Environmental Impact Statement

Regional Detention Basin I
St Marys Development Site, Penrith

Prepared for Maryland Development Company Pty Ltd

Submitted to Penrith City Council

November 2019

Certification of Environmental Impact Statement

Authors

Name	Brent Devine
Qualifications	BAppSc
Name	Dan Keary
Qualifications	BSc MURP MPIA
Name	Michael Woodland
Qualifications	BTP NSW
Address	Suite 2, Level 1 1 Rialto Lane Manly NSW 2095

Proposed development

Applicant	Maryland Development Company Pty Ltd
Applicant's address	PO Box 4 Parramatta NSW 2121
Land to be developed	St Marys Development Site, Penrith local government area
Legal description	Lot 1002 DP 1215087
Project description	Construction of Regional Detention Basin I for the St Marys Central Precinct development.

Declaration

We certify that the contents of the Environmental Impact Statement, to the best of our knowledge, has been prepared in accordance with the requirements of clauses 6 and 7 of Schedule 2 of *Environmental Planning and Assessment Regulation 2000*; contains all available information that is relevant to the assessment of the development and that to the best of our knowledge the information contained in this report is neither false nor misleading.

Dan Keary BSc MURP MPIA
Director
KEYLAN Consulting Pty Ltd

Michael Woodland BTP
Director
KEYLAN Consulting Pty Ltd

21 November 2019

Contact

KEYLAN consulting pty ltd

Suite 2, Level 1
1 Rialto Lane
Manly NSW 2095
ABN 51 45 22 11 892
ACN 613 590 775

Dan Keary
Director
E: dan@keylan.com.au

Michael Woodland
Director
E: michael@keylan.com.au

Cover image: Indicative location of Regional Detention Basin I, St Marys Development Site (Base source: Google Maps)

Table of Contents

Figures

Tables

Appendices

Abbreviations

ACAM	Archaeological and Cultural Assessment Methodology
AHIP	Aboriginal Heritage Impact Permit
ADI site	Australian Defence Industries munitions site (former)
AQIA	Air Quality Impact Assessment
BPA	Bushfire Protection Assessment
CNVMP	Construction Noise and Vibration Management Plan
DP	Dust Management Plan
DMP	Deposited Plan
DP&E	Department of Planning and Environment
EIS	Environmental Impact Statement
Environment SEPP	Draft *State Environmental Planning Policy (Environment)*
EPA	Environment Protection Authority
EPAR	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPI	Environmental Planning Instrument
ESA	Environmental Site Assessment
ESD	Ecologically Sustainable Development
GQA	Groundwater Quality Assessment
HIS	Heritage Impact Statement
ICNG	Interim Construction Noise Guideline
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LCVIA	Landscape Character and Visual Impact Assessment
LGA	Local Government Area
NCA	Noise Catchment Area
NPWS	National Parks and Wildlife Service
NP&W Act	*National Parks and Wildlife Act 1974*
NPI	Noise Policy for Industry
NVA	Noise and Vibration Assessment
PLEP 2010	*Penrith Local Environmental Plan 2010*
PFAS	Per/Poly-Fluoroalkyl Substances
RNP	Road Noise Policy
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 19	*State Environmental Planning Policy No. 19 – Bushland in Urban Areas*
SEPP 33	*State Environmental Planning Policy No. 33 – Hazardous and*
SEPP 55	*Offensive Development*
SIS	*State Environmental Planning Policy No. 55 – Remediation of Land* Species Impact Statement
SREP 30	*Sydney Regional Environmental Plan No. 30 – St Marys*
SWQA	Surface Water Quality Assessment
TSC Act	*Threatened Species Conservation Act 1995*
VENM	Virgin Extracted Natural Material
WM Act	*Water Management Act 2000*
WMP	Waste Management Plan

Executive Summary

This Environmental Impact Statement (EIS) has been prepared by Keylan Consulting Pty Ltd on behalf of Maryland Development Company Pty Ltd (the Applicant) to support a development application for the construction of a stormwater detention basin, referred to as 'Regional Detention Basin I' (Basin I) on land within the former Australian Defence Industries (ADI) munitions site (referred to as the 'St Marys Development Site') in the Penrith local government area (LGA).

The development meets the criteria of 'designated development' under Schedule 3, clause 4(1) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) as it involves the creation of an artificial waterbody requiring the excavation of more than 30,000 m^3 of material.

The development also meets the criteria of 'integrated development' under section 4.46(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it will require an Aboriginal heritage impact permit (AHIP) to be issued under the *National Parks and Wildlife Act 1974* (NP&W Act) and a controlled activity approval to be obtained under the *Water Management Act 2000* (WM Act) for works on waterfront land.

The EIS has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning, Industry and Environment (DPIE) on 25 October 2017 and in accordance with Schedule 2, Part 3 of the EP&A Regulation.

Penrith City Council (Council) is the consent authority for the application.

The site and locality

Basin I is proposed on land east of The Northern Road in Jordan Springs and directly north of Wintercorn Row and Cobbitty Avenue in Werrington Downs within the St Marys Development Site. The site is located within the Penrith LGA and is formally described as Lot 1002 in Deposited Plan (DP) 1215087.

The broader St Marys Development Site extends across both the Penrith and Blacktown LGAs and is approximately 45 km west of the Sydney central business district, 12 km west of the Blacktown city centre and 5 km north-east of the Penrith city centre. The site in its entirety comprises 1,545 hectares and extends approximately 7 km from east to west and 2 km from north to south.

The St Marys Development Site comprises 6 development precincts, referred to as the North Dunheved Precinct, South Dunheved Precinct, Ropes Crossing Precinct, Eastern Precinct, Northern Precinct and Western Precinct. Basin I would be located approximately 500 m south of the Western Precinct (now known as the suburb of Jordan Springs) and approximately 1 km west of the Central Precinct.

Land uses in the area surrounding Basin I includes the Wianamatta Regional Park to the north, east and west and established low density residential development to the south in the suburbs of Werrington Downs and Cambridge Gardens. Recently constructed low and medium density residential development, town centre and open space in the Western Precinct (the suburb of Jordan Springs) is located further to the north. A tributary of South Creek traverses the site which directs runoff from the existing urban area to the south in a north-easterly direction to South Creek.

The proposal

The proposal involves the construction of a detention basin to detain, treat and attenuate stormwater runoff from the downstream urban areas of Werrington Downs and Cambridge Gardens. These locations are located outside of the St Marys Development Site and currently have limited water quality management controls in place. Basin I will act as a constructed wetland with provision for active stormwater detention during high flows.

Physical works required to construct Basin I include:

- the removal of exiting vegetation
- the construction of temporary access tracks to provide for construction vehicles
- the excavation of approximately 137,385 m³ of material and filling of approximately 3,300 m³ of material to create the required shape and dimensions of the basin
- the creation of hydraulic controls at the inlet and outlet of the basin that are adequately lined to prevent erosion (rock lining)
- construction of a permanent 3 m wide vehicular access track around the perimeter of the basin for servicing and maintenance activities
- landscaping works including the establishment of macrophyte aquatic plantings on the water's edge to facilitate nutrient removal, suspended solids removal and to provide habitat for wildlife.

The detention basin is designed to have a maximum detention storage volume of 72,900 m³ and a maximum water depth of 2 metres. The inlet to the detention basin will be from the existing open channel at the boundary of the site. The outlet of the detention basin discharges to a tributary of South Creek that traverses the St Marys Development Site. The proposal does not propose water re-use.

The Applicant will construct the basin and maintain it for three years, after which ownership will be transferred to Penrith City Council via A Deed of Transfer at no cost to the Applicant.

Permissibility

The *Sydney Regional Environmental Plan No 30 – St Marys* (SREP 30) provides the framework for the redevelopment and management of land across the St Marys Development Site including performance objectives to achieve environmental, social and economic outcomes, the zoning arrangement of site and development controls.

Under clause 111A of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), development for the purpose of a 'stormwater management system' may be carried out by any person with consent on any land. Basin I is consistent with the definition of a 'stormwater management system', which defined under clause 110 of the ISEPP as works for the collection, detention or discharge of stormwater (including detention basins). The development is therefore permissible under the Infrastructure SEPP.

Further, Basin I is proposed on land that is currently zoned part 'Drainage' and part 'Regional Park' under the SREP 30. Development for the purpose of stormwater drainage is permissible in the 'Drainage' zone. However, this use is not permissible in the 'Regional Park' zone.

Notwithstanding the above, amendments are currently proposed to SREP 30 involving revisions to the zoning arrangement for land zoned 'Drainage' to reflect the proposed relocation of drainage infrastructure including the on-site detention basins. The proposed amendments were publicly exhibited by DPIE from 4 April 2018 to 11 May 2018. Once

formalised, the amendments will result in Basin I being contained entirely on land zoned 'Drainage' and will therefore be wholly permissible under the SREP 30.

Strategic context

The relevant strategic plans that relate to the development are addressed at Section 5 of the EIS. The following strategic plans are addressed:

- NSW Making it Happen
- State Infrastructure Strategy
- Greater Sydney Region Plan
- Western City District Plan
- Penrith Economic Development Strategy – Building the New West
- Penrith Urban Strategy Managing Growth to 2031

Statutory context

The relevant statutory requirements that relate to the development, including environmental planning instruments (EPIs) and other planning and environmental policies are addressed at Section 6 of the EIS. The following NSW legislation is addressed:

- *Environmental Planning and Assessment Act 1979*
- *Environmental Planning and Assessment Regulation 2000*
- *Water Management Act 2000*
- *National Parks and Wildlife Act 1974*
- *Threatened Species Conservation Act 1995*
- *Biodiversity Conservation Act 2016*

Section 6 of the EIS also addresses the following EPIs:

- *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No 2–1997)*
- *Sydney Regional Environmental Plan No. 30 – St Marys*
- *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No 2–1997)*
- *State Environmental Planning Policy (Infrastructure) 2007*
- *State Environmental Planning Policy No. 19 – Bushland in Urban Areas*
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*
- *State Environmental Planning Policy No. 55 – Remediation of Land*
- *Draft State Environmental Planning Policy (Environment)*
- *Draft State Environmental Planning Policy (Remediation)*
- *Penrith Local Environmental Plan 2010*

Environmental assessment

A detailed assessment of the potential environmental impacts of the proposal is contained in Section 7. A summary of the conclusions made regarding potential environmental impacts is provided below.

Surface water

Basin I will receive surface runoff from the upstream urban areas of Werrington Downs and Cambridge Gardens. The Surface Water Quality Assessment (**Appendix C**) describes the surface water quality strategy and provides guidance on effective operational water quality controls.

Basin I will facilitate nutrient and suspended solids removal while also providing habitat for a variety of fauna species. The detention basin is expected to provide significant water quality improvements to the existing surface water runoff, prior to entering the existing tributaries within the Wianamatta Regional Park. Overall, Basin I will result in improved water quality conditions within the St Marys Development Site and provide sufficient water storage capacity during a 1 in 100-year ARI rainfall event.

Groundwater

The Groundwater Quality Assessment (**Appendix D**) considers the existing groundwater conditions in the area of Basin I to be highly saline and therefore of low quality. During operation, the broader flow pattern of the existing groundwater system is expected to remain unchanged (flowing generally toward the north-east) with the exception of some semi-radial flow away from the eastern extent of the basin. The groundwater assessment has determined there will be minimal groundwater impacts as a result of the detention basin and no specific groundwater mitigation measures required.

Contamination

The St Marys Development Site was previously used for various munition testing, filling and storage activities until 1994. An Environmental Site Assessment (**Appendix E**) has assessed the potential for contamination in the area where Basin I will be constructed.

The Environmental Site Assessment states that the site is located hydraulically upgradient of areas impacted by per/poly-fluoroalkyl substances (PFAS) and therefore PFAS is not considered to be a contaminant of potential concern.

The site is found to be suitable for its intended future use as a detention basin. Remediation works are not considered necessary for soils located within the extent of the basin footprint. However, it is recommended that a Waste Management Plan (WMP) be prepared for site and for an unexpected finds protocol be implemented during construction and excavation works.

Air quality

The Air Quality Impact Assessment (**Appendix M**) determined that construction works, including dredging and remediation activities presents the risk of dust soiling effects and potential human health impacts.

The implementation of appropriate mitigation measures, outlined in a Dust Management Plan for the site, will ensure that the impacts of dust during the construction phase of project are appropriately managed and mitigated.

Recommended mitigation measures include a stakeholder communications plan, monitoring of dust levels on-site and at nearby receivers, removing materials that have a potential to produce dust as soon as possible and the introduction of dust suppression techniques.

Noise and vibration

The Noise and Vibration Assessment (**Appendix N**) assessed potential impacts generated by minor clearing works, dredging/excavation activities, haulage and compaction works at the site. The assessment acknowledges the nearest residential receivers would be affected by noise and recommended a detailed Construction Noise and Vibration Management (CNVMP) plan be prepared.

A range of mitigation measures are recommended to form part of the CNVMP including the establishment of solid and continuous boundary fences around noise catchment areas, the establishment of temporary localised barriers or bunds and the preparation of a Community Liaison Plan that incorporates a complaints management procedure.

Biodiversity
The subject site is vegetated by Critically Endangered Ecological Communities (CEECs) including Cumberland Plain Woodland and Endangered Ecological Communities (EECs) including River-flat Eucalypt Forest and Freshwater Wetlands. Despite the presence of CEECs and EECs on the site, the proposed development will occur within a landscape that has been extensively altered since European settlement.

A Species Impact Statement (SIS) (**Appendix F**) has been prepared for the site that concludes biodiversity impacts of the proposed development will be more than balanced by the major conservation outcome resulting from of the creation of the 900 ha Wianamatta Regional Park.

In accordance with the savings and transitional arrangements for interim planning applications, as set out in the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*, a SIS has been prepared in accordance with the provisions of the (former) *Threatened Species Conservation Act 1995*. This is discussed in further detail at Section 6.5 and Section 6.6 of the EIS.

Construction traffic
Construction activities will require approximately 26 truck movements (in and out of the site, per hour) to export material (over 74 days of operation) and 2 truck movements (in and out of the site, per hour) to import material (over 22 days of operation). Construction vehicle movements will be spread out across the construction period and would be carried out between 7 am and 5 pm Monday to Friday.

There are 3 proposed access points to the site for construction vehicles:

- Route 1: via a haulage route created off The Northern Road, located to the south of the intersection with Sherringham Road
- Route 2: via a haulage route created off Jubilee Drive, located near the intersection with Protea Way. Construction vehicles would then use Lakeside Parade and Greenwood Parkway in Jordan Springs to access The Northern Road
- Route 3: via the haulage route created off Jubilee Drive, Lakeside Parade, Links Road and Forrester Road in the Central Precinct.

A Construction Traffic Management Plan (**Appendix G**) forms part of the EIS that details traffic management measures during construction of Basin I.

Waste management
Waste material excavated from the site will mostly comprise vegetation waste and excavated soils. The sequencing of excavation works/waste removal will initially involve the removal and stockpiling of all surface vegetation, prior to the removal of soil. Both garden waste and virgin excavated natural material (VENM) will be re-used within the St Marys Development Site or other development sites (where possible) or otherwise recycled at a licenced off-site waste processing facility.

A WMP (**Appendix H**) has been prepared for the site that identifies potential waste types that are present within the Basin I footprint and details appropriate waste management procedures to be implemented during construction.

Heritage
Basin I is located outside the boundary of an existing AHIP for the St Marys Development Site. An Archaeological and Cultural Assessment Methodology (ACAM) has been prepared as part of the EIS (**Appendix I**) that will be used to assist with the preparation of an Aboriginal

Cultural Heritage Assessment Report to support an application for an AHIP under section 90 of the NP&A Act.

Preliminary investigations and field inspections carried out as part of the preparation of the ACAM found there to be the potential for intact soil profiles that may contain Aboriginal objects within the footprint of Basin I. It is therefore recommended that further Aboriginal consultation be undertaken and for an AHIP to be sought for the broader development area.

A Heritage Impact Statement (**Appendix J**) assessing historical (European) archaeology found the Basin I study area to have no predicted historical archaeological potential and that no relics were identified that would be protected under the *NSW Heritage Act 1977*.

Visual

The landscape character of the surrounding area is a contrast between the remnant vegetation types of the parkland reserve where Basin I will be located and surrounding residential development. A Landscape Character and Visual Impact Assessment (LCVIA) assessed the site from 10 vantage points (**Appendix K**). The LCVIA found the modest scale, character and catchment of the visual impacts are such that they would not constitute reasons for the proposed basin not to proceed on visual impact grounds.

Bushfire

A Bushfire Planning Assessment prepared for the application (**Appendix L**) considers Basin I will not increase the bushfire hazard for the nearby residential areas to the south and west. Construction of the detention basin will require the removal of Alluvial Woodland vegetation that will in fact reduce the level of bushfire hazard to nearby residential areas. Asset protection zones are not required as the proposal only involves construction of the basin and associated access roads.

Conclusion

This EIS provides a comprehensive assessment of the potential impacts associated with Basin I which is designed to detain, treat and attenuate stormwater runoff from the downstream urban areas of Werrington Downs and Cambridge Gardens.

The conclusions and recommendations provided in the accompanying technical reports confirm the proposal will not detrimentally impact on the surrounding environment. Further, the proposed detention basin will provide significant water quality improvements to current surface water runoff from developed upstream urban areas, located outside of the St Marys Development Site, prior to entering tributaries to South Creek within the Wianamatta Regional Park.

The provision of Basin I will improve water quality conditions across the St Marys Development Site more broadly. It is therefore considered to be in the public interest and warrants approval.

1 Introduction

This Environmental Impact Statement (EIS) has been prepared by KEYLAN Consulting Pty Ltd on behalf of Maryland Development Company Pty Ltd (the Applicant) to support a development application for the construction of a stormwater detention basin, referred to as 'Regional Detention Basin I' (Basin I) on land within the former Australian Defence Industries (ADI) munitions site (referred to as the St Marys Development Site) in the Penrith local government area (LGA).

Basin I will detain, treat and attenuate stormwater runoff from the Werrington Downs and Cambridge Gardens urban areas and will also act as a constructed wetland with provision for active stormwater detention during high flows.

Construction works include the excavation of approximately 137,385 m³ of material and filling of approximately 3,300 m³ of material to create the required shape and dimensions of the basin. The basin is designed to have a maximum detention storage volume of 72,900 m³ and a maximum water depth of 2 metres (m).

The development is 'designated development' in accordance with Schedule 3, clause 4(1) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) as it involves the creation of an artificial waterbody requiring the excavation of more than 30,000 m³ of material.

The development is also 'integrated development' in accordance with section 4.46(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it will require an Aboriginal heritage impact permit (AHIP) to be issued under the *National Parks and Wildlife Act 1974* (NP&W Act) and a controlled activity approval to be obtained under the *Water Management Act 2000* (WM Act) for works on waterfront land.

This EIS provides a comprehensive environmental assessment of the proposed works. In doing so, it identifies the subject site, the proposed development, project justification and public benefits and assesses the proposal against relevant matters set out in relevant State legislation, environmental planning instruments (EPIs) and strategic planning policies.

The structure of this EIS is summarised in Table 1 below.

Section Number	Section Heading	Description
	Executive summary	A summary of the EIS and its findings.
1	**Introduction**	Overview of the EIS, the proposed development and project objectives.
2	**Site analysis**	Description of the site and surrounding locality.
3	**Proposed development**	Description of the project and consultation undertaken with key stakeholders
4	**Project justification**	Need for the proposal and strategic framework.
5	**Statutory planning framework**	Identifies the key legislation that this EIS must address and the legislative criteria the project must comply with.
6	**Environmental assessment**	Provides an assessment of the key environmental issues associated with the proposal.
7	**Conclusion**	A summary of the key findings.

Table 1: Structure of the EIS

1.1 Project Overview

An overview of the project is provided in the table below:

Address	Land east of The Northern Road and south of Jubilee Drive within the St Marys Development Site in Jordan Springs
Legal description	Lot 1002 DP 1215087
Local government area	Penrith
Project	Regional Detention Basin I for the St Marys Central Precinct development. Physical works involve: • the removal of exiting vegetation • the construction of temporary access tracks to provide for construction vehicles • the excavation of approximately 137,385 m³ of material and filling of approximately 3,300 m³ of material to create the required shape and dimensions of the basin • the creation of hydraulic controls at the inlet and outlet of the basin that are lined to prevent erosion (rock lining) • construction of a permanent 3 m wide vehicular access track around the perimeter of the basin for servicing and maintenance activities • landscaping works including the establishment of macrophyte aquatic plantings on the water's edge to facilitate nutrient removal, suspended solids removal and to provide habitat for wildlife.
Zoning	Under the *Sydney Regional Environmental Plan No. 30 – St Marys* (SREP 30) the proposal is located on land zoned: • Drainage (part) • Regional Park (part).
Permissibility	State Environmental Planning Policy (Infrastructure) 2007 Under clause 111A of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), development for the purpose of a 'stormwater management system' may be carried out by any person with consent on any land. Basin I is consistent with the definition of a 'stormwater management system', which defined under clause 110 of the ISEPP as works for the collection, detention or discharge of stormwater (including detention basins). The development is therefore permissible under the Infrastructure SEPP. SREP 30 The development is partly permissible. Under SREP 30, drainage infrastructure works are permissible within the Drainage zone. However, drainage infrastructure works are not permissible in the Regional Park zone. Amendments are currently proposed to SREP 30 that includes revisions to the size and location of Drainage zoned land. The draft amendments were publicly exhibited from 4 April 2018 to 11 May 2018. The proposed amendments, once made, will result in the proposal being located entirely within the Drainage zone and therefore wholly permissible.
Capital investment value	Approximately $5,000,000.
Jobs	10 construction jobs.

Table 2: Project Overview

1.2 Secretary's Environmental Assessment Requirements

The Department of Planning, Industry and Environment (DPIE) issued Secretary's Environmental Assessment Requirements (SEARs) for the proposal on 25 October 2017 (SEARs No. 1174). The SEARs are included at **Appendix A**. The requirements and where they are addressed in the EIS are set out in Table 3.

Secretary's Environmental assessment Requirement	EIS reference	Technical report
General Requirements		
The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.	The EIS meets the requirements of the EP&A Regulation, as discussed at Section 6.2.	N/A
Key Issues		
The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:	Potential impacts of the development are assessed at Section 7.	N/A
Strategic context – including: • *A detailed justification for the proposal and suitability of the site for the development;* • *A demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies;* • *A list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out; and* • *A description of how the proposal will meet the requirements of the Wianamatta Regional Park Plan of Management.*	Justification for the proposal is discussed at Section 4. Consistency with relevant strategic planning strategies, EPIs and DCPs is discussed at Section 5 and Section 6. The Wianamatta Regional Park Plan of Management is addressed at Section 7.12.	N/A
Soil and water *– including:* • *A description of local soils, topography, drainage and landscapes;* • *Details of any existing and proposed water licencing requirements in accordance with the Water Act 1912 and/or the Water Management Act 2000;* • *An assessment of potential impacts on surface water flows, sediment movement, hydraulic regime, water quality, flooding, dependent ecosystems and existing surface water users;* • *Details of sediment and erosion controls;* • *A description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo;*	Soil and water is discussed at Section 7.1. Groundwater is discussed at Section 7.2. Contamination is discussed at Section 7.3.	Surface Water Quality Assessment (**Appendix C**). Groundwater Quality Assessment (**Appendix D**). Environmental Site Assessment (**Appendix E**).

Secretary's Environmental assessment Requirement	EIS reference	Technical report
• *An assessment of potential impacts on the quality and quantity of surface and groundwater resources;* • *Details of the proposed stormwater management system, water monitoring program and other measures to mitigate surface and groundwater impacts;* • *Characterisation of the nature and extent of any contamination on the site and surrounding area; and* • *A description and appraisal of impact mitigation and monitoring measures.*		
***Air quality** – including:* • *A description of all potential sources of air and odour emissions; and* • *A description and appraisal of air quality impact mitigation and monitoring measures.*	Air quality is discussed at Section 7.4.	Air Quality Assessment (**Appendix M**)
***Noise and vibration** – including:* • *A description of all potential noise and vibration sources during construction and operation, including road traffic noise; and* • *A description and appraisal of noise and vibration mitigation and monitoring measures.*	Noise and vibration is discussed at Section7.5.	Noise and Vibration Assessment (**Appendix N**)
***Biodiversity** – including:* • *Accurate predictions of any vegetation clearing on site or for any road upgrades;* • *A detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements* • *Details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies; and* • *A detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts.*	Biodiversity is discussed at Section 7.6.	Biodiversity Assessment (**Appendix F**)
***Traffic and transport** – including:* • *Details of road transport routes and access to the site;* • *Road traffic predictions for the development during construction and operation; and* • *An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.*	Construction traffic is discussed at Section 7.7.	Construction Traffic Management Plan (**Appendix G**).
***Waste management** – including:* • *Details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-sit reuse and disposal; and* • *The measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.*	Waste management is discussed at Section 7.7.	Waste Management Plan (**Appendix H**).

Secretary's Environmental assessment Requirement	EIS reference	Technical report
Heritage *– including Aboriginal and non-Aboriginal cultural heritage.*	Heritage is discussed at Section 7.9.	Archaeological and Cultural Assessment Methodology (**Appendix I**). Heritage Impact Statement – European Heritage (**Appendix J**).
Visual *– including an impact assessment at private receptors and public vantage points.*	Visual impacts are discussed at Section 7.10.	Landscape Character and Visual Impact Assessment (**Appendix K**).
Bushfire *– including addressing the requirements of Planning for Bush Fire Protection 2006 (RFS).*	Bushfire is discussed at Section 7.11.	Bushfire Protection Assessment (**Appendix L**)
Environmental Planning Instruments and other policies		
State Environmental Planning Policy (Infrastructure) 2007	Refer Section 6.7.3	N/A
State Environmental Planning Policy No. 19 – Bushland in Urban Areas	Refer Section 6.7.5	N/A
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development	Refer Section 6.7.6	N/A
State Environmental Planning Policy No. 55 – Remediation of Land	Refer Section 6.7.7	N/A
Sydney Regional Environmental Plan No. 30 – St Marys	Refer Section 6.7.1	N/A
Penrith Local Environmental Plan 2010	Refer Section 6.7.10	N/A
Relevant development control plans and section 94 plans	Refer Section 6.8	N/A
Guidelines		
During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at planning.nsw.gov.au under Development Proposals/Register of Development Assessment Guidelines. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.	The relevant guidelines have been considered as part of the EIS	N/A
Consultation		
During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the: • *Environment Protection Authority;* • *Office of Environment and Heritage;* • *Department of Primary Industries;* • *WaterNSW;* • *Rural Fire Service;* • *Penrith City Council;* • *Blacktown City Council; and*	Refer Section 3.2	N/A

Secretary's Environmental assessment Requirement	EIS reference	Technical report
• *The surrounding landowners and occupiers that are likely to be impacted by the proposal.* *Details of the consultation carried out and issues raised must be included in the EIS.*		

Table 3: Secretary's Environmental Assessment Requirements

1.3 Project Team

An expert project team has been formed to deliver the project and provide input to the EIS. The project team is outlined in Table 4.

Consultant	Role
ADW Johnson	Project management
KEYLAN Consulting	Urban planning
Jacobs	Soils, surface water and groundwater
JBS&G	Contamination
Wilkinson Murray	Air, noise and vibration
Cumberland Ecology	Biodiversity
Cardno	Traffic and transport
Cardno	Waste management
GML & Mary Casey	Heritage
Clouston Associates	Visual
Ecological	Bushfire

Table 4: Project Team

2 Site analysis

2.1 Site location and context

Basin I will be located wholly within the St Marys Development Site in the Penrith LGA. The broader St Marys Development Site extends across both the Penrith and Blacktown LGAs and is located approximately 45 km west of the Sydney central business district, 12 km west of the Blacktown city centre and 5 km north-east of the Penrith city centre.

In its entirety, the site comprises 1,545 hectares and extends approximately 7 km from east to west and 2 km from north to south. It is physically bound by:

- Ninth Avenue in Llandilo and Palmyra Avenue in Shanes Park to the north;
- Palmyra Avenue in Willmot and Shalvey and Forrester Road in Lethbridge Park, Tregear and North St Marys to the east;
- Dunheved Golf Club and the established suburbs of Werrington County, Werrington Downs and Cambridge Gardens to the south; and
- The Northern Road in Cranebrook to the west.

The St Marys Development Site in context to the surrounding locality is shown in Figure 1.

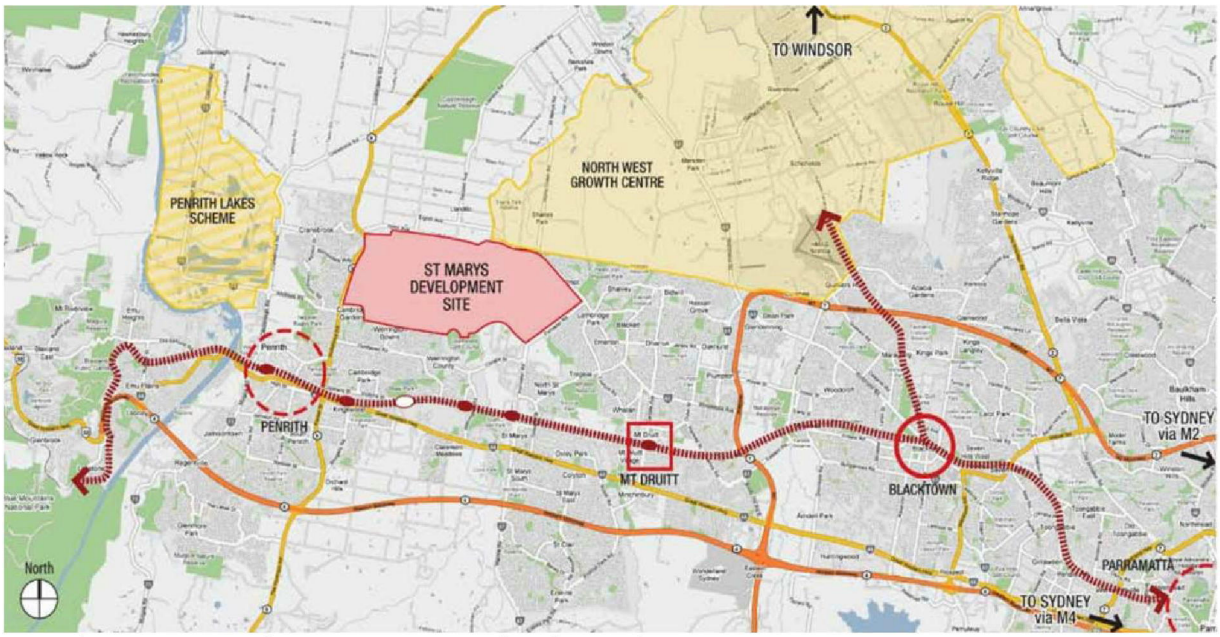


Figure 1: Location Map – St Marys Development Site (Source: Central Precinct Plan)

The broader St Marys Development Site is bisected by the boundary of the Penrith and Blacktown LGAs which generally follows the alignment of South Creek in a north-south direction. It comprises 6 development precincts referred to as the North Dunheved Precinct, South Dunheved Precinct, Ropes Crossing Precinct, Eastern Precinct, Northern Precinct and Western Precinct. The Wianamatta Regional Park is located between each of the development precincts.

Basin I would be located to the south of the Western Precinct (now known as the suburb of Jordan Springs), directly west of the Central Precinct and north of the suburb of Werrington Downs. The site is formally described as Lot 1002 in Deposited Plan (DP) 1215087.

Figure 3 shows the location of Basin I in context to the broader St Marys Development Area.

Figure 2: Location of Basin I – St Marys Development Site (Base source: Cumberland Ecology)

As outlined above, the St Marys Development Site comprises 6 development areas, referred to as development precincts. These precincts and current status of each are summarised below.

Eastern Precinct:

- Declared a release area under SREP 30 by the then Minister Assisting the Minister for Infrastructure and Planning on 16 June 2003
- Precinct Plan adopted by Blacktown City Council on 2 February 2004
- Currently being developed as the suburb of Ropes Crossing.

Ropes Creek Precinct:

- Declared a release area under SREP 30 by the then Minister for Planning on 29 September 2006
- Precinct Plan adopted by Blacktown City Council on 11 March 2011
- Currently being developed as the suburb of Ropes Crossing.

North and South Dunheved Precincts:

- Declared a release area under SREP 30 by the then Minister Assisting the Minister for Infrastructure and Planning on 16 June 2003
- Precinct Plan adopted by Penrith City Council on 8 December 2006 and Blacktown City Council on 12 January 2007
- Development Applications have been approved by both Councils and development anticipated to commence shortly.

Central Precinct:

- Declared a release area by the then Minister for Planning on 29 September 2006
- Precinct Plan adopted by Penrith City Council on 23 March 2009
- Several Development Applications have been approved for development within in the precinct and bulk earthworks/civil works have commenced.

Western Precinct:

- Declared a release area by the then Minister for Planning on 29 September 2006
- Precinct Plan adopted by Penrith City Council on 23 March 2009
- Currently being developed as the suburb of Jordan Springs.

The site also includes an area of approximately 900 hectares of land zoned 'Regional Park' under SREP 30, as well as areas zoned 'Regional Open Space', 'Drainage' and 'Roads'.

Figure 3 shows the located of each development precinct in context to the broader St Marys Development Site as well as the location of Basin I.

Figure 3: St Marys Development Site Precincts (Base source: Clouston Associates)

Basin I is located within the Hawkesbury-Nepean River Catchment immediately downstream of the Werrington Downs and Cambridge Gardens urban areas. The site is generally flat and currently occupied of weedy Freshwater wetlands, small patches of exotic grassland and areas of moderate quality Threatened Ecological Community – River Flat Eucalypt Forest (in the form of Alluvial Woodland). The site area is dissected by an unnamed tributary to South Creek orientated and flowing approximately south-west to north-east. Existing vegetation at the site is shown in Figure 4.

Figure 4: Basin I location with existing Weedy Freshwater Wetland (Source: Cumberland Ecology)

2.2 Surrounding development

The northern extent of the Western Sydney Employment Area is located approximately 4 km south-west of the site. The Western Sydney Employment Area is the single largest new employment area in metropolitan Sydney and provides for major warehousing, distribution, freight transport, industrial, technology, research facilities and also encompasses land that will contain the future Badgerys Creek Airport.

To the immediate north, beyond Palmyra Avenue, is the southern extent of the North West Priority Growth Area. The North West Priority Growth Area includes the suburbs of Riverstone, Vineyard, Schofields, Rouse Hill, Kellyville, Marsden Park and Colebee and has been identified for the provision of 33,000 new homes by 2026.

Penrith Lakes is located approximately 3 km west of the site. Penrith Lakes covers an area of approximately 450 hectares and is zoned for a variety of parkland, environmental protection, tourism and employment opportunities and residential areas.

3 Proposed Development

3.1 Development description

The proposal involves the construction of a detention basin to detain, treat and attenuate stormwater runoff from the downstream urban areas of Werrington Downs and Cambridge Gardens, which do not currently have any water quality management controls. Basin I will act as a constructed wetland with provision for active stormwater detention during high flows.

Physical works required to construct Basin I include:

- the removal of exiting vegetation
- the construction of temporary access tracks to provide for construction vehicles
- the excavation of approximately 137,385 m³ of material and filling of approximately 3,300 m³ of material to create the required shape and dimensions of the basin
- the creation of hydraulic controls at the inlet and outlet of the basin that are adequately lined to prevent erosion (rock lining)
- construction of a permanent 3 m wide vehicular access track around the perimeter of the basin for servicing and maintenance activities
- landscaping works including the establishment of macrophyte aquatic plantings on the water's edge to facilitate nutrient removal, suspended solids removal and to provide habitat for wildlife.

The detention basin is designed to have a maximum detention storage volume of 72,900 m³ and a maximum water depth of 2 m. The inlet to the detention basin will be from the existing open channel at the boundary of the site. The outlet of the detention basin discharges to a tributary of South Creek that traverses the St Marys Development Site. The proposal does not propose water re-use.

In accordance with the St Marys Environmental Panning Strategy 2000 (St Marys EPS) (refer Section 0), the Applicant will construct the basin and maintain it for three years, after which ownership will be transferred to Penrith City Council at no cost to the Applicant.

Figure 5 and Figure 6 shows the Basin I layout and bulk earthworks arrangement for the site, respectively.

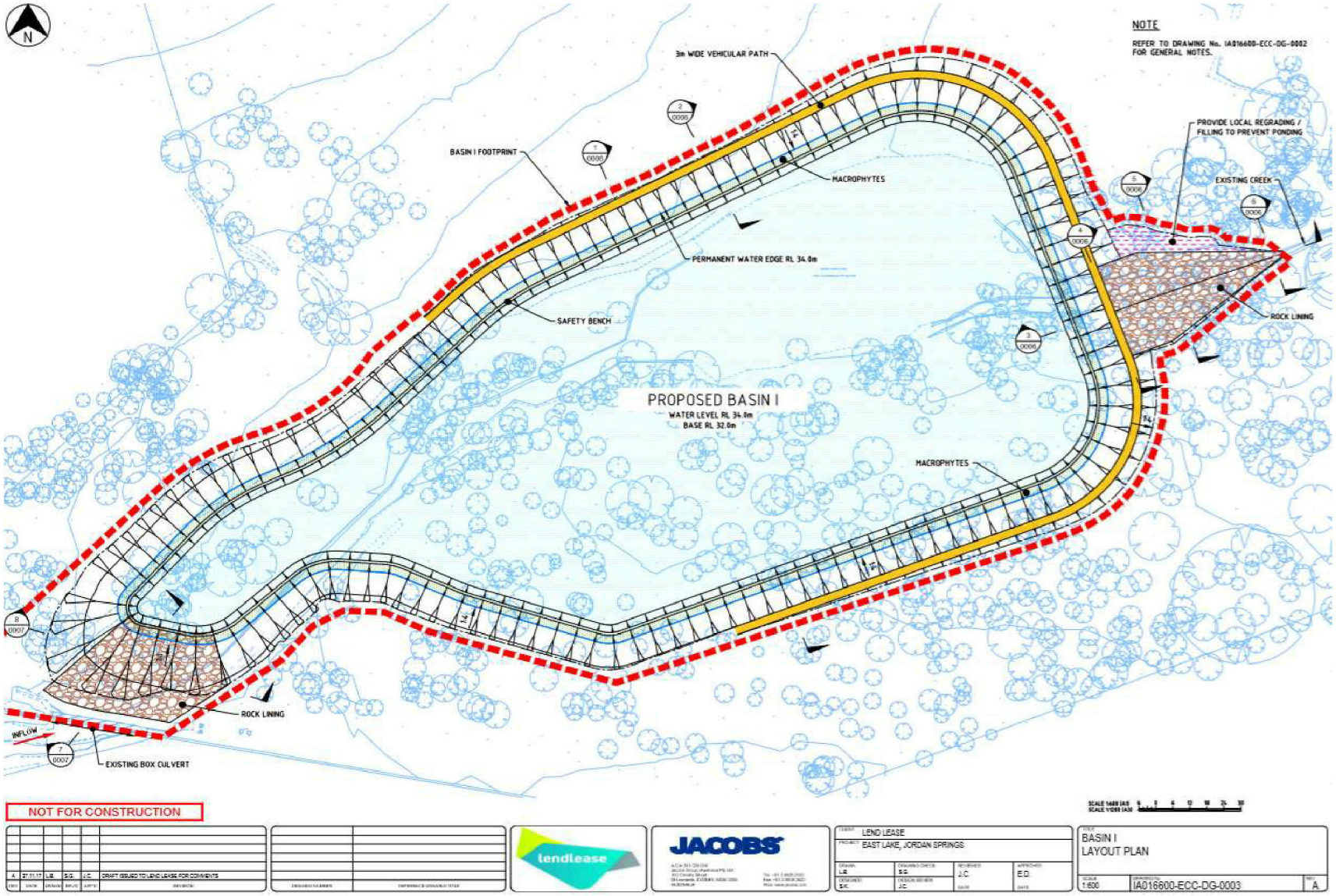


Figure 5: Proposed Basin I layout (Source: Jacobs)

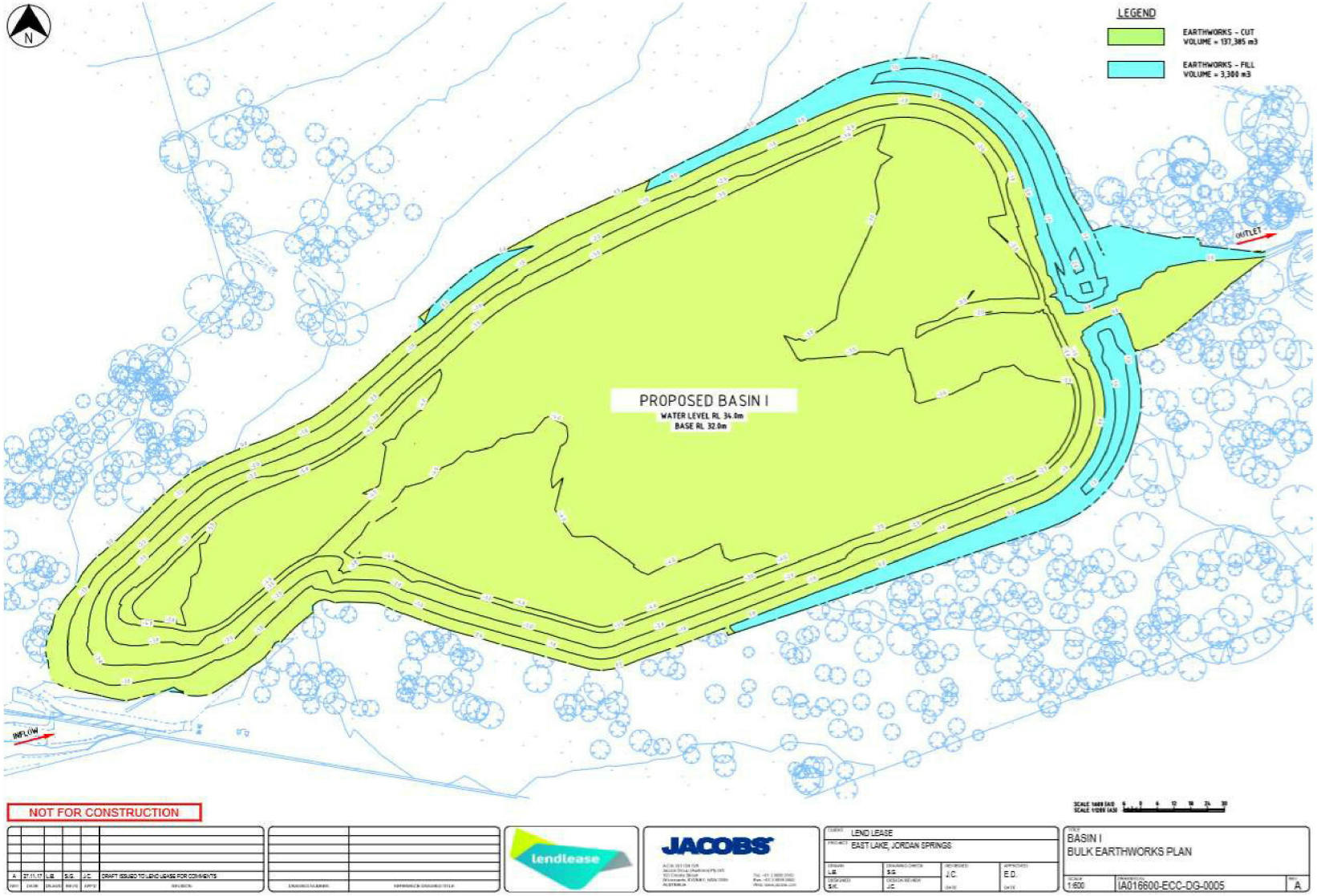


Figure 6: Proposed Basin I earthworks plan (Source: Jacobs)

3.2 Consultation

The proposal has been prepared following detailed consultation with a range of key stakeholders. The comments provided in response to the consultation have been carefully considered and have informed this proposal. Consultation will continue to be carried out with Government agencies and the community once the EIS is placed on public exhibition.

A summary of the consultation undertaken is detailed in the Table 5 below:

Stakeholder	Consultation Summary
Environment Protection Authority	• The ESA prepared by JBS&G was reviewed an EPA accredited Contaminated Site Auditor (Zoic Environmental Pty Ltd). • A Site Audit Report and Site Audit Statement was prepared by Zoic and concludes that the site is suit is suitable from a contamination assessment perspective. • The EPA will be formally notified of the development once the application is publicly exhibited. Any concerns raised by the EPA during the exhibition process will be considered accordingly.
Office of Environment and Heritage (now the Biodiversity and Conservation Division (BCD) within the Environment, Energy and Science Group)	• Chief Executive's Requirements for the preparation of a Species Impact Statement were formally requested from OEH on 8 March 2018. As part of the request, OEH were informed of the proposed works associated with Basin I. In addition, OEH were informed of an ecological constraints analysis that was carried out by Cumberland Ecology in 2017. • The BCD will be formally notified of the development once the application is publicly exhibited. Any concerns raised by the BCD during the exhibition process will be considered accordingly.
Department of Primary Industries	• The Department of Primary Industries (DPI) will be formally notified of the development once the application is publicly exhibited. Any concerns raised by DPI during the exhibition process will be considered accordingly.
WaterNSW	• WaterNSW will be formally notified of the development once the application is publicly exhibited. Any concerns raised by WaterNSW during the exhibition process will be considered accordingly.
Rural Fire Service	• A Bushfire Protection Assessment has been prepared by Ecological Australia, in accordance with RFS' requirements under *Planning for Bushfire Protection*. • RFS will be formally notified of the development once the application is publicly exhibited. Any concerns raised by RFS during the exhibition process will be considered accordingly.
Penrith City Council	• A pre-lodgement meeting was undertaken with Penrith City Council on 15 February 2018. Key issues discussed in the pre-lodgement meeting included planning pathways, environmental management measures and engineering considerations.
Blacktown City Council	• Blacktown City Council will be formally notified of the development once the application is publicly exhibited. Any concerns raised by Council during the exhibition process will be considered accordingly.
Nearby landowners and occupiers that are likely to be impacted by the proposal	• The general public including nearby landowners and occupiers will be formally notified of the development by Council once the application is publicly exhibited. Any concerns raised by the public during the exhibition process will be considered accordingly.

Stakeholder	Consultation Summary
	• The Applicant also commits to undertaking targeted consultation with adjoining owners and occupiers following lodgement of the application.

Table 5: Stakeholder Consultation

4 Planning Justification

4.1 Need for the proposal

Basin I is primarily required to ensure the water quality performance objectives specified under SREP 30 and the St Marys EPS are achieved. The detention basin is intended to be used as a constructed wetland with provision for active stormwater detention during high flows. It will receive runoff from an existing channel that conveys surface runoff from urban areas south to the site (in Werrington Downs and Cambridge Gardens) and discharge eventually to South Creek via an unnamed tributary.

Potential downstream impacts of future urban development within the Central Precinct will be off-set by the provision of a suitable stormwater detention volume provided by Basin I. Further, the proposal contributes to the overall stormwater management regime envisioned of the broader St Marys Development Site.

4.2 Proposal alternatives

The construction of Basin I is considered the most appropriate method of managing stormwater flows from existing urban development located outside of the St Marys Development Site to the south.

Schedule 2, Part 3 of the EP&A Regulation requires an analysis of any feasible alternatives to the carrying out of the development, including any feasible alternatives. The alternatives to the proposal include:

- **Not providing the regional detention basin:** there will likely be environmental consequences within the St Marys Development Site and broader catchment in the absence of the detention basin. Basin I is designed to collect and treat stormwater runoff from impervious areas within the Werrington Downs and Cambridge Gardens urban areas. In the absence of Basin I, stormwater flows will enter the existing tributaries across the St Marys Development Site (that eventually flow to South Creek) untreated. Basin I will therefore assist in reducing total suspended solids, total nitrogen and total phosphorus, prior to discharge to South Creek and the broader Hawkesbury-Nepean River catchment.

- **Relocating the regional detention basin:** SREP 30 identifies locations across the St Marys Development Site that are suitable for the provision of future drainage infrastructure. These locations were selected based on an assessment of the site topography, proximity to existing watercourses that flow to South Creek and consideration of environmental constraints such as the location of Aboriginal heritage items and endangered vegetation. Basin I is proposed on land that is appropriately zoned for drainage infrastructure having consideration for the abovementioned constraints. Relocation of the detention basin would potentially result in impacts on items of cultural heritage and/or endangered vegetation. Further, relocating the detention basin away from tributaries that flow to South Creek may result in the full extent of stormwater flows from future development in the Central Precinct not being sufficiently collected and/or treated prior to entering existing watercourses across the site.

These alternatives are considered sub-optimal development outcomes that would undermine the site's capacity to provide for additional drainage infrastructure upon land that is appropriately zoned for such use.

4.3 Ecologically Sustainable Development

Ecologically sustainable development (ESD) principles are set out in Schedule 7, Part 7(4) of the EP&A Regulation and are addressed in Table 6.

ESD principles	Comment
Precautionary principle	The construction and operation of Basin I will not result in serious or irreversible environmental damage. The assessment of water quality impacts finds that Basin I will provide significant water quality improvements to the currently untreated surface water runoff, prior to entering the existing tributaries within the Wianamatta Regional Park. The detention basin will facilitate nutrient and suspended solids removal, while also providing habitat for a variety of fauna species. Further, Basin I will result in water quality improvements consistent with the performance objectives of SREP 30 and the St Marys EPS. The assessment of biodiversity impacts finds that the impacts of Basin I is unlikely to result in the extinction of any threatened species or ecological communities and will be balanced by the major conservation outcome resulting from of the creation of the 900 ha Wianamatta Regional Park. Environmental impacts of the development, including recommended mitigation measures, are discussed further at **Section 7**.
Inter-generational equity	The mitigation measures proposed as part of the development (detailed in **Section 7** of this report) will ensure that the health, diversity and productivity of the environment is maintained, and enhanced, for the benefit of future generations. In particular, the development will improve the quality of stormwater flows entering tributaries within the Wianamatta Regional Park, including South Creek.
Conservation of biological diversity and ecological integrity	The conservation of biological diversity and ecological integrity were fundamental considerations in the preparation of the EIS, as demonstrated and discussed further in **Section 7**.
Improved valuation, pricing and incentive mechanisms	Environmental goals including water quality targets are outlined in SREP 30 and the *St Marys Environmental Planning Strategy 2000* (EPS). The development has been designed to ensure the performance objectives and targets out in SREP 30 and the EPS are achieved.

Table 6: Ecologically sustainable development principles

5 Strategic Planning Framework

This section addresses the relevant strategic plans and documents that relate to the development, including State-wide strategic plans and local government strategies.

5.1 NSW Making it Happen

NSW Making it Happen sets out the NSW Premier's priorities to grow the economy, deliver infrastructure, and improve health, education and other services across NSW. It outlines the Government's program of investing $68.6 billion over 4 years in transport, roads, schools, hospitals and renewed sports and cultural infrastructure.

Although *NSW Making it Happen* relates to investment in public infrastructure and services, the provision of the proposed detention basin will enhance drainage services and stormwater management for the surrounding residential area. The artificial waterbody will provide sufficient infrastructure, enabling the growth of the St Marys Development Site.

5.2 State Infrastructure Strategy

The *State Infrastructure Strategy* sets out the NSW Government's Rebuilding NSW Plan, which involves the investment of $20 billion in new infrastructure across the state.

Basin I is intended to be used as a water quality wetland with the provision for active stormwater detention during high flows. The proposal is consistent with the Strategy as the proposed drainage basin contributes to flood mitigation and stormwater management of the Hawkesbury Nepean River.

A tributary of South Creek traverses through the proposal. Basin I will improve existing flood management in the Central Precinct and the urban development south of the site. The proposal is unlikely to have an adverse impact on South Creek.

5.3 Greater Sydney Region Plan

The *Greater Sydney Region Plan* outlines how Greater Sydney will manage growth and change in the context of social, economic and environmental matters. It sets the vision and strategy for Greater Sydney, to be implemented at a local level through District Plans.

The Region Plan replaces *A Plan for Growing Sydney* as the leading region plan for Greater Sydney.

The overriding vision for Greater Sydney in the Region Plan is to rebalance Sydney into a metropolis of three unique but connected cities; an Eastern Harbour City, the Western Parkland City and the Central River City with Greater Parramatta at its heart.

The Region Plan provides broad *Priorities and Actions* which focus on the following 4 key themes:

- *Infrastructure and collaboration*
- *Liveability*
- *Productivity*
- *Sustainability*

There are a number of Directions and Objectives that are of particular relevance to the Proposal and these are addressed below:

Direction 8: A city in its landscape
Objective 26: A cool and green parkland city in the South Creek corridor

The proposed regional detention basin incorporates a section of a tributary of South Creek into its design. The Plan recognises the role of existing waterbodies in supporting healthy, liveable and sustainable communities. The management of the South Creek corridor is essential to maintain its waterway health. The proposed basin will manage the potential downstream impacts arising from increase impermeable surfaces within the Central Precinct, contributing to the protection of South Creek from potentially harmful runoff.

Basin I is also intended to be used as a water quality wetland with provision for active stormwater detention during high flows.

5.4 Western City District Plan

The Western City District Plan manages growth in the context of economic, social and environmental matters in the Western City. It provides the district level framework to implement the goals and directions outlined in the *Greater Sydney Region Plan* for the Western City District.

The proposed development is consistent with the District Plan as it will:

- Contribute to the careful management to enhance and improve the health of South Creek by managing the downstream impacts arising from increase impermeable surfaces within the Central Precinct.
- Contribute to the infrastructure required to support continued urban development of the Central Precinct.
- Receive runoff from an existing open channel, that conveys surface runoff from an urbanised Penrith City Council catchment area which does not currently have any water quality controls.

5.5 Penrith City Council Strategy Documents

Penrith Economic Development Strategy – Building the New West

The *Penrith Economic Development Strategy* (January 2017) provides a strategic framework for how Council can best support economic development, foster greater investment and grow jobs in Penrith. It provides Council with target sectors for jobs growth and areas of focus to stimulate economic development across the LGA.

The goal for Penrith is to achieve an increase in total local jobs of between 42,000 and 55,000 by 2031. This target can be met by growing new jobs in a range of areas with a focus on health, education, tourism, arts and culture, advanced manufacturing, and advanced logistics. This will be complemented by growth in service activity in the night-time economy, small business (including start-up activity) and residential services.

The St Marys Development Site comprises a mix of residential and employment uses. The provision of sufficient infrastructure is essential for servicing the future population of the site, which further caters for a growing economy in the St Marys Development Site.

Penrith Urban Strategy Managing Growth to 2031

The *Penrith Urban Strategy Managing Growth to 2031* (PUSMG) sets out a framework to provide equity in access to a range of services and facilities, encourage increased diversity in housing stock and promote a range of lifestyle opportunities within established and new release areas. The PUSMG includes eight Guiding Principles for Penrith:

- A Diverse City meeting the needs of the people (in housing, built form and urban and rural uses), economy and environment.
- A Healthy and Vibrant City with quality spaces and recreation areas. A city that is integrated and whose residents have well-being. A city comprising strong neighbourhoods that build social capital.
- An accessible City that is integrated and interconnected, where communities have access to shops, services, education, employment and transport, etc.
- A Cultural City that is a creative place with self-sustaining arts and culture.
- A Regional City that embraces its economic and service role for the region with strong links to the surrounding regions and metropolitan area.
- A Safe City where people feel confident in living.
- A Lifestyle City that is attractive and well designed, fun for all ages and abilities and creates cohesive communities.
- A City with a Unique Identity that enables lifelong learning, research and development and has a viable economy.

The proposal is generally consistent with the PUSMG. The proposed detention basin will be used as a water quality wetland and will off-set the potential downstream impacts of the Central Precinct development. Basin I is located north of the Werrington Downs and Cambridge Gardens existing urban area. The runoff received in Basin I will receive treatment before it is discharged back into an existing creek within the Wianamatta Regional Park.

The proposal contributes to realising the planned vision for the St Marys Development Site, providing the required stormwater management for future development.

6 Statutory planning framework

This section addresses the relevant statutory requirements that relate to the development, including EPIs and other planning and environmental policies.

6.1 Environmental Planning and Assessment Act 1979

The EP&A Act aims to promote the orderly and economic use and development of land and to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.

Section 4.10 of the EP&A Act specifies designated development as development that is declared to be designated development by an EPI or the EP&A Regulation. The development meets the criteria of designated development under Schedule 3, clause 4(1) of the EP&A Regulation and is discussed further at Section 6.2 of this report.

The development also meets the criteria of integrated development under section 4.46(1) of the EP&A Act as it requires an AHIP to be issued under the NP&W Act (discussed further at Section 6.3). A controlled activity approval is also required to be obtained under the WM Act (discussed further at Section 6.4).

Section 4.15 of the EP&A Act outlines the matters that a consent authority is to take into consideration in determining a development application. This report provides the planning assessment against the key statutory EPIs and Development Control Plans relevant to the development. The following assessment of the proposal is provided, based on the heads of consideration contained in Section 4.15 of the EP&A Act.

Section 4.15 provisions		Comment
(a) the provisions of:		
(i)	*any environmental planning instrument, and*	The relevant environmental planning instruments are addressed at **Section 6.7**.
(ii)	*any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and*	The relevant draft environmental planning instruments are addressed at **Section 6.7**.
(iii)	*any development control plan, and*	The Penrith Development Control Plan 2014 is addressed at **Section 6.8**.
(iiia)	*any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and*	Not applicable.
(iv)	*the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and*	The EP&A Regulation is addressed at **Section 6.2**.
(v)	*(Repealed)*	Not applicable.

Section 4.15 provisions	Comment
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	Environmental impacts of the proposal are assessed at **Section 7**.
(c) the suitability of the site for the development,	The suitability of the site for the development is addressed at **Section 4**.
(d) any submissions made in accordance with this Act or the regulations,	Any submissions made on this subject development application will be considered and addressed. In addition, Council will consider any public submissions relating to the proposal during its assessment of the application.
(e) the public interest.	The development is considered to be in the public interest as it will improve water quality conditions across the St Marys Development Site.

Table 7: Response to section 4.15(1) provisions of the EP&A Act

6.2 Environmental Planning and Assessment Regulation 2000

The EP&A Regulation contains key operational provisions for the NSW planning system. This includes procedures relating to development applications, requirements for environmental assessments, environmental impact assessments, building regulations and other miscellaneous matters.

Schedule 3 of the EP&A Regulation identifies the type of development that is designated development. The proposal meets the criteria of clause 4(1)(c) of Schedule 3 as it is an artificial waterbody from which more than 30,000 m^3 per year of material is to be removed. The creation of Basin I would require the excavation of approximately 137,385 m^3 of material to create the required shape and dimensions of the basin.

This EIS has been prepared in accordance with the form and content requirements outlined under Schedule 2, Part 3 of the EP&A Regulation. An overview of where these requirements are satisfied in the EIS is included in Table 8.

Schedule 2, Part 3 requirements	Comment
(a) a summary of the environmental impact statement,	A summary of the EIS is provided at the Executive Summary.
(b) a statement of the objectives of the development, activity or infrastructure,	A statement of the objective of the development is provided at Section 4.1.
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	An analysis of proposal alternatives is provided at Section 4.2.
(d) an analysis of the development, activity or infrastructure, including:	An analysis of the development is provided at Section 1.1.
(i) a full description of the development, activity or infrastructure, and	A full description of the development is provided at Section 3.
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure,	A general description of the environment likely to be affected by the development is provided at Section 7.

Schedule 2, Part 3 requirements	Comment
together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	
(iii) the likely impact on the environment of the development, activity or infrastructure, and	The likely impacts on the environment is provided at Section 7.
(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Mitigation measures are outlined at Section 7.
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	No relevant approvals required.
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),	Refer to Section 7.
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Justification for the development is provided at Section 4. Ecologically sustainable development is addressed at Section 4.3.

Table 8: Response to Schedule 2, Part 3 provisions of the EP&A Regulation

6.3 Water Management Act 2000

The WM Act aims to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. In particular, the WM Act regulates the protection, enhancement and restoration of water sources and associated ecosystems, ecological processes, biological diversity and water quality.

In accordance with section 4.46(1) of the EP&A Act, the development is integrated development as a controlled activity approval is required to be issued under the WM Act. Under section 91(2) of the WA Act, a controlled activity approval as the development involves any works defined as a 'controlled activity' on 'waterfront land'. Controlled activities include:

- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, and/or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

Waterfront land includes the bed of any river, lake or estuary and all land within 40 m of the highest bank of the river, lake or estuary.

In accordance with the activity approvals requirements under the WM Act, it is necessary to refer the application to the NSW Department of Primary Industries (Water) for approval.

6.4 National Parks and Wildlife Act 1974

6.4.1 Heritage

The NP&W Act is the main piece of legislation for managing and protecting Aboriginal cultural heritage. In accordance with section 4.46(1) of the EP&A Act, the development is integrated development as an AHIP is required to be issued under the NP&W Act.

Under section 90 of the NP&W Act an AHIP is required if an Aboriginal object is to be destroyed, damaged or defaced. An AHIP may be issued by the Chief Executive of the Office of Environment and Heritage (OEH) and may be subject to conditions.

The AHIP application and determination process requires an assessment of impact carried out by the Applicant and an evaluation of the Aboriginal heritage values to be carried out by OEH. It is therefore necessary to refer the application to OEH to issue the AHIP.
An Archaeological and Cultural Assessment Methodology (ACAM) has been prepared by GML Heritage. The ACAM will be used to assist with the preparation of an Aboriginal Cultural Heritage Assessment Report to support an application to OEH for an AHIP under section 90 of the NP&W Act. The submission of an AHIP firstly requires development consent to be obtain under Part 4 of the EP&A Act.

6.5 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) aims to conserve biological diversity, promote ecologically sustainable development and protect the critical habitat of threatened species, populations and ecological communities.

The TSC Act has been repealed and subsequently replaced by the *Biodiversity Conservation Act 2016* which came into effect on 25 August 2017.

Notwithstanding, under clause 28(1) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*, the former planning provisions continue to apply to the determination of a 'pending' or 'interim' planning application (meaning Part 7 of the *Biodiversity Conservation Act 2016* does not apply). A 'pending' or 'interim' planning application is defined under clause 27(1) of the Regulation as:

(f) in the case of development (except State significant development) within ***an interim designated area*** *under subclause (3)—an application for development consent under Part 4 of the Environmental Planning and Assessment Act 1979 (or for the modification of such a development consent) made within 15 months after the commencement of the new Act (but only if any species impact statement that is to be submitted in connection with the application is submitted within 18 months after the commencement of the new Act).*

Interim designated areas are listed under clause 27(3) of the Regulation and includes the Penrith LGA. The application, being for development located within the Penrith LGA, is considered to be an interim planning application in accordance with the savings and transitional arrangements and is therefore subject to assessment under the TSC Act.

A Species Impact Statement (SIS) has been prepared by Cumberland Ecology. The SIS has determined that biodiversity impacts of the proposed development will be more than balanced by the major conservation outcome resulting from of the creation of the 900 ha Wianamatta Regional Park.

6.6 Biodiversity Conservation Act 2016

As discussed at Section 6.5, the *Biodiversity Conservation Act 2016* replaces the TSC Act and came into effect on 25 August 2017. However, in accordance with the savings and transitional arrangements for interim planning applications, this Act does not apply to the application.

6.7 State Environmental Planning Policies

6.7.1 Sydney Regional Environmental Plan No. 30 – St Marys

SREP 30 is a deemed State Environmental Planning Policy (SEPP) under the EP&A Act and is the primary statutory planning framework for the redevelopment and management of land across the St Marys Development Site.

SREP 30 outlines the desired performance objectives for all development across the site including, but not limited to, environmental outcomes relating to air quality, heritage, watercycle, soils, transport and waste management.
The zoning arrangement for the St Marys Development Site under SREP 30 consists of 6 zones, including:

- Regional Park
- Regional Open Space
- Employment
- Urban
- Road and Road Widening
- Drainage.

Basin I is proposed on land currently zoned part Drainage and part Regional Park under the SREP 30. Development for the purpose of stormwater drainage is permissible in the Drainage zone. However, this use is not permissible in the Regional Park zone.

Amendments are currently proposed to SREP 30 involving revisions to the zoning arrangement for land zoned Drainage to reflect the proposed relocation of drainage infrastructure including the on-site detention basins. The proposed amendments to SREP 30, if supported by the Minister for Planning and Public Spaces, will result in Basin I being contained entirely on land zoned Drainage and will therefore be wholly permissible under SREP 30. Notwithstanding, the development is also permissible under the Infrastructure SEPP as it is for the purpose of a stormwater management system. This is discussed further at Section 6.7.4.

The development is located wholly upon land within the Penrith LGA. As specified under Part 4 of SREP 30, Penrith City Council is the consent authority for development applications relating to land within the Penrith LGA and on land to which the SREP applies.

An assessment against the SREP 30 Performance Objectives are provided in Table 9 below.

SREP 30 Part 5 – Performance objectives	Comment
21 Required outcomes for any development	• The proposal is consistent with the performance objectives outlined below.

SREP 30 Part 5 – Performance objectives	Comment
22 Ecologically sustainable development	• The proposal is consistent with the principles of ecologically sustainable development.
23 Air quality	• As discussed in Section 7.4, the proposed works are considered minor in terms of overall air quality impacts. • A construction management plan has been prepared, which describes proposed air quality impacts and any required management or mitigation measures.
24 Conservation	• The proposal has been designed and located to minimise potential adverse impacts on the conservation values of the land and on the park's natural values. • Biodiversity has been addressed in Section 7.6. The proposed development will require the removal of 5.69 ha of vegetation.
25 Heritage	• As discussed in Section 7.9, the proposal will not result in any adverse impacts on European or Aboriginal heritage.
26 Community services	• The proposal is for a stormwater detention basin, and therefore clause 26 is not applicable.
27 Open space and recreation	• The proposal is for a stormwater detention basin, and therefore clause 27 is not applicable.
28 Watercycle	• Water quality and groundwater has been discussed in Sections 7.1 and 7.2. • There will be minimal groundwater impacts and the proposal will result in water quality improvements consistent with this performance objective.
29 Soils	• As discussed in Sections 7.1 and 7.2, the proposal is not subject to soil constraints. • The detention basin will facilitate nutrient and suspended solids removal while also providing habitat for a variety of fauna species. • Remediation works are not considered necessary for soils located within the extent of the basin boundary.
30 Transport	• The proposal is for a stormwater detention basin, and therefore clause 30 is not applicable.
31 Urban form	• Clause 31 relates to urban development. The proposal is for a stormwater detention basin, and therefore clause 31 does not relate to the proposal. • However, the modest scale, character and catchment of the site will not result in adverse visual impacts. • Visual impact has been addressed in Section 7.10.
32 Employment and business development	• The proposal is for a stormwater detention basin, and therefore clause 32 is not applicable.
33 Housing	• The proposal is for a stormwater detention basin, and therefore clause 33 is not applicable.
34 Energy efficiency	• The proposal is for a stormwater detention basin, and therefore clause 34 is not applicable.
35 Waste management	• Waste has been addressed in Section 7.8. • A waste management plan for the site has been prepared by JBS&G and is included at **Appendix H**. The WMP identifies potential waste types that are present within the proposed Basin I site and provides appropriate waste management procedures • Waste material excavated from the site will mostly comprise vegetation waste and excavated soils

SREP 30 Part 5 – Performance objectives	Comment
	• Both garden waste and virgin extracted natural material (VENM) will be re-used within the St Marys Development Site (where possible) or otherwise recycled at a licenced off-site waste processing facility.

Table 9: Assessment against Part 5 of SREP 30 – Performance objectives

Part 7 of SREP 30 sets out development controls as they relate to development within the St Marys Development Site. The development controls in context to Basin I are addressed in Table 10.

SREP 30 Part 7 – Development controls	Comment
44 Consultation with National Parks and Wildlife Service	• Clause 44(2) requires the consent authority to refer a copy of the development application to the Director-General of National Parks and Wildlife Service (NPWS) for comment. • It is anticipated that Council will refer a copy of the application and EIS to NPWS and that any comments received from NPWS will be considered by Council as part of its assessment of the application.
45 Subdivision	• N/A – subdivision is not proposed.
46 Development near zone boundaries	• Clause 46(1) allows for development that would be prohibited in a zone to be carried out (with development consent) within 30 m of the boundary between that zone and another zone (if it is allowed in the other zone with or without development consent). Notwithstanding, clause 46(2) does not allow consent to be granted for development within the 'Regional Park' zone. • Amendments are currently proposed to SREP 30 involving revisions to the zoning arrangement for land zoned 'Drainage' to reflect the proposed relocation of drainage infrastructure including the on-site detention basins. The proposed amendments to SREP 30, if supported by the Minister for Planning and Public Spaces, will result in Basin I being contained entirely on land zoned Drainage and will therefore be wholly permissible.
47 Demolition	• N/A – demolition is not proposed as part of the application.
48 Interim uses	• N/A – interim uses are not proposed as part of the application.
49 Land below the PMF level	• The application does not propose the erection of a building or development for residential or industrial purposes. • Basin I will contribute to flood mitigation and stormwater management of the broader St Marys Development Site.
50 Filling of land	• N/A – filling of land is not proposed as part of the application.
51 Salinity and highly erodible soils	• Soils are discussed in further detail in the ESA (**Appendix E**) and at Section 7.3.
52 Tree preservation	• Clause 52(1) requires consent to remove or wilfully destroy any tree. • Basin I will be constructed in a landscape that has been extensively altered since European settlement. Impacts on biodiversity including impacts associated with the clearing of existing vegetation is discussed in further detail at Section 7.6.
53 Items of environmental heritage	• It is noted that items of environmental heritage are identified on the Heritage Map.

SREP 30 Part 7 – Development controls	Comment
54 General heritage considerations	• A Heritage Impact Statement has been prepared as part of the EIS (**Appendix J**) and heritage impacts are discussed at Section 7.9. The HIS concludes that Basin I would have no impact on historical (European) archaeology.
55 Conservation of items of environmental heritage	• A Heritage Impact Statement has been prepared as part of the EIS (Appendix J) and heritage impacts are discussed at Section 7.9. The HIS concludes that Basin I would have no impact on historical (European) archaeology.
56 Demolition of items of environmental heritage	• N/A – demolition is not proposed as part of the application.
57 Access	• N/A – vehicular access to The Northern Road, Palmyra Avenue or Forrester Road is prohibited.
58 Certain development prohibited	• N/A – development along The Northern Road and/or development for the purpose of housing is not proposed as part of the application.
59 Retail and commercial development restricted	• N/A – retail and/or commercial development is not proposed as part of the application.
60 Services	• The application proposes development for the purpose of providing stormwater drainage infrastructure.
61 Subdivision without consent	• N/A – subdivision is not proposed as part of the application.
62 Bush fire hazard reduction works	• N/A – bushfire hazard reduction works are not proposed as part of the application.

Table 10: Assessment against Part 7 of SREP 30 – Development controls

6.7.2 St Mary Environmental Planning Strategy 2000

The St Marys EPS accompanies SREP 30. One of the aims of SREP 30 (clause 3(a)) is to support the St Marys EPS by providing a framework for the sustainable development and management of the land.

The St Marys EPS identifies:

- the aims for the future use and management of the site
- specific performance objectives
- actions to be undertaken by local and State governments
- development controls the obligations of developers

The St Marys EPS, together with SREP 30 and the St Marys Development Agreement establish the planning, urban design and environmental conservation principles to guide the long-term development and conservation of the site.

6.7.3 Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2–1997)

Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2–1997) (SREP 20) aims to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

Basin I would be located within the Hawkesbury-Nepean catchment where South Creek is a tributary of the Hawkesbury-Nepean River. Clause 6 of SREP 20 sets out specific planning

policies and recommended strategies for the catchment, including recommendations relating to environmentally sensitive areas and water quality.

Section 7 of the EIS addresses matters outlined under clause 6 of SREP 20 including surface water and water quality impacts (Section 7.1), biodiversity including impacts on flora and fauna and environmentally sensitive areas (Section 7.6) and cultural heritage (Section 7.9).

6.7.4 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP identifies the environmental assessment category into which different types of infrastructure and services development fall.

Clause 110 of the Infrastructure SEPP categorises works for the collection, detention and discharge of stormwater (such as detention basins) as a 'stormwater management system'. Under clause 111A of the Infrastructure SEPP, development for the purpose of a stormwater management system may be carried out by any person with consent on any land.

This EIS supports a development application seeking consent for works categorised as a stormwater management system and is therefore permissible with consent under the Infrastructure SEPP.

6.7.5 State Environmental Planning Policy No. 19 – Bushland in Urban Areas

State Environmental Planning Policy No. 19 – Bushland in Urban Areas (SEPP 19) aims to protect and preserve bushland within the urban areas to enable existing plant and animal communities to survive in the long term including rare and endangered flora and fauna species. The Penrith LGA is identified as an area to which SEPP 19 applies.

The provisions of SEPP 19 will be consolidated into draft *State Environmental Planning Policy (Environment)* (Environment SEPP). The draft Environment SEPP is discussed further at Section 6.7.8 of this report.

6.7.6 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The SEARs require an assessment of the proposal against the provisions of *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33). SEPP 33 aims to ensure that, in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account.

The development proposes the construction of a stormwater detention basin and does not constitute hazardous or offensive development, as defined under SEPP 33.

6.7.7 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) applies to the State and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment by specifying when consent is required, and when it is not required, for a remediation work.

Clause 7(1) of SEPP 55 states that where a development application is made concerning land that is contaminated, the consent authority must not grant consent unless:

(a) It has considered whether the land is contaminated, and
(b) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
(c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

An Environmental Site Assessment has been prepared by JBS&G (dated 12 June 2018) and is included at **Appendix E**. Field observations and laboratory analysis of soils undertaken as part of the ESA concluded that the soils are consistent with virgin soils that have not been significantly impacted by any historical contaminating activities.

The ESA has determined that remedial works are not necessary for soil within the extent of the site in order to facilitate the proposed detention basin. In accordance with SEPP 55, the site is considered suitable from a contamination perspective for its future use as a detention basin. Contamination is further discussed at Section 7.3 of this report.

6.7.8 Draft State Environmental Planning Policy (Environment)

The draft Environment SEPP aims to promote the protection and improvement of key environmental assets for their intrinsic value and the social and economic benefits they provide. Once adopted it will consolidate the following existing EPIs:

- *State Environmental Planning Policy No.19 – Bushland in Urban Areas*
- *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*
- *State Environmental Planning Policy No.50 – Canal Estate Development*
- *Greater Metropolitan Regional Environmental Plan No.2 – Georges River Catchment*
- *Sydney Regional Environmental Plan No.20 – Hawkesbury-Nepean River (No.2-1997)*
- *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005*
- *Willandra Lakes Regional Environmental Plan No.1 – World Heritage Property*

It is noted that the preliminary maps accompanying the Draft Environment SEPP do not identify the site as urban bushland or a critical habitat area.

A Species Impact Statement (SIS) has been prepared by Cumberland Ecology (**Appendix F**). The SIS has determined that biodiversity impacts of the proposed development will be more than balanced by the major conservation outcome resulting from of the creation of the 900 ha Wianamatta Regional Park.

6.7.9 Draft State Environmental Planning Policy (Remediation of Land)

Draft *Remediation of Land State Environmental Planning Policy* (Remediation SEPP) aims for better management of remediation works by aligning the need for development consent with the scale, complexity and risks associated with the proposed works.

Once adopted, the Draft Remediation SEPP will:

- Provide a state-wide planning framework for the remediation of land
- Require consent authorities to consider the potential for land to be contaminated when determining development applications

- Clearly list the remediation works that require development consent
- Introduce certification and operational requirements for remediation works that can be undertaken without development consent.

As discussed in Section 6.7.7, the ESA considers the site is suitable from a contamination perspective for its future use as a detention basin. Contamination is further discussed at Section 7.3 of this report.

6.7.10 Penrith Local Environmental Plan 2010

The *Penrith Local Environmental Plan 2010* (PLEP 2010) regulates development throughout the Penrith LGA. As SREP 30 applies to the St Marys Development Site, the PLEP 2010 does not apply.

6.8 Penrith Development Control Plan 2014

A detailed assessment of the proposal against the relevant provisions of the DCP is provided in the table below:

DCP Provision	Assessment	Complies
3.3 Watercourses, Wetlands and Riparian Corridors	• The proposal comprises development for the purposes of a Regional Detention Basin, which will affect the quantity and flow of water to South Creek to the north of the site, and requires approval under section 91 of the *Water Management Act 2000*. • A tributary of South Creek traverses through the site of the proposal, which collects runoff from the existing urban area south of the site and flows north along South Creek. • Stormwater and water quality, both during and post construction will be suitable managed.	Yes
3.7 Water Retention Basins/Dams	• The design and location of the basin has been carefully considered within the catchment area of the site to protect natural flows to natural waterways and river systems.	Yes
13.4 Engineering Works and Construction Standards	• The works will be undertaken in accordance with the provisions of the relevant Council guidelines.	Yes

Table 11: Assessment against the relevant DCP provisions

7 Environmental assessment

7.1 Surface water

A Surface Water Quality Assessment (SWQA) has been prepared by Jacobs and is included at **Appendix C**. The SWQA describes the surface water quality strategy and provides guidance on effective operational water quality controls.

The broader St Marys Development Site is located within the Hawkesbury-Nepean River Catchment. Land within the catchment has been subject to intensive urban development which has resulted in increased sedimentation impacts and the potential for reduced water quality. This is due to the increase in stormwater flows to surrounding drainage lines due as a result of increased impermeable areas.

Basin I will treat stormwater runoff before discharging to a first order tributary that connects to South Creek. South Creek drains a large catchment in western Sydney that is up to 8 km wide and encompasses an approximate area of 18,000 hectares in total.

The detention basin will be a maximum 2 m deep waterbody that will provide for both the detention of stormwater flows and enable nutrient removal. The unnamed tributary flowing to South Creek is described in the SWQA as a first order stream with minimal channel definition, limited instream habitat and is not mapped as being potential habitat for threatened fish species under the *Fisheries Management Act 1994*.

7.1.1 Existing conditions

There is limited water quality data available for the existing, unnamed tributaries flowing to Basin I from South Creek. The SWQA therefore sourced water quality data from Sydney Water monitoring sites located both upstream and downstream of Basin I which were considered representative of the water quality conditions in tributaries located in proximity to Basin I.

The SWQA states that the monitoring sites show high nutrient concentrations with medium concentrations of total nitrogen, oxidised nitrogen, ammonium and total phosphorus. These high concentrations are likely the result of South Creek receiving high stormwater flows and the result of bank erosion, weed proliferation and accumulation of rubbish and sediment during storm events. The poor water quality of South Creek at the monitoring sites indicates the waterway is currently impacted by surrounding urban development, particularly during heavy rainfall and storm events. These impacts are likely to extend to the tributaries that are located in proximity to Basin I.

7.1.2 Water quality impacts

SREP 30 includes performance objectives for water quality across the site including the introduction of stormwater management measures that ensure there is no net adverse impact upon the water quality (nutrients and suspended solids) in South Creek and Hawkesbury-Nepean catchments.

A water quality assessment was undertaken as part of the SWQA to assess the preliminary design of Basin I and to estimate the total reduction in water pollution that will be achieved. The SWQA notes that the water quality assessment could not be undertaken in isolation of just Basin I. Consequently, both Basin I and proposed Basin B (proposed to be located further north of Basin I) were assessed using the eWater MUSIC model.

The water quality modelling results outlined in the SWQA indicates the SREP 30 water quality objectives, requirements and design criteria will be achieved by Basin I. The detention basin is expected to provide an overall improvement to water quality conditions by reducing total suspended solids, total nitrogen and total phosphorus. Further, the design criteria and target reductions for new urban areas outlined in Council's *Waste Water Sensitive Urban Design (WSUD) Policy* (December, 2013) will be achieved.

Hydrological modelling indicates a maximum water storage quantity of 72,900 m³ will be available within Basin I (up to the basin crest level). This is well above the maximum storage capacity required to accommodate a 100-year ARI rainfall event (57,863 m³).

7.1.3 Mitigation measures

To ensure the performance objectives of SREP 30 and Council's WSUD policy are achieved, the SWQA recommends a number of measures that will be implemented during both the construction and operational phases of the development.

During construction, it is recommended that a Soil and Water Management Plan be developed in accordance with the Blue Book – *Soils and Construction – Managing Urban Stormwater* Volume 1 (Landcom, 2004) and Volume 2D (DEC, 2008a). Recommendations are also provided in relation to erosion and sediment control measures, timing of high risk soil/erosion activities (such as earthworks) and storage of fuels, chemicals and liquids away from the existing stormwater drainage system.

During operation, several recommendations are made relating to the management of noxious weeds, debris and litter removal, water quality sampling, signage and maintenance procedures.

7.1.4 Conclusion

Basin I will receive surface runoff from the upstream urban areas of Werrington Downs and Cambridge Gardens which do not currently have any water quality management controls. Basin I will therefore provide significant water quality improvements to the currently untreated surface water runoff, prior to entering the existing tributaries within the Wianamatta Regional Park. The detention basin will facilitate nutrient and suspended solids removal while also providing habitat for a variety of fauna species. Overall, Basin I will result in water quality improvements consistent with the performance objectives of SREP 30 and the St Marys EPS.

7.2 Groundwater

A Groundwater Quality Assessment (GQA) has been prepared by Jacobs and is included at **Appendix D**. The GQA has been carried out in accordance with the *NSW Aquifer Interface Policy* (DPI, 2012).

The GQA considers the existing groundwater conditions in the area of Basin I to be highly saline and therefore of low quality. The groundwater's salinity level is too high to make a viable resource for drinking water, stock and/or irrigation purposes. Hence, water re-use is not proposed. The GQA notes that Basin I will be an unlined stormwater detention basin with the captured stormwater free to move into the groundwater body below.

The GQA identifies the greatest impacts to the groundwater system as potentially resulting from temporary construction dewatering and associated drawdown and/or changes to groundwater levels and flow directions during operation. Groundwater modelling undertaken as part of the GQA indicates a total dewatering discharge rate of approximately 1.2 ML and an average discharge rate of 6.6 m^3/day during construction.

During operation, the broader flow pattern of the existing groundwater system is expected to remain unchanged (flowing generally toward the north-east) with the exception of some semi-radial flow away from the eastern extent of the basin. It is expected that the basin will not be hydraulically well-connected to the surrounding groundwater system as the basin bed/banks will consist of compacted clay which is anticipated to be of lower permeability than the surrounding existing material. The GQA further states that there are no high-priority groundwater dependant ecosystems mapped in proximity to Basin I that would be adversely impacted.

In conclusion, the GQA determines there will be minimal groundwater impacts and therefore no specific groundwater mitigation measures are recommended.

7.3 Contamination

The St Marys Development Site was previously used for various munition testing, filling and storage activities until 1994. An ESA was prepared by JBS&G to assess the potential for contamination in the area where Basin I will be constructed. The ESA was prepared in accordance with the relevant Environmental Protection Authority (EPA) technical guidelines for contaminated land and is included at **Appendix E**.

7.3.1 Existing conditions

The site is generally flat with minor slopes toward local drainage lines and elevation ranging between 36 m and 39 m AHD. The ESA characterises the existing site conditions as consisting of grassed and heavy wooded areas that is dissected by an unnamed tributary of South Creek flowing approximately south-west to north-east.

Stagnant water was observed in the wetland in the central portion of the site in alignment with the unnamed creek. Scattered rubbish, likely transported via stormwater runoff, was also observed. No odours, staining or asbestos containing material was observed. Further, there was no evidence of prior site filling works or other disturbance.

The ESA identifies the site as being underlain by Bringelly Shale, Minchinbury Sandstone and Ashfield Shale. The eastern extent of the site is underlain by alluvial South Creek soils while the remainder of the site is underlain by erosional Luddenham soils. The Natural Resources Atlas indicates there to be no known occurrence of acid sulfate soils in the vicinity of the site.

7.3.2 Sampling results

The ESA provides a detailed assessment of potential contamination risk at the site including soil sampling and laboratory analysis. The ESA found that:

- levels of analytes in soils are either below laboratory detection limits or are otherwise at low levels
- there are no unacceptable risks to future site users or the environment from soil contamination

- levels of heavy metals are consistent with anticipated background levels for urban soils
- no potential chemical mixtures are identified that may pose management issues at the site
- no odours or evidence of fill or other foreign material were observed during the site works program
- there is no potential for the migration of contaminants from the site as contamination has not been identified.

Further to the above, the ESA states that the site is located hydraulically upgradient of areas impacted by per/poly-fluoroalkyl substances (PFAS) and therefore PFAS is not considered to be a contaminant of potential concern.

7.3.3 Conclusion

In summary, the ESA found the site to be suitable for its future use as a detention basin. Consequently, remediation works are not considered necessary for soils located within the extent of the basin boundary. It was recommended that the surplus soils generated by the substantial excavation works to construct the basin be classified as virgin excavated natural material (VENM).

The ESA does, however, recommend a Waste Management Plan (WMP) be prepared for site and for an unexpected finds protocol be implemented during excavation works.

7.4 Air Quality

An Air Quality Impact Assessment (AQIA) has been prepared by Wilkinson Murray Pty Ltd and is included at **Appendix M**. The AQIA provides a qualitative assessment of potential dust impacts during construction activities associated with dredging and remediation of the basin. The assessment has been prepared in accordance with the *Guidance on the assessment of dust from demolition and construction* (IAQM, 2014).

7.4.1 Existing conditions

The AQIA selected observations of wind speed and direction of OEH's nearest air quality monitoring station to represent typical wind patterns in the area surrounding the site. The air quality monitoring station is located approximately 7 km south of the site. Southerly and south-westerly winds are most prevalent conditions in the area.

The assessment found that, on occasions, the 24-hour average concentrations of particulate matter exceed the criteria outlined in the NSW EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. However, these events are most often associated with extreme conditions such as bushfires, hazard reduction burning and dust storms.

No odours have been identified from the existing detention basins.

7.4.2 Impact

Potential air pollutants generated by the proposed works include dust and particulate matter, including:

- total suspended particulates;
- particulate matter; and

- deposited dust.

The air quality assessment found that the proposed works are considered to have a high risk of dust soiling effects and a medium risk of health impacts. However, the works are unlikely to result in unacceptable air quality impacts, subject to the implementation of the mitigation measured outlined below.

The AQIA considers that odour impacts are unlikely to occur.

7.4.3 Mitigation measures

The AQIA recommends a Dust Management Plan (DMP) be prepared prior to the commencement of works to address potential air quality impacts. The DMP should include the following mitigation measures, where practicable:

- implementation of a stakeholder communications plan that includes community engagement activities prior to works commencing on site;
- site management measures including recording of all dust and air quality complaints and undertaking appropriate measures to reduce dust emissions in a timely manner;
- monitoring of dust levels at nearby receiver locations and undertaking regular on-site and off-site inspections to monitor compliance with the DMP;
- preparing the site layout so that machining and dust generating activities are located away from receptors, as far as possible;
- removing materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used, keep materials covered;
- no idling of construction vehicles and implement a maximum speed limit of 25 km per hour on surfaced roads and 15 km per hour on un-surfaced haul roads and work areas;
- measures for general construction activities including suitable dust suppression techniques such as water sprays or local extraction; and
- measures specific to haulage including the use water-assisted dust sweepers on the access and local roads and ensure vehicles entering and leaving site are covered to prevent the escape of materials during transport.

No odours have been identified from the existing detention basins and it is unlikely that the proposal will cause any odour impacts. However, the AQIA recommends the following mitigation measures should odours be detected during the works at any sensitive receptor location:

- apply covers, odour sealant or odour suppressant to control odours generated at the point of excavation or at stockpiles;
- have contingency odour suppressant available such as Zeolite and/or odour suppressing foam;
- cover or coat with sealant stockpiled material that is to remain inactive for a period greater than two weeks to prevent odour/dust generation; and
- ensure that the site manager is on site during work hours to manage potential odour impacts managing odour suppressants and controls, reporting and implementing contingency measures if required.

7.4.4 Conclusion

The AQIA proposes a range of management and mitigation measures to minimise dust and air quality impacts during construction of the basins. The AQIA concludes the residual effects of dust from the project are not expected to be significant and would have a low risk of generating unacceptable air quality impacts, subject to the implementation of the recommended mitigation measures that are to form part of a DMP.

7.5 Noise and vibration

A Noise and Vibration Assessment (NVA) has been prepared by Wilkinson Murray and is included at **Appendix N**. The NVA assesses potential noise and vibration impacts generated by minor clearing works, dredging/excavation activities, haulage and compaction works. The impacts were assessed in accordance with the following EPA guidelines:

- Noise Policy for Industry (NPI);
- Interim Construction Noise Guideline (ICNG);
- Road Noise Policy (RNP); and
- Assessing Vibration: A Technical Guideline.

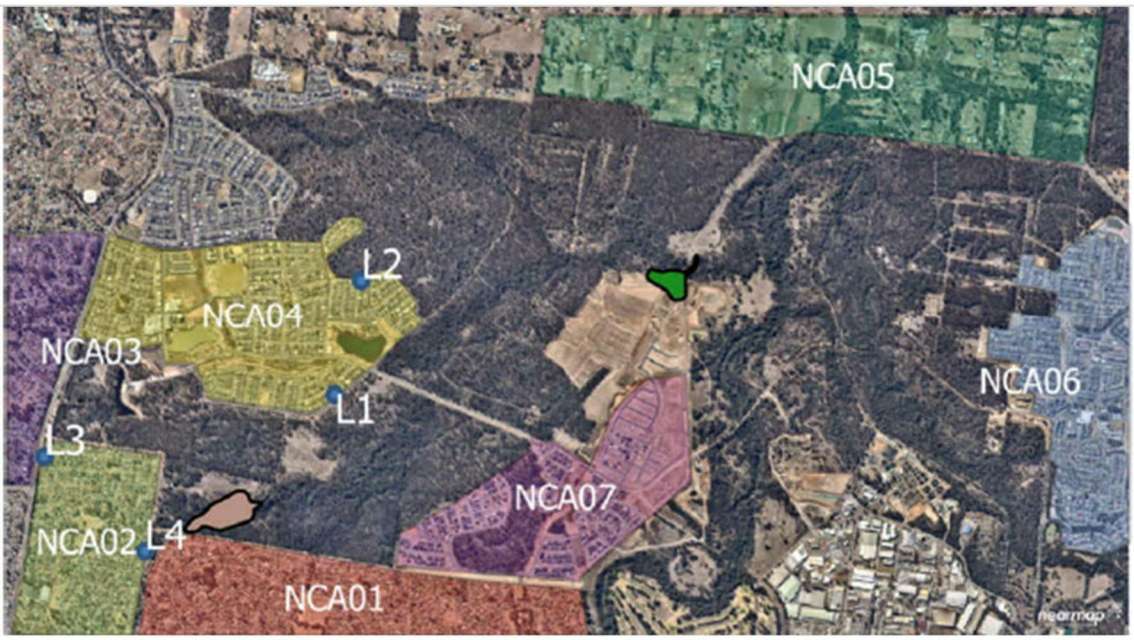
Construction is proposed to be carried out during the hours of 7:00 am and 6:00 pm Monday to Friday and 8:00 am to 1:00 pm on Saturday. No works are proposed on Sunday and public holidays. A construction programme of approximately 8 months is anticipated.

7.5.1 Existing conditions

The surrounding area comprises mostly residential receivers (typically one to two-storey detached dwellings). The potentially most impacted receivers in proximity to Basin I include the following suburbs:

- Werrington Downs to the south (NCA 01);
- Cambridge Gardens to the west (NCA 02); and
- Jordan Springs to the north (NCA 04).

In determining the existing background noise levels required to establish appropriate noise management levels (NMLs) for the development, unattended noise monitoring was carried out at four locations surrounding the site. The unattended noise monitoring locations are shown in Figure 7. Noise Catchment Areas (NCAs) were then established based on each NCA's similar acoustic environment and existing land uses. The NCAs are also shown in Figure 7.



Monitoring Location	Property Address	Position on Property
L1	158 Jubilee Drive, Jordan Springs	Front Yard
L2	20 Callistemon Circuit, Jordan Springs	Front Yard
L3	71 Newham Drive, Cambridge Gardens	Front Yard
L4	16 Huntingdon Parade, Cambridge Gardens	Back Yard

Figure 7: Noise monitoring locations and noise catchment areas (Source: Wilkinson Murray)

The NVA recorded (unattended) the following existing ambient noise levels at the following monitoring locations:

Monitoring Location	Address	Noise Level (dBA)		
		RBL	L_{Aeq}	$L_{Aeq,15hr}$
L1	158 Jubilee Drive, Jordan Springs	34	51	NA
L2	20 Callistemon Circuit, Jordan Springs	30	50	NA
L3[2]	71 Newham Drive, Cambridge Gardens	52	62	62
L4	16 Huntingdon Parade, Cambridge Gardens	37	68	NA

Note 1: RBL adjusted to minimum recommended values per *NPfI*. Unadjusted values in brackets.
Note 2: Logger location 3 was also used to establish existing traffic noise.
The $L_{Aeq,15hr}$ is displayed in the table for calculating traffic noise criteria.

Table 12: Existing Ambient Noise Levels - Day period (Source: Wilkinson Murray)

7.5.2 Impact

Construction noise and vibration impacts were assessed against the criteria outlined in the ICNG. Construction traffic impacts were assessed against the criteria outlined in the RNP.

Construction noise

Construction noise impacts will result from dredging and excavation works including the use of excavators and dozers/scrapers.

To provide a comprehensive assessment, two scenarios were assessed. Scenario 2 is the worst-case scenario which would require the use of a hydraulic hammer should rock be encountered during excavation. This is considered unlikely given the shallow excavation required to be carried out. Table 13 shows the predicted worst-case construction noise impacts at the surrounding NCAs under both scenarios.

Receiver	NML	Predicted $L_{Aeq, 15min}$ Noise Level					
		Basin + Route 01		Basin + Route 02		Basin + Route 03	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
NCA 01	47	***76.1***	***80.9***	***76.1***	***80.9***	***76.1***	***80.9***
NCA 02	47	*66.1*	*67.0*	*56.8*	*61.5*	*62.7*	*64.5*
NCA 03	62	53.3	53.7	40.1	44.8	40.2	44.8
NCA 04	45	*62.2*	*62.4*	*68.6*	*68.7*	*67.7*	*67.9*
NCA 05	45	<35	<35	<35	<35	<35	<35
NCA 06	45	<35	<35	<35	<35	<35	<35
NCA 07	45	*46.0*	*50.7*	*46.2*	*50.8*	*46.2*	*50.8*

Note: Values in italics exceed the NML and values in red bold italics are highly noise affected

Table 13: Predicted worst-case construction noise (Source: Wilkinson Murray)

Exceedances of the NMLs are predicted for some of the NCAs with some residences located in NCA 01 expected to be highly noise affected (i.e: noise levels above $L_{Aeq(15min)}$ 75dBA) under both Scenario 1 and Scenario 2.

The NVA recommends standard noise mitigation measures in the first instance to address the noise exceedances with additional noise mitigation measures to be implemented should the NMLs continue to be exceeded. Potential mitigation measures are described in further detail at Section 7.5.3.

Vibration noise

Vibration intensive activities will include hydraulic hammering (should rock be encountered) and the use of a vibratory roller during the compaction phase.

The nearest residential receiver is located approximately 20 m from these works and therefore the velocity impinging onto the building is predicted in the NVA to be less than 1mm/second.

The predicted vibration levels are of less than 1mm/second is well below the 12.5mm/second screening criterion. Consequently, the risk of building damage is considered negligible and specific mitigation not necessary.

Construction traffic noise

Noise due to increased traffic movements and haulage along the more sensitive local roads has been assessed. Traffic noise levels were assessed along Greenwood Parkway, Lakeside Parade and Jubilee Drive. The predicted noise levels are shown in Table 14.

Road	Calculated $L_{Aeq,1hr}$ Traffic Noise Level	
	260 movements	520 movements
Greenwood Parkway	54.0	***57.0***
Lakeside Parade	***63.0***	***66.0***
Jubilee Drive	***63.5***	***66.5***

Table 14: Predicted traffic noise levels from haul truck movements at residences (Source: Wilkinson Murray)

Construction traffic noise impacts are anticipated to result in an exceedance of the hourly noise management levels, as specified under the RNP, by between 3 and up to 11.5 dBA. Mitigation may be necessary to reduce the noise impact, with specific mitigation measures to be determined once the final construction traffic routes are selected. Construction traffic routes are further discussed at Section 7.7. The potential mitigation measures listed at Section 7.5.3 would assist in addressing construction traffic noise impacts.

7.5.3 Mitigation measures

The assessment concludes that a detailed Construction Noise and Vibration Management (CNVMP) plan is required to be prepared once a contractor has been secured. The following mitigation measures are to be considered as part of the CNVMP:

- ensure that all boundary fences for receivers within NCA 01 and NCA 02 are solid, continuous and at least 1.8 m high;
- allow for temporary localised barriers or bunds between the works and worst case impacted within NCA 01. Barriers should be solid, continuous and at least 2.4m high and located close to the works. This aspect alone is capable of reducing the impact a further 5 dBA;
- allow for initial attended noise measurements in the form of site trials when worst case scenarios occur and begin works as far from residential receives as possible so that impacts and mitigations for the residential receivers closer can be confirmed;
- inform all impacted residential receivers and in particular those in NCA 01 when Basin I works are occurring;
- for works associated with Basin B, monitor the progress and occupation of the nearest residential receivers within Jordan Springs East; and
- prepare a Community Liaison Plan that incorporates a complaints management procedure.

7.5.4 Conclusion

The NVA acknowledges the nearest residential receivers in NCA 01 are likely to be noise affected during the construction Basin I and that the implementation of appropriate noise mitigation measures is required.

A CNVMP will be prepared once a contractor has been secured and the construction approach finalised. The CNVMP shall detail noise and vibration mitigation measures to be implemented during construction of the basin to minimise impacts on sensitive receivers. The mitigation measures shall include those measures recommended in the NVA.

7.6 Biodiversity

A SIS for the site has been prepared by Cumberland Ecology and is included at **Appendix F**. The purpose of the SIS is to identify threatened species on the site that may be impacted by the proposal and recommend appropriate strategies to minimise adverse impacts.

7.6.1 Existing conditions

The subject site is vegetated by Critically Endangered Ecological Communities (CEECs) including Cumberland Plain Woodland and Endangered Ecological Communities (EECs) including River-flat Eucalypt Forest and Freshwater Wetlands and Derived Native Grassland.

While CEECs and EECs are present, the proposed basin will be constructed in a landscape that has been extensively altered since European settlement.

7.6.2 Impact

The proposed basin will require the removal of approximately 5.69 ha of vegetation classified as either CEEC or EEC. Table 15 outlines the impacted vegetation types and the total area proposed to be removed.

Vegetation type	Status	Area to be removed (ha)
Cumberland Plain Woodland	CEEC	0.02
Regenerating Cumberland Plain Woodland	CEEC	0.22
Cumberland Plain Woodland Low Diversity Native Grassland	CEEC	0.51
River-flat Eucalypt Forest	EEC	4.15
Regenerating River-flat Eucalypt Forest	EEC	0.47
Freshwater Wetland	EEC	0.32
Total vegetation		5.69 ha

Table 15: Vegetation removal for Basin I

Table 16 provides a summary of likely impacts on existing vegetation communities and threatened species at the site.

Impact	Description
Vegetation communities	*The proposed development will occur within a landscape that has been extensively altered since European settlement took place. The RFEF present on the subject site consists of a degraded form of the community, which is heavily weed infested, but adjoins more intact RFEF within the South Creek riparian corridor of the Regional Park. All RFEF conforms to the endangered ecological community listing under the TSC Act. The CPW vegetation on the subject site consists of a mix of mature woodland, young, woodland in various stages of regeneration and derived native grassland which collectively conforms to the critically endangered listing under the TSC Act. A conservative approach has been taken for this SIS and it is assumed that all vegetation within the subject site will be removed for the purposes of the proposed development, although replanting will occur in association with the constructed basin, and temporary access tracks will be restored post construction* (SIS, Cumberland Ecology).
Threatened species	*The clearing of vegetation mentioned within the subject site will directly remove habitat for threatened species such the Cumberland Plain Land Snail (Meridolum corneovirens). The Cumberland Plain Land Snail was recorded within RFEF in the central area of the subject site and has a high potential to occur within other parts of this community, and within adjoining scattered patches of woodland within the subject site. Several individuals are likely to be removed given that habitat is to be cleared.* *Some highly mobile fauna species such as microbats, and some small woodland birds that are known from the study area may experience minor habitat loss, however, the subject site generally lack important habitat features, such as hollow-bearing trees. This paucity of habitat features suggests that it would be unlikely for these species to be dependent on the habitats present. The Regional Park also provides substantial habitat for these species* (SIS, Cumberland Ecology).

Table 16: Assessment of impacts on vegetation communities and threatened species

The SIS states that the proposed development is not likely to have a significant impact such that the large and viable representatives of CEECs and EECs in the Wianamatta Regional

Park would be placed at risk of extinction. Further, the large and continuous remnants present in the Wianamatta Regional Park will be protected and enhanced through a range of mitigation measures identified and retained in perpetuity and transferred to public ownership.

The major affected fauna species impacted by the proposed development is the Cumberland Plain Land Snail. The mature and regenerating Cumberland Plain Woodland, and to a lesser extent the River-flat Eucalypt Forest, provides habitat for this species. However, this area of habitat is considered to be degraded and of a lesser importance due to the increased level of disturbance, sparse nature and its comparatively small in size. Therefore, the loss of this habitat is not considered to be significant.

7.6.3 Conclusion

Biodiversity impacts of the proposed development will be balanced by the major conservation outcome resulting from of the creation of the 900 ha Wianamatta Regional Park. The SIS concludes that the proposed development is unlikely to result in the extinction of any threatened species or ecological communities.

7.7 Construction traffic

7.7.1 Construction traffic volumes

A Construction Traffic Management Plan (CTMP) has been prepared by Cardo and is included at **Appendix G**. The CTMP addresses the proposed construction vehicle routes, construction vehicle traffic generation, construction operating hours and site access arrangements.

Basin I requires approximately 140,000 m³ of excavated material to be removed from the site. In addition, approximately 2,000 m³ of rock and 3,600 m³ of topsoil material will need to be imported to the site.

Construction activities will require approximately 26 truck movements (in and out of the site, per hour) for the exportation of material over 74 days of operation. In addition, there will be 2 truck movements (in and out of the site, per hour) for the importation of material over 22 days of operation. The construction vehicle movements will be spread out uniformly across the construction period and would be carried out between 7 am and 5 pm Monday to Friday.

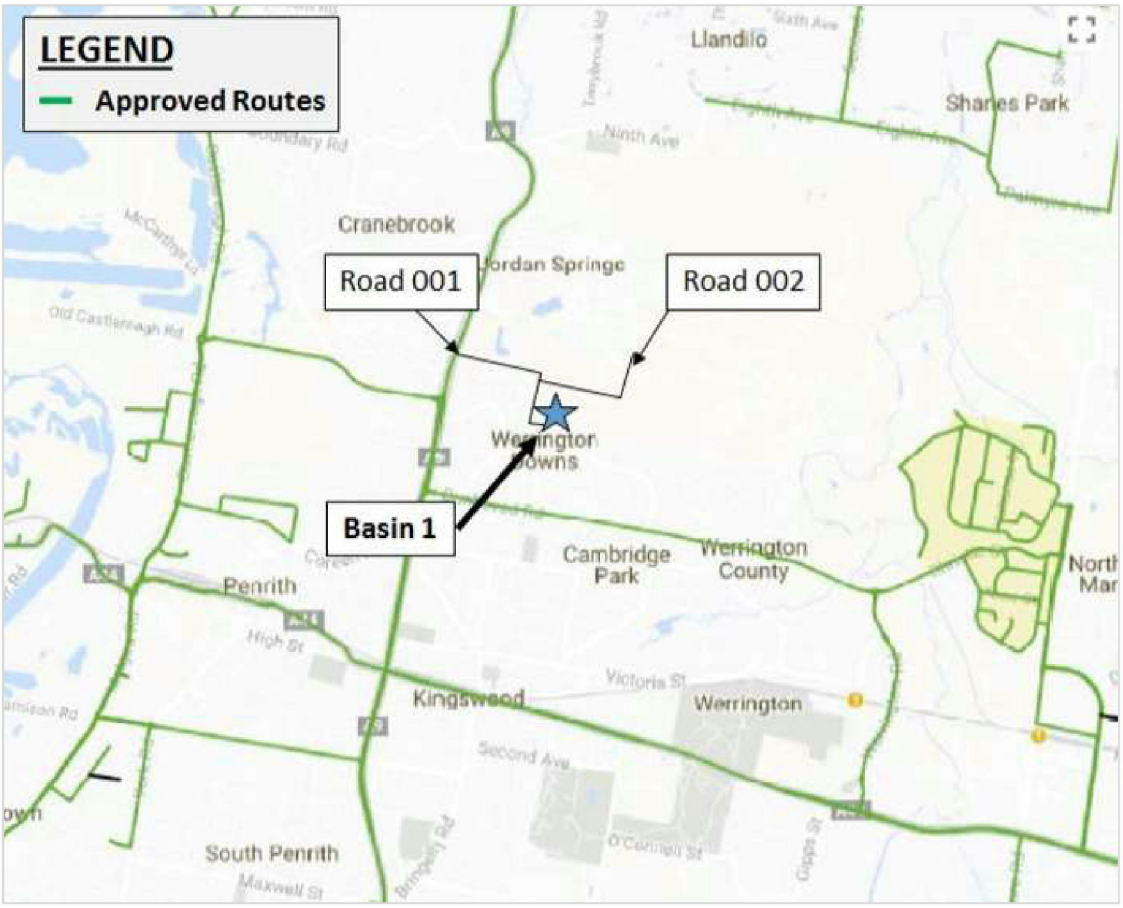
Key roads in the vicinity of the site that will be used by construction vehicles include:

- The Northern Road: a four-way State Road under the authority of Roads and Maritime Services (RMS) connecting to Trinity Drive to the south and Jordan Boulevarde to the north
- Lakeside Parade: a two-lane local road under the authority of Council connecting Jordan Springs to The Northern Road
- Jubilee Drive: a two-lane local under the authority of Council running along the norther side of the site and intersection with Lakeside Parade.

7.7.2 Construction vehicle access routes

There are 3 access points to the site for construction vehicles, including:

- Route 1: via a haulage route created off The Northern Road (referred to as Haul Road 001), located to the south of the intersection with Sherringham Road



- Route 2: via a haulage route created off Jubilee Drive (referred to as Haul Road 002), located near the intersection with Protea Way. Construction vehicles would then use Lakeside Parade and Greenwood Parkway in Jordan Springs to access The Northern Road
- Route 3: via Haul Road 002 created off Jubilee Drive, Lakeside Parade, Links Road and Forrester Road in the Central Precinct.

Heavy vehicles (mostly comprising 'Truck & Dog' trailers of 19 m in length) would access the site via Route 1 only. Light construction vehicles would access the site via all three routes. A hardstand area at the site will be used as a truck layover and parking area.

Figure 8 shows the location of Haul Roads 001 and 002. Figure 11 to Figure 11 shows the proposed construction vehicle access routes to and from the site.

Figure 8: Proposed access roads to Basin I (Source: Cardno)

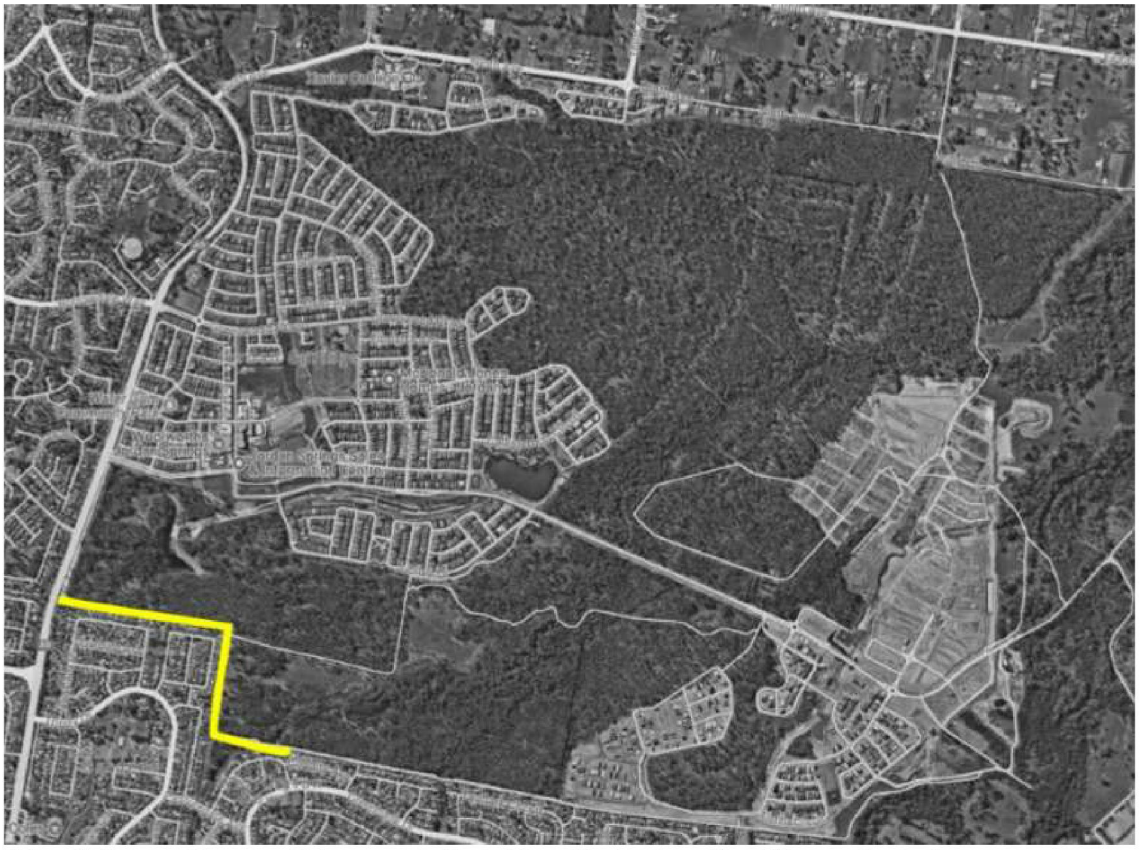


Figure 9: Proposed heavy vehicle access to Basin I from The Northern Road (Source: Cardno)

Figure 10: Proposed light vehicle access to Basin I from Jubilee Drive and the Western Precinct (Source: Cardno)

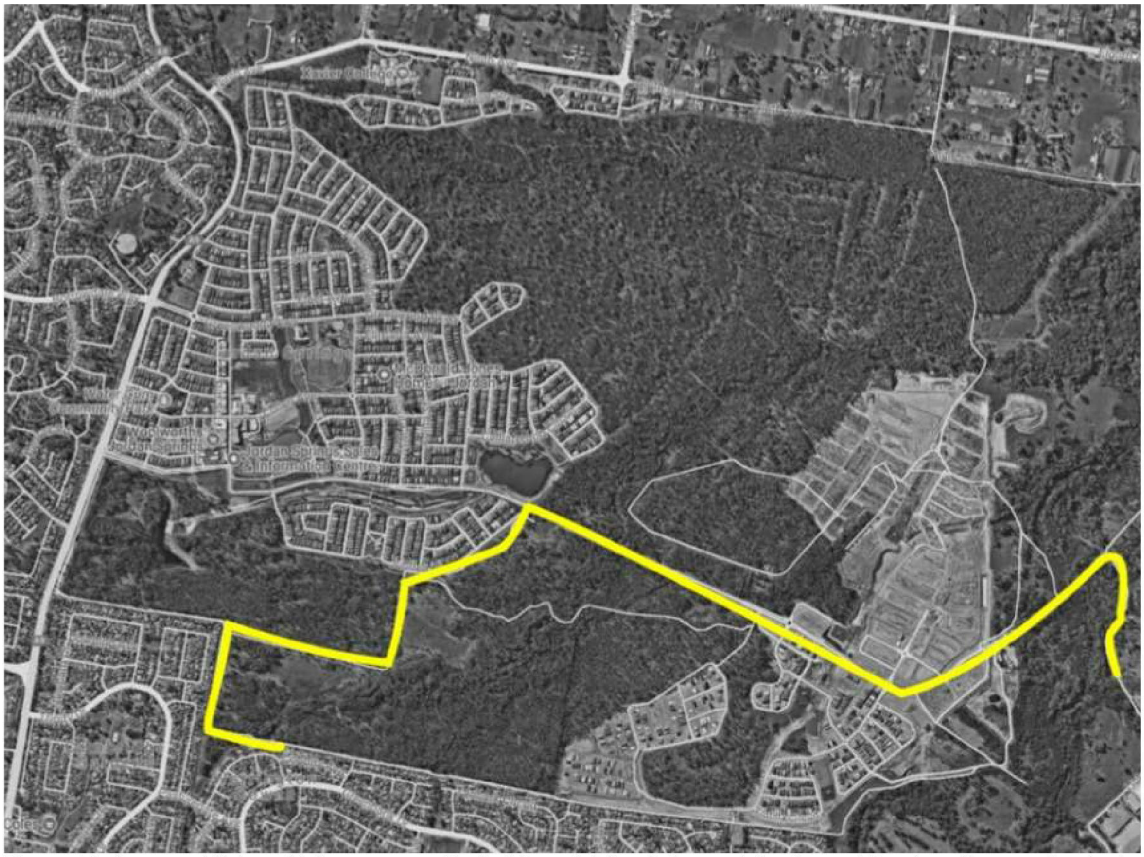


Figure 11: Proposed light vehicle access to Basin I from Jubilee Drive and the Central Precinct (Source: Cardno)

Appropriate sight distances and temporary road signage will be provided at the intersection of The Northern Road/Haul Road 001 and Jubilee Drive/Haul Road 002 to guide construction traffic vehicles. The temporary signage arrangement is shown in Figure 12 and Figure 13.

Figure 12: Proposed temporary signage plan for The Northern Road/Haul Road 001 intersection (Source: Cardno)

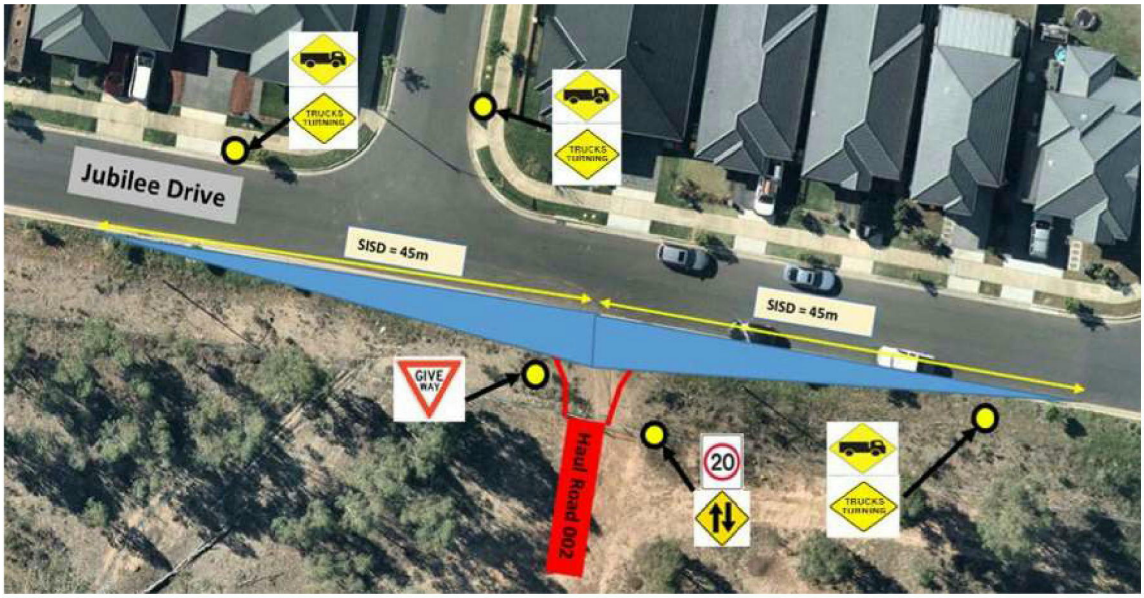


Figure 13: Proposed temporary signage plan for Jubilee Drive/Haul Road 002 intersection (Source: Cardno)

7.7.3 Conclusion

The CTMP considers the construction traffic impacts of the development on the surrounding road network. The CTMP concludes that:

- the proposed heavy vehicle route for construction vehicles is contained within the RMS designated heavy vehicle routes for all road section, as identified as Option 1
- routes, identified in Option 2 and 3, are anticipated for Light construction vehicles only
- a heavy and light vehicle parking and layover area shall be provided on-site, on a hard stand area, to accommodate construction vehicles and the parking requirements of labour force
- due to the relatively low volume of traffic generated, the traffic impacts during the bulk earthworks stage of construction and operation are anticipated to be minimal and are unlikely to generate significant adverse impacts on the road network operation
- all movements by the largest anticipated vehicle (19m long Truck and Dog trailer) can be sufficiently accommodated within the constraints of the key external intersections, as they are part of the approved B-Double route
- temporary works signage shall be provided as required to warn traffic travelling in both directions on both Northern Road and Jubilee Drive to the potential hazards associated with the proposed construction vehicle movements.

7.8 Waste management

A WMP for the site has been prepared by JBS&G and is included at **Appendix H**. The WMP identifies potential waste types that are present within the proposed Basin I site and provides appropriate waste management procedures.

Waste material from the site will generally comprise vegetation waste and excavated soils. The WMP classifies waste product consistent with the EPA's classification of 'garden waste' for vegetation material which includes grass, leaves, branches, tree trunks and stumps and similar materials. Surplus soil is classified as 'general solid waste (non-putrescible)' and

VENM including clay, gravel, sand, soil and rock fines that does not contain sulfidic ores or soils, or any other waste.

The sequencing of waste removal will initially involve the removal and stockpiling of all surface vegetation, prior to the excavation of soils. Both garden waste and VENM will be re-used within the St Marys Development Site (where possible) or otherwise recycled at an off-site waste processing facility. It is likely any garden waste will need to be processed (i.e. chipped) prior to its re-use within the site.

Waste that is unsuitable for re-use will be removed in accordance with the relevant regulatory and EPA requirements for the transportation of waste products. This includes adequately coverage of waste loads to prevent spillage on to the road and prevention of dust, litter or damage to other vehicles. Waste transportation will be undertaken by an appropriately licensed contractor and disposed of at a lawful place, in accordance with the *Protection of Environment Operations Act 1997*.

There is the potential for contaminants of potential concerns to be encountered across the site including fill materials not consistent with the definition of VENM, asbestos-containing materials and fragments, chemicals and ash or slag contaminated soils. The WMP states that a review of historical activities indicates there is a low possibility for such contaminants to be present at the location where Basin I is proposed. Notwithstanding, the WMP includes an Unexpected Finds Protocol as a precautionary measure to ensure the protection of workers and the surrounding community. It will be the responsibility of the construction contract to ensure the protocol is followed during construction of the detention basin.

7.9 Heritage

7.9.1 Aboriginal heritage

An area-wide Aboriginal heritage impact permit (AHIP) for works within the Central Precinct was issued by OEH on 5 June 2014 (No. C0000362). The AHIP was issued under section 90 of the NP&W Act and is valid for 15 years. The AHIP authorises the undertaking of salvage excavations, community collections and harm to certain Aboriginal objects as part of the proposed works.

Basin I is located outside the boundary of the existing AHIP for the site. Consequently, an Archaeological and Cultural Assessment Methodology (ACAM) has been prepared by GML Heritage to support the EIS. The ACAM is provided at **Appendix I**.

The ACAM has been prepared to provide Registered Aboriginal Parties with information about Basin I and to allow the opportunity to provide culturally appropriate information and comment on the methodology. The ACAM will be used to assist with the preparation of an Aboriginal Cultural Heritage Assessment Report to support an application to OEH for an AHIP under section 90 of the NP&W Act. The submission of an AHIP firstly requires development consent to be obtain under Part 4 of the EP&A Act.

In preparing the ACAM, preliminary investigations and field inspections were carried out by GML Heritage in October 2016. The site inspection assessed the current site conditions including the potential for Aboriginal archaeological deposits, objects or places. The ACAM states that the Basin I field inspection found there to be the potential for intact soil profiles which may potentially contain Aboriginal objects within the basin footprint, which would potentially be impacted during construction works. The ACMA subsequently recommends:

- further Aboriginal consultation be undertaken in accordance with OEH's guidelines;
- an Aboriginal archaeology research design be prepared detailing how the study area will be archaeologically tested and if relevant, subject to salvage excavations; and
- an area-based AHIP be sought for the whole development area.

7.9.2 European heritage

A Heritage Impact Statement (HIS) that assesses historical (European) archaeology has been prepared by Casey & Lowe and is included at **Appendix J**. The HIS found the Basin I study area to have no predicted historical archaeological potential and no relics were identified that would be protected under the *NSW Heritage Act 1977*.

The HIS concludes that Basin I would have no impact on historical (European) archaeology. It is recommended that any unexpected historical archaeological relics that are located be managed as part of an Unexpected Finds Protocol/Relics Management Plan.

7.10 Visual

A Landscape Character and Visual Impact Assessment (LCVIA) for the site has been prepared by Clouston Associates and is included at **Appendix K**. The LCVIA address the potential for impacts on the existing landscape character and visual amenity at the site and includes potential mitigation measures to reduce visual impacts.

The LCVIA describes the location of Basin I as an area occupied of weedy freshwater wetlands, moderate quality River Flat Eucalypt Forest and small areas of exotic grassland. The landscape character of the surrounding area is a contrast between the remaining vegetation types of the reserve where the basin will be located and surrounding suburban development. The LCVIA notes there are no significant public or private views in the immediate vicinity of Basin I.

Visual impacts have been assessed from 10 vantage points surrounding the site. The viewpoints are shown in Figure 14 to Figure 23 below. The anticipated visual impact at each of the viewpoints, as outlined in the LCVIA, is also provided.

Viewpoint 1: Looking east from the Northern Road Entrance with the residential boundary of Cambridge Gardens to the right (distance of 940 m).

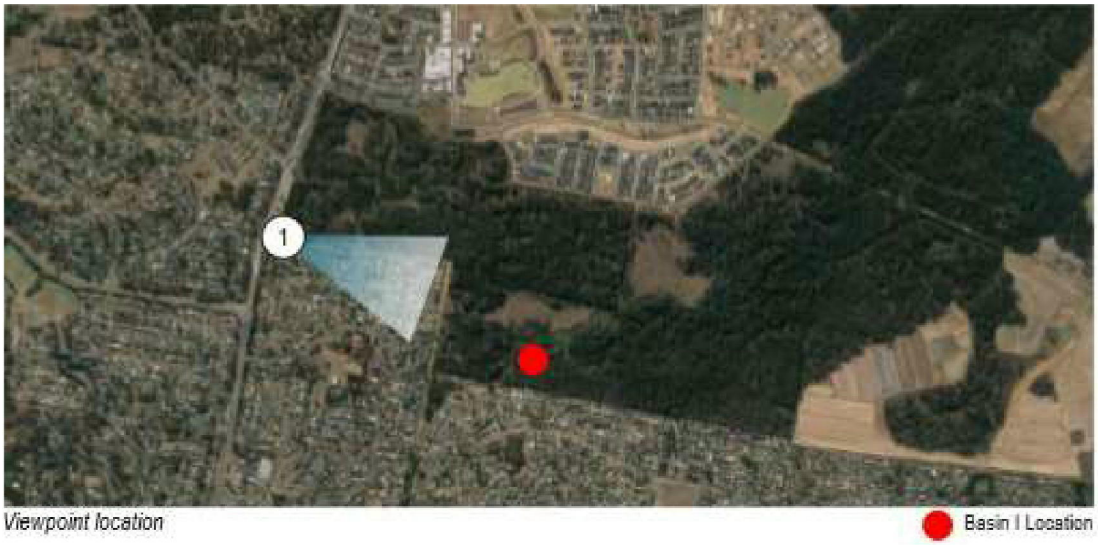


Figure 14: Viewpoint 1 looking south (Source: Clouston Associates)

Visual impact: *Due to the existing properties of Cambridge Gardens the basin will not be visible from this location. Mature vegetation both within the residential properties as well as the Regional Park will completely obscure the basin. As a result of this a* ***negligible*** *visual impact is anticipated* (Clouston Associates, 2018).

Viewpoint 2: Looking south with the residential boundary of Cambridge Gardens to the right. (distance of 400 m).

Figure 15: Viewpoint 2 looking south (Source: Clouston Associates)

Visual impact: *Due to the existing vegetation within the regional park the basin will not be visible from this location. Although the understorey is sparse in some parts the basin will be below the ground plane and so will be obscured by surrounding trees and understorey. As a result of this a* ***negligible*** *visual impact is anticipated* (Clouston Associates, 2018).

Viewpoint 3: Looking east with open grassland and residential boundary of Werrington Downs to the right (distance of 192 m).

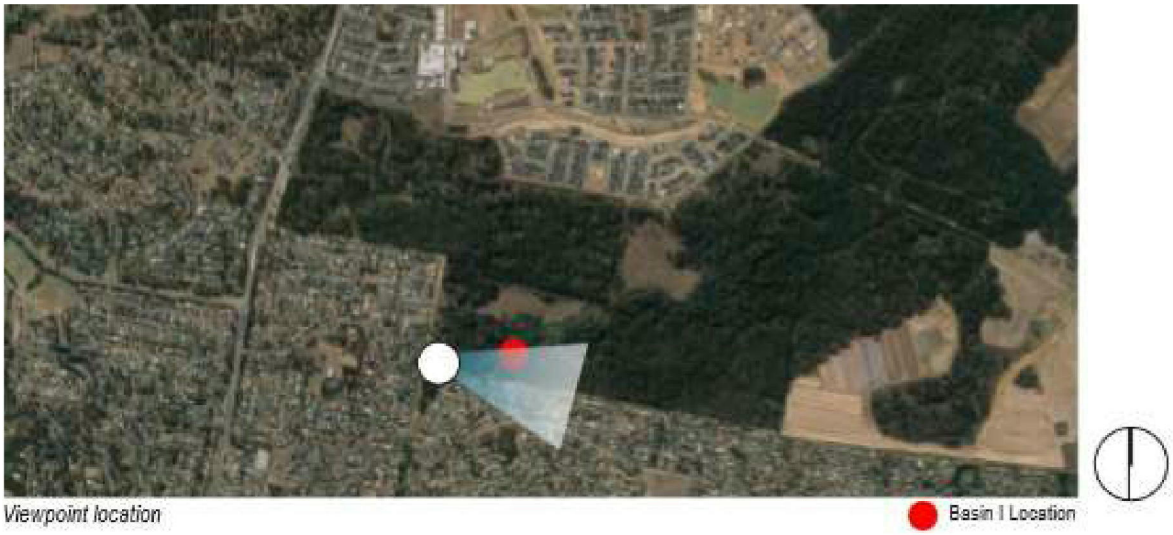


Figure 16: Viewpoint 3 looking east (Source: Clouston Associates)

Visual impact: *The lower height vegetation and box culvert exit point mark the southern edge of the proposed basin, where the inflow point and rock grading will be located. It is expected that a reduction in the level of vegetation will be visible in order to accommodate the proposed regrading required for the basin and rock lining area, and will result in the track on the eastern side of the proposed basin becoming more visible in the centre of the view from this location. As a result of this a* ***low*** *visual impact is anticipated* (Clouston Associates, 2018).

Viewpoint 4: Looking south-east at existing box culvert and Werrington Downs residential boundary (distance of 0 m).

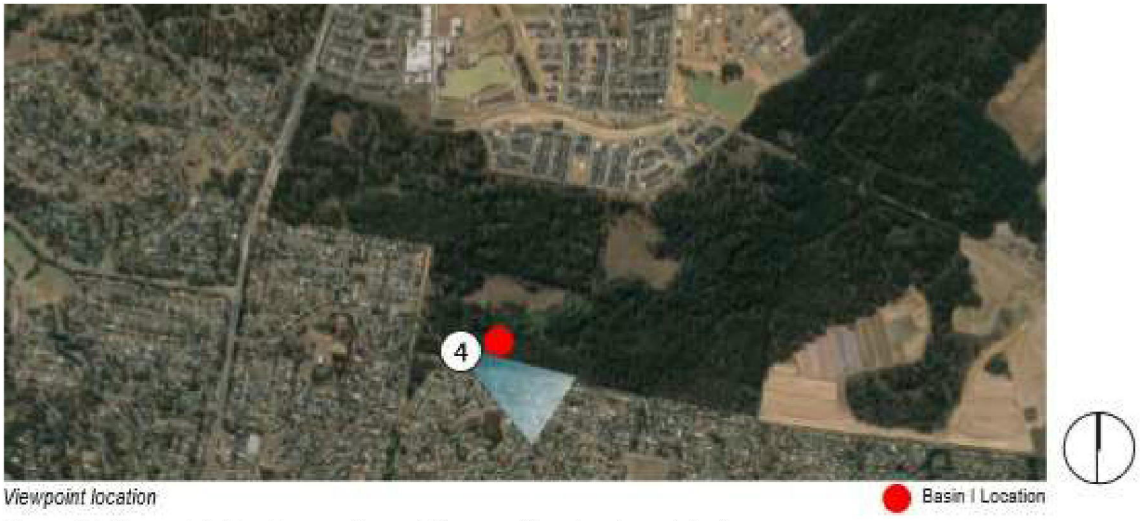


Figure 17: Viewpoint 4 looking south-east (Source: Clouston Associates)

Visual impact: *This will serve as an inflow point for the basin, and as a result the existing vegetation in this area will be removed. Local regrading has been proposed to prevent ponding, as well as rock lining in the vicinity of the box culvert. A 3m wide vehicular path will be where the current path is. It is expected that this area will become more open with the regrading and removal of the existing vegetation, allowing for views across the basin to the*

track on the eastern side (currently obscured). The level of permanent water visible will be more noticeable from this location due to the regrading increasing the visible distance between the existing banks. As a result of this a ***moderate*** *visual impact is anticipated (Clouston Associates, 2018).*

Viewpoint 5: Looking east with Werrington Downs residential boundary to the right (distance of 5 m).

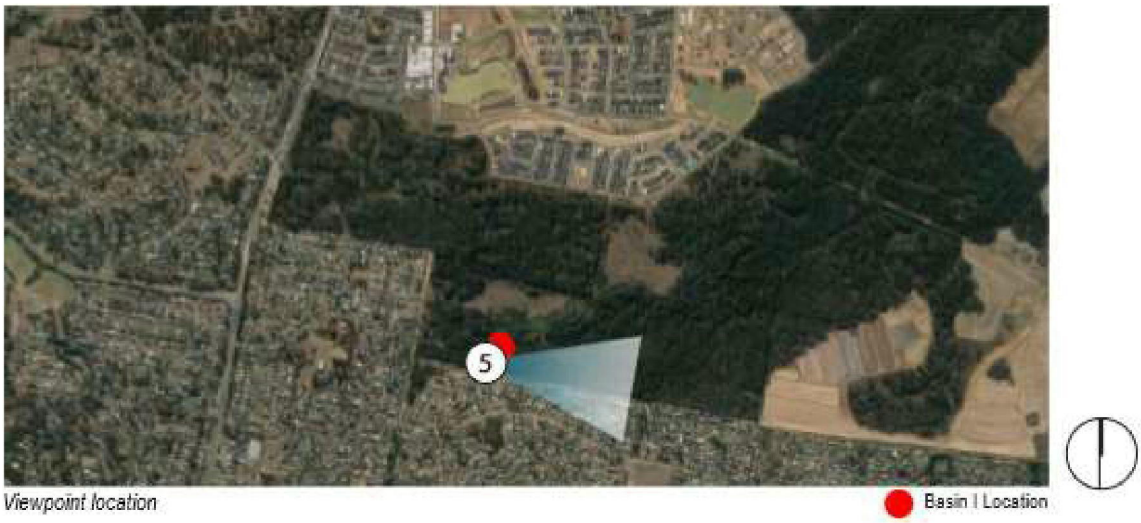


Figure 18: Viewpoint 5 looking east (Source: Clouston Associates)

Visual impact: *A small band of existing vegetation will be retained along the track edge which will provide filtered views to the basin. A noticeable reduction in the density of vegetation looking north will be apparent both from the track and from the backyards of the properties facing the direction of the basin. As a result of this a* ***moderate*** *visual impact is anticipated* (Clouston Associates, 2018).

Viewpoint 6: Looking north from the track next to the proposed basin (distance of 0 m).

Figure 19: Viewpoint 6 looking north (Source: Clouston Associates)

Visual impact: *The existing view of vegetation will be replaced by views of standing water within the basin surrounded by a ring of macrophytes to the waters edge, with the basin edge sloping upwards to meet the surrounding existing ground level. As a result of this the existing visual scene will be significantly altered and it is expected a* ***moderate/high*** *visual impact will result* (Clouston Associates, 2018).

Viewpoint 7: Looking north from the northern edge of the proposed basin (distance of 0 m).

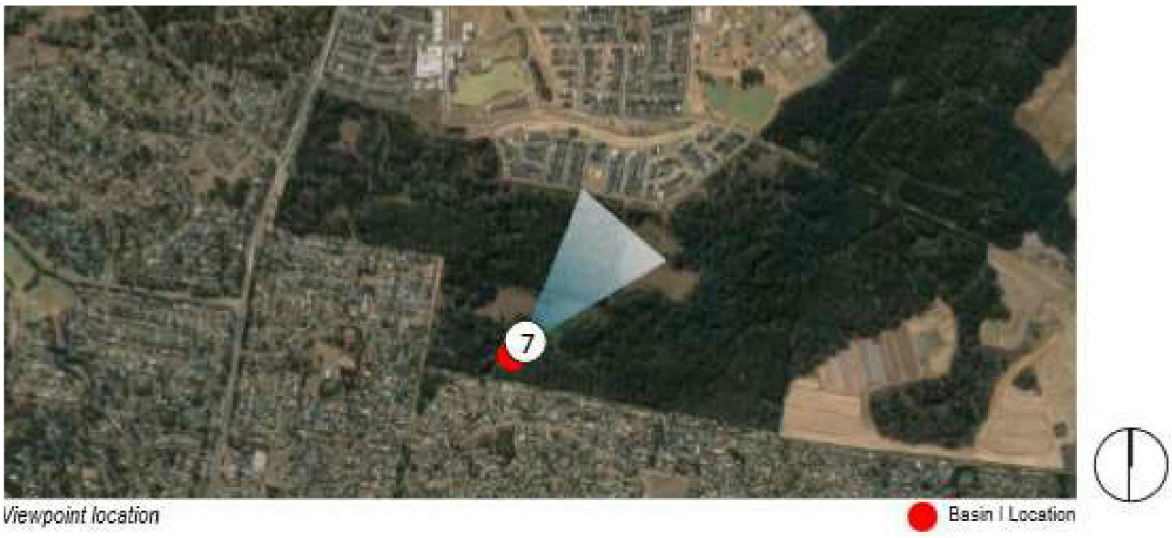


Figure 20: Viewpoint 7 looking north (Source: Clouston Associates)

Visual impact: *This is in the vicinity of the northern most part of the basin, and as a result of this a portion of the exotic grassland will be lost and replaced with the basin. This will comprise of standing water with macrophytes ringing the edge of the basin at the permanent water height. From here the basin will slop up to meet the existing ground level. Open grasslands will remain visible beyond the edge of the basin, as will the existing mature vegetation in the distance. As a result of this it is expected that a* ***moderate/high*** *visual impact will occur.* (Clouston Associates, 2018).

Viewpoint 8: Looking south from the Jubilee Drive entrance (distance of 520 m).

Figure 21: Viewpoint 8 looking south (Source: Clouston Associates)

Visual impact: *Due to the established woodlands the project will be shielded from this location as well as further down the track. As a result of this it is expected that a* ***negligible*** *visual impact will result. impact will occur.* (Clouston Associates, 2018).

Viewpoint 9: Looking east along Jubilee Drive with the site boundary to the right (distance of 560 m).

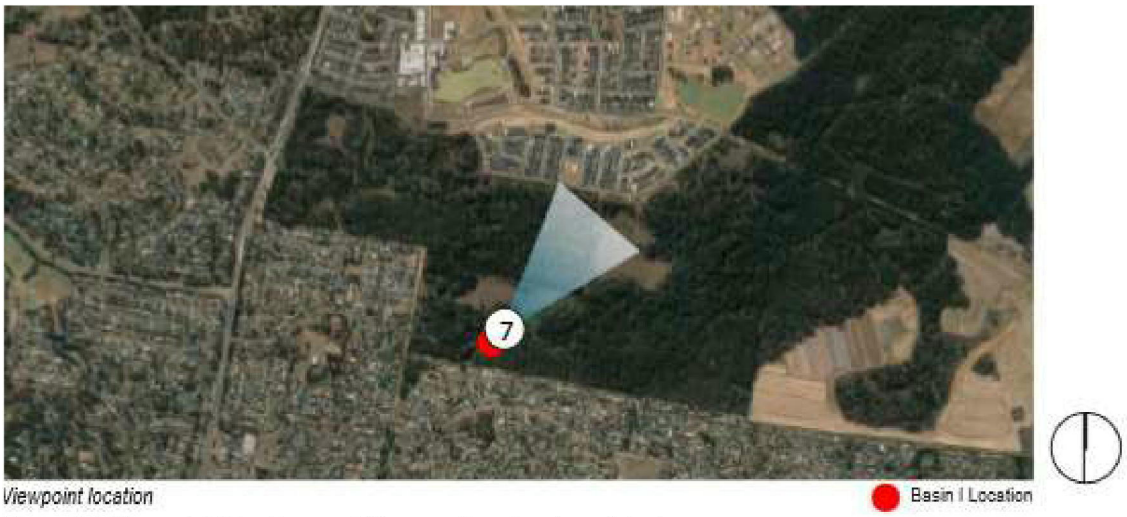


Figure 22: Viewpoint 9 looking east (Source: Clouston Associates)

Visual impact: *Although the topography itself does not vary greatly from Jubilee Drive to the basin location, the woodlands will prevent views from both the street and the houses along Jubilee Drive. As a result of this a* ***negligible*** *visual impact is expected.* (Clouston Associates, 2018).

Viewpoint 10: Looking south from Jubilee Drive across Boronia Village Park (distance of 630 m).

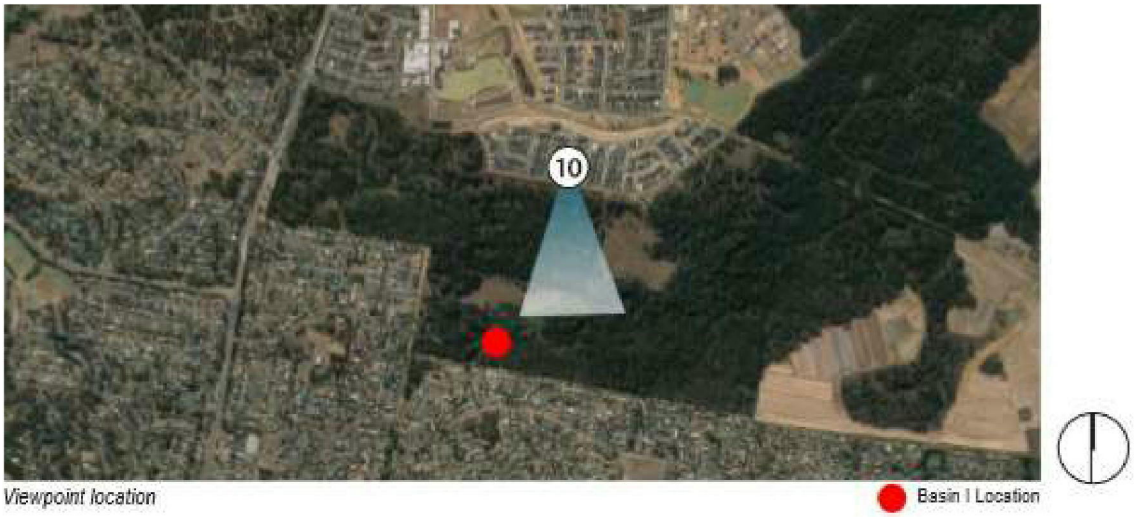


Figure 23: Viewpoint 10 looking south (Source: Clouston Associates)

Visual impact: *The basin will not be visible from this location due the density of the woodland. As a result of this a* ***negligible*** *visual impact will result.* (Clouston Associates, 2018).

Conclusion

As stated in the LCVIA, the proposal will be visible only from a small number of properties bordering the Wianamatta Regional Park (properties along Wintercorn Row and Cobbity Avenue in Werrington Downs) and to the north of the proposed basin in the open grassland area (that is not accessible to the public). Moderate to high visual impacts are only expected from directly adjacent to the basin with the most noticeable visual impact being the result of vegetation removal to be replaced with a standing waterbody.

The LCVIA concludes that the modest scale, character and catchment of the visual impacts are such that they would not constitute reasons for the proposed basin not to proceed on visual impact grounds and recommends the use of planting around the proposed basin site to provide filtered views.

7.11 Bushfire

A Bushfire Protection Assessment (BPA) was prepared by Eco Logical Australia. The BPA was prepared in accordance with *Planning for Bush Fire Protection 2006* (RFS, 2006) and is included at **Appendix L**.

The BPA considers Basin I will not increase the bushfire hazard for nearby residential areas. Construction of the detention basin will require the removal of Alluvial Woodland vegetation that will reduce the level of hazard for existing development in proximity to the site, including the suburbs of Werrington Downs and Cambridge Gardens.

The BPA does not require the establishment of asset protection zones as the proposal only involves construction of the detention basin and creation of access roads to be used during construction. The construction access roads do not constitute perimeter roads or designated fire trails. The BPA raised no further concerns regarding bushfire hazard.

7.12 Wianamatta Regional Park

The Wianamatta Regional Park comprises land zoned Regional Park under SREP 30. The Park was established in January 2008 and has gradually been expanded as land is acquired across the St Marys Development Site. The Park will eventually encompass an area of up to 900 hectares and will be managed as a regional park under the NP&W Act.

The SEARs require the EIS to demonstrate how the proposal will meet the requirements of the *Wianamatta Regional Park Plan of Management* (DECCW, 2011). The Plan has been prepared to protect and maintain remnant vegetation, biodiversity, cultural and scenic values across the St Marys Development Site.

Table 17 demonstrates how proposed Basin I meets the management objectives of the Plan.

Plan of Management objective	Consideration
1. Protection and enhancement of the natural heritage of the Park, particularly the endangered ecological communities and the threatened flora and fauna species through the	The proposal will not impact on the continued protection and enhancement of the natural heritage of the Park.

Plan of Management objective	Consideration
management of fire, disturbed areas, drainage, introduced species, access and visitor us.	
2. Recognition and protection of traditional and contemporary Aboriginal cultural heritage, landscape and spiritual values through providing opportunities for the involvement of the traditional owners and the local Aboriginal community in the protection, interpretation and management of this heritage and values.	An ACAM has been prepared as part of the application which recommends further Aboriginal consultation be undertaken, an Aboriginal archaeology research design be prepared and an area-based AHIP be sought for the entire development area (see **Section 7.9**). These recommendations will ensure the continued protection of traditional and contemporary Aboriginal cultural heritage.
3. Protection of historic sites and relics through identifying, recording, conserving and interpreting historic resources.	The proposed detention basin will not impact on the continued protection of any historic sites and relics.
4. Protection of the catchment values of South and Ropes Creeks through managing any disturbances, particularly those associated with fire, access and drainage.	The proposed detention basin will improve the catchment values of South Creek and Ropes Creek by providing significant water quality improvements to the currently untreated surface water runoff prior to entering tributaries within the Regional Parkland area (see **Section 7.1**).
5. Provision of recreational facilities that are appropriate in a regional context and are designed, located and managed to protect the natural and cultural heritage and visual values of the Park.	The application seeks approval for a stormwater detention basin and does not propose the provision of any recreational facilities.
6. Provision of interpretive and educational opportunities through signage, park brochures and activities to assist visitor understanding and enjoyment of the Park.	The application seeks approval for a stormwater detention basin and does not propose the provision of signage and/or park brochures.
7. Improving knowledge of natural and cultural heritage, corresponding threats and the evaluation of management programs through research and monitoring. Working with local government, other agencies and authorities, the community and commercial interests to maximise community interest and involvement in the conservation of the Park, and the implementation of sympathetic conservation measures in the neighbouring environment.	Monitoring of water quality conditions within the basin is anticipated through conditions of consent.

Table 17: Objectives of the Wianamatta Regional Park Plan of Management

8 Conclusion

This EIS addresses the matters outlined in the SEARs issued by DPIE on 25 October 2017 and has been prepared in accordance with the requirements of Schedule 2 of the EP&A Regulation.

The EIS provides a comprehensive assessment of the potential impacts associated with the creation of a regional detention Basin I on land within the St Marys Development Site. The conclusions and recommendations provided in the accompanying technical reports confirm the proposal will not have a detrimental impact on the surrounding environment.

Basin I will provide significant water quality improvements to the currently untreated surface water runoff from developed downstream urban areas and the future Central Precinct prior to entering tributaries to South Creek within the Regional Park. As a result, the development will improve water quality conditions across the broader St Marys Development Site.

The application is therefore considered to be in the public interest and warrants approval.