

Queanbeyan Sewage Treatment Plant Upgrade

Environmental Impact Statement



Clear waters for
future generations

Cover Page

Cover page as per Scoping Document requirements:

Requirement	Detail
Name of proposal	Queanbeyan Sewage Treatment Plant (STP) Upgrade
Block identifier and street address for the proposal	Block: 27 Section: 0 District/division: Jerrabomberra Street address: 7 Mountain Road, Jerrabomberra, ACT
Date of preparation of this document	26 April 2022
Full name and postal address of the proponent	Queanbeyan-Palerang Regional Council (QPRC) PO Box 90 Queanbeyan NSW 2620
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Volume 1



Glossary & Abbreviations



Glossary

Abbreviations	Definition
AADT	Annual Average Daily Traffic
AC	asphalt concrete
ACM	Asbestos containing materials
ACT	Australian Capital Territory
ACT EPA	ACT Environment Protection Authority
ADR	Asbestos Pre Demolition Register
ADWF	Average Dry Weather Flow
AEP	annual exceedance probability
AHD	Australian Height Datum
AIC	Asset Interface Classification
ALS	Australian Laboratory Services
ANEF	Australian Noise Exposure Forecast
AMP	Asbestos Management Plan
AMR	Asbestos Management Register
APZ	Asset Protection Zones
ARI	average recurrence interval
ASRIS	Australian Soil Resource Information System
ASS	Acid sulphate soil
AS / NZS	Australian Standard / New Zealand Standard
AUSRIVAS	Australian River Assessment System
A-weighting	a single-number sound pressure level that includes a frequency weighting
BOD	Biological oxygen demand
BPA	Bushfire Prone Area
BMS	ACT Bushfire Management Standards 2014
BNR	Biological nutrient removal
BTEX	benzene, toluene, ethylbenzene and xylenes
CAS	Conventional Activated Sludge
CASA	Civil Aviation Safety Authority
Caustic	sodium hydroxide solution
CEC	Cation exchange capacity
CEMP	Construction environmental management plan
CFCs	Chlorofluorocarbons
CH ₄	Methane
CHA	Cultural Heritage Assessment
CHAIR	Construction Hazard Assessment Implication Review
CoC	chain of custody

Abbreviations	Definition
CO	carbon monoxide
CO ₂	Carbon dioxide
CO _{2-e}	CO ₂ equivalent
CoPCs	contaminants of potential concern
CMTEDD	Chief Minister, Treasury and Economic Development Directorate
CNVMP	Construction Noise and Vibration Management Plan
DA	Development application
DAF	Dissolved Aerated Filtration
DAFF	Dissolved Air Flotation and Filtration
DAWE	Department of Agriculture, Water and the Environment.
DBYD	Dial Before You Dig
DCP	dynamic cone penetrometer
DESA	design equivalent standard axle loads
DPIE	NSW Department of Planning, Industry and the Environment
DPI	NSW Department of Primary Industry
DPI Water	NSW Department of Primary Industries – Office of Water
DoEE	Australian Government Department of Environment and Energy. Renamed to Department of Agriculture, Water and the Environment (DAWE) after 1 February 2020.
EA	Environmental Authorisation
EBPR	Enhanced Biological Phosphorus Removal
EDCs	Endocrine Disrupting Chemicals
EIL	Ecological Investigation Level
EIS	Environmental impact statement
EISAR	EIS Assessment Report
EMP	Environmental Management Plan
ENM	Excavated Natural Material
EP	equivalent population
EP Act	<i>Environment Protection Act 1997 (ACT)</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPP	Contaminated Sites Environmental Protection Policy 2009
EP Regulation 2005	ACT Environment Protection Regulation 2005
EPSDD	ACT Environment Planning and Sustainable Development Directorate
ESCP	Erosion and Sediment Control Plan
ESA	ACT Emergency Services Agency
ESD	Ecologically sustainable development
Far future	Climate projections for 2070 represent the 20 year period between 2060-2079
FC	Faecal Coliform

Abbreviations	Definition
FOGO	Food Organics and Garden Organics
GO	Garden Organics
GRP	Gross Regional Product
GSM	Golden Sun Moth
H ₂ O	Water vapour
H ₂ S	hydrogen sulphide
HAZOP	Hazard and operability
HFCs	Hydrofluorocarbons
HGV	heavy goods vehicle
HIA	Health Impact Assessment
HIL	Health Investigation Levels
HMMP	Hazardous Materials Management Plan
HPS	Health Protection Service
HSL	Health Screening Levels
HWA	Hunter Water Australia P/L
IAP2	International Association for Public Participation
IAPZ	Inner Asset Protection Zone
IAQM	Institute of Air Quality Management
IBC	immediate bulk containers
IP&R	Integrated Planning and Reporting
IS	Infrastructure Sustainability
ISCA	Infrastructure Sustainability Council of Australia
IWCM	Integrated Water Cycle Management
JSEA	Job Safety and Environmental Analysis
LBG	Lake Burley Griffin
LGA	Local Government Area
LOR	limit of reporting
LSC	Land and Soil Capability
MBT	Membrane Bioreactor Technology
MCA	Multi Criteria Analysis
MNES	Matters of National Environmental Significance
MOL PAD	Molonglo River Corridor, Area of Archaeological Potential
MOU	Memorandum of Understanding
N ₂ O	Nitrous oxide
NC Act	<i>Nature Conservation Act 2014</i>
NCA	National Capital Authority
NCP	National Capital Plan

Abbreviations	Definition
near future	Climate projections for 2030 represent the 20 year period between 2020-2039
NEMP	National Environmental Management Plan
NEPP	ACT EPA Noise Environment Protection Policy 2010
NGER	National Greenhouse Gas and Energy Reporting
NMM	ACT EPA 'Noise Measurement Manual' 2009
NOHSC	National Health & Safety Commission
NO ₂	Nitrogen dioxide
NPI	National Pollutant Inventory
NSW	New South Wales
NSW AVTG	NSW Department of Environment and Conservation's Assessing Vibration: A Technical Guideline, February 2006
NSW DPIE	NSW Department of Planning, Industries and Environment
NSW EPA	New South Wales Environment Protection Authority
NVIA	Noise and Vibration Impact Assessment
O ₃	Ozone
OAPZ	Outer Asset Protection Zone
OCP	organochlorine pesticides
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OEPA	Oaks Estate Progress Association
OLS	Obstacle Limitation Surface
OPP	organophosphorus pesticides
OU	Odour Units
PAD	Potential Archaeological Deposit
PAH	Polycyclic aromatic hydrocarbons
PANS-OPS	Procedures for Air Navigation Services – Aircraft Operations
PCB	polychlorinated biphenyls
PD Act	<i>Planning and Development Act 2007</i>
PD Regulation	Planning and Development Regulation 2008
PFAS	per-and poly-fluoroalkyl substance
PID	photo-ionisation detector
PMF	Probable maximum flood
PMST	Public Matters Search Tool
POEO Act 1997	<i>Protection of the Environment and Operations Act 1997</i>
POEP Regs 2014	Protection of the Environment and Operations Protection (Waste) Regulation 2014
PLM	Polarised Light Microscopy
PRA	Preliminary risk assessment - from section 7 of EIA Scoping Report (Arup, July 2019)
primary sludge	Sludge from the sedimentation tank

Abbreviations	Definition
PM _{2.5} and PM ₁₀	Particulate Matter _{2.5} and Particulate Matter ₁₀
PST	Primary settlement tank
PTWL	Pink-tailed Worm-lizard
PDWF	Peak Dry Weather Flow
QPRC	Queanbeyan-Palerang Regional Council
QSTP	Queanbeyan Sewage Treatment Plant
QSTP PAD	Queanbeyan Sewage Treatment Plant Potential Archaeological Deposit
RAO	Representative Aboriginal Organisation
RANMG	Transport Canberra and City Services' Roads ACT Noise Management Guidelines
RCMCG	ACT & Region Catchment Management Coordination Group
RWQMP	Recycled Water Management Plan
RWQIA	Receiving Water Quality Impact Assessment
SA EPA	South Australian Environment Protection Authority
SBMP v4	ACT Strategic Bushfire Management Plan 2019-2024
SCADA	supervisory control and data acquisition
SCEP	Stakeholder Communications and Engagement Plan
secondary sludge	Sludge from the sludge lagoons
SGC	Silica Gel Clean-up
SMF	Synthetic Mineral Fibre
Sodium hypochlorite system	liquid chlorine
SPRAT	The Department of Agriculture, Water and the Environment Species Profile and Threats Database
SS	Suspended solids
STP	Sewage Treatment Plant
SWMS	Safe Work Method Statement
TCCS	Transport Canberra and City Services
TCLP	toxicity characteristic leaching procedure
TDS	Total dissolved solids
TEC	Threatened Ecological Communities
the Regulation	ACT Environment Protection Regulation 2005
the Statement	The Statement of Strategic Directions identified in section 2.1 of the Territory Plan
TMP	Traffic Management Plan
TN	Total nitrogen
ToBAN	Total Fire Ban
TP	Total phosphorous
TRH	total recoverable hydrocarbons
TSS	Total Suspended Solids

Abbreviations	Definition
UFP	Unexpected Finds Procedure
UTR	Utilities Technical Regulator
UV	Ultraviolet
VDV	vibration dose value
UTR Act	<i>Utilities (Technical Regulation) Act 2014</i>
VENM	Virgin Excavated Natural Material
WAMI	Queanbeyan Waste Minimisation Centre
WHS	Work health and safety
WHO	World Health Organisation
WQOA	Water quality objectives analysis
WQHA	Water Quality and Hydrology Assessment
WQMP	Water Quality Management Plan
WHMP	Wildlife Hazard Management Plan
WR Act	<i>Water Resources Act 2007</i>
WRMP	Waste and Recycling Management Plan

Executive Summary



Executive Summary

Queanbeyan-Palerang Regional Council (QPRC) is seeking approval for the Queanbeyan Sewage Treatment Plant (QSTP) upgrade (the Proposal). The approval is being sought under the *Planning and Development Act 2007* as an impact track assessment.

This Revised Environmental Impact Statement (EIS) has been prepared to describe the Proposal and provide an assessment of the potential environmental impacts that could occur as a result of its construction and operation and identifies measures that would be implemented to avoid and minimise those impacts.

What is proposed?

The QSTP upgrade includes the planning, design and building of a new sewage treatment plant (STP) facility to cater for up to 75,000 equivalent population (EP). The new STP would be constructed on the existing site to the south east of the existing treatment process. The upgrade would improve treatment reliability by replacing the existing treatment plant, which is approaching the end of its asset life, with a modern treatment facility.

The Proposal involves the construction of a new treatment plant complete with screening and grit removal, a continuous oxidation ditch activated sludge process with gravity clarifiers, tertiary filtration and ultraviolet (UV) disinfection. Waste sludge produced would be stabilised in an aerobic digester and dewatered, producing a biosolids product that is suitable for reuse. Treated effluent would be discharged via an on-bank discharge structure adjacent to the Molonglo River.

Modelling and assessments have determined that the Proposal would result in comparable or improved effluent quality, with nutrient load contributions from the QSTP predicted to be almost identical between the existing plant and the upgrade.

Why is it needed?

The existing STP is estimated to have a design EP of 34,500 (MWH, 2008) and is currently serving about 52,000 EP. Some of the existing equipment is obsolete and there are issues with maintenance of the existing plant. While maintenance and works have been regularly undertaken on the QSTP, the plant is no longer fit-for-purpose and is experiencing issues such as structural failure, equipment obsolescence and maintenance issues.

The STP is currently meeting effluent licence conditions. There is the risk that the STP may not be able to continue to meet the criteria due to population growth overwhelming the existing infrastructure and would be unable to meet more stringent discharge criteria if imposed in the future. It is estimated that the existing QSTP has about three to five years of effective service life remaining before its condition or ability to meet water quality requirements presents a major asset risk to QPRC and the community.

What are the objectives?

The objective of the Proposal is to provide a robust, reliable and sustainable STP that protects public health and the environment for future generations. The Proposal would deliver a robust and reliable sewage treatment solution that provides for both immediate service needs and plans for identified needs of the future.

The upgrade proposed represents a solution that provides value for money, achieves targeted sustainability and public health outcomes, and would continue to meet regulatory requirements.

The new STP has been designed to meet regulator and stakeholder requirements, and to achieve an Infrastructure Sustainability Council (ISC) rating of 'Excellent'.

QPRC have identified additional benefits of the Proposal, including:

- Securing Queanbeyan's sewage treatment needs for future growth
- Improved ability to control the water quality discharged to the environment and to protect public health
- Improved odour and noise outcomes
- Improved workplace health and safety for workers and visitors to the facility

- Providing improved treatment reliability
- Providing improved protection of the treatment plant against flooding and climate change sustainability
- Providing a source of recycled water that can be used for applications such as dust suppression
- Providing a local facility to receive and treat septage waste collected from domestic septic tanks and aerated wastewater treatment systems
- Improved treatment of the biosolids produced by the treatment process to a quality that is suitable for agricultural reuse
- Providing improved treatment of the waste screening and grit materials generated during the treatment process
- Providing improved traffic access to the treatment plant by sealing the access road.

Statutory framework

Section 123 of the *Planning and Development Act 2007* identifies assessment of the Proposal as Impact Track requiring an EIS. Specifically, the Proposal includes activities identified in Schedule 4 of the Act: construction of a sewage treatment plant that will be less than one kilometre from the boundary of a residential block and will be able to treat each day more than 2500 EP.

The National Capital Plan does not identify any requirements that apply to the site; therefore the Proposal is assessed against the requirements of the Territory Plan. Under the Territory Plan, Block 27 Jerrabomberra is zoned TSZ2 Services and NUZ4 River Corridor. A sewage treatment plant is a permitted use on land zoned TSZ2 Services, as it is considered a 'Major Utility Installation'.

A separate Development Application (DA) will be prepared and submitted to the ACT Environment, Planning and Sustainable Development Directorate (EPSDD).

Community consultation

QPRC have engaged with the community and stakeholders to inform the planning of the Proposal since 2011. As part of the options development, project planning and preparation of the Draft and Revised EIS, QPRC have undertaken various consultation activities with a range of government and agency stakeholders. QPRC has also undertaken a series of community engagement activities prior to and during the preparation of the Revised EIS.

Consultation activities undertaken to date include:

- Agency engagement sessions with ACT Government agencies
- Engagement of Representative Aboriginal Organisations
- Consultation and engagement activities with local environmental groups, including:
 - Queanbeyan Landcare
 - Molonglo Catchment Group
 - Lake Burley Griffin User Groups
 - Canberra Angler's Association
 - Canberra Ornithologists Group
 - Molonglo Conservation Group
 - Jerrabomberra Residents' Association
 - Residents and property owners in Oaks Estate and Beard
 - Inner South Canberra Community Council
 - Pialligo Resident's Association
 - Lake Burley Griffin Guardians.

- Dedicated Project website
- Community letters and brochures.

Consultation activities will continue as the Proposal progresses to detailed design and construction. Further discussion of the community and stakeholder involvement for the Proposal is provided in Chapter 6.

Key findings of the Revised EIS

Materials and waste

Currently the STP stores biosolids in stockpiles on the site, after being stabilised and dewatered. Biosolids from the new STP would be treated to allow for potential reuse options such as agriculture, forestry or soil and site rehabilitation. Alternatively, the biosolids would be transported to landfill. Once the Proposal is operational, no new biosolid material will be stored on site.

It is currently proposed that biosolids produced from the operation of the new STP would be transported to the Woodlawn Bioreactor Facility which produces electricity from biogas. The treatment facilities being constructed at the new STP would also enable biosolids to be beneficially reused for agriculture if a market was identified in the future.

Contamination

Investigations and studies of the existing site have been undertaken with regards to the potential contamination of the site. These studies have included a Preliminary Contamination Report (Appendix K1) and Site Contamination Assessment (Appendix K2).

Results of these assessment indicated the presence of contaminants including asbestos, PFAS and heavy metals. These were determined not to present an unacceptable ecological or human health risk. Heavy metals were also identified on site, however this is consistent with the industrial use of the site and is not anticipated to pose a risk to human health.

Water quality and hydrology

The Receiving Water Quality Impact Assessment (Appendix T3) determined that the effluent quality of the upgraded STP is considered comparable or improved relative to the existing plant, with phosphorus concentrations remaining at the same levels as the existing plant, nitrogen concentrations also remaining at a level comparable to the existing plant, with lower concentrations of bioavailable nitrate. The results also show that nutrient loads from the QSTP would increase as the population increases (i.e. the plant is processing a greater quantity of sewage), however the effluent quality would remain at the same level that it would be once the Proposal is operational.

The methodology for the Receiving Water Quality Impact Assessment underwent significant consultation with EPSDD, the Conservator of Flora and Fauna, other relevant stakeholders so that an appropriate and robust assessment approach would be undertaken

The assessment demonstrates that the water quality of the discharge to the receiving waters (for both Molonglo River and Lake Burley Griffin) would be the same or better than the current STP facility upon operation of the Proposal.

A Revised Water Quality Management Plan (WQMP) has been prepared for the Proposal (see Appendix T1). This plan aims to provide the monitoring and sampling requirements to meet the Environmental Approval conditions for the new facility.

The Proposal has been designed to mitigate infrastructure failure as well as minimise the impact of any failure on the receiving environment due to redundancy provisions, newly constructed assets, contingencies such as controlled bypasses for re-treatment, being built above the flood zone and being highly engineered and controlled.

Odour

No odour complaints have been reported for the surrounding area with regards to the existing STP operations. A QSTP Upgrade Odour Assessment (Appendix M1) has been prepared for the Proposal to determine likely odour impacts as a result of the Proposal. Odour impacts and concentrations for the proposed STP are not predicted to be significant and would meet acceptable odour levels.

Odour contours modelled for the proposed STP show a reduction in emissions for the site as to be expected with the retirement of the older treatment units and removal of sludge stockpiles from the site.

Odour generated from decommissioning maturation ponds is considered low risk and poses less of a risk of odour generation than the sludge lagoon dewatering that occurs as part of current operation. Odour generation from dewatering maturation ponds would be temporary (unlikely to extend for more than a few weeks).

Hazard and risk

The existing STP is located within the extents of the 1% Annual Exceedance Probability (AEP) (1 in 100 year) flood zone of the Molonglo River. Previous lower flood events have resulted in the failure of maturation pond embankments, and release of partially treated effluent. Following construction of the Proposal, the maturation ponds would be decommissioned, and the area remediated to extend the riparian zone along the bank of the Molonglo River. The maturation ponds will not form part of the treatment process once the new treatment plant has been constructed and commissioned.

The proposed upgrade has been designed to have all critical infrastructure (major structures, buildings and roads) situated outside the 1% AEP flood zone (including allowance for climate change), protecting the major structures from flooding. Mechanical and electrical equipment is located above the 0.5% AEP level. The hydraulic grade of the treatment process has been designed so that the top water level of the last treatment process (the UV disinfection facility) is above the 0.5% AEP flood level, and most of the treatment plant facilities are located above the 0.2% AEP.

Biodiversity

Desktop studies, terrestrial, aquatic and targeted field surveys have been undertaken to understand the existing ecological conditions of the site.

Results of terrestrial field surveys identified the presence of habitat for the vulnerable Golden Sun Moth in the south east corner of the site. The Proposal has been designed to avoid the identified areas of habitat and it will be marked up as an exclusion zone during construction.

No threatened ecological communities or threatened plant species were identified at the site and the Revised Ecological Assessment (Appendix Q1) determined that it is unlikely that these would occur within the site.

Aquatic habitat and ecology surveys were undertaken as part of the Revised EIS and identified three freshwater fish as potentially occurring within the adjacent freshwater habitats of the Molonglo River, including Murray Cod, Macquarie Perch and Silver Perch. The Revised Ecological Assessment (Appendix Q1) concluded that the Proposal does not impact on population or habitat critical to the survival of these species.

The maturation ponds are not required for operation of the new STP, and will be decommissioned following construction and commissioning of the Proposal. This may result in the loss of bird refugia however, this area would be revegetated in accordance with a Landscape Plan (to be prepared). A Wildlife Hazard Management Plan (Appendix V4) has been prepared to provide recommendations to reduce the risk of collisions between birds and aircraft (given the proximity to Canberra Airport) associated with the Proposal.

Heritage

A Revised Cultural Heritage Assessment (Appendix R1) has been prepared to assess the Aboriginal and non-Aboriginal cultural heritage values of the site. This process included consultation with the Registered Aboriginal Organisations and other relevant stakeholders. Records suggest that the heritage-listed cottage of Jimmy Clements (King Billy) was located on the site however no information on its history, location or physical composition were recorded.

This assessment concluded that most of the study area has low Aboriginal archaeological potential with the exception of two areas that were considered to have higher or moderate potential for intact evidence of Aboriginal occupation and were therefore identified as Potential Archaeological Deposit (PAD) sites. PAD 1 is located in the southwest corner of the study area and PAD 2 to the east of Nimrod Road. PAD 1 will be marked as an exclusion zone during construction. PAD 2 was determined to have moderate archaeological potential, and while some construction works are proposed in the area (for sewer pipes and cabling, and use as a laydown area), these works are not anticipated to impact any intact subsurface archaeological deposits. Overall, it is not expected that the proposed works would result in impacts to intact and significant Aboriginal and non-Aboriginal archaeological remains.

Other issues

The following environmental issues were also considered during the preparation of the Revised EIS, but were not considered to present key environmental issues associated with the Proposal:

- Planning and land status (Section 5.1)
- Traffic and transport (Section 5.2)
- Utilities (Section 5.3)
- Asbestos (Section 5.5)
- Soils and geology (Section 5.6)
- Climate change (Section 5.9)
- Air quality (Section 5.10)
- Health (Section 5.12)
- Socio-economic (Section 5.13)
- Noise (Section 5.14)
- Hazard and risk (Section 5.15)
- Bushfire (Section 5.16).

How would the impacts be managed?

A suite of management and mitigation measures are proposed to be implemented to reduce the potential adverse impacts of the Proposal (see Section 7, Recommendations). These measures would be incorporated into the final design process, the construction environmental management plan (CEMP) and operation management plans and systems (and other management documents as outlined in Section 7, Recommendations) as relevant.

Provided the measures and commitments specified in the Revised EIS are applied and effectively implemented during the design, construction and operational phases, the identified environmental impacts are considered to be acceptable and manageable.

1 Introduction



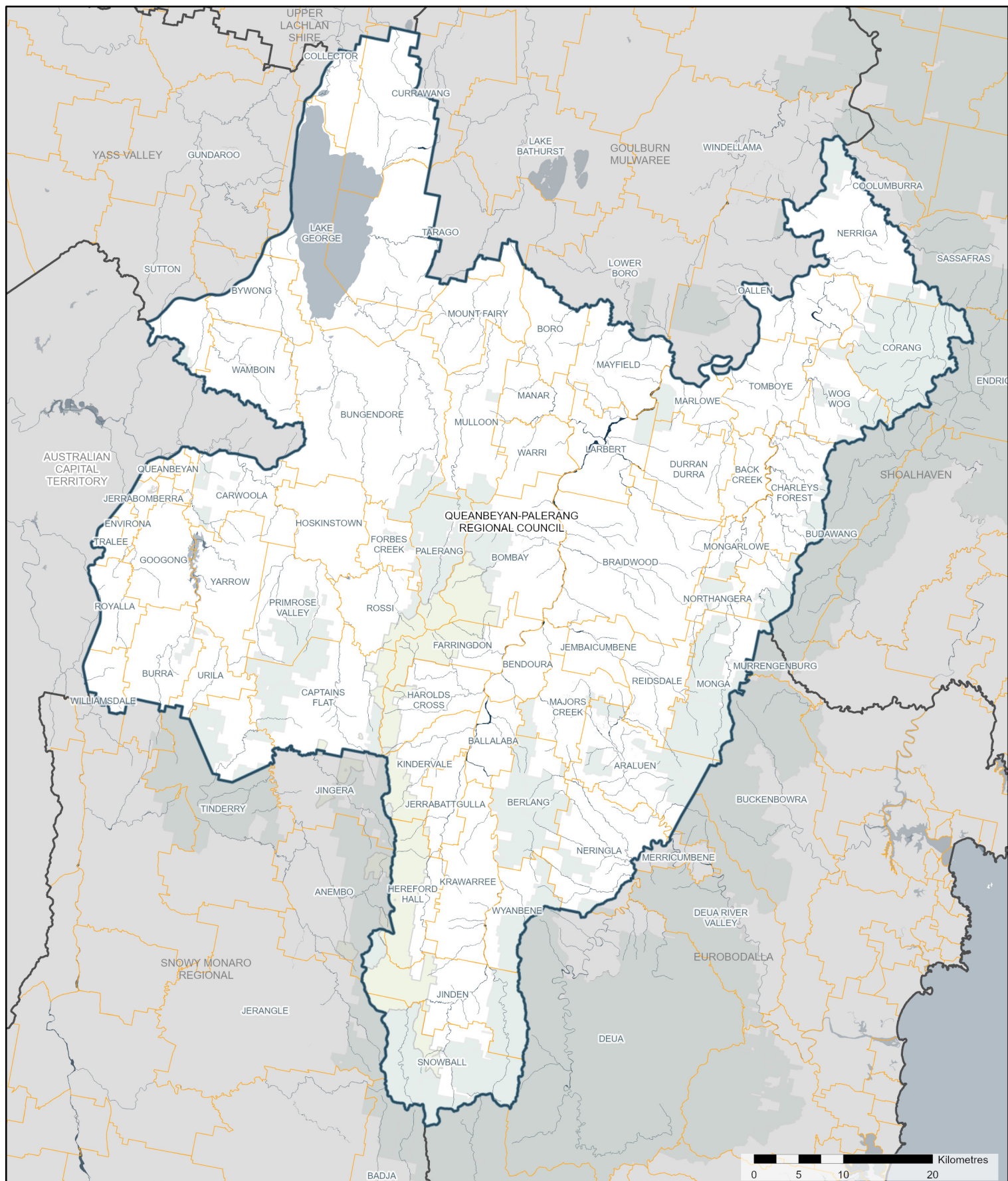
1 Introduction

Queanbeyan-Palerang Regional Council (QPRC) was proclaimed on 12 May 2016 through a merger of the City of Queanbeyan and Palerang Councils. QPRC has a population of over 61,000 and assets totalling around \$1.7b, and covers an area of over 5,30km² (see Figure 1.1). QPRC regulates activities and provides services to the local government area (LGA), including:

- Parking, local roads and road infrastructure
- Waste management
- Recreational and cultural facilities
- Services including childcare, aged care and accommodation
- Water and sewerage
- Town planning
- Building approvals and inspections.

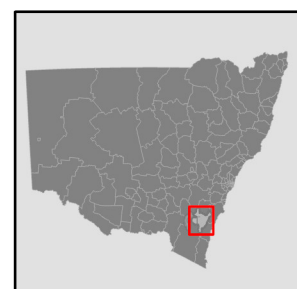
QPRC are responsible for the operation of the QSTP which is located approximately nine kilometres south-east of Canberra, on the southern bank of the Molonglo River within the Jerrabomberra district of the ACT. While located within the ACT, the QSTP is approximately 500m from the border with NSW, and the site processes sewage from both NSW and the ACT.

The existing plant is nearing end of life and is treating more than its design capacity, and an upgrade to a modern treatment facility is necessary to improve reliability and capacity. The upgrade of the QSTP has been part of QPRC's long-term planning for many years.



Queanbeyan-Palerang Regional Council LGA

- Queanbeyan-Palerang Regional
- Suburb
- Watercourse



This map is not a precise survey document. Accurate locations can only be determined by a survey on the ground. This information has been prepared for Council's internal purposes and for no other purpose. No statement is made about the accuracy or suitability of the information for use for any purpose (whether the purpose has been notified to Council or not). While every care is taken to ensure the accuracy of this data, no representations or warranties are made about its accuracy, reliability, completeness or suitability for any particular purpose. Council disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason. ©Spatial Services, ©Queanbeyan-Palerang Regional Council

Figure 1.1: Queanbeyan-Palerang Regional Council

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1.1 Background

The existing QSTP was built in the mid-1930s and treats Queanbeyan's sewage prior to discharge of treated effluent into the Molonglo River. The plant is maintained regularly but will soon not be fit for purpose due to capacity constraints and key assets that are at or approaching end of life.

QPRC had growing concerns about the capacity and reliability of the QSTP and in 2011 engaged Hunter Water Australia P/L (HWA) to prepare an options study for upgrading the STP. This study recommended a major upgrade to the plant, including:

- The construction of new inlet works
- A new bioreactor process with combined biological/chemical phosphorus removal
- A single sludge stream
- Aerobic sludge digestion.

QPRC has not carried out the proposed major upgrades. Since the 2011 recommendations, the condition of assets has continued to deteriorate, and the local population has increased, which has resulted in the exceedance of the design capacity of the plant.

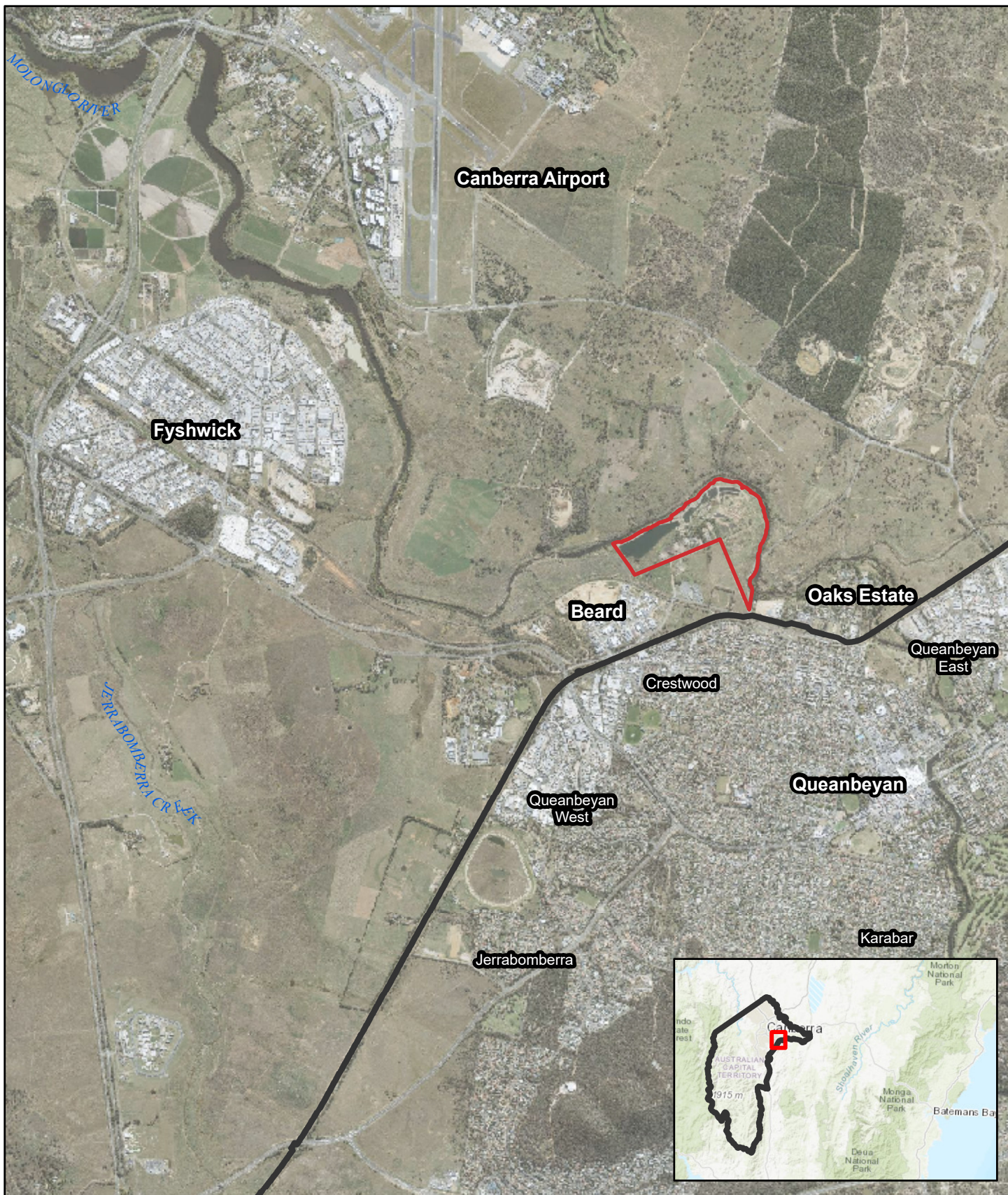
In 2015, QPRC prepared the QSTP Masterplan as part of the strategic process to implement the planning, design and construction of sewage collection, treatment and disposal facilities for Queanbeyan within the former Queanbeyan City Council LGA.

The existing STP is estimated to have a design capacity of 34,500 EP (MWH, 2008) and is currently serving about 52,000 EP. Some of the existing equipment is obsolete and there are issues with maintenance of the existing plant. To make the plant fit for purpose, a significant works program is needed to solve the issues that include structural failure, equipment obsolescence, maintenance issues, and improving the process train for enhanced controlled treatment performance.

The STP is currently meeting effluent licence conditions. There is the risk that the STP would be unable to meet more stringent discharge criteria if imposed in the future and may not be able to continue to meet the criteria due to population growth. It is estimated that the existing QSTP has about three to five years of effective service life remaining before its condition or ability to meet pollutant load requirements presents a major asset risk to QPRC and the community. This assessment is based on the previous studies carried out at the plant ((MWH, 2008) and (HWA, 2011)) and the recent condition assessment completed as part of the QSTP Masterplan in 2015.

To address these concerns, QPRC proposes to undertake the upgrade of the QSTP. This would provide a robust, reliable and sustainable STP that protects public health and the environment for future generations.

Figure 1.2 shows the QSTP location in relation to the NSW / ACT border, Canberra and the Canberra Airport.



Legend

- QSTP Site
- ACT / NSW Boundary
- Water features (ACT)
- ACT Boundary



Client

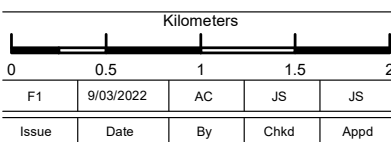
**Queanbeyan-Palerang
Regional Council**

Job Title

**Queanbeyan Sewage
Treatment Plant**

Figure Title

Location Map



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Scale at A4

1:40,000

Figure Status

Final

Coordinate System

GDA 1994 MGA Zone 55

Job No

267007-00

Figure No

1.2

1.2 Purpose and structure of this report

1.2.1 Report purpose

This EIS has been prepared by Arup Australia Pty Ltd, on behalf of QPRC. The EIS details the possible impacts of the Proposal on the environment, as well as suggesting avoidance, mitigation and offset measures. The EIS aims to enable decision makers to understand the environmental consequences of construction and operation of the Proposal.

The EIS includes information covering environmental, social and economic impacts associated with the Proposal. These have been identified and assessed, so any adverse impacts are avoided, minimised, mitigated or as a last resort, offset.

The preparation of the EIS has taken into consideration the requirements of the *Planning and Development Act 2007*, Planning and Development Regulation 2008 and the Proposal scoping submission requirements (Application Number 201900029).

This Revised EIS has considered all community and agency submissions that were received after public exhibition of the draft EIS from 18 January 2021 to 9 March 2021. Where relevant, submissions received have been summarised and included in a table within each chapter. A short response has been provided to each submission and the reader is then referred to the relevant section of the revised EIS to find more information. A summary of all submission and responses can be found in Section 6.3.

1.2.2 Report structure

The structure and content of the revised EIS is as follows:

Volume 1

Executive Summary

Chapter 1 | Introduction

Chapter 2 | Proposal details

Chapter 3 | Legislative and strategic context

Chapter 4 | Risk assessment

Chapter 5 | Assessment of impacts

- Section 5.1 Planning and land status
- Section 5.2 Traffic and transport
- Section 5.3 Utilities
- Section 5.4 Materials and waste
- Section 5.5 Asbestos
- Section 5.6 Soils and geology
- Section 5.7 Contamination
- Section 5.8 Water quality and hydrology
- Section 5.9 Climate change
- Section 5.10 Air quality
- Section 5.11 Odour
- Section 5.12 Health
- Section 5.13 Socio-economic
- Section 5.14 Noise
- Section 5.15 Hazard and risk

- Section 5.16 Bushfire
- Section 5.17 Biodiversity
- Section 5.18 Heritage
- Section 5.19 Entity requirements

Chapter 6 | Community and stakeholder consultation

Chapter 7 | Recommendations

Chapter 8 | Other relevant information

Chapter 9 | References

Volume 2

Appendix A1 | Scoping document for the EIS

Appendix A2 | Scoping document reference

Appendix B1 | Proponent's environmental history

Appendix C1 | Information sources

Appendix D1 | Study team

Appendix E1 | QSTP Environmental Management Plan

Appendix F1 | QSTP Environmental Authorisation

Appendix G1 | Concept Design Report

Appendix G2 | Concept Design Addendum

Appendix H1 | Traffic and Transport Report

Appendix I1 | Asbestos Management Plan

Appendix I2 | Asbestos Pre-Demolition Register

Appendix I3 | Asbestos Management Register

Appendix I4 | Asbestos Inspection of Jerrabomberra Trunk Main

Appendix J1 | Geotechnical Interpretive Report

Appendix J2 | Geotechnical Factual Report

Appendix K1 | Preliminary Contamination Report

Appendix K2 | Site Contamination Assessment

Appendix L1 | Climate Risk and Adaptation Assessment

Appendix M1 | QSTP Upgrade Odour Assessment

Appendix N1 | Health Impact Assessment

Appendix O1 | Noise and Vibration Impact Assessment

Appendix O2 | Operational Noise Impact Assessment

Appendix P1 | Bushfire Protection Assessment

Appendix Q1 | Revised Ecological Assessment

Appendix R1 | Revised Cultural Heritage Assessment

Appendix S1 | Stakeholder Communications and Engagement Plan

Appendix S2 | Copies of stakeholder letters

Appendix S3 | Consultation feedback

Appendix T1 | Revised Water Quality Management Plan

Appendix T2 | Water Quality and Hydrology Assessment

Appendix T3 | Receiving Water Quality Impact Assessment

Appendix U1 | Research

Appendix V1 | Lease extension application

Appendix V2 | Waste Facility Licence

Appendix V3 | Wildlife Hazard Management Plan

Appendix V4 | Arboricultural Impact Assessment Report

2 Proposal details



2 Proposal details

This chapter outlines the Proposal location and existing land uses as well as providing a detailed description of the Proposal features including infrastructure components, planned construction methodology and operational aspects. It also presents alternatives considered for the Proposal.

The information in this chapter has been informed by the Concept Design Report (Hunter H2O, 2020) (Appendix G1) and the Concept Design Addendum Report (Hunter H2O, 2022) (Appendix G2). Design would be subject to refinement during the detailed design process.

2.1 Proposal location, land uses and existing sewage treatment plant

2.1.1 Location and property details

The existing QSTP is located between Beard and Oaks Estate (ACT), and directly north of Queanbeyan (NSW). While located within the ACT, the QSTP is approximately 500m from the border with NSW, and the site processes sewage from both NSW and the ACT. The Proposal would be located within the existing QSTP site.

The QSTP was constructed in the mid-1930s and is on land leased from the ACT Government by QPRC (lease dated August 1938). The 99-year lease is due to expire in August 2037. QPRC applied for a lease extension for Block 27 Jerrabomberra from the ACT Government Leasing Services in October 2021 (see Appendix V1).

As the site is located within the ACT, it is regulated by the ACT Environmental Protection Authority (EPA) and ACT Utilities Technical Regulator (UTR). Most of the sewer network is located within NSW and is regulated by the NSW Department of Planning and Environment (DPE).

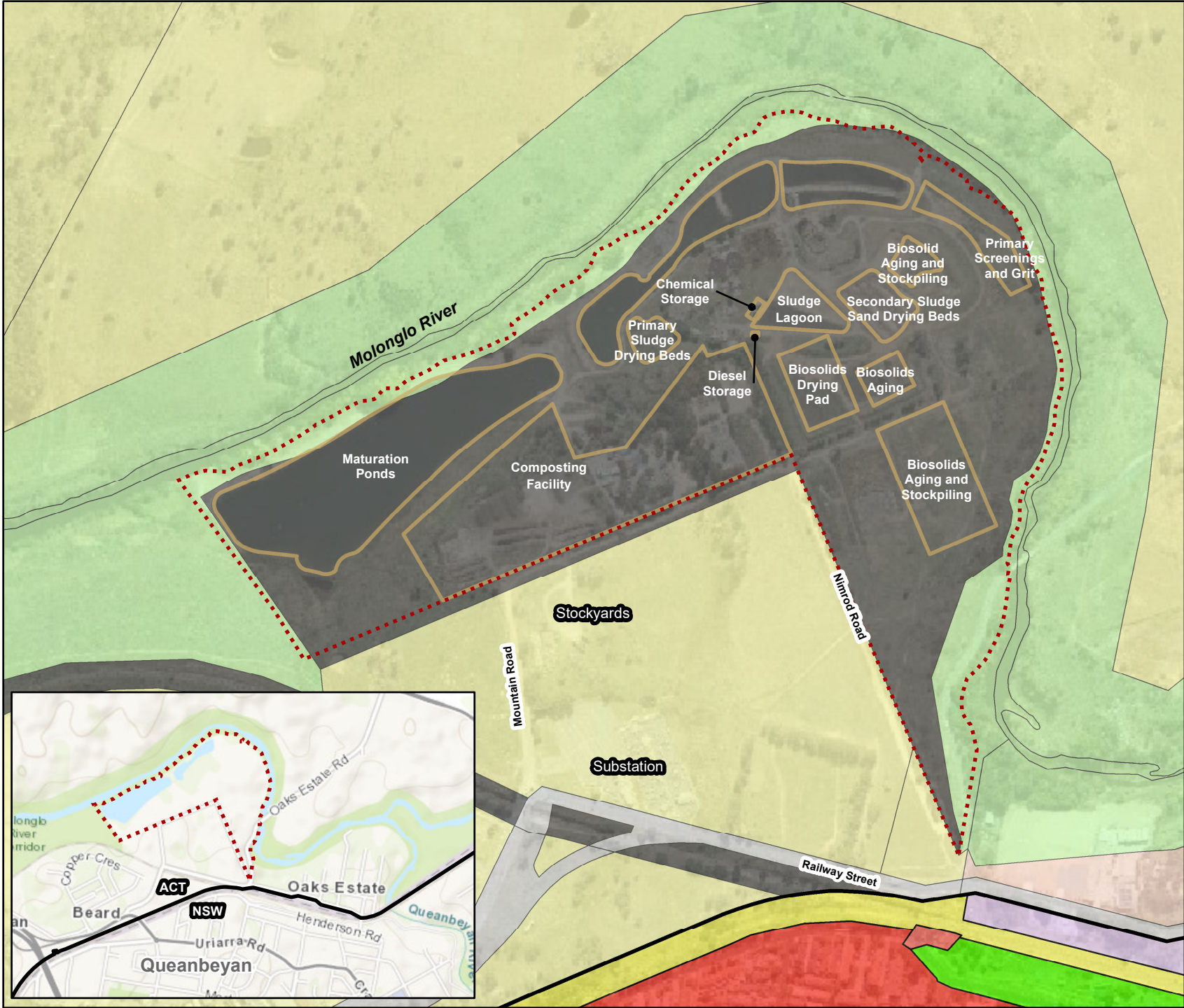
Discharge to the Molonglo River is regulated by the ACT EPA, who issue licencing for the operation of the STP. Discharges to Lake Burley Griffin are regulated by the National Capital Authority (NCA) from a water quality perspective, and ACT Health from a human health perspective.

The site is zoned mainly as Services (TSZ2) with a section of River Corridor (NUZ4) along the Molonglo River under the Territory Plan 2008 (see Figure 2.1). The Proposal is considered an appropriate activity for these zones, subject to a Development Application. As a 'Public Utility', a STP is a permitted use on land zoned NUZ4 River Corridor, under Section 3.2.5.4 of the National Capital Plan.

Table 2.1 provides a summary of the site details, and Section 5.2, Planning and land use provides more information.

Table 2.1: Site identification, location and setting

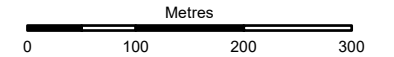
Item	Details
Street Address	7 Mountain Road, Jerrabomberra ACT, 2619
Block and Section under <i>Districts Act 2002</i>	Block 27 Section 0 Jerrabomberra
Approximate Area	467,960 m ²
Current Land Use	Sewage Treatment Plant
Approximate Geographic Coordinates	-35.33480, 149.21731
Territory Plan Land Use Zoning	TSZ2: Services NUZ4: River Corridor



Legend

- Subject site
- Key Features (existing)
- ACT / NSW Boundary
- Land Use Zone
 - NUZ1, Broadacre
 - NUZ2, Rural
 - NUZ4, River Corridor
 - TSZ1, Transport
 - TSZ2, Services
 - IN2, Light Industrial
 - R3, Medium Density Residential
 - R4, High Density Residential
 - RE1, Public Recreation
 - SP2, Infrastructure

F1	29/03/2022	AC	JS	JS
Issue	Date	By	Chkd	Appd



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Figure Title

Land use zoning

Scale at A4

1:7,000

Figure Status

Final

Coordinate System

GDA 1994 MGA Zone 55

Job No

267007-00

Figure No

2.1

2.1.1.1 Surrounding land uses

The blocks immediately adjoining the Proposal are zoned TSZ2 Services, NUZ4 River Corridor and NUZ1 Broadacre. The Molonglo River Corridor (NUZ4) lies between the Proposal and the adjoining blocks to the north, which are currently vacant. To the south of Mountain Road, land uses include an electrical substation and stockyards. Other land uses within the vicinity of the Proposal include industrial development, approximately 1km south-west and residential developments, approximately two kilometres south (NSW) and east-west (ACT).

2.1.1.2 Existing and future developments

The QSTP is located in the ACT and treats sewage from ACT and NSW. The upgrade has considered proposed growth in NSW as well as the Oaks Estate (which is currently treated by the QSTP). The upgrade has considered the following development areas in the region, though they are not anticipated to have an impact or interaction with the Proposal:

- Light industrial areas at Fyshwick and Hume
- Canberra Airport
- Canberra development in the north including the Capital Metro plans
- Beard Industrial Estate (which is in a separate catchment, treated by Icon Water).

The Proposal has been designed with consideration of the obstacle limitation surface (OLS) from Canberra Airport, and none of the buildings have been designed at a height that would require approval from Air Services or the Civil Aviation Safety Authority (CASA). Construction of the Proposal is likely to require a 60m crane that would extend into the Canberra Airport OLS. This is discussed in more detail in Section 5.15, Hazard and risk, and Chapter 8, Other relevant information.

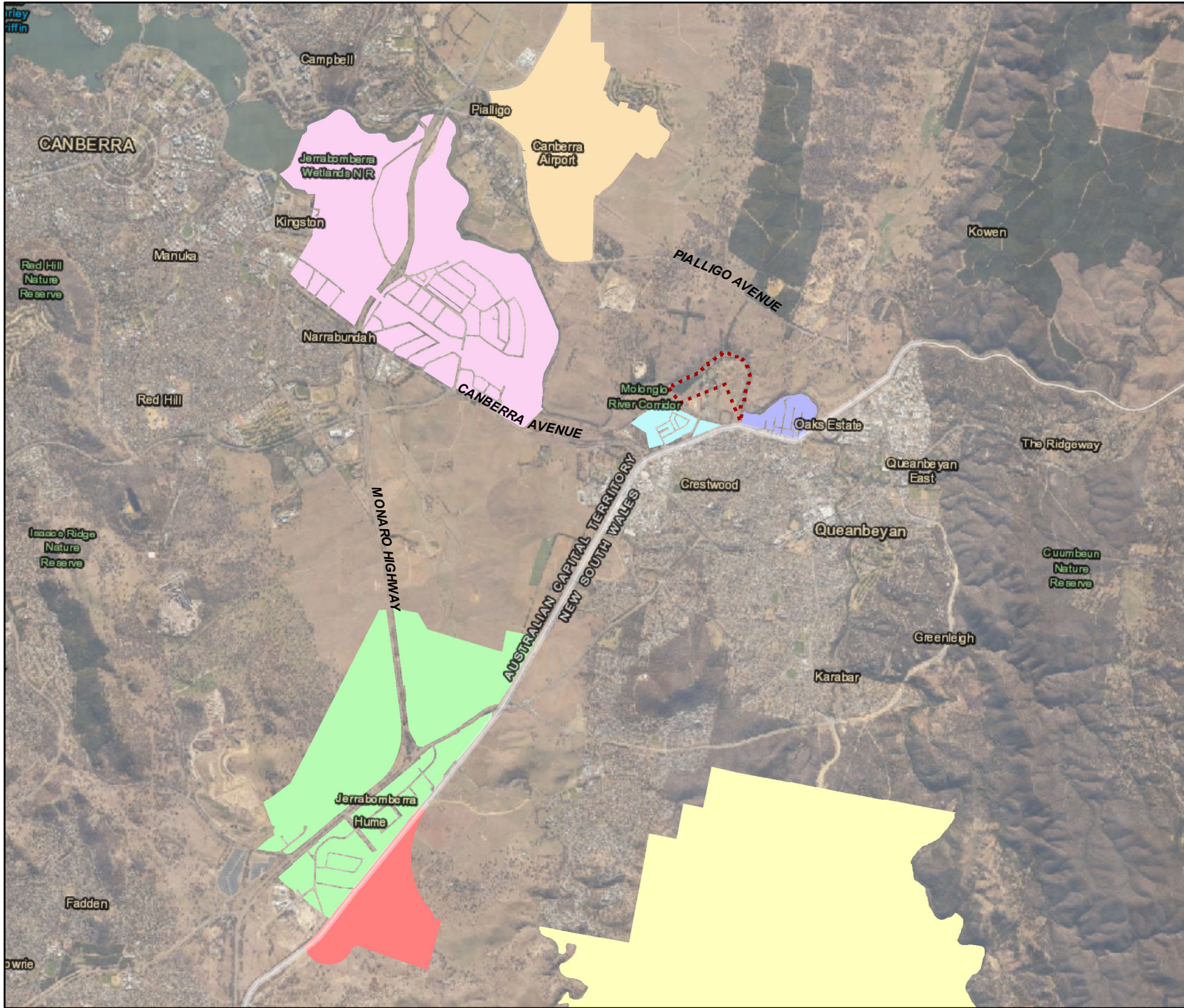
There are two developments planned and under construction within and directly adjacent to the suburb of Queanbeyan, as detailed below and in Figure 2.2.

South Jerrabomberra Development Area

The South Jerrabomberra Development Area is located in NSW south of Queanbeyan, near the existing suburb of Jerrabomberra. The 417ha South Jerrabomberra area would be serviced by the Proposal, and would include a mix of residential, commercial and industrial developments, as well as community and recreational facilities. Construction is likely to be undertaken in stages over a period of 25 years.

Googong Township

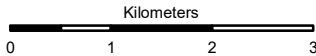
Googong Township is located about five kilometres south of Queanbeyan. The 780ha Googong development is planned to have around 5,550 homes for approximately 16,000 people, as well as schools, parks, shops and businesses. Googong has its own STP and would not rely on the QSTP.



Legend

- Subject site
- South Jerrabomberra
- Development Area (Approximate Location)
- Goongong
- Beard Estate
- Canberra Airport
- Fyshwick
- Hume
- Oaks Estate

F1	28/10/2020	AC	JS	JS
Issue	Date	By	Chkd	Appd



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Job Title
**Queanbeyan Sewage
Treatment Plant**

Figure Title
Existing and future developments

Scale at A4 1:75,000	Figure Status Final
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Coordinate System GDA 1994 MGA Zone 55
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Job No 267007-00	Figure No 2.2
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2.1.1.3 Existing sewage treatment plant

The existing STP services a catchment made up of urban, light commercial, light industrial and some rural residential properties, including the NSW neighbourhoods of Crestwood, Jerrabomberra, Karabar, Queanbeyan, Queanbeyan East, Queanbeyan West, and Greenleigh, and the ACT suburb of Oaks Estate. It is supplied by a gravity collection system with 15 pump stations and about 286km of pipeline (excluding Icon's Oaks Estate network). Sewage is transferred to the STP via two independent trunk mains. The STP discharges treated effluent into the Molonglo River. The existing STP has a capacity of 34,500 EP however is currently operating above this capacity and is servicing about 52,000 EP.

The layout of the sewage collection network (shown in red) and the key features of the area are presented in Figure 2.3. The incoming trunk mains will be diverted to the new STP within the existing QSTP site. There are no other changes to the sewage collection network as part of the Proposal.

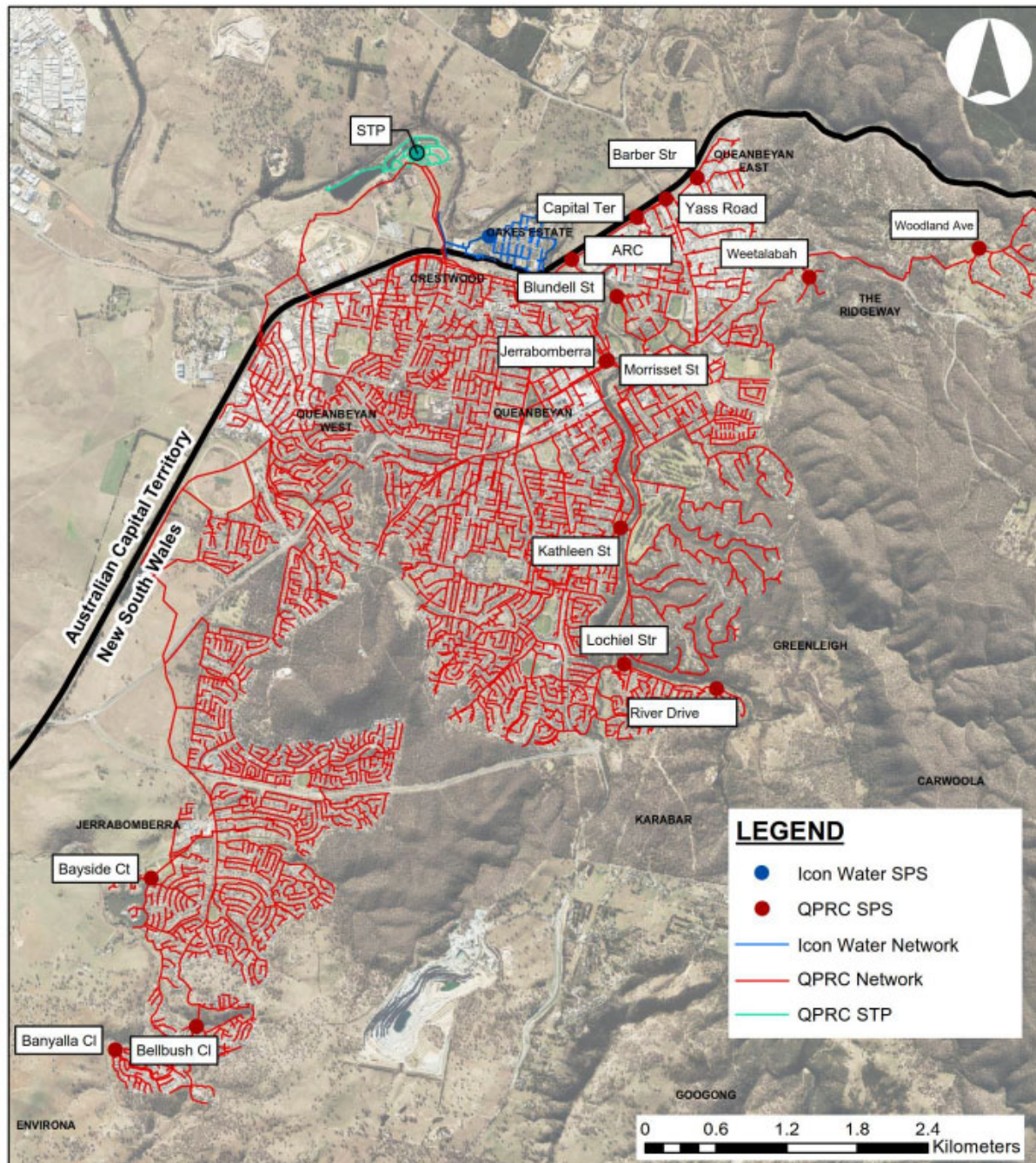


Figure 2.3: Layout of QSTP sewerage network (Source: QPRC)

The STP operates continuously and is staffed by operators from 7:00am to 4:00pm Monday to Friday, and 7:00am to 1:00pm on weekends. No work is scheduled on public holidays. However, emergency response teams are available at all times.

The STP has five major separate processes, including:

- Screening (pre-treatment)
- Grit removal (pre-treatment)
- Activated sludge / trickling filters and clarifiers (secondary treatment)
- Maturation ponds (disinfection)
- Sludge handling.

The major components of the STP include the following elements, which are shown in Figure 2.1 and Photograph 2.1 to Photograph 2.6, and Figure 2.4 shows the current process flow at the QSTP:

- Inlet works (comprising of bar screens, grit chambers, flow splitting and measurement flumes, lime dosing, ferric sulphate dosing, return lines and two modes of stormwater bypass. The screened bypass flow is sent to the maturation ponds)
- Two grit removal tanks (located downstream of the inlet screens. Grit is currently buried onsite with screenings)
- Four trickling filters (primary sludge is pumped to a joint collection pit, where it is pumped either to the primary drying beds or returned to the head of the works)
- Three aeration tanks (two with an effective volume of 1,400m³ each, and one with an effective volume of 3,300m³)
- Three clarifiers
- Three maturation ponds
- Four primary sludge drying beds
- Two sludge lagoons
- Four sand drying beds
- One drying pad
- Three biosolids aging pads
- Chemical and fuel storage
- Emergency back-up generator.

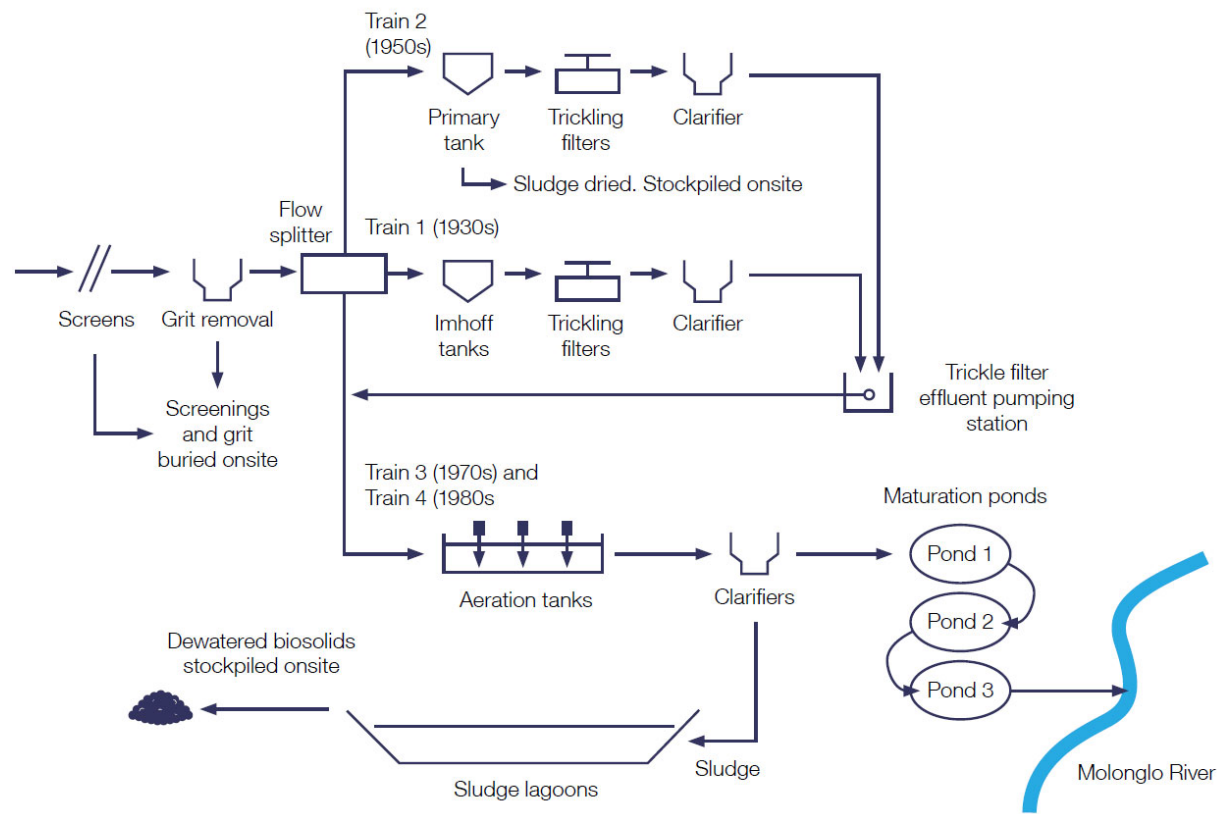


Figure 2.4: Existing standard QSTP Process flow and discharge to Molonglo River



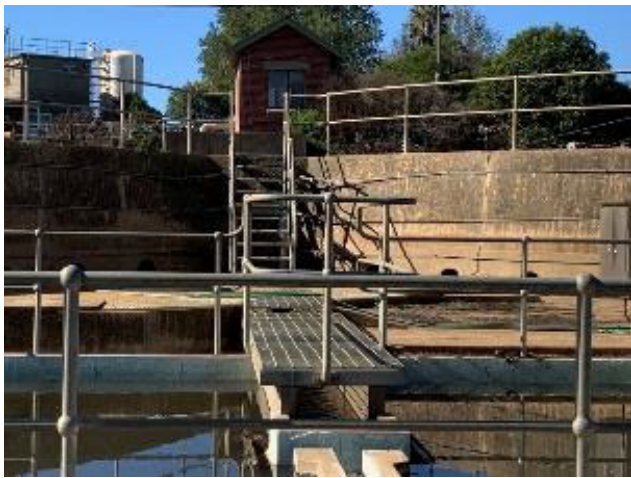
Photograph 2.1 Trickling filters



Photograph 2.2 Trickling filter



Photograph 2.3: Aeration Tank



Photograph 2.4: Clarifier and trickling filter



Photograph 2.5: Chemical storage on site



Photograph 2.6: Western maturation pond

2.2 Proposal objectives and justification

The objective of the Proposal is to deliver an upgrade of the QSTP, providing a robust, reliable and sustainable STP that protects public health and the environment for future generations. The Proposal is critical to address the fact that the current STP is operating above its capacity, servicing about 52,000 EP. In developing the Proposal, the upgrade would deliver:

- A robust and reliable sewage treatment solution that provides for both immediate service needs and plans for identified needs of the future
- An upgrade solution that:
 - Represents value for money for Queanbeyan residents
 - Achieves targeted sustainability and public health outcomes
 - Meets regulatory requirements.

The existing STP was originally constructed in the 1930s and is reaching end of life. The existing plant has capacity constraints and there are concerns regarding the operability and reliability of the STP. Lower lying areas of the existing STP are at risk of being affected by flooding. While maintenance and works have been regularly undertaken on the QSTP, the plant is no longer fit-for-purpose and is experiencing issues such as structural failure, equipment obsolescence and maintenance issues. While the QSTP is meeting current effluent licence conditions, the maturation ponds are a key asset in achieving this effluent quality and there is a risk that these lagoons may fail again as occurred in 2010 due to flooding.

The new STP has been designed to meet regulator and stakeholder requirements, and to achieve an ISC rating of 'Excellent'. The IS rating scheme was developed by and is administered by ISC. The IS rating scheme is a comprehensive rating system for evaluating sustainability across the design, construction and operation of infrastructure. The IS rating scheme applies a point score across 15 sustainability themes, including water and energy use, materials, management, climate change, heritage, stakeholders, biodiversity and innovation. The ISC themes and credits align with the proposed sustainability objectives and the policy framework for the Proposal. Under the IS rating tool, points are achieved by providing verified evidence of performance, and totalled to achieve an overall project rating.

QPRC have identified additional benefits of the Proposal, including:

- Securing Queanbeyan's sewage treatment needs for future growth
- Improved ability to control the water quality discharged to the environment and to protect public health
- Improved odour and noise outcomes
- Improved treatment reliability
- Improved protection of the treatment plant against flooding
- Improved treatment of the biosolids produced by the treatment process to a quality that is suitable for agricultural reuse
- Providing improved treatment of the waste screening and grit materials generated during the treatment process
- Providing a source of recycled water that can be used for applications such as dust suppression
- Providing a local facility to receive and treat septage waste collected from domestic septic tanks and aerated wastewater treatment systems
- Providing improved traffic access to the treatment plant by sealing the access road
- Improved workplace health and safety for workers and visitors to the facility.

A range of studies have been conducted to inform and develop the concept design, to validate the drivers listed by QPRC and to further justify the benefits the Proposal would provide. The studies include:

- A design basis study that reviewed the factors required to develop the initial design for the facility such as the existing flows and characteristics of sewage, population projections, and existing quality criteria for treated effluent and biosolids

- A review of durability, criticality and redundancy requirements as well as lessons learned from other operating STPs
- A site selection study that reviewed potential areas for construction of the new STP
- A review of flood modelling sourced from the Queanbeyan Floodplain Risk Management Study and Plan
- Testing and analysis of the existing sewage to determine key characteristics and treatability
- A review of effluent quality from the existing STP as well as water quality in the Molonglo River, supported by a water quality monitoring program
- An options study that selected the preferred treatment process for the upgrade based on a multi-criteria assessment
- Site investigations including aerial and ground survey, location of services, geotechnical investigation, groundwater sampling, contamination assessment, heritage and ecological assessments
- Assessment reports including odour, noise and vibration assessments
- Consideration of adaptation opportunities to mitigate against risks to construction and operation as a result of climate change
- Consideration of opportunities to improve the sustainability of the design based on the ISC ratings tool
- Safety in Design reviews undertaken with the designer and operators to eliminate or minimise health and safety risks associated with construction and operation of the STP.

In response to the feedback received during the draft EIS exhibition period, additional investigations were undertaken including water quality modelling to assess the potential impact of the Proposal on Lake Burley Griffin.

This information has been captured in the revised Water Quality Management Plan (Appendix T1) and Receiving Water Quality Impact Assessment (Appendix T3), and summarised in Section 5.8, Water quality.

The Proposal has been designed to create a plant that would be able to meet more stringent discharge criteria that may be proposed in the future. The Proposal would result in improved water quality in the Molonglo River and Lake Burley Griffin, reducing potential impacts on the environment and public health, and improved treatment and disposal of biosolids.

If the Proposal were not to proceed, the existing QSTP would continue to be operating above capacity until the treatment plant failed. This could result in potentially catastrophic impact to the areas that rely on the QSTP for sewage treatment, as well as the water quality and biodiversity of the Molonglo River, Lake Burley Griffin and downstream catchments.

2.3 Proposal overview

The new STP would be constructed on the existing site to the south east of the existing treatment process. The site location provides a predominantly level area where the new treatment process may be constructed while maintaining operation of the existing STP.

The site layout has been developed in consultation with QPRC and informed by site investigations completed to date. Key considerations in development of the layout include:

- Locating the hydraulic grade line and height of structures to ensure bioreactor, clarifiers and UV are positioned at ground level (i.e., top of structure is at handrail height generally) to minimise ongoing pumping costs, simplify operation and reduce costs associated with access to elevated structures
- Protecting treatment structures and equipment from flooding
- Minimising hydraulic losses of major pipe runs through the treatment process
- Providing adequate space between structures for construction access, operation and maintenance access as well as for installation of below ground pipework and electrical conduits
- Consideration of geotechnical conditions and construction sequencing requirements
- Site operation, monitoring and security requirements.

The site layout will continue to be refined and further developed during the design process to take into account final equipment selection and sizing as well as safety, construction, operation and maintenance requirements.

Additional works included in the QSTP upgrade include:

- Diversion of the incoming Morisset and Jerrabomberra trunk sewers from cut-in locations within the STP boundary to the new inlet works
- Upgrades to the potable water supply and electricity supply to the site
- Upgrade of the existing Mountain Road access
- Decommissioning and modification of the three existing maturation ponds.

The power system architecture for the upgrade uses two transformers with separate distribution across the site. Backup onsite diesel generators are provided to automatically start and transfer power on loss of transformer supply.

Evoenergy has advised that there is currently insufficient power supply capacity for the new plant. Evoenergy has a planned upgrade to increase supply capacity in the area and is investigating options to provide the required capacity to the new STP. It is anticipated that these upgrades can be made available in time for commissioning of the upgraded Queanbeyan STP, as Evoenergy prioritises critical infrastructure (see Chapter 8, Other relevant information). QPRC are undertaking ongoing consultation with Evoenergy with regards the required upgrade.

The Proposal does not include decommissioning and demolition of the existing STP with the exception of the decommissioning of the maturation ponds (see Section 2.3.5.6). A scope for the decommissioning of the existing STP would be prepared in consultation with EPA and the Utilities Technical Regulator (UTR).

QPRC is investigating the purchase of Nimrod Road to be absorbed into the QSTP lot. Consultation with the Transport Canberra and City Services Directorate (TCCS) is ongoing. If the purchase were to proceed, Nimrod Road would be closed to public traffic, but the existing road alignment would be maintained as an emergency egress.

2.3.1 Plant capacity

The existing treatment plant is currently treating loads of approximately 52,000 EP, despite having been designed for a capacity of 34,500 EP. A detailed review of existing and projected future sewage loads identified that a capacity of 75,000 EP would be required for the upgrade. This adopted design capacity allows for sufficient capacity to ensure that no additional treatment expansion would be required for at least 15 years following commissioning based on current land zoning, industrial development and forecast population growth in the catchment of QSTP.

The plant design capacity at full loading is summarised in Table 2.2.

Table 2.2: Plant capacity at full loading

Parameter	Value	Units	Notes
Equivalent population	75,000	EP	Plant capacity based on measured existing load, future growth and developments
Average Dry Weather Flow (ADWF) flow loading	230	L/EP/day	A conservative basis that accounts for possible additional inflow and infiltration into sewers as well as daily water use.
Design ADWF	17.25	ML/d	Average dry weather flow
Peak flow to full treatment	599	L/s	Storm bypass treatment commences at flows equivalent to 3 x ADWF on an instantaneous basis.
Peak wet weather flow	155.25	ML/d	Equivalent to 9 x ADWF

A review of water quality data and additional onsite testing suggests that influent quality is generally typical of predominantly domestic sewage. The proposed treatment plant capacity has been designed on this basis. Discharges to QPRC's sewerage system will continue to be managed in accordance with QPRC's Liquid Trade Waste Policy.

There are a significant number of domestic septic tanks and aerated wastewater treatment systems within the QPRC LGA. Currently most of this waste is transported to facilities operated by Icon Water in the ACT. The Proposal includes a facility to receive and treat this type of domestic waste that would be delivered to the new STP by septic tank waste collection services. This service is limited to treatment of domestic wastewater from septic tanks and onsite treatment systems and does not include any other liquid trade waste.

2.3.2 Effluent quality objectives

The current STP operates under the ACT EPA Environmental Authorisation No. 0417. The existing licence conditions are summarised in Table 2.3 and Table 2.4, with the required sampling frequency for routine wastewater quality monitoring summarised in Table 2.5.

Table 2.3: Allowable concentrations and loads in wastewater under ACT EPA Environmental Authorisation No. 0417

Parameter	Concentration 50 th %ile limit (mg/L)	Concentration 90 th %ile limit (mg/L)	Average daily load limit (kg/d)	Average performance period (months)	Sample method
BOD ₅	5	10	50	3	24 hr composite
Total Phosphorous (TP)	0.2	0.3	6	3	24 hr composite*
Total nitrogen (TN)	30	35	300	12	24 hr composite*
Suspended solids (SS)	8	20	90	3	24 hr composite
Total dissolved solids (TDS)	600	650	6000	12	24 hr composite

Parameter	Concentration 50 th %ile limit (cfu/100mL)	Concentration 80 th %ile limit (cfu/100mL)	Performance period (days)		
Thermotolerant coliforms	200	1,000	35 days – grab sampling		

Parameter	Lower limit (pH value)	Upper limit (pH value)	Sample method	Sample method
pH	6.5	8.5	Average of continuous daily (via online analyser)	Grab

* Samples stored and analysed weekly

Table 2.4: Maximum allowable concentration of ammonia in wastewater as a function of receiving water pH and temperature under ACT EPA Environmental Authorisation No. 0417

Temp of receiving waters °C	pH of receiving waters					
	6.5	7.0	7.5	8.0	8.5	9.0
Ammonia as N mg/L						
0	2.53	2.53	2.53	1.53	0.49	0.16
5	2.36	2.40	2.40	1.44	1.47*	0.16
10	2.24	2.20	2.20	1.37	0.45	0.16
15	2.15	2.16	2.17	1.33	0.44	0.16
20	1.46	1.49	1.50	0.93	0.32	0.12
25	1.03	1.04	10.5	0.66	0.23	1.10*
30	0.73	0.74	0.75	0.47	0.17	0.08

* Note the values in red and bold in Table 2.4 appear to be miss-typed in the Environmental Authorisation. It appears the first number should be zero not 1 in both instances. In early versions of the Environmental Authorisation the figures appear correct.

Table 2.5: Required sampling frequency for routine wastewater quality monitoring under ACT EPA Environmental Authorisation No. 0417

Parameter	Unit	Wastewater quality monitoring
Acidity	pH value	Daily average from continuous monitoring
Ammonia	mg/L	Daily (24 hr composite)
BOD5	mg/L	Weekly (24 hr composite)
TN	mg/L	Daily (24 hr composite)*
TP	mg/L	Daily (24 hr composite)*
SS	mg/L	Daily (24 hr composite)*
Temperature	°C	Daily grab
Thermotolerant coliforms	Cfu/100 mL	Weekly
TDS	mg/L	Weekly
Total daily flow	ML/day	Daily
Peak daily flow	L/s	Daily
Monthly irrigation volume	ML	Monthly

* Nitrogen and phosphorous samples are stored and analysed weekly

The effluent quality of the existing QSTP is presented in Table 2.6 below, alongside the effluent quality predicted for the proposed QSTP and the licence conditions.

Characterisation of the existing QSTP effluent was derived by Hunter H2O based on recent monitoring undertaken from July 2020 to September 2021, within Maturation Pond 3. Characterisation of the effluent quality for the QSTP upgrade was developed by Hunter H2O based on modelling of the proposed treatment configuration. The median effluent concentrations presented in Table 2.6 for the QSTP upgrade represent a best estimate of the likely operating performance based on modelling and operating performance results of similar facilities. As part of best practice water quality management, the QSTP facility will operate with operational control points that are established during commissioning, and licence compliance concentrations that are higher than these values.

The effluent quality of the Proposal is considered comparable or improved relative to the existing plant as follows:

- Phosphorus concentrations to remain at levels as per existing QSTP
- Total Nitrogen concentrations to remain comparable (< 2% change) to the existing QSTP with lower concentrations of bioavailable nitrate and higher concentrations of organic nitrogen
- Suspended solids to reduce as a result of improved clarification and tertiary filtration
- Organic carbon to remain at similar concentrations to the existing QSTP.

Table 2.6: Assumed effluent quality of the existing QSTP and QSTP Upgrade

Parameter	Existing STP Median	QSTP Upgrade Median	Licence conditions Median
Total Nitrogen (TN)	7.1	7.2	30
Ammonium	0.2	0.2	
Nitrate	6.3	6.0	
Organic Nitrogen	0.6	1.0	
Total Phosphorus (TP)	0.07	0.07	0.2
Phosphate	0.05	0.05	
Organic Phosphorus	0.02	0.02	
Suspended Solids (SS)	19	3	8
Organic Carbon	< 2	< 2	

A rigorous assessment of water quality including water quality modelling has been undertaken (see Section 5.8, Water quality and hydrology) which demonstrates that the water quality of the discharge to the receiving waters once the Proposal is operational would be the same or better than the current STP facility and in accordance with the Environmental Authorisation. In addition, a detailed and long-term water quality monitoring program is committed to be undertaken.

The upgraded STP plant design has been designed in accordance with best practice, and will provide a high quality of effluent, as well as enhanced and substantially improved engineering control and monitoring. There is improved redundancy in the plant design providing a robust and reliable plant that is advanced from the current facility.

2.3.3 Process configuration overview

Table 2.7 highlights the Proposal processes in comparison to the existing facility. Full details of the process configuration are provided in the Concept Design Report (Hunter H2O, 2020) (Appendix G1) and Concept Design Addendum (Appendix G2).

The flow ranges are expressed as multiplies of Average Dry Weather Flow (ADWF) of incoming sewage at 75,000 EP.

Table 2.7: Proposal upgrades compared to current facility

Process Step	Current STP	Upgraded STP (images are indicative only)
Treatment capacity	- Design 34,500EP - Serves 52,000EP	75,000EP
Screening	- Partial screening up to 1000L/s 12 mm aperture - One dimension 	- Screening of all flow received ~ 1800L/s 5mm aperture - Two dimensions - Screenings washing (reduced odour, organics returned to treatment). 

Process Step	Current STP	Upgraded STP (images are indicative only)
Biological treatment	- Trickling filters and primary settlement tank (PST) 8ML Aeration-only bioreactor - Ammonia removal only - High energy/noise surface aeration - PSTs produce higher odour. 	- Twin Reactors 25ML Biological nutrient removal (BNR) oxidation ditch - Resilient against shock loads - Full nitrogen removal (ammonia and controlled oxidised nitrogen removal) - Enhanced Biological Phosphorus Removal (EBPR) - Energy efficient low noise diffused aeration - Fully activated sludge results in low odour. 
Phosphorus and Nitrogen removal	Phosphorus removal - Two removal processes chemical/particulate in bioreactor/clarifier and ponds) - Chemical phosphorus removal only - One-point dosing. Nitrogen removal - Ammonia removal only.	Phosphorus removal - Bioreactor designed for enhanced biological phosphorus removal - Enhanced chemical phosphorus removal with multiple-point dosing in the bioreactor/clarifier and prior to filtration - Particulate phosphorus removal with tertiary media filtration and dissolved air flotation (DAFF) - Phosphorus resource recovery potential as calcium hydroxyapatite from a lime clarifier. Allows return of phosphorus to soils in biosolids reuse programs. Calcium improves solids sodicity (ability to convey and hold water). Nitrogen removal - Ammonia removal - Nitrate removal (total nitrogen removal) - Enhanced particulate nitrogen removal (filtration and flotation) - Operational flexibility to adjust during commissioning to optimise nitrogen and ammonia removal.

Process Step	Current STP	Upgraded STP (images are indicative only)
Clarification	- Clarifier area of 1,040m² 3m sidewall ~ 500 L/s hydraulic capacity. 	- Clarifier area of 2,400m² (230% increase) 4m sidewall (25% increase which would improve clarity) - Flocculation well (improves particle capture and clarity) - Weir or Stamford Baffle (improves clarity) 5.5 ADWF ~ 1098 L/s hydraulic capacity 
Filtration	None	- Granular media filtration with dissolved air flotation (DAFF) - Filtration capacity 3 ADWF net (extra capacity is provided the manage process recycles) - Tertiary phosphorus removal - Improves potential for future recycled water use.
Disinfection	- Maturation ponds - Algae growth common - pH increase in summer - Un-ionised ammonia increase with pH 	- UV disinfection for discharge - No algae or pH issues - Provides a protozoa barrier - No chemical by-products. 

Process Step	Current STP	Upgraded STP (images are indicative only)
Enhanced storm treatment	- Clarifiers bypassed at flows above ~ 500 L/s - Maturation ponds buffer storm bypasses - No storm storage	30ML Storm storage - All storm flows receive fine screening to 5 mm two dimensional prior to storm pond entry - Storm storage captures and returns more flow to treatment. This ensures most storm flows get treatment - Storm pond flow is re-screened through fine screens when sent to treatment - Process is optimised to automatically use the storm pond and plant to maximise full treatment (i.e., all passes through screening, grit removal, bioreactor, clarifier, DAFF and UV). Partial treatment (i.e., full screening, full grit removal, part bioreactor, full clarifier, part DAFF and full UV) only occurs at higher storm pond levels. Plant can part treat up to 5.5 ADWF. - In extreme events when the storm pond is full screened and settled flows above 5.5 ADWF overflow the pond to discharge. Storm pond provides solids and nutrient removal (in particulates) by gravity settling prior to discharge if it occurs.
Recycled water	Nil	- Recycled water used onsite - Provides recycled water standpipe for offsite use - Water treated to high quality and ready for reuse.
Noise	Surface aeration	- Acoustic enclosed blowers and diffused aeration - Major other machinery is in buildings or has covers (e.g., dewatering, DAFF, blowers are all in buildings)

2.3.4 Process design

This section provides an overview of the process design, with full details provided in the Concept Design Report (Hunter H2O, 2020) (Appendix G1). The flow diagram in Figure 2.5 shows an overview of the process configuration and major unit operations of the upgrade. Flow ranges are shown for the major unit operations to indicate the range of flows of incoming sewage that receives treatment and each stage. The flow ranges are expressed as multiples of ADWF on an instantaneous basis at 75,000 EP.

All flows expressed below as multiples of ADWF are on an instantaneous basis (i.e., L/s).

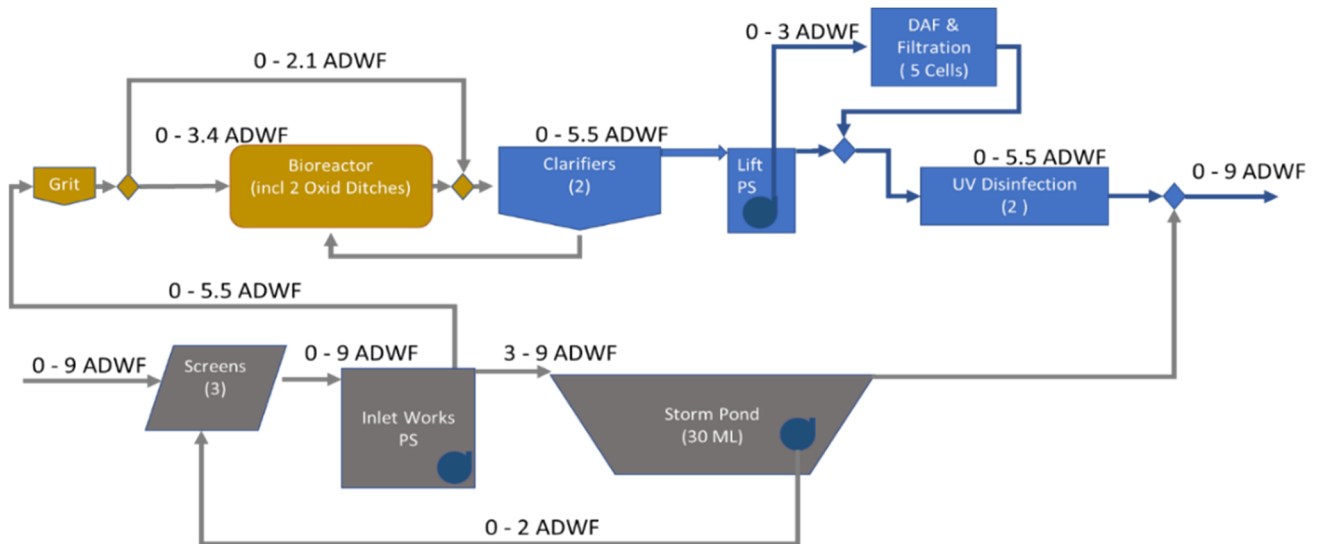


Figure 2.5 Proposal flow diagram

Figure 2.6 shows the process of the Proposal process flow from receiving influent, through the treatment process and to discharge of treated effluent into the Molonglo River. These stages are discussed further in the following sections.

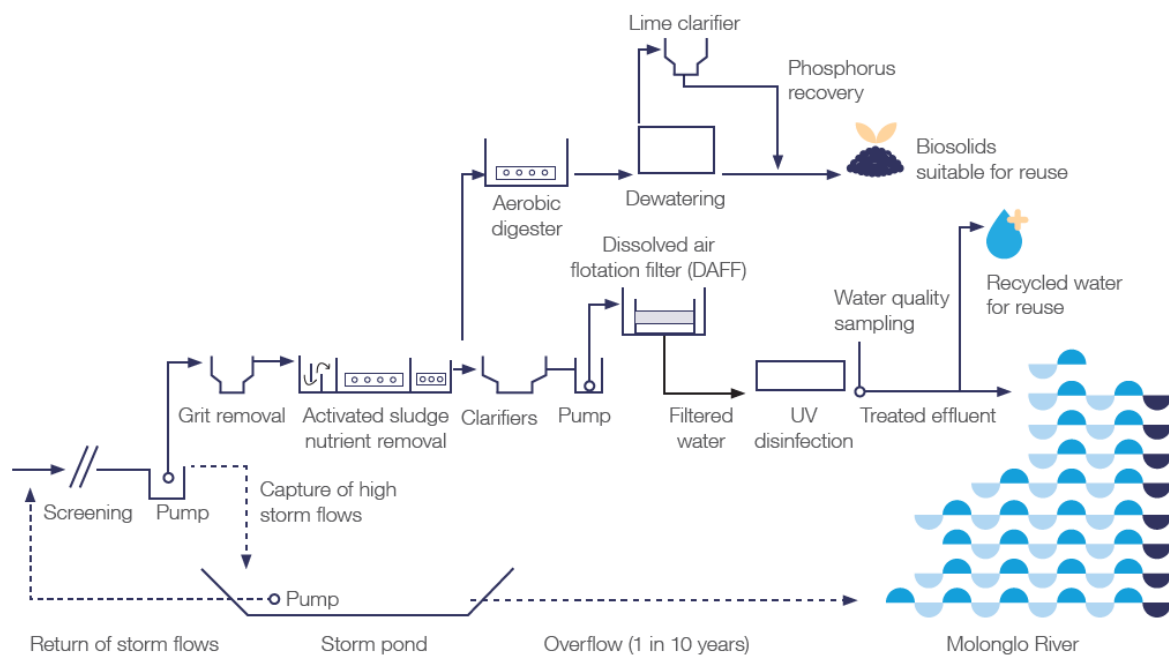


Figure 2.6: Proposed upgrade process flow and discharge of treated effluent to Molonglo River

2.3.4.1 Septage receipt

The QPRC LGA includes a significant number of domestic septic tanks and onsite aerated wastewater treatment systems. The Proposal includes a facility to receive and treat septage from these systems which would be delivered to the new STP by septic tank waste collection services. Reception of septage waste deliveries would be managed by QPRC. The septage receipt facility would provide screening of the waste received prior to further treatment by the plant. The volume of deliveries would be measured for waste tracking and billing purposes.

2.3.4.2 Inlet works

The inlet works treatment consists of the receival pit, automatic band screens, screen washing, and inlet works pumping station.

The QSTP receives wet weather flows of up to 9 ADWF from the catchment. The inlet works receive flows to the treatment process. Screening would be provided to all flow using two-dimensional five-millimetre aperture band screens ensuring that effective screening is provided during peak wet weather flow conditions. These screens would provide a higher level of screening capture than the inlet screens at the existing STP.

The inlet works would include screening washing. This facility would reduce odour by washing and compacting the screening material received at the STP from the sewer network. Screening material would be collected and removed from site for disposal at a licenced landfill facility.

The inlet works pumping station would transfer screened wastewater to the treatment process. The pump station controls the rate that flow is transferred to treatment to minimise bypassing events and prevent the treatment processes from becoming overloaded. The pump station is designed to transfer up to 1,100L/s (5.5 ADWF) to the treatment process.

2.3.4.3 Storm pond and return pump station

The new STP would include a 30ML storm pond that would capture high wet weather inflows and return them to treatment as the peak wet weather flow subsides. The storm pond would act as buffer storage to increase the portion of inflow that receives full treatment.

During wet weather events, screened inflows that are not pumped to treatment would be stored in the storm pond. The stored diluted inflow would be automatically returned to the treatment process as inflows subside and spare treatment capacity becomes available, such as during the lower inflow periods that occur overnight.

The storm pond also includes an overflow for use in extreme wet weather events. Once the storm pond is full, screened and diluted inflow would overflow via a weir adjacent to the plant outfall. During these rare occasions, the storm pond would provide a settling process, enabling solids and nutrients settled within the storm pond to be returned to the treatment process. These controlled overflows from the storm pond are rare and are estimated to occur during at approximately a 10% AEP (1 in 10 year) event. In these instances, the overflow is likely to be discharged into a high river flow environment.

The overflow from the storm pond has been sized to pass the full flow which can be received (9 ADWF) to discharge if required. This is to ensure a controlled release of flow under an extreme situation of no power or generator and a full pond which is very rare. Refer to Chapter 5.3, Utilities, and Chapter 8, Other relevant information.

2.3.4.4 Grit removal

All flow directed to treatment would initially pass through a vortex grit removal system. The grit removal system is positioned ahead of the bioreactors to remove grit so that it does not accumulate in treatment tanks, or damage equipment. Settled grit would be periodically pumped to a grit classifier that washes and concentrates the grit prior to disposal at a licenced landfill facility.

2.3.4.5 Bioreactor and clarifier flow control

After the grit removal, screened sewage would enter a weir and orifice splitter system that regulates flow to the bioreactor and prevents the clarifiers from becoming overloaded. During normal flow conditions, the splitter regulates flow to the bioreactor to less than 3 to 3.4 ADWF.

During significant wet weather events, the treatment process is configured to provide treatment of up to 5.5 ADWF using the solids contact process. This process provides treatment to higher flow rates during larger wet weather events by making the clarifiers work harder. The change to the solids contact mode would occur automatically as part of the treatment control system to maximise flow to treatment. It is anticipated that the solids contact mode would be used in the order of five times a year on average.

As the flow from the Inlet Works Pumping Station exceeds 3 ADWF in solids contact mode, the level in the channel starts to overtop a long weir and gradually introduces flow to the clarifier. As the inflow to treatment increases to the maximum of treatment capacity of 5.5 ADWF, the flow to the bioreactors increases to 3.4 ADWF with 2.1 ADWF bypassing the bioreactor. The flow bypassing the bioreactor mixes with the bioreactor outflow in a contact chamber

and flows to the clarifiers. This mixing process provides solids contact treatment where particles and colloids in the bypass attach to activated sludge flocs from the bioreactor and settle in the clarifier. This returns a portion of the ammonia and other nutrients to treatment via the high-capacity sludge pumps at the base of the clarifiers.

2.3.4.6 Bioreactor

The bioreactor would provide biological nutrient removal from the wastewater using the activated sludge treatment process. It includes:

- Anaerobic zones to support Enhanced Biological Phosphorus Removal (EBPR). An energy efficient hydraulic mixing system rather than mechanical mixing has been used
- Two oxidation ditches that use energy efficient diffused aeration and high efficiency mixers to provide aeration and keep the activated sludge in suspension
- Two final aerobic zones to provide ammonia polishing and assist with phosphorus removal via the EBPR mechanism.

The bioreactor has been designed for all diffusers and mechanical equipment to be retrievable while it is online. Using this approach, it would be very unusual to need to take the bioreactor offline for maintenance purposes. However, the bioreactor has been configured to enable the various zones of the bioreactor to be taken offline if required while maintaining dry weather treatment in rare events (i.e., every 20 years).

2.3.4.7 Clarifiers

The clarifiers provide settling to produce a clarified secondary treated effluent and return the activated sludge to the bioreactor.

The new STP is designed with two clarifiers which can accept flows up to 5.5 ADWF while operating in solids contact configuration. As a clarifier has revolving submerged equipment there is a minor risk that a clarifier would fail and require shut down. The design is such that the plant can treat in excess of the Peak Dry Weather Flow (PDWF) with a single clarifier, if required. In such events the storm pond can provide further buffering for moderate storm flows.

2.3.4.8 Dissolved Air Flotation and Filtration

Tertiary treatment would be provided to the clarified effluent using a water treatment process known as Dissolved Air Flotation Filtration, or DAF on Filter (DAFF). The DAFF process provides polishing and further solids removal from the clarified effluent using dissolved air flotation and filtration through a dual media coal and fine sand filter. The high standard of treatment provided by the DAFF has been included in the treatment process to remove total phosphorus to meet effluent quality objectives. The tertiary effluent produced by the process is suitable for use as recycled water following disinfection. The DAFF has a net instantaneous peak filtration capacity of 3 ADWF and includes separate filtration cells to enable a filter to be taken offline for backwashing as required.

2.3.4.9 Ultraviolet disinfection

A low pressure UV system provides disinfection of the treated effluent prior to discharge. The UV disinfection system would provide disinfection for flows up to the treatment plant capacity of 5.5 ADWF.

The UV disinfection system includes automatic monitoring and control of the UV dose to optimise power use.

2.3.4.10 Sludge and biosolids handling

Sludge from the bioreactor would be wasted continually to gravity sludge thickeners. A picket fence style thickener will be used and produces a concentrated sludge which would be continually conveyed to the Aerobic Digester. A three-cell aerobic digester would stabilise the sludge and include balance storage for periodic operation of dewatering. Sludge typically would be drawn for the last digester cell and dewatered using two centrifuges. The dewatered biosolids would be loaded directly to a semi-trailer truck body using conveyors.

The NSW Environmental Guidelines for Use and Disposal of Biosolids Products (Environment Protection Authority, 2000) categorise biosolids using two grading systems: contaminate and stabilisation grade. The sludge handling and digestion facilities of the upgrade are designed to provide stabilisation grade B based on the current guidelines.

Achieving stabilisation grade B places the biosolids in the Restricted Use 2 category provided the contaminate levels are met. This category allows biosolids to be disposed to landfill or reused for agriculture, forestry, solid and site rehabilitation and land disposal.

Reuse for these purposes is dependent on suitable sites being available and is only possible if the required contaminate grade is also met through appropriate implementation of QPRC's Liquid Trade Waste Policy (QPRC, 2018).

A calcium phosphate sludge may be generated from released phosphorus in the digester. This sludge is considered a resource when added to biosolids or disposed separately. It has bio-available phosphorus and the calcium in the sludge acts to improve soil quality.

2.3.4.11 Recycled water system

Recycled water produced by the treatment plant would be reticulated for use in onsite treatment process (e.g., screen washing) and site hose reels used for washdown. A standpipe would also be provided for filling tankers with recycled water for offsite uses managed by QPRC such as dust suppression.

Recycled water treatment standards will meet the requirements in the NSW Guidelines for Recycled Water Management Systems (NSW DPI, 2015) and in the Australian Guidelines for Water Recycling (NRMMC, 2006).

A backup potable water supply has been included to maintain supply the two duty band screens so that screening removal can continue in the event of recycled water supply loss. Other systems can be offline for a period while supply is restored.

The plant has been designed with space provision for future reuse pumps post DAFF and UV disinfection. If a broader reuse scheme is adopted for QSTP in future, the plant is mostly reuse ready with DAFF treatment and UV disinfection. Additional chlorination disinfection (i.e., dosing pumps, chlorination contact tank and enlarged chemical storage) would be required to achieve the log credits necessary for unrestricted reuse under the NSW Guidelines for Recycled Water.

2.3.4.12 Bulk chemicals

The following chemicals would be used as part of the proposed treatment process. Lime is delivered as a powder and would be stored in a silo. The other bulk chemicals are delivered as solutions and would be stored in a common bulk storage area.

Lime

Lime (calcium hydroxide) is used primarily to provide chemical phosphorus removal. Lime will be dosed at two locations to achieve a high degree of phosphorus removal. Lime will be dosed to the bioreactor in conjunction with ferric chloride to provide chemical phosphorus removal. Lime will also be dosed to the lime clarifier to reduce the amount of phosphorus that is returned from the biosolids dewatering facility. Lime will be stored in a 40T silo.

Ferric Chloride

Ferric (ferric chloride solution) is used primarily in chemical phosphorus removal. The lime and ferric usage is dependent on the raw sewage concentration and how much EBPR can be achieved. To achieve a high degree of phosphorus removal ferric is dosed in two locations (bioreactor and filters) by two separate dosing pumps. Two 50kL tanks would be required for the storage of ferric. The ferric chloride dosing system has been designed to enable QPRC to use alum as an alternative chemical to ferric chloride. Alum (aluminium sulphate solution) will be used if there are longer term costs, treatment or phosphorus removal benefit.

Sodium Hydroxide (Caustic)

Sodium hydroxide solution (caustic) may be dosed prior to tertiary treatment to adjust the pH of the effluent to the optimum levels to achieve phosphorus removal in the dissolved air flotation and filtration process. Sodium hydroxide can also be dosed at the inlet works to reduce odour. Two 25kL tanks would be required for the storage of sodium hydroxide.

Sodium Hypochlorite

Sodium hypochlorite system (liquid chlorine) dosing is used to provide slime control and disinfection for the recycled water used on site and at the recycled water standpipe. It is not used for disinfection of treated effluent discharged to the

Molonglo River. As the usage rate is low, only a small 1.5kL dose storage tank is required, which would allow for acceptance of 1kL immediate bulk containers (IBC). Up to three IBCs can be stored along with the storage tank.

In addition to these bulk chemicals, the facility will also use smaller quantities of polymer for filtration and dewatering. A small quantity of hydrochloric acid (in the order of 40L) will be stored on site and used for cleaning the lime system and dosing lines. Diesel will also be stored onsite as fuel for the backup generators.

Table 2.8: Summary of chemicals to be stored on site during operation

Bulk Chemical	Use	Storage volume
Lime	Phosphorus removal	40T
Ferric chloride or Aluminium sulphate	Phosphorus removal	100kL
Sodium hydroxide (Caustic)	pH adjustment	50kL
Sodium hypochlorite	Disinfection for recycled water	3 x 1kL IBC containers and 1.5kL day tank
Polymer	Filter aid	Filter aid polymer 50kg
	Sludge thickening and dewatering	Thickening and dewatering polymer emulsion 4kL
Diesel	Fuel for backup generators	20kL

2.3.4.13 Backup power supply

A diesel generator will back up the power supply. In the event of power failure, the generator will provide full backup power to the STP. The upgrade includes 20kL above ground diesel fuel storage to store fuel for the generators. This fuel storage enables the plant to operate on generator power supply for more than 48 hours.

2.3.4.14 Odour control

The odour dispersion modelling undertaken for the concept design indicated that with the proposed changes in treatment technology, the new STP would have a lower potential odour impact than the existing STP. As part of odour control for the new STP, sodium hydroxide can be dosed into the inlet works to raise the pH to reduce odour generation.

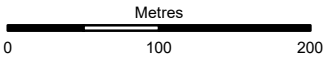
Hydrogen sulfide at the inlet works was checked and assessed at QSTP and the results display that both the time weighted average and short-term exposure limits fall well below the current limits for WHS Guidelines. For more information, see Section 5.11, Odour.



Legend

- Subject site
- Construction area
- Concept Design Elements
 - Septage Receiving
 - Dewatering Facility
 - Chemical Dosing Facility
 - Aerobic Digester
 - Grit Removal Facility
 - Lime Clarifier / Lime Silo
 - Bioreactor
 - Blower Facility
 - Electrical Generator & Diesel Storage
 - Dirty Backwash Tank / Clear Water Tank
 - Dissolved Air Flotation Filters (DAFF)
 - Stormwater Detention Basin
 - UV Disinfection Facility / Electrical Switchroom
 - Plant Outfall
 - Storm Pond (30ML)
 - Inlet Works

F1	4/03/2022	AC	JS	JS
Issue	Date	By	Chkd	Appd



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Client
**Queanbeyan-Palerang
Regional Council**

Job Title
**Queanbeyan Sewage
Treatment Plant**

Figure Title
Proposed Key Features

Scale at A4 1:5,000	Figure Status Final
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Coordinate System GDA 1994 MGA Zone 55
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Job No 267007-00	Figure No 2.7
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2.3.5 Civil / structural design

This section provides an overview of the civil/structural design, with full details provided in Concept Design Report (Hunter H2O, 2020) (Appendix G1) and Concept Design Addendum Report (Hunter H2O, 2022) (Appendix G2).

The new QSTP would primarily be situated above the nominated 1% AEP (1 in 100 year) design flood level and located on the eastern side of the site, to the south and east of the existing STP.

The site footprint of the new STP is set out across a predominantly level area, with the exception of the new storm pond which is located in a part of the site that grades downwards to the north-east. The centre of the site is highest, with a minor drop in elevation to the east and slightly more prominent drop-off to the west. The site layout has been developed to use the topography to enable gravity flow through the processes where possible.

Access ring roads are provided for the new works, with new internal site pavements servicing all areas of the site within a grid arrangement. The layout accommodates the movement of heavy rigid vehicles with predominantly looping roadways and only two dead-ends which can be avoided by larger vehicles. Provision has been made for permanent crane set down pads to access designated areas to allow for maintenance and repairs in the vicinity of mechanical/process infrastructure.

An upgrade to the site access road, Mountain Road is also included in the Proposal, consisting of a two-coat seal pavement upgrade to meet ACT Roads requirements. Further consultation with ACT Roads will occur in the detailed design phase.

2.3.5.1 Structural foundations

Differential settlement is a key issue for the major liquid retaining structures e.g., the bioreactor, clarifiers, DAF filters etc due to the variability of founding strata properties across their large footprints, as identified in the geotechnical investigations (see Appendix J1 and Appendix J2). This has implications for structural foundations and will be addressed during detailed design for selection of foundation improvement.

2.3.5.2 Diversion of incoming sewer trunk mains

Sewage is currently conveyed to the existing STP by the Morisset trunk main to the south and the Jerrabomberra trunk main to the west. Both mains currently terminate at the existing inlet works, which is situated approximately 180m south-west of the new primary inlet works. As part of the upgrade, both mains will be diverted to the new inlet works receival pit.

2.3.5.3 On-bank river discharge

The upgrade to the QSTP requires the location of the effluent discharge to the Molonglo River to be relocated to be adjacent to the new site. Treated effluent would be discharged using an engineered on-bank river discharge structure. The location has been selected to minimise impact to the riverbank and avoid in-river construction works. An area of riprap would be provided at the discharge structure to minimise scouring of the riverbank.

2.3.5.4 Roadworks

The QSTP is accessed via Mountain Road. The existing road is unsealed and in poor condition. As part of this Proposal, Mountain Road would be upgraded from the existing intersection with Railway Street to accommodate access for larger vehicles and provide suitable road conditions for operational traffic. Preliminary discussions with ACT Roads have been undertaken and consultation will be finalised as part of the detailed design phase.

The access road within the STP will enable an articulated vehicle, up to 19m in length, to access the proposed structures and equipment for construction, maintenance and operational purposes.

2.3.5.5 Stormwater drainage

Site buildings would be constructed with suitably sized roof guttering and downpipe systems to direct stormwater to road level. The internal site pavements would be constructed with crossfall to direct stormwater towards kerb and guttering, which would contain suitably spaced inlet pits and adjoining pipework to collect and distribute discharge to a stormwater detention basin. The subsurface stormwater network configuration and final basin location would be determined during detailed design.

The stormwater from areas of the treatment plant where there is a risk of sewage spills (such as the inlet works, grit removal and septage receival areas) would be contained separately and returned to the treatment process.

Along Mountain Road, no formed kerb and guttering is currently proposed; however, a culvert or similar would be required at the low point situated approximately 150m south-west of the existing site entrance to prevent localised flooding. The downstream (northern) end of the culvert would require construction of a suitable diversion channel to promote the stormwater flow to the natural gully orientated north-west towards the Molonglo River.

2.3.5.6 Maturation pond decommissioning

The existing STP includes three maturation ponds that are located immediately south of the Molonglo River on the north-west of the site. The three maturation ponds operate in series with an area in the order of 7.6ha and a volume approaching 200ML. Effluent from Pond 3 discharges to the Molonglo River at the existing licenced discharge point.

The maturation ponds are located within the extents of the 1% AEP (1 in 100 year) flood zone and are at risk of failure during flood events, such as occurred during the 2010 flood event. It is proposed to decommission the ponds once the upgraded STP has been commissioned and is operational.

The Proposal would not include the maturation ponds as part of the treatment. The maturation ponds are regulated under the *Utilities (Technical Regulation) Act 2014* (UTR Act) and Pond 2 and Pond 3 are registered dams. The decommissioning of the ponds would be done in consultation with the UTR and EPSDD.

A plan would be prepared to detail the proposed method of decommissioning the maturation ponds, and would include details of the following required actions:

- Dewater of the existing maturation ponds, including consideration of any fish salvage requirements
- Descale internal faces of lagoons/embankments (i.e., remove sludge)
- Partially backfill empty ponds using fill from construction of the Proposal that would be stored on site, and subsequent revegetation to mitigate future erosion
- Breach embankments of each pond to allow floodwater ingress and recession without retention. Breaching should include recontouring, placement of geotextile/riprap/rock armouring/concrete reinforcement and revegetation around the breached embankment face to mitigate future erosion.

Additional information in relation to the ponds is in Section 5.8, Water quality and hydrology, and Chapter 8, Other relevant information.

2.3.6 Technology, skills and workforce

The Proposal is comprised solely of well-established, tested, robust and reliable technology well suited to treating sewage as per the established design basis, both in terms of flow capacity and treatment performance. The upgraded STP would be a considerable improvement on the technology used in the current STP with associated improvements in environmental outcomes.

The treatment technology is supported by communications technology including supervisory control and data acquisition (SCADA) technology enhancement, allowing detailed monitoring, control and alarm management.

The operators that currently run the plant are skilled in wastewater treatment and would continue to operate the upgraded plant. The operators' skills include an appropriate level of understanding and competency in work health and safety, environmental management, water quality control, hydraulics, water chemistry and optimisation of operation.

Equipment information and training would be provided to all operators during the commissioning and handover period, with a particular focus on the SCADA system, which may be somewhat advanced in comparison to the current system. Training information sessions and presentations would be recorded for ongoing use, ensuring all operational personnel are adequately trained to maintain consistent and competent operation of the upgraded STP. Detailed Operations and Maintenance Manuals and Asset Inventory and Maintenance Schedules would also be issued to QPRC.

The currently proposed operational staffing levels are one team leader and three operators.

- Monday – Friday: two operators, eight-hour shifts
- Saturday and Sunday: one operator.

Operators will undertake some servicing and maintenance tasks. More specialist maintenance and servicing will be undertaken using maintenance contracts.

2.4 Proposal timeframe

Subject to planning and environmental approvals, the proposal is expected to commence construction by early-2023 with a construction period of up to two years. The proposal is expected to be commissioned (i.e., become operational) in mid-2025. Commissioning of the new STP will be followed by the decommissioning of the maturation ponds which is anticipated to take another six months. Table 2.9 presents the key milestones for the delivery of the Proposal. These dates are for planning purposes and will be refined as the Proposal progresses.

Table 2.9: Procurement Program

Milestone	Current estimate
Concept design approval	May 2020
Draft EIS	January 2021
Final EIS	May 2022
Detailed design complete	August 2022
Contract award	January 2023
Construction, testing and commissioning	February 2023 – March 2025
Decommissioning of maturation ponds complete	October 2025

2.5 Construction activities

The methodology presented below is based on the current design and would be subject to confirmation by the nominated construction contractor. Any material changes to the construction methodology which could result in additional environmental impacts to those assessed in this EIS would need to consider the requirement for additional environmental assessment or consistency review.

Construction work is expected to commence in 2023 and take up to two years to complete. It is anticipated that the main construction activities would generally be carried out in the following sequence:

- Site early works and establishment
- Site mobilisation and construction
- Pre-commissioning and commissioning activities
- Decommissioning and modification of the maturation ponds
- Site clean-up and restoration.

These activities are discussed in further detail in the sections below.

2.5.1 Construction staging

Staging would involve a sequence of works lasting up to three years, starting in February 2023 as summarised in Table 2.10

Table 2.10: Description of preliminary construction program and stages

Activity	Duration
Mobilisation	25 days
Procurement	130 days
Establishment and early works	60 days
Bulk earthworks	60 days

Activity	Duration
Construction key structures	320 days
Testing and commissioning	80 days
Maturation ponds decommissioning	180 days
Restoration of Mountain Road	40 days

2.5.1.1 Working hours

Construction would be largely carried out during standard construction hours given in Table 2.11. It is anticipated that there may be some schedule night works on case-by-case basis which will require approval from the ACT EPA.

Table 2.11: Standard hours of construction

Day	Standard construction hours
Monday to Friday	7:00am to 6:00pm
Saturdays	8:00am to 1:00pm

2.5.1.2 Site early works and establishment

Early works to be undertaken prior to construction include:

- Testing of trial concrete mixes pre-contract so results are available to the tenderers
- Relocation of services including a number of power poles along Mountain Road and the power supply to the existing site to provide clear site access for construction phase
- Early upgrade of Mountain Road to support construction traffic.

The early works would be detailed in the Development Application submission.

2.5.1.3 Site mobilisation and construction

At the commencement of construction, the main activities which would be undertaken include:

- Installation of temporary fencing around designed construction areas and provision of security measures as well as any necessary construction environmental management measures such as erosion and sedimentation controls
- Confirmation of all utility services and any affected services which would be relocated or required to be made safe to allow construction to proceed
- Establishing and fencing designated stockpile areas. Topsoil excavated from trenching activities would be stockpiled on site. The stripped topsoil would be stockpiled for later use as part of site restoration
- Establishment of new access tracks and haulage road (as required)
- Establish temporary site amenities as required
- Construction of a temporary operational access road to the existing treatment plant to maintain access during the construction period and separate operational and construction traffic as much as possible
- Excavation and installation of the Morisset trunk sewer diversion which runs through the proposed build zone from the existing sewer to the proposed inlet works
- Establishment of the construction compound
- Import and securing of materials to laydown areas (including laydown of sewer pipe and fittings, ancillary items etc.).

Site office(s) and any other temporary buildings and compounds would also be established at this time, with power and water connected to these buildings (as required).

The key activities during construction of the main plant will include:

- Early procurement of items including:
 - Cast in pipe stubs for major structures
 - Imported equipment (e.g., inlet screens, centrifuges, blowers, etc)
 - Switchboards
- Installation of the Jerrabomberra trunk sewer diversion which runs through the existing works to the proposed inlet works
- Bulk earthworks including excavation for the bioreactor and clarifier structure areas
- Construction of major reinforced concrete liquid retaining structures – inlet works, bioreactor, clarifiers, filters, digesters
- Construction of electrical switch rooms
- Plant roads, pumping stations, chemical storage area, hardstands and buildings
- Yard pipework, electrical and instrumentation
- Connect to new power supply
- Hydrostatic testing
- Mechanical testing
- Cut-over of sewage flows and commissioning of whole plant
- Final finish to upgrade of Mountain Road.

Construction traffic

Although the number of workers on site will vary throughout the construction programme, the peak number of construction workers expected to be on-site is 60.

In addition, it is expected ten concrete trucks per day would visit the site. A range of construction vehicles and plant will also be stored on site. Septage deliveries to the site will occur with a frequency of up to three vehicles per day. Recycled water tankers may also be required for dust suppression these would contribute up to 20 vehicle movements per day. The potential impact of these traffic numbers is discussed further in Section 5.2, Traffic and transport.

Table 2.12 lists the equipment anticipated to be used for construction. The frequency of each vehicle will vary throughout the course of the construction period. It is anticipated that a number of the vehicles listed below will be used at the site daily. Initial construction works will largely include earthmoving vehicles, whilst throughout the construction period vehicles such as concrete trucks and cranes are anticipated to assist with the above ground construction works. Section 5.3, Traffic and transport provides an assessment of the potential traffic and transport impacts during construction.

Table 2.12: Construction vehicle volumes

Vehicle Type	Estimated volume at peak
Tracked excavator	5
Forklift / Manitou	1
Excavators 10, 15, 20 & 30t	10
Dozers D7, D8, D9	2
Conventional hydraulic equipment	2
Large Excavators fitted with teeth	1
Backhoe	1
Compactor	2

Vehicle Type	Estimated volume at peak
Trucks for spoil movement, disposal	5
Moxys	8
Concrete agitator truck / concrete pump	6
Trucks for deliveries	4
Crane	2

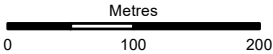
Figure 2.8 shows the layout of the proposed upgrade, including the upgraded STP, the location of the maturation ponds to be decommissioned, and the primary stockpile areas. The figure also shows two exclusion zones; a potential archaeological deposit which is discussed in more detail in Section 5.18, Heritage, and an area of habitat for Golden Sun Moth *Synemon plana*, which is discussed in more detail in Section 5.17, Biodiversity.



Legend

- Subject site
- Current Structures
- Concept Design Layout (Phase 1)
- Construction area Phase 1
- Laydown area, phase 1
- Stockpile area, phase 1 and 2
- Construction area phase 2
- Golden Sun Moth exclusion zone
- Potential Archeological Deposit 1 (PAD 1) exclusion zone
- Potential Archeological Deposit 2 (PAD 2)

F1	8/04/2022	AC	JS	JS
Issue	Date	By	Chkd	Appd



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Client

**Queanbeyan-Palerang
Regional Council**

Job Title

**Queanbeyan Sewage Treatment
Plant Upgrade Project**

Figure Title

Proposed QSTP Development

Scale at A4

1:6,000

Figure Status

Final

Coordinate System

GDA 1994 MGA Zone 55

Job No

267007-00

Figure No

2.8

2.6 Alternatives considered

As discussed in the QPRC Masterplan (QPRC, 2016a), three alternatives to the Proposal to build a new STP have been considered:

1. Do nothing
2. Build a new STP, using restored parts of the existing facility
3. Restore QSTP and expand as needed to provide sufficient capacity.

The “do nothing” option was quickly discounted, due to the significant environmental and human health impacts of not proceeding with the upgraded STP. These include, but are not limited to:

- Flooding more often impacting current STP infrastructure with higher flood flows and severity
- Asset failure as more of the assets continue to be operated beyond their asset life
- Hydraulic capacity failure as the population continues to grow and sewage flows increase
- Performance failure as the population continues to grow and the current treatment facilities cannot effectively treat nitrogen, phosphorus, carbon, solids and pathogens
- Environmental and human health harm of poorly treated or untreated sewage entering the Molonglo River due to hydraulic and treatment performance failures
- Environmental and human health harm from noise and odour as the current assets fail
- Higher operating costs due to energy draining processes and poor asset condition.

To investigate the option of reuse of parts of the existing facility, a condition assessment was undertaken. This assessment identified that only the aeration tanks, secondary clarifiers and sludge lagoons could be plausibly reused as structures, although not necessarily as their current process unit operations. The inlet works, primary sedimentation tanks, trickling filters and effluent ponds are not fit for reuse due to their poor condition and in part being affected by the 100-year average recurrence interval (ARI) flood level.

Six build strategy options were compared. These included consideration of both conventional activated sludge and membrane bioreactor technology for each of the three build strategies. The options are presented in Table 2.13.

Table 2.13: QSTP Upgrade options

Option	Build strategy	Treatment technology
1A	Build New all process units and equipment, completely abandon the existing plant	BNR (Biological Nutrient Removal) / CAS (Conventional activated sludge process)
1B	Build New all process units and equipment, completely abandon the existing plant	BNR / MBR (Membrane process)
2A	Build New main process units and Reuse some process units from STP	BNR / CAS
2B	Build New main process units and Reuse some process units from STP	BNR / MBR
3A	Renew main QSTP process units & Augment with new additional process units	BNR / CAS
3B	Renew main QSTP process units & Augment with new additional process units	BNR / MBR

A Multi Criteria Analysis (MCA) was undertaken of the options considered. Six criteria were used:

1. Cost.
2. Constructability, including quality, environmental and safety risks, timeframe for completion, likelihood of exceeding discharge licence conditions and extent of temporary works.
3. Operability, including potential for increase in operating costs, ability to operate, WHS for operational staff, extent of autonomy and remote capability.
4. Sustainability, including impact on environment, ability to reuse effluent and biosolids and ability to capture gas and resource recovery.
5. Future Proofing, including achieving licence, increasing capacity and accommodating unexpected increases in flows or influent quality.
6. Community acceptance and affordability, including impact on rates and QPRC financial position and QPRC reputation.

The MCA was tested in a variety of weighted criteria. Options 1A and 1B were consistently indicated as the preferred options. As a result, the “Build New” strategy is the preferred option and was used as the basis for this Proposal.

3 Legislative and strategic context



3 Legislative and strategic context

3.1 Planning and Development Act 2007

The *Planning and Development Act 2007* (PD Act) outlines the process for assessing and approving developments in the ACT. The PD Act assesses developments based on a track-based system. The impact track is used for developments with a potential to have a major impact on the environment of the ACT and the method of assessment is rigorous and subject to high levels of scrutiny.

Under section 123 of the PD Act, a development application is considered as an impact track development proposal if:

- The relevant development table of the Territory Plan states that the impact track applies
- It is of a kind mentioned in Schedule 4 of the PD Act
- The Minister makes a declaration under section 124 of the PD Act in relation to the proposal
- Section 125 or section 132 of the PD Act provides that the impact track applies
- The Commonwealth Minister responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) advises the Minister in writing that the proposed development is:
 - A controlled action under the EPBC Act, section 76, and
 - Does not require assessment under that Act because a bilateral agreement allows the proposal to be assessed under the PD Act.

This Proposal is to be assessed under the impact track because it is of a kind mentioned in Schedule 4 of the PD Act, that it is a development proposal requiring an EIS. This Proposal falls specifically under Schedule 4, Part 4.2, Item 5.

As per the PD Act, the EIS is not an approval process, but a means of ensuring that all potential environmental impacts and possible mitigation measures for impact track development proposals have been investigated and documented.

3.1.1 Impact track process

This EIS has been prepared to respond to the EIS Scoping Document Requirements issued by the EPSDD on 10 September 2019. Following the issuance of the Scoping Document, the proponent is required to give a draft EIS to the Authority within 18 months.

This EIS details the anticipated potential environmental impacts of the Proposal on the environment. It aims to provide sufficient information to the EPSDD to assess the environmental impact and proposed mitigation and management measures.

The Draft EIS was submitted and placed on public exhibition from 18 January 2021 to 9 March 2021. This Revised EIS has been prepared to respond to the feedback received during this consultation period.

Before construction, a DA will be submitted by QPRC. Following the deemed completion of the EIS, the EPSDD would then be able to determine the DA.

The general approvals pathway is shown in Figure 3.1.

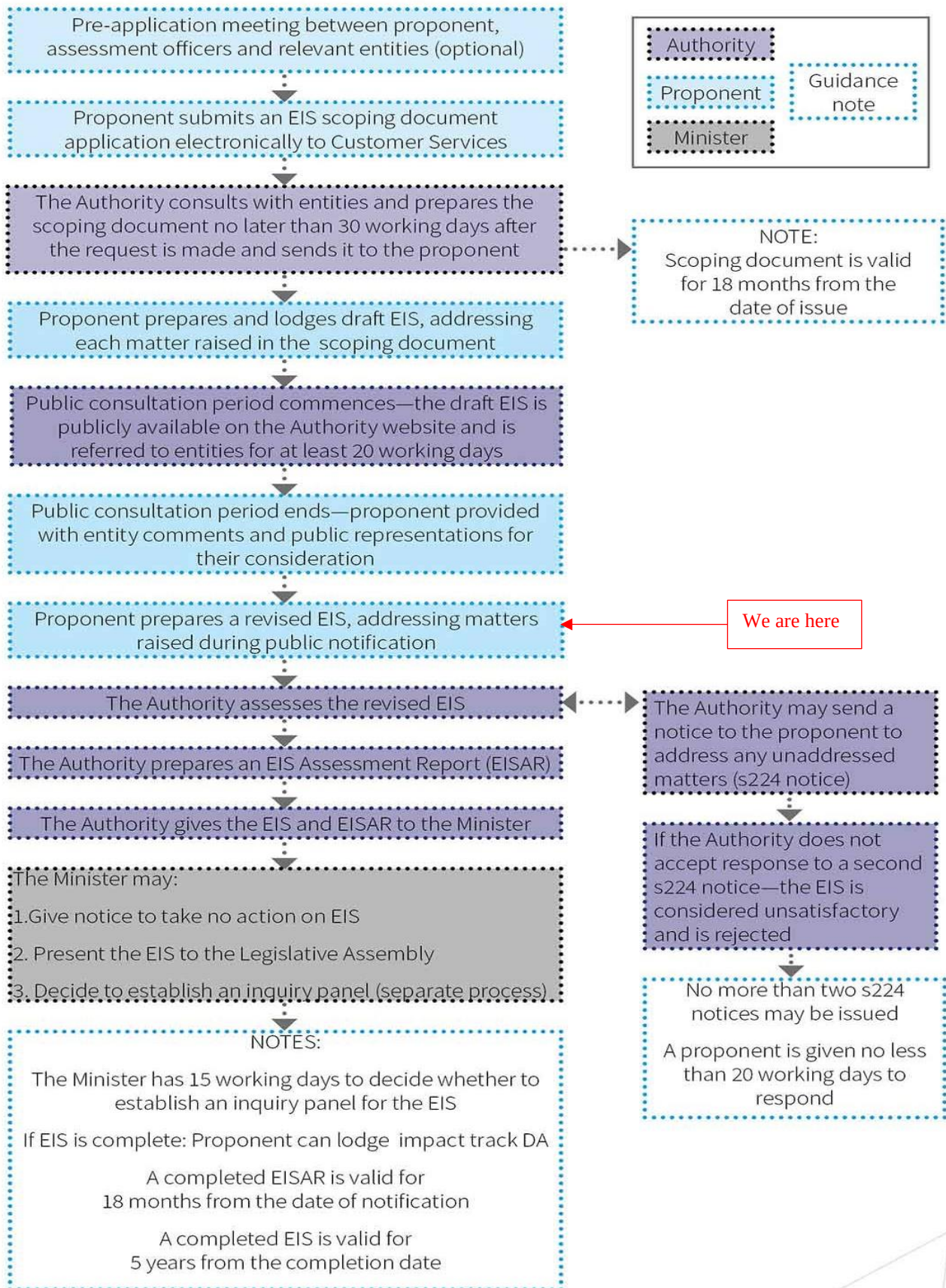


Figure 3.1: ACT EIS process (Source: EPSDD)

3.2 Planning and Development Regulation 2008

This EIS has considered the requirements for preparing an EIS under Part 4.1 Environmental Impact Statements of the (ACT) Planning and Development Regulation 2008 (PD Regulation).

As stated in the scoping document for this development proposal, the EIS must be prepared in accordance with s.50 of the PD Regulation, which sets out what must be included in an EIS, such as:

- A non-technical summary of the EIS and recommendations
- A glossary of technical terms, abbreviations and acronyms used
- A description of the proposal including main information about the land location
- A description of the EIS process, including statutory approvals obtained/required, base information used for predicting environmental impact and criteria for assessing significance of environmental impacts
- A statement of compatibility with the principles for environmental sustainability in the Territory Plan
- For each potentially significant environmental impact identified in the scoping document:
 - An identification of the relevant environmental values
 - An identification of the findings and results of any environmental investigation
 - A description of the effects of the environmental impact
 - An analysis of the significance of the potential environmental impact
 - A statement of the approach proposed, including any proposed impact prevention, mitigation or offsetting measures
- A description of consultation undertaken for the EIS.

Chapter 4 of the PD Regulation also requires that each potentially significant environmental impact identified in the scoping document must be answered in its own part of the EIS.

3.3 Utilities Act 2000 and Utilities (Technical Regulation) Act 2014

The *Utilities Act 2000* provides a regulatory framework for electricity, gas, water and sewerage utility services. This Proposal relates to the ‘*Conveyance, collection, treatment and disposal of sewage*’ and is considered a utility service under the *Utilities Act 2000*.

To provide a utility service in the ACT, a utility must be licensed under the *Utilities Act 2000* or be the subject of an exemption. The Utilities Act imposes obligations on licensees associated with operation of networks and licence conditions including compliance with local and national legislation. Technical regulation is provided by The Technical Regulator under the *Utilities (Technical Regulation) Act 2014*. Technical regulation is concerned with the operation of utility services and the protection and maintenance of their networks (Utilities Technical Regulation, 2020).

QPRC is seeking an exemption from the *Utilities Act 2000* and the *Utilities (Technical Regulation) Act 2014* (the UTR Act) exempting the class of utility service from both Acts. The bases for the exemption are:

- The activities carried out by QPRC at the site are adequately regulated under another law applying in the ACT, primarily the Commonwealth Crown Lease 1938 and the activities completed to convey sewerage at Oaks Estate are adequately regulated under the Act through the entity Icon Water.
- Exempting QPRC will not significantly impede the ICRC achieving its objects under section 3 of the Act.
- The circumstances surrounding Queanbeyan STP are not consistent with the definitions of main terms in the Act.
- The obligations imposed under the Act would duplicate existing safeguards and would not necessarily reduce the level of risk or consequences of failure to treat and dispose of sewage, and
- Unnecessary duplication of regulation would otherwise be imposed together with additional costs to QPRC’s customers which would not be justified as QPRC are regulated to convey, treat and dispose of sewage under NSW legislation.

These reasons are fully explained in QPRC’s request for exemptions submitted to the Minister on 21 April 2020.

On 14 July 2020, a response was received from the Minister for the Environment and Heritage. In the view of the Minister, “while the majority of customers of the sewerage services are located within NSW, due to the treatment and disposal aspects of the service occurring within the ACT, the risks of the utility service failing or not being provided in a safe, reliable and effective way are significant to the ACT”.

Accordingly, the Minister considered that the risks require an ‘*Appropriate level of regulation under ACT legislation*’ and declined QPRC’s request for a class exemption under section 15A of the *Utilities Act 2000* and section 10A of the *Utilities (Technical Regulation) Act 2014*.

However, the Minister did agree to a Ministerial exemption from holding a licence in accordance with section 22 of *Utilities Act 2000*, which requires that QPRC obtain an operating certificate from the ACT Utilities Technical Regulator in accordance with Part 6 of the *Utilities (Technical Regulation) Act 2014*. QPRC will prepare a Regulatory Plan to be submitted to the Utilities Technical Regulator (UTR) to demonstrate that the Proposal is in compliance with the UTR Act. Further information is provided in Chapter 8, Other relevant information.

3.3.1 Register of Dams

The Technical Regulator is required to keep a register of dams under section 58 of the UTR Act. Registrable dam means a dam, or proposed dam, in the ACT that:

- Is more than 5m high; or
- Has a water storage capacity of more than 250ML; and
- Googong dam in NSW.

QPRC have two ponds that are registered as dams:

- Sewage Maturation Pond 2
- Sewage Maturation Pond 3.

Both these dams will be removed; therefore, approval will be sought for decommissioning the two dams.

3.4 Environment Protection Act 1997

The *Environment Protection Act 1997* (EP Act 1997) provides for a broad range of measures to protect and enhance the environment. There are three situations where an Environmental Authorisation is required. They are:

- The conduct of Class A activities (found in Schedule 1 of the Act). Due to their potential for causing significant environmental harm, these are regulated to the highest of the levels in the Act
- The conduct of Class B activities (found in Schedule 1 of the Act). Class B activities have less potential for causing significant harm but still require a level of detailed regulation
- Other situations determined by the EPA, as explained by section 43 of the Act.

The Proposal is classified as a Class A activity (Item 10: sewage treatment if discharging treated or untreated sewage to land or water and having a peak loading capacity designed for more than 100 people per day).

QPRC already has an Environmental Authorisation (0417, dated 21 February 2017) for the existing plant that is reviewed on an annual basis. The current Environmental Authorisation states:

‘1.1.5 The Authorisation holder shall seek the approval in writing of the EPA to install, construct or modify any equipment or works in or on the premises which would impact on the plant’s capacity to achieve Authorisation conditions.’

It should be noted that the current Environment Authorisation is for Block 2087 Oaks Estate, now known as Block 2087 Jerrabomberra. Clarification of the site will be made in the Authorisation, including the applicability of the approval to Block 27 Jerrabomberra (Arup, 2019 and Queanbeyan Palerang Regional Council, 2016).

An Environment Protection Agreement would be required for Class B activities, under the ACT *Environment Protection Act 1997* (Environment Protection Act 2017, 1997), carried out during construction on the site. The Proposal is considered a Class B activity as it constitutes the construction of public infrastructure on a site of 0.3ha. The agreement would be obtained prior to construction of the Proposal.

Environment Protection Regulation 2005 sets out specific offences in relation to the EP Act. The Proposal will answer and meet the objectives of the regulations.

3.5 Waste Management Resource and Recovery Act 2016

The *Waste Management Resource and Recovery Act 2016* (WMRR Act) aims to manage waste through the following hierarchy:

- Minimise the generation of waste
- Maximise the recovery and re-use of resources
- Minimise the amount of waste that goes to landfill.

The WMRR Act also supports innovation and investment in waste management, promotes responsibility for waste reduction and best-practice waste management. As a waste management facility in the ACT, the QSTP is subject to licencing requirements under the WMRR Act. This is discussed further in Section 5.04, Materials and Waste.

3.6 Nature Conservation Act 2014

The *Nature Conservation Act 2014* (NC Act) is the chief legislation for the protection of native plants and animals in the ACT and for the management of the conservation reserve network. The NC Act protects native plants and animals and provides management authority for conservation lands. The NC Act provides the legal underpinning of nature conservation policy, management and action across the territory. This is discussed further in Section 5.17, Biodiversity.

3.7 Tree Protection Act 2005

The *Tree Protection Act 2005* sets out how the ACT Government protects individual trees on leased land in the ACT. The objectives of this Act are:

- To protect individual trees in the urban area that have exceptional qualities because of their natural and cultural heritage values or their contribution to the urban landscape
- To protect urban forest values that may be at risk because of unnecessary loss or degradation
- To protect urban forest values that contribute to the heritage significance of an area
- To ensure that trees of value are protected during periods of construction activity
- To promote the incorporation of the value of trees and their protection requirements into the design and planning of development; and
- To promote a broad appreciation of the role of trees in the urban environment and the benefits of good tree management and sound arboricultural practices.

This is discussed further in Section 5.17, Biodiversity.

3.8 Public Health Act 1997

The *Public Health Act 1997* is the primary legislation in the ACT to manage public health. The objectives of the *Public Health Act 1997* are the protection of the population from public health risks including those associated with facilities, equipment, products and activities through the monitoring of health indicators, to provide the public with information about the health of the population and to design and implement appropriate policies and programs for the maintenance and improvement of the population's health. The policy also allows for provision of rapid response in the event of a Public Health Risk.

ACT Health (together with the NCA) regulates discharges to Lake Burley Griffin. The Minister responsible for the *Public Health Act 1997* has the ability to declare the Proposal impact applicable and then needing an EIS to be completed. It is unlikely that this occur given as an EIS is already needed and that the Proposal will improve the quality of the inputs into the Molonglo River and other receptors. QPRC have been and will continue to consult with ACT Health.

3.9 Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires referral to the Commonwealth Minister for the Environment and Energy for any actions that are likely to have a significant impact on the following:

- Matters of national environmental significance (MNES)
- An action by the Commonwealth or a Commonwealth agency which has, will have or is likely to have a significant impact on the environment
- An action which has, will have or is likely to have a significant impact on the environment on Commonwealth land, no matter where it is to be carried out.

The Ecological Assessment Report prepared as part of the EIS (see Appendix Q1) shows that an EPBC referral is not required provided work does not impact on identified Golden Sun Moth habitat. This is discussed further in Section 5.17, Biodiversity.

3.10 Water Resources Act 2007

The objectives of the *Water Resources Act 2007* (WR Act) are:

- To ensure that management and use of the water resources of the Territory sustain the physical, economic and social wellbeing of the people of the ACT while protecting the ecosystems that depend on those resources
- To protect aquatic ecosystems and aquifers from damage and, where practicable, to reverse damage that has already happened and
- To ensure that the water resources can meet the reasonably foreseeable needs of future generations.

Subject to the WR Act, the right to the use, flow and control of all water of the territory is vested in the territory and is exercisable by the Minister on behalf of the territory.

As the Proposal will seek approval through an Environment Protection Agreement, an additional waterway work licence is not required.

3.11 Other related approvals

3.11.1 Integrated water cycle management

The NSW Government, via the Office of Water, insist that local water utilities which follow the Best Practice Management Framework will demonstrate and achieve more effective and sustainable water supply and sewerage services. For this reason, adoption and following best practice frameworks at a local water utility level, through mechanisms such as Integrated Water Cycle Management (IWCN), will offer these improved services (Queanbeyan Palerang Regional Council, 2016a).

The Framework is a main driver for planning reform and continuous performance improvement. The 19 requirements of the Framework are prescribed in the Best Practice Management of Water Supply and Sewerage Guidelines, which sit across six key elements including (Queanbeyan Palerang Regional Council, 2016a):

1. Integrated water cycle management
2. Strategic business planning
3. Regulation and pricing of water supply, sewerage and trade waste:
 - Pricing
 - Developer charges
 - Liquid trade waste
4. Water conservation
5. Drought management
6. Performance monitoring.

In its purest form, the Framework allows for public accountability of the local water utility to the communities it serves and provides verification of agreed service delivery standards. In addition, the framework supports the intent of the *Water Management Act 2000* to protect human health and the environment. The Framework support comes from using triple bottom line accounting to achieve a balance between financial, social and environmental outcomes (Queanbeyan Palerang Regional Council, 2016a).

Going forward, the Best Practice Management Framework will likely underpin the current Fit for the Future reform program, which NSW local councils must comply with. The NSW Government suggests that regional Joint Organisations be established to provide a platform for local council collaboration to achieve regional outcomes and maximise efficiencies.

The NSW Government Department of Planning and Environment Water Group (previously NSW Department of Primary Industries – Office of Water) has advised QPRC that it should prepare and implement an IWCM for the whole LGA. QPRC is in a regional joint organisation and is in the process of preparing an IWCM for Queanbeyan.

3.12 Climate change

There are key strategies within the ACT that set the Territory's ambition for dealing with climate change and adapting to its impacts. Since the release of the Scoping Document in mid-2019, the ACT Government released their updated Climate Change Strategy 2019–25 (ACT Government, 2019a) and Canberra's Living Infrastructure Plan (ACT Government, 2019b). These Strategies replace the previous ACT Climate Change Adaptation Strategy 2016 and AP2 – A new climate change strategy and action plan for the Australian Capital Territory 2012. This was confirmed as appropriate for the EIS assessment via email on 5 December 2019 from EPSDD. Section 3.12.1 and Section 3.12.2 below consider the Climate Change Strategy 2019–25 (ACT Government, 2019a) and Canberra's Living Infrastructure Plan (ACT Government, 2019b) respectively. The EIS has considered the impacts of climate change, such as the potential for increased temperatures, bushfire and flood risks, on operation and reliability of electrical infrastructure in Section 5.9 Climate change and Section 5.10 Air quality.

3.12.1 ACT Climate Change Strategy 2019 – 25

The ACT Government has set a target to achieve zero net emissions by 30 June 2045 through the *Climate Change and Greenhouse Gas Reduction Act 2010* (updated in 2018).

The ACT Climate Change Strategy 2019–25 (ACT Government, 2019a) sets out the ACT Government's pathway to achieve a 50 – 60% reduction in emissions from 1990 levels by 2025 and then the immediate steps to achieve net zero emissions by 2045. It identifies actions that increase resilience of the Canberra region to the shocks and stresses associated with climate change, as well as mitigation and adaptation measures. The Strategy's ambitions related to emissions reduction, sustainable infrastructure and electrification are particularly relevant to the Proposal. There are 10 action areas outlined in the Strategy, with corresponding goals and actions set out for the ACT Government to complete. These are addressed in Section 5.9 Climate Change.

3.12.1.1 Infrastructure Sustainability Council rating scheme

The Infrastructure Sustainability (IS) rating scheme from the ISC is a sustainability performance benchmarking tool for infrastructure proposals in Australia. It can provide ratings across the planning, design, as-built and operational phases of a piece of infrastructure, driving more sustainable outcomes across its lifecycle. Goal 5.6 of the ACT Climate Change Strategy sets the ambition that all proposals over \$10m achieve an IS Rating or equivalent.

The IS Rating was utilised on the Proposal to:

- Set target levels of performance for sustainability – a score between 65 – 75 mandated by QSTP, which is 'Excellent'
- Make sure adequate governance and documents of sustainability initiatives occurred
- Demonstrate the performance of the Proposal to external stakeholders
- Align with the ambition of the territory to put all large infrastructure proposals through the IS Rating process, as above.

It considers better practice within the themes of:

- Management systems
- Materials
- Community, health, wellbeing and safety
- Procurement and purchasing
- Heritage
- Discharges to air, land and water
- Climate change adaptation
- Land
- Stakeholder participation
- Energy and carbon
- Waste
- Urban and landscape design
- Water
- Ecology
- Innovation.

The Proposal's final performance would be audited for design and also once built, aims for an IS rating of at least between 65 – 75 points in line with Infrastructure Sustainability Technical Manual, Version 1.2 (Infrastructure Sustainability Council of Australia, 2018). This needs a written assessment and audit evidence of achieving this rating.

3.12.2 Canberra's Living Infrastructure Plan 2019

Canberra's Living Infrastructure Plan (ACT Government, 2019b) was released alongside the Climate Change Strategy 2019–25 (ACT Government, 2019a) and sets Canberra's current ambition for dealing with urban heat island and realising other benefits of living infrastructure. It sets two main targets for Canberra's urban footprint by 2045:

- The equivalent benefits of a 30% tree canopy cover
- 30% permeable surfaces.

These targets are designed to improve environmental, social and economic outcomes by providing living infrastructure. These are applicable to the Proposal as the site is within the urban footprint for Canberra as defined in Canberra's Living Infrastructure Plan (ACT Government, 2019b). This is further explained in Section 5.9 Climate change.

3.13 Other requirements

The following plans and strategies have been considered in the preparation of the EIS:

- Territory Plan 2008
- ACT Planning Strategy
- National Capital Plan
- Relevant environment protection policies and separation distance guidelines for air emissions
- Canberra Airport Master Plan 2020 Preliminary Draft
- Contaminated Sites Environment Protection Policy 2017
- Public land management
- River discharge licence
- Heritage Assessment Policy 2018
- Hazardous Materials Environment Protection Policy 2012
- Noise Environment Protection Policy 2012
- Water Quality Environment Protection Policy 2012.

Table 3.1 details the requirements, key relevance and how requirements are answered.

Table 3.1: Plans and strategy answers

Requirement	Key relevance	How requirement is answered
Territory Plan 2008. The object of the Territory Plan is to provide the people of the ACT with an attractive, safe and efficient environment in which to live, work and have their recreation. The territory, the Executive, a Minister or a territory authority must not do any act, or approve the doing of an act, that is inconsistent with the Territory Plan (Territory Plan 2008, 2008).	The site is located in the ACT on Territory land and is therefore subject to the requirements of the ACT <i>Territory Plan 2008</i>.	The site is zoned as TSZ2: Services and NUZ4: River Corridor land uses under the Territory Plan. The construction of a 'sewage treatment facility' is an allowed activity in the zones (TSZ2: Services and NUZ4: River Corridor) (Queanbeyan Palerang Regional Council, 2016a). Block 27 is zoned as both Services (TSZ2) and River Corridor (NUZ4). Most works proposed are to occur in land zoned as services. Water sampling is proposed to occur in land zoned as River Corridor. There is limited possible scope for river bank stabilisation works in the river corridor pending site investigations and will be later defined (Arup, 2019). The Proposal meets the objectives of the current land use zoning – services.
ACT Planning Strategy. The ACT Planning Strategy's purpose is to give guidance to the future spatial planning, development and management of Canberra and the ACT to help achieve the economic, cultural and environmental aspirations of its people. It gives people a better understanding of how change in the ACT will be managed (ACT Government, 2018b). The ACT Planning Strategy aims to: • Outline where more specific planning and investigation is required • Inform statutory planning policy to deliver change and the outcomes identified in the strategy • Help prioritise investment in social and utility infrastructure; and • Identify where regional collaboration is important.	Some of the main targets of the strategy which relate to this Proposal are: • Use infrastructure efficiently to support our growing community • Integrate living infrastructure and sustainable design to make Canberra a resilient city within the landscape • Plan for integrated water cycle management to support healthy waterways and a liveable city.	The Proposal would specifically assist in helping to prioritise investment in additional utility infrastructure in the ACT.

Requirement	Key relevance	How requirement is answered
National Capital Plan. The object of the National Capital Plan (NCP) is <i>‘To ensure that Canberra and the Territory are planned and developed in accordance with their national significance’</i>. The NCP provides guidance for the planning, design and development of designated areas and other areas identified in the NCP with special requirements.	The general policy plan in the NCP identifies the site as a river corridor. Under section 3.2.5.4, ‘Public Utility’ is a permitted use in a river corridor. Appendix A of the NCP defines public utility as below: <i>‘The use of land for...[h]eadwork and network undertakings for the provision of sewerage and drainage services or the reticulation of water, electricity, or gas except for gas manufacture and storage.’</i> There are also principles and a number of policies for river corridors, outlined in section 3.2.5.2 and 3.2.5.3 of the NCP. The principle for river corridors aims to protect and enhance the environmental quality, landscape setting and the natural and cultural resources of the Murrumbidgee and Molonglo River corridors.	While a works approval or Development Control Plan is not required, consultation with the NCA and compliance with the NCP is required. This consultation is required as the NCA (together with ACT Health) regulate the discharge to Lake Burley Griffin. Also, the policies for river corridors are consistent with the development of the Proposal.
Relevant environment protection policies and separation distance guidelines for air emissions. The EPSDD has prepared the Separation Distance Guidelines for air emissions for use as a tool in the development application process for new or expanding developments in the ACT. These guidelines provide recommended separation distances between various emitters and sensitive land uses.	These guidelines apply to new industries/activities and redevelopment of existing industries/activities for which a development application is required under the <i>Planning and Development Act 2007</i> (ACT Government, 2018b).	These guidelines have been used to inform the Air Quality Assessment (Section 5.9, Climate change and Section 5.10, Air quality).

Requirement	Key relevance	How requirement is answered
Canberra Airport Masterplan 2020. The 2020 Masterplan discusses aviation capacity for the Canberra Region in 50 – 60 years' time which is when the main runway is forecast to reach its practical limits. The Masterplan identifies limitations on development in the vicinity of the airport. The Masterplan defines the Obstacle Limitation Surface (OLS) or Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS). The purpose of the OLS is to define the volume of airspace at and around the airport which should be kept free of obstacles in order to minimise danger to aircraft arriving. The purpose of the PANS-OPS is to safeguard an aircraft from collision with obstacles when the pilot is flying on avionic instruments. The PANS-OPS creates minimum clearances between approach and departure paths of aircraft and obstacles.	The OLS level at the site is 22m. Local approval will be required from Canberra Airport before starting construction. The masterplan also requires where facilities are constructed at or in the vicinity of the airport that: • Sensible cladding and roofing materials are used to minimise the possibility of glare effects • Solar farms planned, designed and located in a manner so as not to cause reflection or glare to aircraft • Glass for buildings is used in a manner to minimise reflection and glare; and • All external lighting will be lit downward from a horizontal level to minimise impact on aircraft operations at night.	The Proposal has been designed to meet Canberra Airport Master Plan requirements.
Contaminated Sites Environment Protection Policy 2017. The Contaminated Sites Environment Protection Policy 2009 (EPP) contains information and policies relating to the assessment, remediation (including management) and audit of contaminated land and aims to minimise the risk of adverse impacts of contaminated land on the environment and human health (ACT Government, 2017b).	Development of the site would be subject to the ACT EPP.	A site assessment has been carried out for this EIS consistent with the methodology proposed in the EPP. Ongoing management measures proposed consider the guidance in the EPP. The results of the site assessment and mitigation measures are presented in Section 5.6 Soils and geology.
Public Land Management – Jerrabomberra Wetlands Nature Reserve Plan of Management 2010. Located about four kilometres east of Canberra Civic Centre, Jerrabomberra Wetlands Nature Reserve is a largely artificial habitat created by the filling of the Lake Burley Griffin. It is one of the most valuable freshwater wetland habitat areas in the ACT and adjacent region of NSW, with the presence of permanent shallow water bodies giving the wetlands regional importance as a drought refuge.	This Management Plan applies to public land near the Proposal.	The Proposal does not directly impact any public land.

Requirement	Key relevance	How requirement is answered
Public Land Management – Molonglo River Reserve Management Plan 2019. The Molonglo River Reserve Management Plan sets out how the reserve will be managed and restored over time to protect flora and fauna, provide recreational opportunities and minimise the risk of bushfire. It sets out a clear and agreed set of long-term objectives for the reserve and outlines the policy approaches for achieving the objectives. The plan also gives clear guidance on how the land and waters of the reserve will be managed and used. Extensive consultation with a wide range of groups and individuals was carried out during various stages of development of the reserve management plan (EPSDD, 2019).	The Molonglo River Reserve Management Plan 2019 is a disallowable instrument under the <i>Nature Conservation Act 2014</i>. Works completed within the Molonglo River corridor would likely require a waterway works license under the <i>Water Resources Act 2007</i>.	The Proposal does not directly impact any public land.
Hazardous Materials Environment Protection Policy 2012. The Hazardous Materials Environment Protection Policy 2012 contains information and policies relating to the management of hazardous materials including removal, movement and disposal of hazardous material to minimise the risk of adverse impacts they may have on the environment.	Development of the site would be subject to the guidelines in the Hazardous Materials Environment Protection Policy 2012.	The Hazardous Materials Environment Protection Policy 2012 has been used to inform the Materials and Waste assessment (refer to Section 5.4) and would be used to inform the Waste and Recycling Management Plan (WRMP).
Noise Environment Protection Policy 2012. The Noise Environment Protection Policy 2012 contains information and policies relating to the management of noise to minimise impacts on the environment.	Construction and operation of the Proposal would be subject to the guidelines in the Noise Environment Protection Policy 2012.	The Noise Environment Protection Policy 2012 has been used to inform the assessment and mitigation measures for the Proposal. This is presented in Section 5.14 Noise.
Water Quality Environment Protection Policy 2012. The Water Quality Environment Protection Policy 2012 contains information and policies relating to the management of water quality to minimise environmental harm.	Development of the site would be subject to the Water Quality Environment Protection Policy 2012 including Water Sensitive Urban Design, working in waterways requirements and maintaining water quality objectives.	The Water Quality Environment Protection Policy 2012 has been used to inform the water quality assessment and mitigation measures (refer to Section 5.8).

3.14 Any other relevant plans

Listed in the following section are any other relevant Masterplan, planning, environmental guidelines or action plan.

3.14.1 Masterplan for Sewerage Treatment Plant Upgrade Proposal

GHD completed the Masterplan for Sewerage Treatment Plant Upgrade Proposal in September 2016. This Masterplan created the framework and constraints for the upgrade Proposal. Issues examined include existing infrastructure in Queanbeyan and the surrounding region, future growth, environmental constraints, water quality objectives and technology selection (Queanbeyan Palerang Regional Council, 2016a). This Masterplan identified the infrastructure that best meets expected growth and development of Queanbeyan. Some of the main matters answered by the Masterplan include:

- Stakeholder consultation regarding objectives or expectations, cross border arrangements, cross border regulation, key design criteria, and service strategies and options
- Review of existing sewage collection and treatment arrangements for Queanbeyan including demands, inflows, influent quality, service level, and service costs
- Review of future growth proposal for Queanbeyan LGA
- A Water Quality Objectives Analysis (WQOA) to identify treatment criteria in terms of public health and environment protection; particularly for the Molonglo River and Lake Burley Griffin
- Options for providing services to meet future needs including potential for recycled water reuse, decentralised services, energy and carbon footprint reduction
- Review of treatment technologies (including emerging trends) and their advantages and disadvantages that could be adopted for Queanbeyan to meet agreed treatment criteria
- Master planning options workshop to compare and rank the various treatment options, and initiate approvals processes
- Review of environmental and operational risks that could adversely affect Proposal outcomes
- Review of approved requirements
- Review of the Proposal and that the Proposal is still economically sound.

The timeframe for this Masterplan is a 50-year planning horizon. This means that the constraints and issues identified and considered now will also be considered into the future. The Masterplan has been utilised to inform baseline assessments in this EIS.

3.14.2 Design Criteria and Assumptions Report

Hunter H2O completed a Design Criteria and Assumptions Report in December 2019 which sets out the design criteria and assumptions that will be used as the basis for the development of upgrade options and subsequent concept and reference designs. The report considers population size, flow, influent, effluent quality, biosolids and environment (Hunter H2O, 2019b).

3.14.3 Concept Design Report

Hunter H2O completed a Concept Design Criteria Report in April 2020 which supersedes the above Design Criteria and Assumptions Report. This report describes the concept design of the Queanbeyan STP upgrade. This concept has been used to inform the preparation of a business case and the Draft EIS for the Proposal. This report was used to inform the Proposal details and construction timeframe which the EIS assesses against and is provided in Appendix G1.

In response to consultation received during the public exhibition, the design of the treatment facility has developed. An addendum to the Concept Design Report has been prepared to detail these changes, and is provided in Appendix G2.

3.14.4 NSW EPA Guidelines for Use and Disposal of Biosolids Product 2000

The Environmental Authorisation for the plant requires the implementation of an Environmental Management Plan (EMP) for the STP. The EMP states that Section 2.2.7: *'Reuse of the biosolids require ACT EPA approval and would be undertaken in accordance with NSW EPA Guidelines for Use and Disposal of Biosolids Products, 2000'*.

The guidelines establish the requirements for the beneficial use and disposal of biosolids products to land in NSW. The guidelines identify appropriate uses for biosolids based on a grading system. The Proposal will continue to apply these guidelines for disposal of biosolids and aims to produce a product of Grade B. This is discussed in more detail in Section 5.4 Materials and waste.

3.14.5 River discharge licence

A licence allowing treated wastewater to be discharged to the Molonglo River is required. QPRC has an authorisation (No. 0417) to conduct the following activities:

- Sewage treatment if the activity involves the discharge of treated or untreated sewage or septic tank effluent to land or water and having a peak loading capacity designed for more than 100 people per day, other than an activity involving the recycling of wastewater if there is no discharge to receiving waters; and
- Storage of petroleum products in a facility designed to store more than 50m³ of products for the purpose of treatment of wastewater from Queanbeyan's sewer network and discharge of effluent to the Molonglo River on Block 2087 of Oaks Estate.

This will need to be confirmed and updated during the Proposal (Queanbeyan Palerang Regional Council, 2016a).

3.15 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration for the Proposal. This includes the effective integration of economic and environmental considerations in all decision-making processes. The principles of ESD are defined in section 9 of the PD Act and are defined as *'The effective integration of social, economic and environmental considerations in decision-making processes, achievable through implementation of the following principles:*

- *The precautionary principle*
- *The inter-generational equity principle*
- *Conservation of biological diversity and ecological integrity*
- *Appropriate valuation and pricing of environmental resources."*

Table 3.2 shows the ESD principle and describes the principle with reference to the applicability of the Proposal to the principle.

Table 3.2: ESD principle, descriptors, and applicability

Principle	Description	Applicability
Precautionary principle	If there is a threat of serious or irreversible environmental damage, a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	As this EIS is being prepared against a concept design, not all the Proposal's details are confirmed. Therefore, there is still uncertainty in the full extent of the Proposal's impacts. This means a precautionary approach has been taken for the Proposal to protect the environment. The precautionary approach has been applied to develop the recommendations in Chapter 7.

Principle	Description	Applicability
Inter-generational equity principle	The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The Proposal is designed to meet the future population growth of the area and provide health benefits for future generations through provision of reliable wastewater treatment. The Proposal is committed to protecting historical cultural heritage. This is done through avoidance of areas identified as having Indigenous significance as outlined in Section 5.18.
Conservation of biological diversity and ecological integrity	Conservation of biological diversity and ecological integrity should be a fundamental consideration.	The Proposal would conserve biological diversity through protection of the threatened Golden Sun Moth and associated habitat. As identified above, the area on site identified as containing Golden Sun Moths and their habitat would be cordoned off as an exclusion zone and no works will be undertaken in this area. The Proposal would conserve ecological integrity through transformation of the maturation ponds. The existing maturation ponds would be removed once the upgraded STP is operational, and the area would be landscaped and revegetated. The landscaping will be designed to avoid attracting large birds due to the risk of potential strikes associated with the nearby Canberra Airport.
Appropriate valuation and pricing of environmental resources	Environmental factors should be included in the valuation of assets and service.	The Proposal has been designed to consider the value of the environment and promote behaviours that encourage the above four principles to be met. This includes ensuring that Proposal benefits are maximised relative to any environmental or other impacts. The Proposal would be constructed and operated under approved management plans and licences. These plans include limits to emissions and mechanisms to monitor impacts to the environment. They also include standard actions to respond rapidly if any adverse environmental impacts are identified.

3.16 Territory Plan Strategic Directions

The Statement of Strategic Directions ('the Statement') is identified in section 2.1 of the Territory Plan. The Statement sets out the principles for implementing the Territory Plan as required by the PD Act. The Statement respects the position of the ACT as both the National Capital with a regional impact and its own community with particular needs. The Statement includes the principles for sustainable development following the 'triple bottom line approach' to include principles for environmental, economic and social sustainability. The Statement includes spatial planning and urban design principles which are divided into urban areas, non-urban areas, and urban design.

Where applicable, these principles have been considered during the design and development of the Proposal, and their relevance is discussed below.

3.16.1 Principles for sustainable development

'Principle 1.1 Planning processes and decisions will be focused on the combined achievement of economic vitality, community wellbeing, and environmental quality. Broad community involvement will be a main element in the pursuit of sustainable development, as will complementary regional strategies and agreements.'

Principle 1.3 Economic, social and environmental objectives will be pursued in a balanced and integrated way, having regard to both short-term and long-term factors, such that present needs can be met without prejudicing the welfare of future generations, and without serious or irreversible loss of life-supporting natural resources or damage to the environment.'

During development of the Proposal potential economic, community, and environmental impacts associated with the Proposal have been considered. Economic considerations were made on the business case supporting the development.

Environmental considerations have been made through the preparation of this EIS. A range of community and other stakeholders have been involved in the development of the Proposal and is discussed in Chapter 6.

Any potential short-term and long-term adverse environmental impacts would be minimised with the implementation of appropriate mitigation measures described throughout Chapter 5 of this EIS. The Proposal would not result in environmental or social impacts that would detrimentally limit the potential for future generations to enjoy and utilise the natural environment.

‘Principle 1.5 Planning policies will seek to ensure the efficient use of all resources and to reduce consumption of non-renewable resources. Waste minimisation, reuse and recycling will be encouraged, whilst energy-rating and conservation measures will be applied wherever appropriate, particularly in transport, subdivision planning, and building design and construction.’

The potential environmental impacts of the consumption of resources including energy and materials, as well as the generation of carbon emissions and waste, have been assessed as part of this EIS. No serious or local irreversible environmental damage has been identified, and several features of the Proposal promote resource efficiency. Key examples include the purchase of renewable energy on site for operations, the reuse of all spoil on site and the upgrade to more modern and efficient plant equipment. Where any impacts have been identified, appropriate mitigation measures have been included in this EIS, with consideration of the waste management hierarchy. For more detail see Section 5.4 Materials and waste, Section 5.9 Climate change and Section 5.10 Air quality.

‘Principle 1.6 The pattern of development is to reflect land capability constraints resulting from topography, soils, geotechnical factors, drainage, natural hazards, microclimate and the sensitivity of ecosystems. Particular attention will be given to the need to conserve soil, water and vegetation; maintain biological diversity; safeguard important ecosystems and ecological processes; and provide and protect wildlife corridors.’

The Proposal has been developed and informed by land capability constraints onsite, including geotechnical, biological and hydraulic. Geotechnical investigations were undertaken during the design process to inform site layout. An ecological investigation was completed to inform the EIS and design. Golden Sun Moth and habitat was found on site in the design phase and the design was altered to avoid impact. Hydraulic constraints have been considered and the plant has been designed to sit above the 1 in 100 flood level, with some allowance for climate change. Chapter 5 includes mitigation measures to safeguard ecosystems and ecological processes.

‘Principle 1.7 Land and water resources will be planned in accordance with the principles of integrated catchment management and water sensitive urban design. Policies will seek to protect identified environmental values, whilst focusing on opportunities for multi-purpose use of resources. Special attention is to be given to protecting sources of the Territory’s water supply and to maintaining environmental flows in rivers and streams.’

As discussed in Section 5.8, the Proposal is not expected to have a significant adverse impact on surface water, groundwater, or flood risk in the region. An integrated water catchment management plan has been written for QPRC.

‘Principle 1.11 Policies for environmental planning and management will ensure amenity, minimise pollution, and protect public health and safety.’

The Proposal would include a range of safety measures, such as security fencing and lighting around main infrastructure, to maintain and protect public health and safety. The visual amenity of the site will be maintained after construction and visual impacts in the operation of the Proposal are expected to be minimal as this is an expansion of an existing infrastructure utility.

‘Principle 1.17 In planning future development and redevelopment, particular emphasis will be placed on cost-effective provision and management of existing and new infrastructure and services, taking into account whole-of-life and whole-of-system costs, including the ecological footprint of proposed developments and activities.’

A business case has been prepared to support the Proposal this has considered whole-of-life and whole-of-system costs. The Proposal has considered its ecological footprint and striving to reduce the potential impacts by achieving an ISC accreditation. The Proposal has taken into account potential impacts and has identified mitigation measures to be applied to avoid the possibility of significant adverse impacts and the loss of environmental values.

‘Principle 1.25 Heritage and cultural values will be safeguarded, including in particular those of the Territory’s Aboriginal peoples and those derived from both its rural history and urban development as the National Capital. The distinctive qualities of residential areas and other places, as well as elements of community heritage, will also be recognised and their conservation promoted.’

A Cultural Heritage Assessment has been carried out as part of this EIS (see Appendix R1), mitigation measures are outlined in Section 5.18. The Proposal is not anticipated to impact on any identified places of heritage significance.

‘Principle 1.26 Identified places of heritage significance will be protected in accordance with requirements for their conservation contained in the heritage register and any relevant heritage guidelines under the heritage act 2004. Special provisions are included in the heritage act for the recognition, registration and conservation of aboriginal heritage.’

A Cultural Heritage Assessment has been completed as part of this EIS (see Appendix R1), mitigation measures are outlined in Section 5.18. The Proposal is not anticipated to impact on any identified places of heritage significance.

The development will preserve the natural screening of the site and install vegetation around the development to reduce visual impact.

3.16.2 Spatial Planning and Urban Design Principles

‘Principle 2.13 Clearance zones will be established where necessary around major facilities to protect the operational efficiency of those facilities and to minimise adverse environmental impacts.’

Potential requirement for a buffer zone is discussed in Section 5.1 Planning and land status.

‘Principle 2.16 Retention of Canberra’s unique landscape setting, including the integration of natural and cultural elements that create its ‘garden city’ and ‘bush capital’ qualities, will be accorded the highest priority. Special attention will be given to safeguarding visual amenity, protecting vegetation and other important features within the established urban landscape, and ensuring the high quality of environmental design in new developments or redevelopment.’

The visual amenity of the Proposal site will be maintained after construction and visual impacts in the operation of the Proposal are expected to be minimal as this is an expansion of an existing infrastructure utility.

4 Risk assessment



4 Risk assessment

This chapter covers risks outlined in the preliminary risk assessment (PRA) for the Proposal, and risks identified by Environment, Planning and Sustainable Development Directorate (EPSDD). The PRA was undertaken as part of the Scoping Report (Arup, 2019) submitted with the request for scoping document. Risks identified by EPSDD were provided in Table 1 of the scoping document (EPSDD, 2019) (attached in Appendix A1).

The environmental risk assessment process allows risks to be prioritised according to their rating. The preliminary identification of impact and assessment has been undertaken for the construction and operation phases of the Proposal, based on unmitigated impacts.

The risk assessment was completed in accordance with the Australian and New Zealand Standard for risk management AS/NZS ISO 31000:2018 Risk Management – Principles and guidelines and the Proponent’s Guide to Environmental Impact Statements (ACT Government, 2017c).

The criteria and methodology have been revised from the scoping report (Arup, 2019) to align with the example table in the Proponent’s Guide to Environmental Impact Statements (ACT Government, 2017c). Both methodologies comply with AS/NZS ISO 31000:2018 Risk Management – Principles and guidelines. Further detail of the conversation of risk assessment methods is listed in Section 4.1.

Risks identified in the scoping report have been re-assessed against the revised criteria and methodology outlined in Section 4.1. Any residual risks associated with the Proposal are addressed in each relevant Section of the EIS.

4.1 Risk assessment methodology

The following section addresses the risks outlined in the Scoping Document and any new risks that have been identified during the assessment process. Risks were evaluated by likelihood of occurrence and magnitude of consequence to determine the risk level and impact significance. Likelihood and consequence are further described in Section 4.1.1 and 4.1.2. The matrixes are from the Proponent’s Guide to Environmental Impact Statements (ACT Government, 2017c) and comply with AS/NZS ISO 31000:2018 Risk Management – Principles and guidelines.

4.1.1 Evaluating likelihood

Likelihood is best described as the probability of an impact occurring that affects the environment. It ranges on a scale from remote where an event occurs in exceptional circumstances, to almost certain where an event is expected to occur, and the range is indicated in Table 4.1. Best practice dictates where there is scientific uncertainty, a precautionary approach is warranted which will in turn result in a higher level of risk.

Table 4.1: Evaluating likelihood (ACT Government, 2017c)

Likelihood	Description	Probability	Community attitude
Remote	May occur in exceptional circumstances	<1%	Few people interested
Unlikely	Not expected to occur in most circumstances	1–20%	Some people affected
Possible	May occur	21–49%	Many people affected
Likely	Probably will occur	50–85%	Most people affected
Almost Certain	Expected to occur	>85%	Almost everyone affected

4.1.2 Evaluating consequences

Risk consequence is the result or effect of an event expressed in terms of impact, ranging from minimal to catastrophic. Risk consequence has been evaluated using elements of Magnitude, Temporal, Ecological, Social and Economic against standard criteria (provided in Table 4.2) and Proposal specific criteria (provided in Table 4.3).

Table 4.2: Evaluating consequence standard criteria (ACT Government, 2017c)

Elements	Criteria	Description
Magnitude	Spatial Intensity	The area over which the impact will occur, from square metres to square kilometres. The level of impact within the spatial area, from minor disruptions to total destruction. A low intensity impact over a large area could be worse than a high intensity impact in a small area, depending on other elements.
Temporal	Duration Timing	The Length of time of the impact, from a single event to a permanent change. Short term events may create significant impacts if they occur often. They may also coincide with particularly sensitive times in the receiving environment such as breeding cycles.
Ecological	Values	The quality of the receiving environment, generally identified through the declaration of conservation areas, identification of protected species and other features of natural conservation value.
	Sensitivity	The capacity of the receiving environment to regenerate or adapt to the impact (resilience). The sensitivity of an environment to a potential impact will require informed judgement.
Social	Number of People Heritage Political	The number of people directly or indirectly affected through lost opportunities for enjoyment or other values such as equity or existence values. The impact on known or possible items of heritage or cultural value. The measure of the likely political implications or level of community interest.
Economic		The financial cost of the impact through lost productivity or the cost of remediation.

Table 4.3: Evaluating Consequence Project Specific Criteria (ACT Government, 2017c)

Consequence	Minimal	Minor	Moderate	Major	Catastrophic
Magnitude					
Spatial	A single pool.	A reach or river or part of a catchment.	Multiple reaches or whole catchment.	Multiple catchments.	Whole of basin.
Intensity	Low level, behavioural, lifespan or condition effect.	Acute impacts on some species.	Moderate impacts on growth, recruitment, or survival rates.	Lethal impacts on some species.	Lethal for individuals or communities.
Temporal					
Duration	Single incident or transient event.	Short term impact, single generation.	Medium term.	Long term, multiple generations.	Permanent.
Timing	Occurs outside of breeding time.	Occasional interruption of feeding or breeding.	Interrupts one life cycle.	Regularly interrupts life cycle.	Permanent interruption of life cycle.

Consequence	Minimal	Minor	Moderate	Major	Catastrophic
Ecological					
Values	Previously disturbed areas.	Parkland.	Nature conservation area.	Conservation area, listed species, or other conservation feature of ACT cognisance.	Wilderness, nationally threatened specific or other conservation feature of natural significance.
Sensitivity	Will recover completely.	Will recover with some changes.	Moderate change to ecosystem functioning.	Significant change to ecosystem functioning.	Will not recover.
Social					
Number of people	Some people indirectly impacted.	Some people directly impacted or several indirectly.	Several people directly impacted or many indirectly.	Large number of people directed impacted.	Loss of life.
Heritage	Impact on item of minimal significance.	Impact on multiple items of low significance.	Impact on significant item.	Impact on multiple significant items.	Major impact on protected item.
Political	Single negative press article.	Multiple negative press articles.	Significant press interest.	Leads to an inquiry.	Change of government.
Economic					
	Minimal losses.	Several thousand dollars in lost revenue or remediation costs.	Half million dollars in lost revenue or remediation costs.	A million dollars in lost revenue or remediation costs.	Several millions of dollars lost revenue or remediation costs.

4.1.3 Assigning risk level

The risk assessment matrix in Table 4.4 is used to assign a risk level to potential impacts based on the likelihood and consequence of the impact.

Table 4.4: Risk Assessment Matrix (ACT Government, 2017c)

Consequence	Minimal	Minor	Moderate	Major	Catastrophic
Likelihood					
Remote	Negligible	Negligible	Very low	Low	Medium
Unlikely	Negligible	Very low	Low	Medium	High
Possible	Very low	Low	Medium	High	Very High
Likely	Low	Medium	High	Very High	Significant
Almost Certain	Medium	High	Very High	Significant	Significant

4.2 Risk register

Table 4.5 presents a risk assessment prior to the application of any mitigation measures. The risks identified in this table have been informed by the Preliminary Risk Assessment previously completed for the Request for Scoping Document (Arup, 2019), comments received from entities on the application and further identified risks for the Proposal.

As identified in the Scoping Document and Table 4.5, each risk is identified as having a medium level risk or higher, and these are further assessed and addressed within the relevant chapter of this EIS. Each chapter includes a residual risk assessment, which considers proposed mitigation and management measures for each issue.

Table 4.5: Pre-mitigation risk register

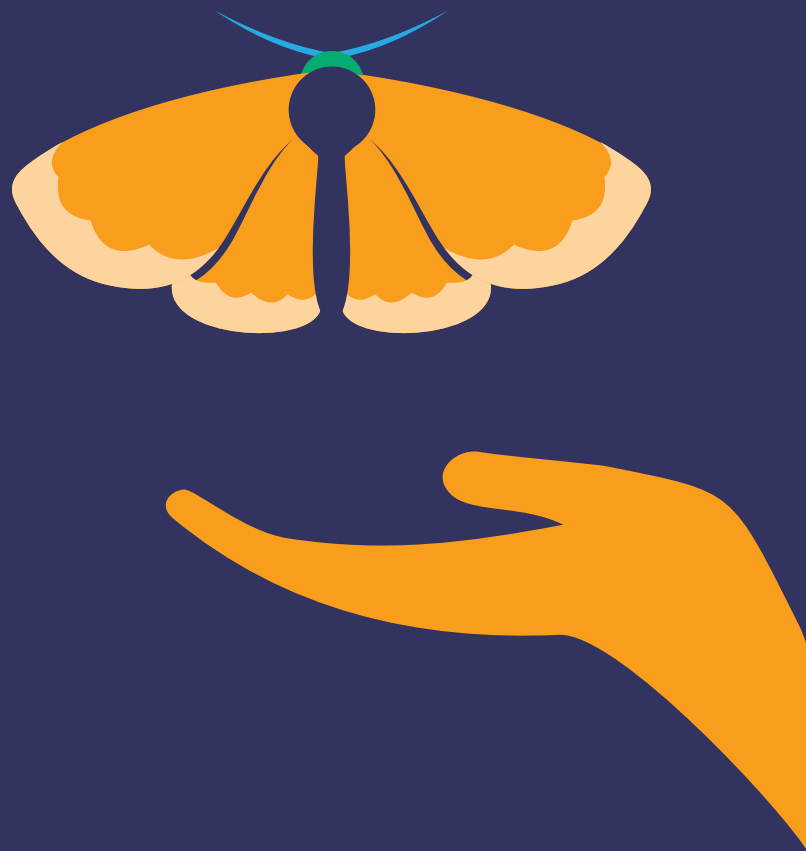
Identified risk	Unmitigated likelihood	Consequence	Risk level / significance	Where addressed in the EIS
Planning and land status				
Impact on existing and potential adjacent land uses.	Possible	Moderate	Medium	Section 5.1
Impact on the STP operation if existing lease cannot be renewed.	Unlikely	Catastrophic	High	Section 5.1
Traffic and transport				
Increased traffic congestion and reduced road safety during construction.	Likely	Moderate	High	Section 5.2
Utilities				
Impacts to existing infrastructure, including the underground sewage pipes, during construction.	Likely	Major	Very High	Section 5.3
Utility failure causing issues with the STP operation.	Possible	Major	High	Section 5.3
Materials and waste				
Increased waste to landfill during construction, demolition and operation.	This was split into three individual risks to separate risks at different stages.			
Increased waste to landfill during construction.	Likely	Minor	Medium	Section 5.4
Increased waste to landfill during demolition.	Almost certain	Minor	High	Section 5.4
Increased waste to landfill during operation.	Almost certain	Minor	High	Section 5.4
Impacts from storage of large amount of contaminated sludge and biosolids.	Possible	Moderate	Medium	Section 5.4
Spill of liquid waste or fuel during operation.	Possible	Moderate	Medium	Section 5.4

Identified risk	Unmitigated likelihood	Consequence	Risk level / significance	Where addressed in the EIS
Soils and geology				
Unexpected ground conditions.	Likely	Moderate	High	Section 5.6
Potential to increase run-off (sediment and erosion) entering into the Molonglo River in high rainfall events during construction.	Possible	Moderate	Medium	Section 5.6
Contamination				
Discovery of contaminated soils.	Likely	Moderate	High	Section 5.7
Leaching to groundwater.	Possible	Major	High	Section 5.7
Contamination of soil from uncontrolled release of chemical spills and leaks.	Likely	Moderate	High	Section 5.7
Impact of existing soil contamination from existing and previous uses, including the burial of solids and screenings.	Almost certain	Moderate	Very high	Section 5.7
Water quality and hydrology				
Dirty run-off from site works.	Possible	Major	High	Section 5.8
Leaching to groundwater.	Possible	Major	High	Section 5.8
Impact on water quality of Molonglo River and Lake Burley Griffin from effluent leaving the site.	Possible	Moderate	Medium	Section 5.8
Leakage or spills of untreated or partially treated sewage contributing to contamination of surface and groundwater.	Likely	Moderate	High	Section 5.8
Potential for bank stabilisation works to impact on the river water quality.	Likely	Major	Very High	Section 5.8
Microplastics, Endocrine Disrupting Chemicals (EDCs) and other non-organic contaminants impacting water quality and ecosystems.	Possible	Moderate	Medium	Section 5.8
Climate change				
Increases in the frequency and intensity of extreme climatic events result in the breach / failure of infrastructure and contamination of water.	Possible	Major	High	Section 5.9

Identified risk	Unmitigated likelihood	Consequence	Risk level / significance	Where addressed in the EIS
Air quality				
Emissions from construction traffic and equipment.	Likely	Minor	Medium	Section 5.10
Odour				
Risk of odour impacting nearby land uses, including but not limited to residential uses.	Possible	Moderate	Medium	Section 5.11
Health				
Health risk associated with the effluent leaving the site.	Likely	Moderate	High	Section 5.12
Impact on health from accidental leakage or spill of untreated or partially treated sewage.	Possible	Moderate	Medium	Section 5.12
Socio-economic				
Impact on recreational use of Molonglo River and Lake Burley Griffin due to water quality impact.	Possible	Moderate	High	Section 5.13
Noise				
Noise impacts on the amenity of sensitive receivers during operation.	Possible	Moderate	Medium	Section 5.14
Hazard and risk				
Impacts of failure to construct the new STP within the proposed timeframe.	Almost Certain	Major	Significant	Section 5.15
Impacts related to infrastructure damage/ failure due to flooding or extreme rain event.	Possible	Major	High	Section 5.15
Bushfire				
Risk of bushfire or fire damaging the proposed facility.	Possible	Major	High	Section 5.16
Biodiversity				
Works to accommodate endangered or threatened species.	Possible	Major	High	Section 5.17
Impact on terrestrial and aquatic species or ecological communities from construction and operation.	This risk has been separated into Construction and Operation stages.			
Impact on terrestrial and aquatic species or ecological communities from construction.	Possible	Major	High	Section 5.17

Identified risk	Unmitigated likelihood	Consequence	Risk level / significance	Where addressed in the EIS
Impact on terrestrial and aquatic species or ecological communities from operation.	Possible	Moderate	Medium	Section 5.17
Discharged wastewater from the site impacting on aquatic habitat and species in the waterway.	Possible	Moderate	Medium	Section 5.17
Heritage				
Impacts on Aboriginal places and objects.	Possible	Moderate	Medium	Section 5.18
Discovery of non-Aboriginal heritage structures on site.	Possible	Moderate	Medium	Section 5.18
Discovery of Aboriginal heritage items on site.	Likely	Major	Very High	Section 5.18

5 Assessment of impacts



5.1 Planning and land status



5.1 Planning and land status

This section details the planning and land status impacts of the Proposal. For further information about the location of the Proposal, refer to Chapter 2, Proposal details.

The risks in Table 5.1.1 have been identified as having a medium or higher unmitigated risk level (see Chapter 4, Risk assessment). These have been considered in more detail within this chapter.

Table 5.1.1: Initial planning and land status risks associated with the Proposal

Risk identified	Unmitigated likelihood	Consequence	Risk level / significance
Impact on existing and potential adjacent land uses.	Possible	Moderate	Medium
Impact on the STP operation if existing lease cannot be renewed.	Unlikely	Catastrophic	High

5.1.1 Planning and land status – Requirements

5.1.1.1 Detailed requirements

Table 5.1.2 lists the detailed requirements identified in the Scoping Document, and where they have been addressed in this Revised EIS.

Table 5.1.2: Scoping document requirements for planning and land status and where addressed

Scoping document reference	Risk identified	Section addressed
Section 8.2.1	Include a description of planning context of the area where the project will be located.	Section 5.1.2.2
Section 8.2.1	Describe planning and development status of any land or project relevant to the Proposal.	Section 5.1.2.3
Section 8.2.1	Describe land use of the proposed land and any land to be affected (including, but not limited to, zoning, lessee(s) or custodian of the land, the permissibility of the proposed use defined in the Territory Plan).	Section 5.1.2.2
Section 8.2.1	Investigate the impacts associated with the proposal including the potential requirement for a buffer zone, on the surrounding uses and whether the proposal will limit existing or future use for the surrounding blocks.	Section 5.1.4.2
Section 8.2.1	Describe the potential impacts of lease expiration on future operation of the STP.	Section 5.1.4.2

5.1.1.2 Entity requirements

Table 5.1.3 lists the specific planning and land status entity comments, and where they have been addressed in this Revised EIS.

Table 5.1.3: Scoping document entity comments

Scoping document reference	Comment	Section addressed
Attachment A – National Capital Authority (NCA)	The NCA supports the statement that a ‘Public Utility’ is a permitted use on the subject land.	No response required
Attachment A – National Capital Authority (NCA)	The proponent should more accurately describe the application of plan requirements. For example, there are general principles and policies of the Plan that apply (refer sections 3.2.5.2 and 3.2.5.3 of the Plan – clause 3 under the latter section is particularly relevant). The statement in section 3.2.2 that there are no requirements of the Plan that apply to the land isn't correct and is also at odds with statements made at section 5.3 of the report.	Section 5.1.2.1
Attachment A – National Capital Authority (NCA)	The site is not within Designated Areas, and therefore a development application must be lodged with the Territory planning authority. The Territory Plan is intended to be not inconsistent with the National Capital Plan, however where there are inconsistencies the Territory Plan has no effect. The statement at section 3.2.2 that compliance with the Territory Plan results in compliance with the National Capital Plan is not wholly accurate.	Section 5.1.2.1
Attachment A – National Capital Authority (NCA)	Section 5.3 of the scoping report suggests that a Works Approval or Development Control Plan is unlikely to be required as the site is not located near any Designated Areas. The assertion is accurate however they should make more definitive statements about the planning framework. The roadmap at section 5.12 should be equally definitive (engagement with the NCA is relevant, but the roadmap should accurately identify why this engagement is occurring).	Section 5.1.2.1 Chapter 3, Legislative and strategic context. Chapter 8, Other relevant information. The regulatory roadmap from the scoping document has not been included in this EIS.

5.1.1.3 EIS Feedback

Table 5.1.4 lists the feedback on the Draft EIS that was made with regards to planning and land status, and where these comments have been addressed in this Revised EIS.

Table 5.1.4: Draft EIS Feedback relating to planning and land status

Source	Draft EIS Assessment Outcomes	Response	Section addressed
EPSDD assessment	The Draft EIS did not include an adjacent development proposal (upgraded electricity storage) at Block 2246 Jerrabomberra. The Revised EIS is required to repeat and update search results for development proposals and clarify at 2.1.1.2 the method that was used to identify developments adjacent to and within a reasonable distance (including downstream) of the proposal area and more broadly in the region.	A review of development applications within 200m of the site was undertaken to identify any potential impact that the Proposal would have on new developments. Developments in the vicinity of the Proposal were found to be industrial and therefore are unlikely to be impacted by the Proposal.	Section 5.1.2.3
EPSDD assessment	The Draft EIS includes a mitigation measure Item PL1 at table 5.1.4 that is outside the remit of the proponent. Section	This mitigation measure has been removed from the Revised EIS.	Table 5.1.6

Source	Draft EIS Assessment Outcomes	Response	Section addressed
	5.1.4.2 concludes that a buffer is required surrounding the site to avoid conflicts with incompatible uses. Other facilities formalise these controls through the precinct codes of the Territory Plan. The Revised EIS must remove this mitigation measure or clearly specify that the proponent will undertake a Territory Plan variation process to formalise the buffer area.		
EPSDD assessment	In reference to item PL2 mitigation measure in the Draft EIS at table 5.1.4, the Revised EIS must include evidence of any consultation with the ACT Government Leasing Section (EPSDD), to reach an agreement that the lease would be renewed.	QPRC have submitted an application for renewal of the lease of Block 27 Jerrabomberra (see Appendix V1).	Appendix V1
EPSDD assessment	Mitigation measure item PL3 conflicts with Item PL4 in table 5.1.4 of the Draft EIS. This conflict must be addressed in the Revised EIS to ensure construction within the build zone and subsequent operation remain entirely within Block 27 Jerrabomberra.	No construction is to extend beyond the Proposal site boundary, therefore mitigation measure PL4 has been removed.	Table 5.1.6
EPSDD assessment	Mitigation measure item PL4 in the Draft EIS at table 5.1.4 suggests the build zone may be required to extend outside of the proposal's site. It is noted that the Scoping Document for the EIS only identifies Blocks 27 and 2087 Jerrabomberra. Including additional works outside the area may trigger separate approval requirements. The Revised EIS must provide a statement to confirm if there are any construction or operational activities related to the STP upgrade that are proposed to occur on land outside the subject site.	Mitigation measure has been removed, with mitigation measure PL3 reworded to clarify that the build zone must be contained to the subject site, Block 27 Jerrabomberra.	Table 5.1.6

5.1.2 Planning and land status – Environmental conditions and values

5.1.2.1 Strategic planning framework

National Capital Plan

The National Capital Plan (NCP) is the strategy and blueprint giving effect to the Commonwealth's interests and intentions for planning, designing and developing Canberra and the Territory. The statutory object of the NCP is to ensure that Canberra and the Territory are planned and developed in accordance with their national significance. Part of the NCP's function is the specification of Designated Areas, which are areas of land that hold national significance. Works within Designated Areas are assessed against the NCP by the National Capital Authority to gain approval.

As the Proposal is not within Designated Areas, it does not require a works approval, though there are general principles and policies of the NCP that still apply. The Proposal's location within a River Corridor makes it subject to section 3.2.5 of the NCP. This section sets out the principle for River Corridors as:

“Protect and enhance the environmental quality, landscape setting and the natural and cultural resources of the Murrumbidgee and Molonglo River Corridors. The Murrumbidgee River Corridor is to be conserved as an important national resource and a key open space element which provides a definable edge to the development of urban areas.” (National Capital Authority, 2020).

There are also a number of policies for River Corridors that are relevant to the Proposal specified in section 3.2.5.3 of the NCP. Of particular relevance to this Proposal includes:

- *“The ecological resources and environmental quality of the rivers should be conserved and the character of their landscape retained and reinforced.”*
- *“The streamflow and water quality of the rivers must be protected from adverse external influences and maintained in a manner which ensures compatibility between land uses, water uses and the environmental character of the rivers.”* (National Capital Authority, 2020)

Public Utility is identified as a permitted use within a River Corridor. Appendix A of the National Capital Plan defines Public Utility as below:

“The use of land for...[h]eadwork and network undertakings for the provision of sewerage and drainage services or the reticulation of water, electricity, or gas except for gas manufacture and storage.” (National Capital Authority, 2020)

The Proposal is consistent with general principles and policies of the NCP.

The Territory Plan

The Territory Plan is the statutory document that guides the day-to-day planning and development of Canberra and the Territory, though it does not apply to land within Designated Areas. While the Territory Plan is intended to be not inconsistent with the National Capital Plan, where there are inconsistencies the Territory Plan has no effect. As the site is located on Territory land, and is not within Designated Areas, it is subject to the requirements of the ACT Territory Plan and a DA must be lodged with the Territory Planning authority.

The Proposal is located on Block 27 Jerrabomberra, which is zoned TSZ2 Services and NUZ4 River Corridor under the Territory Plan 2008 (Figure 5.1.1). The type of activities proposed are considered appropriate in these zones, subject to a DA. A sewage treatment plant is a permitted use on land zoned TSZ2 Services, as it is considered a ‘Major Utility Installation’ (ACT Government, 2008).

5.1.2.2 Existing land use

The existing STP on the site has been operating for over 80 years. The site is currently held on a 99-year lease from the ACT Government by QPRC for the purpose of the existing plant, with 17 years remaining. A license for Environmental Authorisation is under the ACT EPA, however licences to use Recycled Water (where water is used) is under NSW EPA.

The blocks immediately adjoining the site are similarly zoned TSZ2 Services, NUZ4 River Corridor, as well as NUZ1 Broadacre. The Molonglo River runs between the site and adjoining blocks to the north. All adjoining blocks are currently vacant and undeveloped. Other land uses within the vicinity of the Proposal include:

- Industrial development, approximately one kilometre south-west (Beard Estate)
- Residential development (largely characterised by low-density dwellings), approximately one kilometre south (NSW) and east-west (ACT).

5.1.2.3 Future land use

As noted above, this site has operated as a sewage treatment facility for over 80 years, with this activity proposed to continue into the future. The Proposal supports more efficient operation of the sewage treatment facility in the future. Land to the south of the Proposal in NSW is developed urban land, largely categorised by residential and commercial uses. It is expected that there will be no significant changes to urban development in this area and that any future

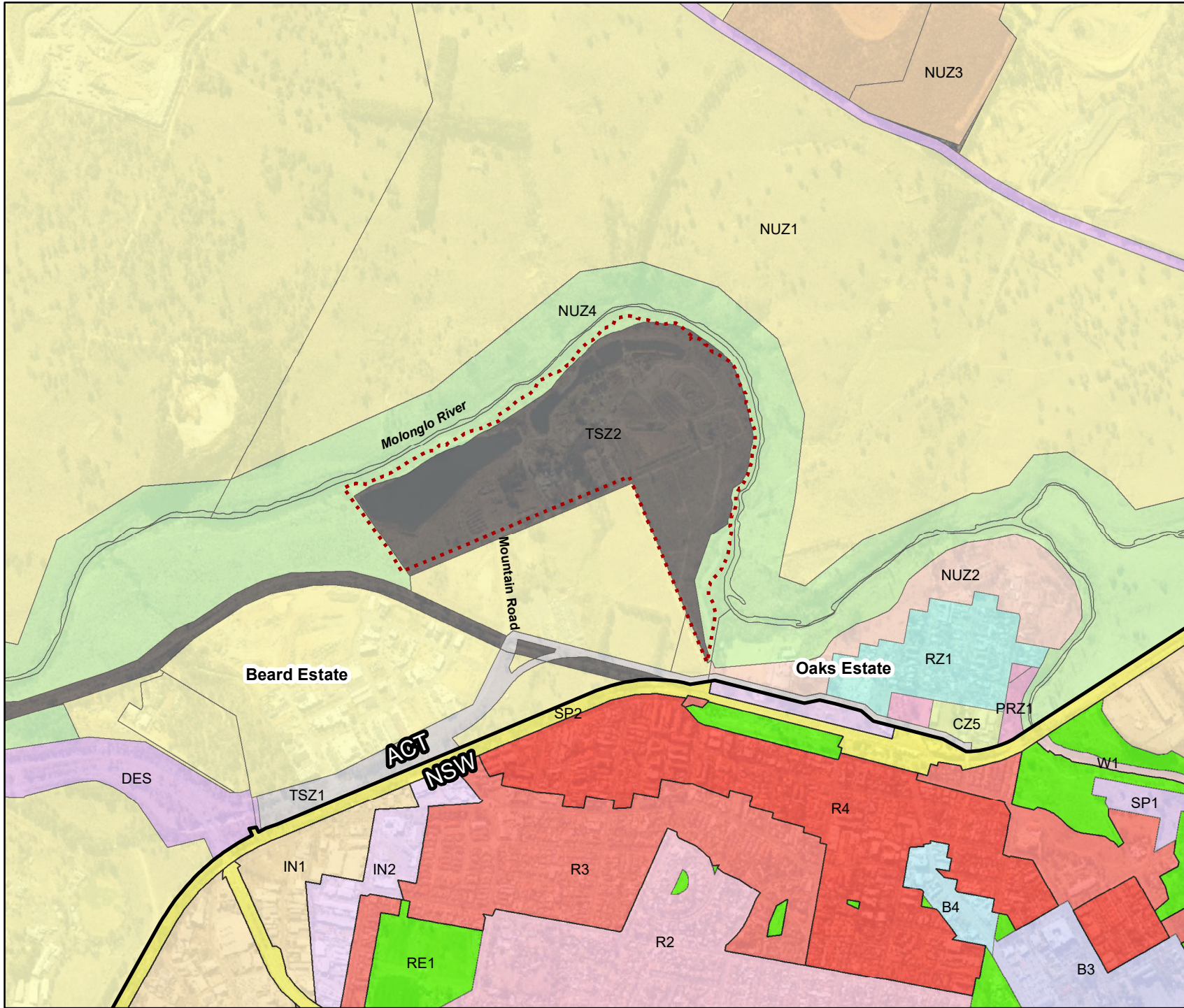
development in this area will be small-scale and incremental in nature, which is unlikely to result in conflict with the Proposal.

The ACT Planning Strategy identifies extensive land surrounding the Proposal to the north, south and west, as Eastern Broadacre (ACT Government, 2018b). Sensitive uses, such as residential development, are identified as unsuitable within this Eastern Broadacre area. The area is instead identified to be compatible with less sensitive development, such as light industrial and freight support facilities. This type of development is unlikely to result in conflict with the Proposal.

Chapter 2, Proposal details identifies a number of significant projects that are proposed within the broader surrounding region. Additionally, a review of ACTmapi was undertaken for active and approved DAs from 2020 – 2022 within approximately one kilometre of the Proposal. These projects and their interaction with the Proposal are summarised in Table 5.1.5.

Table 5.1.5: Projects within 1km of the QSTP and their potential interaction with the Proposal

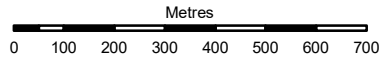
Project	Description	Interaction with the Proposal
South Jerrabomberra Development Area and Googong Township	Residential developments set to grow increase population over the next 25 years. These developments would rely on the QSTP for sewage treatment.	It is unlikely that these developments would result in land use conflict with the Proposal. The five kilometre distance to South Jerrabomberra and nine kilometre distance to Googong provides an adequate noise and odour buffer to the sensitive residential development.
Canberra Airport	The Canberra Airport is expected to increase its aviation potential over the next 20 years, alongside development to facilitate greater economic activity around the airport (Canberra Airport Masterplan, 2020). The development may result in a change to airspace limitations above the site. This is not anticipated to impact operation of the QSTP.	The operations of Canberra Airport are unlikely to impact the Proposal. Consultation has been undertaken with Canberra Airport during the design and EIS process (refer to Chapter 8, Other relevant information).
Beard Estate	An industrial development located approximately one kilometre south-west of the QSTP. 16 DAs were approved in the Beard Estate across 2020 and 2021. The predominant use for these developments is industrial purposes. It is anticipated that additional DA approvals would be granted over the next few years as the area continues to develop.	Construction for the Proposal is anticipated to commence in 2022. Concurrent construction in Beard Estate may increase traffic pressure on local roads, however this is not anticipated to have a significant impact on traffic movement in the area. The industrial land uses in Beard Estate are compatible with the land use of the Proposal.
Queanbeyan Substation Battery Energy Storage System (Jerrabomberra: Block 2246)	The Queanbeyan Substation Battery Energy Storage System is located on Mountain Road, approximately 200m south of the QSTP. The project is a standalone battery energy storage system which is capable of up to 10MW of energy storage. The battery would be connected to the Queanbeyan Substation to discharge energy as required.	Construction for the Proposal is anticipated to commence in 2022. Concurrent construction may increase traffic pressure on local roads, however this is not anticipated to have a significant impact on traffic movement in the area. Increase the electricity storage is beneficial for the operation of the Proposal.
Capital Battery (Jerrabomberra: Block 187)	This project is located in the lot immediately to the south of the Queanbeyan Substation Battery Energy Storage System. The project is a standalone battery energy storage system which is capable of up to 100MW of energy storage. The battery would be connected to the Queanbeyan Substation to discharge energy as required.	Construction for the Proposal is anticipated to commence in 2022. Concurrent construction may increase traffic pressure on local roads; however, this is not anticipated to have a significant impact on traffic movement in the area. Increase the electricity storage is beneficial for the operation of the Proposal.



Legend

- Subject site
- ACT / NSW Boundary
- Land Use Zone (ACT/NSW)**
 - CZ5, Mixed Use Zone (ACT)
 - DES, Designated Area (ACT)
 - NUZ1, Broadacre (ACT)
 - NUZ2, Rural (ACT)
 - NUZ3, Hills, Ridges and Buffer (ACT)
 - NUZ4, River Corridor (ACT)
 - PRZ1, Urban Open Space (ACT)
 - RZ1, Suburban (ACT)
 - TSZ1, Transport (ACT)
 - TSZ2, Services (ACT)
 - B3, Commercial Core (NSW)
 - B4, Mixed Use (NSW)
 - IN1, General Industrial (NSW)
 - IN2, Light Industrial (NSW)
 - R2, Low Density Residential (NSW)
 - R3, Medium Density Residential (NSW)
 - R4, High Density Residential (NSW)
 - RE1, Public Recreation (NSW)
 - SP1, Special Activities (NSW)
 - SP2, Infrastructure (NSW)
 - W1, Natural Waterways (NSW)

F1	28/10/2020	AC	JS	JS
Issue	Date	By	Chkd	Appd



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Client

**Queanbeyan-Palerang
Regional Council**

Job Title

**Queanbeyan Sewage
Treatment Plant**

Figure Title

Land use zoning in ACT and NSW

Scale at A4

1:15,000

Figure Status

Final

Coordinate System

GDA 1994 MGA Zone 55

Job No

267007-00

Figure No

5.1.1

5.1.3 Planning and land status – Investigations

A desktop review of existing and future land uses was undertaken to identify the potential planning and land use impacts associated with the construction and operation of the Proposal. The desktop investigation also included a review of the relevant plans for future developments. Key sources reviewed included:

- ACTmapi (Development Applications, cadastre) (ACT Government, 2020)
- Sewerage Systems EIS Guidelines (NSW Department of Urban Affairs and Planning, 1996).

5.1.4 Planning and land status – Impacts

5.1.4.1 Construction

During the construction phase, the key impacts to consider are those associated with the Proposal's worksite on the local residential community and economy. This includes the potential for additional noise and traffic generation associated with construction works to impact residents, businesses and workers. The impacts and potential mitigation measures are discussed in further detail in the respective chapters:

- Section 5.2, Traffic and transport
- Section 5.14, Noise.

It is anticipated that the impact during construction would not be significant as a result of the distance between the worksite and sensitive receivers, and the buffer provided through the adjoining undeveloped lands.

5.1.4.2 Operational

As the Proposal consists of an updated STP on the site of an existing one, it is expected that there would be minimal planning impacts on surrounding land uses, particularly as the use of newer and more efficient technologies are likely to result in reduced impacts from noise, water quality and odour impacts. Additionally, the Proposal is immediately adjoined by vacant land, and sensitive receivers (residential and commercial) are located approximately 500m away. As a result, impacts associated with noise, odour and air quality are not anticipated to be significant.

At present, there is no formal buffer zone associated with the existing STP. Buffers are an important tool used to make sure separation distances between emitters and sensitive land uses. This separation protects the amenity of sensitive uses (such as residential areas), while also ensuring the operation of industrial, utility and business activities without hindrance. ACT Government's Separation Distance Guidelines for Air Emissions (ACT Government, 2018a) notes that for STP servicing a population of over 15,000, an individual assessment needs to be undertaken to determine an appropriate buffer. Similarly, NSW Department of Planning and Environment (NSW DPE) notes that the extent of a buffer zone for sewerage systems (for the purposes of minimising impact on surrounding land uses) should be determined on a case-by-case basis, informed by local conditions and design considerations. This case-by-case approach is reflected in the Scoping Document, with the comments provided by Utilities Technical Regulation, Chief Minister, Treasury and Economic Development Directorate highlighting the need to develop a buffer that considers the specific impacts associated with odour, landscape/urban design and noise, at a minimum.

Based on the analysis undertaken as part of this Revised EIS for noise, odour and air quality, the buffer illustrated in Section 5.11, Odour (Figure 5.11.6) is appropriate for the Proposal. In order for planning impacts to remain minimal, future use or development of adjoining lands should be limited to uses compatible within buffer zones, such as nature reserves, recreation areas, forests and public road reserves (Sewerage Systems EIS Guidelines). The risk of incompatible uses in the future is low, as the NCP's Policies for River Corridors ensures protection from urban encroachment and inappropriate development.

The existing 99-year lease is due to expire in August 2037. Inability to renew the lease would require QPRC to build a new STP elsewhere to service the catchment of residents, as well as requiring the existing facility to be completely decommissioned. To mitigate against this occurring, QPRC applied for a lease extension for Block 27 Jerrabomberra from the ACT Government Leasing Services in October 2021 (see Appendix V1).

5.1.5 Planning and land status – Mitigation

The mitigation measures detailed in Table 5.1.6 would be implemented to manage potential impacts related to planning and land status during construction and operation of the Proposal.

Table 5.1.6: Planning and land status mitigation measures

Impact	ID	Environmental mitigation measure	Responsible entity	Timing	Statutory / policy basis	Endorsement or approval agency
Impact on the STP operation if existing lease cannot be renewed.	PL1	Prior to construction, consultation should be undertaken with the Lessor to reach an agreement that the lease would be renewed.	Proponent	Prior to construction	Standard measure	EPSDD as part of approval
Construction works impacting residents, workers and businesses.	PL2	Build zone must be contained entirely within the QSTP property (Block 27 Jerrabomberra) to minimise area/spread of impact on surrounding land uses.	Proponent and Contractor	During design and construction	Standard measure	EPSDD as part of approval
	PL3	Engagement with local residents and businesses to enable understanding around scope of works including expectations around construction hours and timeline.	Proponent and Contractor	During design	Standard measure	EPSDD as part of approval
	PL4	A Community Engagement Plan should be prepared and outlined methods to engage with local community (offering a number of available channels e.g., written, in-person, online) and incorporated into the CEMP.	Proponent	During design and construction	Standard measure	EPSDD as part of approval

5.1.6 Planning and land status – Residual risk

In accordance with the Scoping Document requirements, a residual risk assessment has been undertaken for the identified utilities impacts which were assessed as having a medium or greater risk rating prior to application of the proposed mitigation measures for the Proposal. Table 5.1.7 outlines the residual risk rating for the impact which is anticipated following the implementation of the identified measures. The risk has been calculated using the same methodology as detailed in Chapter 4, Risk assessment.

Table 5.1.7: Planning and land status residual risk

Impact	Unmitigated likelihood	Consequence	Risk level / significance	Environmental mitigation measure	Residual likelihood	Residual consequence	Residual risk level / significance
Impact on existing and potential adjacent land uses.	Possible	Moderate	Medium	PL 2, 3 4	Unlikely	Minor	Very Low
Impact on the STP operation if existing lease cannot be renewed.	Unlikely	Catastrophic	High	PL1	Remote	Catastrophic	Medium

5.2 Traffic and transport



5.2 Traffic and transport

This section describes the traffic and transport considerations, potential impacts and related mitigation measures associated with the Proposal. It has been informed by the revised Traffic and Transport Report (Arup, 2021c), which has been updated to consider the adjusted traffic numbers that would be generated with the revised treatment process (accommodating deliveries of lime and ferric, rather than alum). The revised Traffic and Transport Report (Arup, 2021c) is Attachment H1.

The risk in Table 5.2.1 has been identified as having a medium or higher unmitigated risk level (see Chapter 4, Risk assessment). This has been considered in more detail within this chapter.

Table 5.2.1: Initial traffic and transport risk associated with the Proposal

Risk identified	Unmitigated likelihood	Consequence	Risk level significance
Increased traffic congestion and reduced road safety during construction.	Likely	Moderate	High

5.2.1 Traffic and transport – Requirements

5.2.1.1 Detailed requirements

Table 5.2.2 lists the specific traffic and transport impacts identified in the Scoping Document (Section 8.2.2) and where they have been addressed in this Revised EIS.

Table 5.2.2: Scoping document requirements for traffic and transport, and where addressed

Scoping document reference	Risk identified	Section addressed
Section 8.2.2	Describe arrangements for the transport of construction materials, equipment, products, and people in the construction phase of the development proposal.	Section 5.2.4.1
Section 8.2.2	Include a description of the volume of traffic generated in construction.	Section 5.2.4.1
Section 8.2.2	Investigate the impacts the proposal will have on traffic congestion and road safety and describe mitigation measures to reduce the impacts.	Section 5.2.4
Section 8.2.2	Investigate the impacts the proposal will have on the structural capacity and the design life of the road network due to heavy vehicles accessing the facility in construction works and describe mitigation measures to reduce the impacts.	Section 5.2.5
Section 8.2.2	Investigate the impacts on the vehicular route that will be used to transport oversized equipment and accessories by heavy vehicles and describe mitigation measures to reduce the impacts.	Section 5.2.5

5.2.1.2 Entity requirements

Transport Canberra and City Services (TCCS) has expressed interest in reading the traffic and transport documents. More information about traffic and transport is in Appendix H1.

5.2.1.3 EIS Feedback

Table 5.2.3 lists the feedback on the Draft EIS that was made with regards to traffic and transport, and where these comments have been addressed in this Revised EIS.

Table 5.2.3: Draft EIS Feedback relating to traffic and transport

Source	Draft EIS Assessment Outcomes	Response	Section addressed
Transport Canberra and City Services Directorate (TCCS)	Section 4.4 and Section 5. The proposal of upgrading Mountain Road to a sealed road as part of Stage 1 works needs to be consulted with TCCS (i.e. cost, timing and staging etc.) for further consideration. A formal Development Application for the upgrading works needs to be lodged.	The upgrade of Mountain Road is being undertaken as a separate project to the Proposal and will be subject to its own Development Application. QPRC have been consulting with TCCS regarding the upgrade and will continue to do so as the project progresses.	N/A
TCCS	Section 2.1. Data shown on the Traffic Map in Appendix A is for the AM peak on the 9 November 2019. This seems to be a Saturday. The proponent is to advise why a typical weekday data is not shown	The traffic map in Appendix A of the revised Traffic and Transport Report (Arup 2021c, Attachment H1) has been revised to show weekday data. This change shows minor network changes in the map extent and has not impacted the findings or results of the report.	Attachment H1
TCCS	Section 4.5. This report needs to state and demonstrate all vehicles can enter and exit the site in a forward-in/forward-out direction.	The revised Traffic and Transport Report (Arup 2021c, Attachment H1) has been updated to show swept paths with forward in and out movement (see Figure 3 of Appendix C).	Attachment H1
TCCS	Section 4.5.1. This report states that bicycle facilities should be provided for staff accessing the site. However, Section 2.2.2 states that the current layout of Mountain Road is not sealed and not wide enough for vehicles to pass cyclists without encroaching on the opposite lane. The proponent is to advise if provision for safe cyclist movement is considered for the proposed upgrade of Mountain Road.	The upgrade of Mountain Road is being undertaken as a separate project to the Proposal and will be subject to its own Development Application. No pedestrian or cycle exclusive infrastructure are proposed to be incorporated into the design however given the rural setting of the site this is considered acceptable.	N/A

5.2.2 Traffic and transport – Environmental conditions and values

5.2.2.1 Policy context

The following relevant legislation has been considered when developing the study methodology and undertaking the impact assessment:

- *Road Transport (Safety and Traffic Management) Act 1999*
- ACT Parking and Vehicular Access General Code (2014)
- ACT Planning Strategy 2018
- Transport for a Sustainable City 2012–2031
- Moving Canberra 2019–2045: Integrated Transport Strategy.

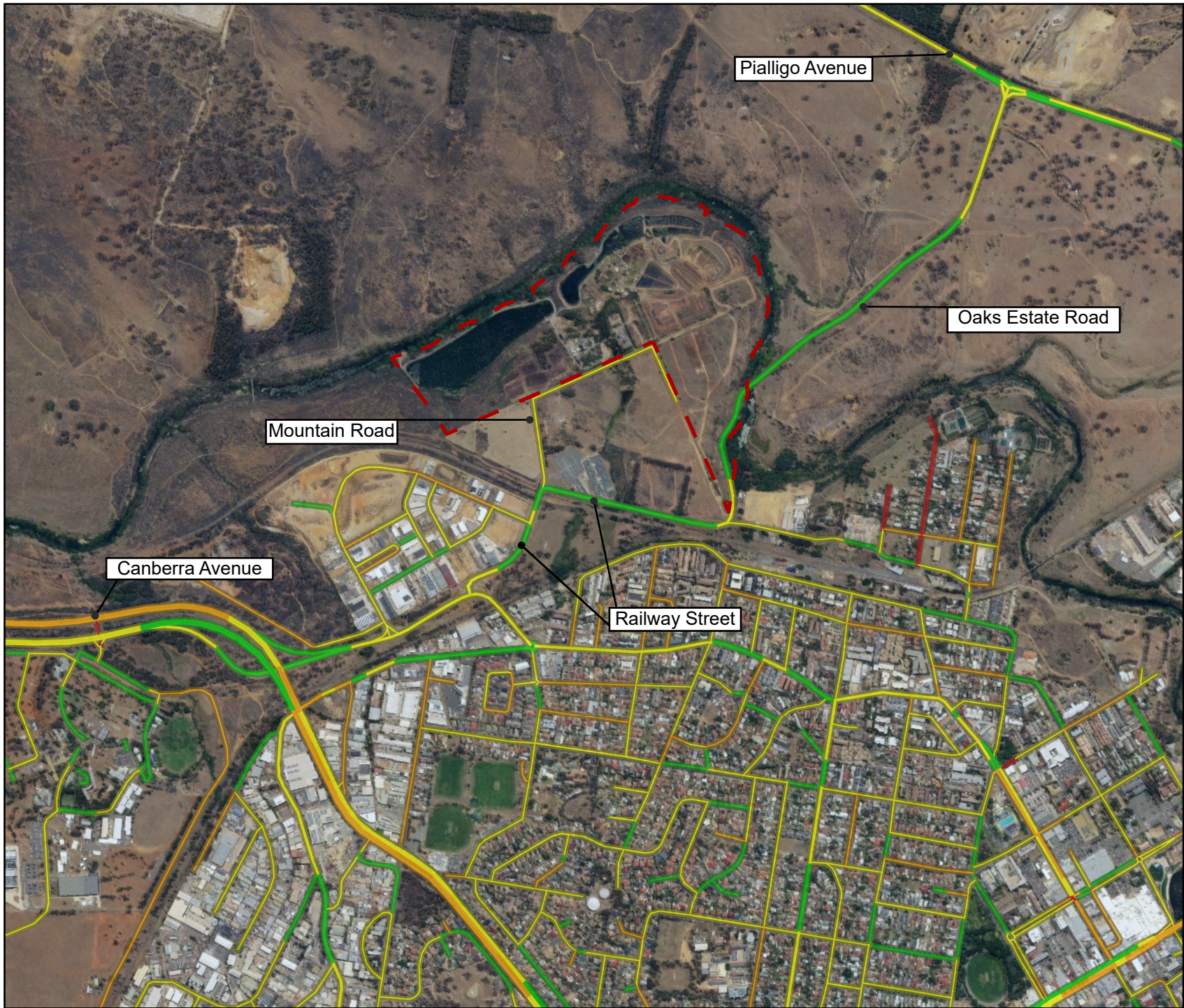
5.2.2.2 Existing traffic conditions

The road network around the study area includes a combination of local, regional and state roads. Railway Street is the main connector to key locations extending west towards Canberra CBD, and east towards Braidwood and regional towns. It also links with Henderson Road towards the Queanbeyan town centre. The main access road for the QSTP is Mountain Road accessed from Railway Street.

This assessment was carried out during the COVID-19 pandemic in early 2020, which significantly impacted traffic volumes on roads throughout Australia. As a result, historic traffic data has been used as the baseline for the assessment rather than collecting traffic surveys that were unlikely to be representative of normal conditions.

The QSTP is operational 24 hours per day, seven days a week. On a normal day there are three operators and two maintenance staff members onsite during core operational hours between 7:00am to 3:30pm. For robustness, it is assumed they would all arrive and depart using private vehicles in the peak hours (morning peak 6:00am to 7:00am, afternoon peak 5:00pm to 6:00pm, Monday to Friday). There may be times where staff will need to access the site outside of the standard hours for after-hours shutdowns and maintenance checks. Chemical delivery, waste handling and biosolids removal and septage tanker deliveries will generate heavy goods vehicle (HGV) trips to and from the site.

QPRC provided traffic data from November 2019 morning peak hour which was used to determine typical existing traffic conditions. This data shows minimal congestion on most roads with 'free flow' or 'moderate' conditions on the most links, as shown in Figure 5.2.1.



Legend

 QSTP Subject Site

Asia Pacific Traffic

 Stop and Go

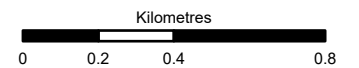
 Slow

 Moderate

 Free Flow



D1	24/11/2020	DD	SO	JS
Issue	Date	By	Chkd	Appd



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Client

**Queanbeyan-Palerang
Regional Council**

Job Title

**Queanbeyan Sewage
Treatment Plant**

Figure Title

Traffic Map (9/11/2019 AM PEAK)

Scale at A4

1:20,000

Figure Status

Final

Coordinate System

WGS 1984

Job No

267007-00

Figure No

5.2.1

76

5.2.2.3 Active and public transport

There are no designated footpaths on the roads used to access to the QSTP. An off-road cycleway along Henderson Road connects Queanbeyan Train Station with Railway Street. On-road cycling is possible on Railway Street and Mountain Road for access to the QSTP. However, currently Mountain Road is not sealed, and vehicle lanes are not wide enough for vehicles to pass a cyclist without encroaching on the opposite lane. These existing cycle routes can be seen in Figure 5.2.2.

Public transport access to site is limited to two bus services, the 830 and 838 loops or a train service to Queanbeyan Train Station from Sydney. These services would need a 1.3 – 1.5km walk with some sections without footpaths (Figure 5.2.3).

Access to site is expected to be by private vehicle for most people due to the lack of other modes of transport.

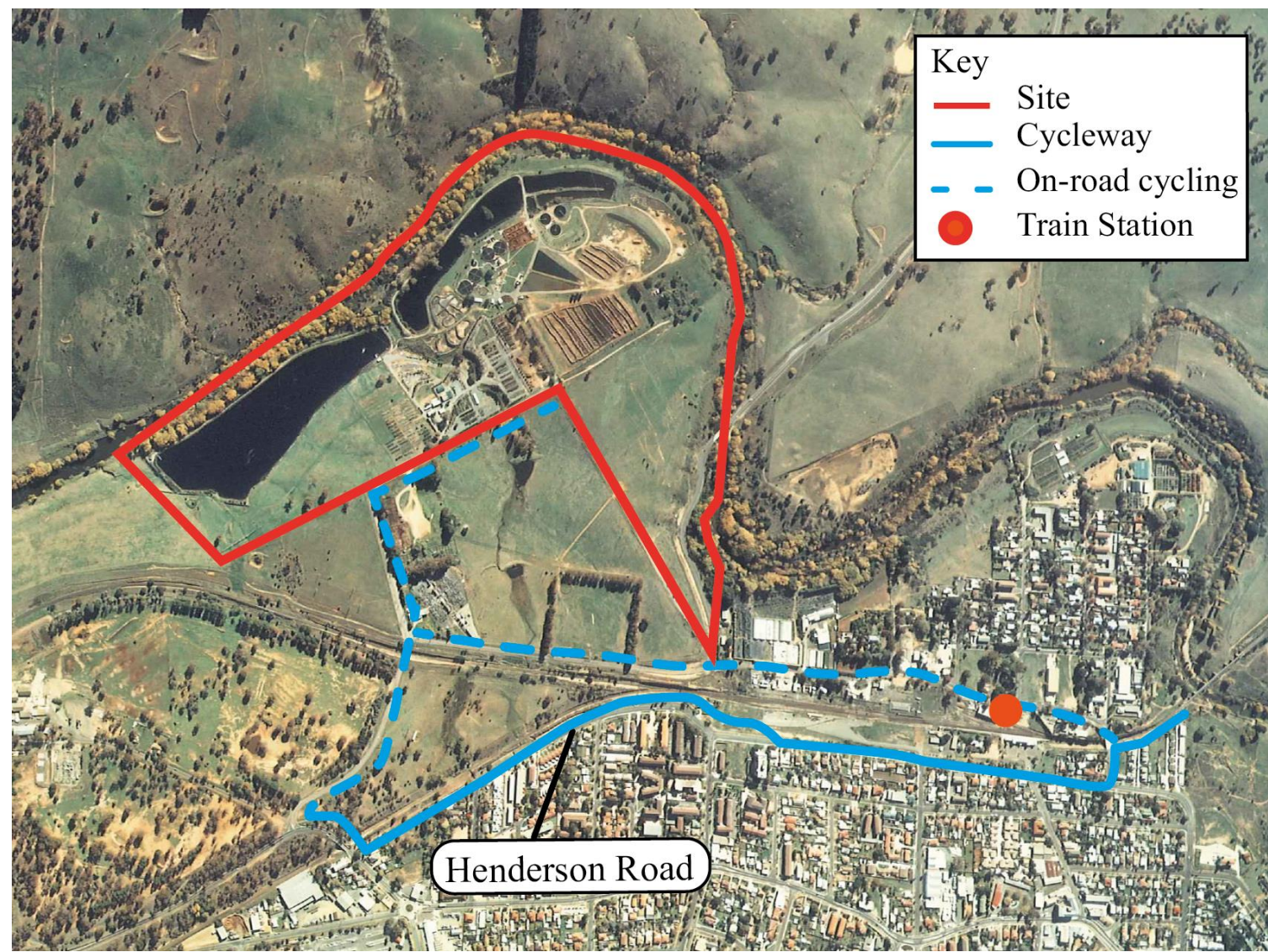


Figure 5.2.2: Existing cycling routes

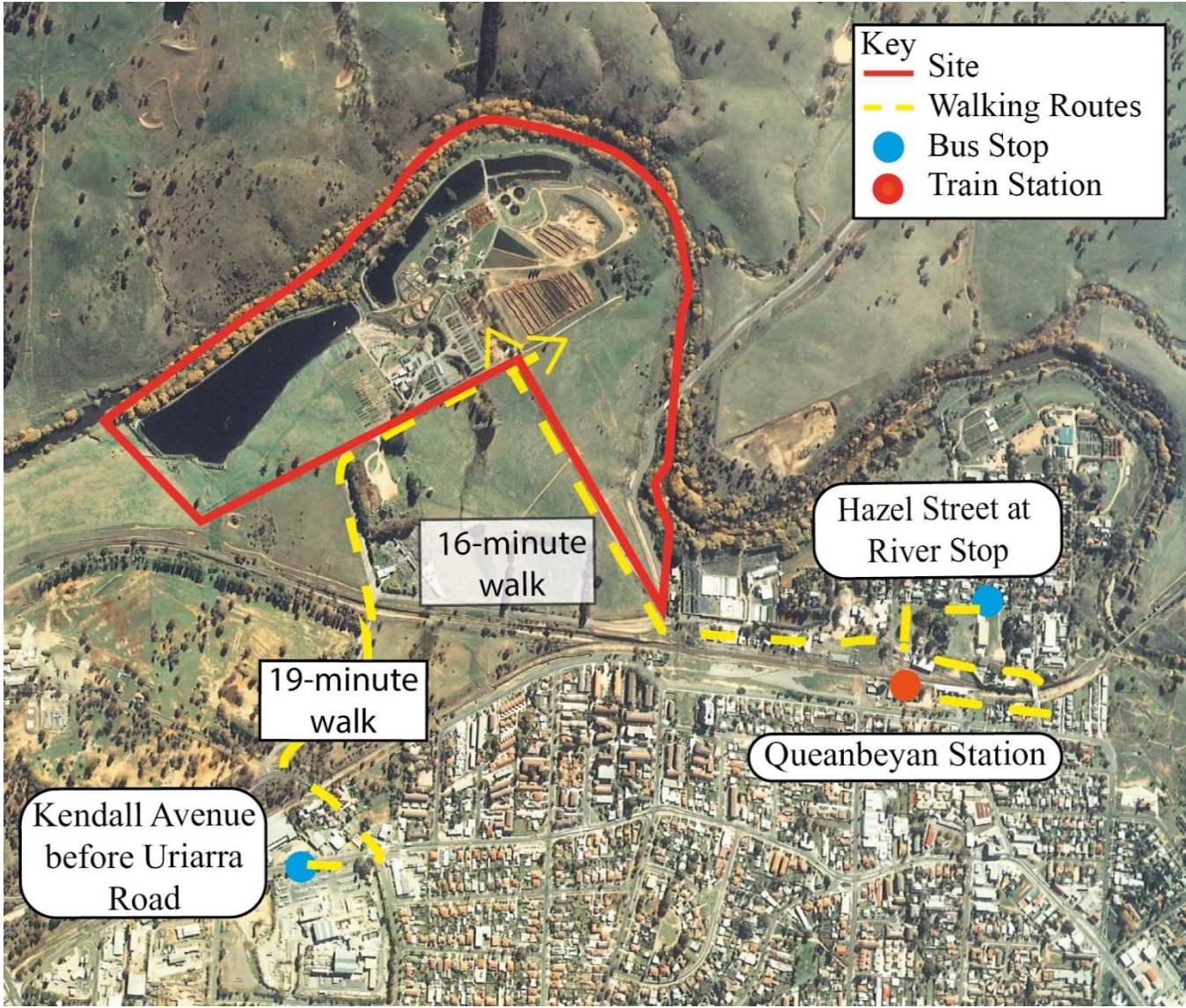


Figure 5.2.3: Public transport access

5.2.3 Traffic and transport – Investigations

5.2.3.1 Methodology

The Traffic and Transport Report was updated to consider the adjusted traffic numbers that would be generated with the revised treatment process (accommodating deliveries of lime and ferric, rather than alum) (Appendix H1). To address the impact of the QSTP on traffic and transport the following methodology was developed:

Review available data and policy documents to understand the transport needs of the facility

- A desktop study of the transport facilities available to access the site by walking, cycling, public transport and private vehicle
- Identify key routes to be used by construction and operational vehicles considering the suitability of roads
- Understand the different vehicle types expected to be accessing the site for various uses
- Undertake a quantitative traffic generation exercise to estimate vehicle movements in construction and operation
- Review service vehicle movements and parking arrangements at the proposed site layout
- Swept path analysis of the access routes to the development, including checks to confirm these comply with Australian Standards
- An assessment of the impacts on the local road network because of vehicle volumes generated in construction and operation
- Create mitigation measures to manage impacts on the surrounding transport network.

5.2.4 Traffic and transport – Impacts

5.2.4.1 Construction traffic

Mountain Road would be the main access route for the construction site. This road would not be upgraded until after the construction phase. It would be the responsibility of the contractor through liaison with TCCS to maintain the existing road surface and make sure it is fit for use by construction vehicles and workers. A temporary access road would be built to allow access to the existing STP throughout construction.

Throughout construction when oversized equipment is delivered to or transported from the site, it would be the contractor's responsibility to manage this using suitably qualified Traffic Controllers, notify the appropriate Road Authorities and obtain the needed approvals.

The areas to the south and west of the new plant location would be used for construction vehicle storage, laydown, site amenities and worker parking. QPRC may find other designated areas if further space is needed. Chapter 2, Proposal details shows the site layout of the Proposal, including the temporary access road and area for construction site amenities, car parking and laydown.

There are three main activities that would cause extra traffic in construction, including the existing STP operational traffic (estimated to be 10 vehicle movements per hour); vehicles for the transport of construction staff, and construction vehicles such as trucks.

The peak number of construction workers onsite is expected to be 60. For the assessment it was assumed that each worker would travel to the site in their own vehicle, and 50% would arrive during the morning peak hour. The reverse is expected to occur in the afternoon peak hour. This results in traffic generation of 30 vehicle movements in the morning peak period between 6:00am to 7:00am and the afternoon peak period of 5:00pm to 6:00pm.

It is anticipated that the peak construction vehicle movements are likely to occur during construction of the bioreactors. This is a 12-week period where it is anticipated that 10 concrete trucks would visit the site per day. This is in addition to the other construction vehicles (heavy goods vehicles) which are estimated at 10 vehicle trips per day.

The daily and peak generated vehicle volumes are shown below in Table 5.2.4.

Table 5.2.4: Construction phase traffic generation

Description	Vehicle type	Daily vehicle trip (two way)	Peak hour volume
Existing sewage treatment plant	Light vehicle	10	10
Construction worker	Light vehicle	60	30
Construction vehicles	HGV	10	1
Concrete trucks	HGV	10	1
TOTAL		90	42

To assess the capacity of the access route to the site, the Guide to Traffic Management Part 3: Traffic Studies and Analysis Methods (Austroads, 2020) was used. This document indicates that the theoretical capacity of a single traffic lane can range between 680 – 1000 vehicles per hour. This theoretical capacity has been used with Mountain Road and Railway Street as both have single traffic lanes in each direction.

As mentioned in Section 5.2.2.2, due to the COVID-19 pandemic, historic traffic data (provided by QPRC) was used as the baseline for this assessment. The most recent traffic data on Railway Street was from 2011, and a growth rate was applied to uplift the values to the baseline 2020 year.

Table 5.2.5 provides an estimate of the traffic numbers for Railway Street during construction. These results show that even with the increase in peak hour traffic during construction, the volumes are still within the theoretical capacity of Railway Street.

Although historical data was not available for Mountain Road, only traffic relating to the QSTP would be using this road. Flows on Mountain Road are expected to be lower than Railway Street and would be within the theoretical capacity.

Table 5.2.5: Construction traffic assessment for Railway Street

Traffic flows in construction base year (2022)	
Baseline vehicle movements. Annual Average Daily Traffic (AADT)	6,452
Peak hour volume 10% of AADT	645
Peak hour flow during construction	42
% Increase	6.5%

5.2.4.2 Operational traffic

Mountain Road would be upgraded to a sealed road as part of the proposed upgrade work. The QSTP site would have multiple access points from Mountain Road with a network of internal roads to give access to appropriate facilities for servicing vehicles. Construction of the Proposal includes the provision of parking spaces located between the Amenities Building and Chemical Dosing Facility. This would give parking spaces to operators and contractors visiting on an ad-hoc basis. There would also be a bicycle rail next to the amenities building so staff can travel to the QSTP by bicycle.

There are a variety of activities related to the Proposal that would generate traffic. These mainly include operation and maintenance staff vehicles, chemical deliveries, and waste handling.

The QSTP is operational 24-hours a day, and on a normal day it is expected that three operators and two maintenance staff would be onsite during core operational hours between 7:00am to 3:30pm. The operators and maintenance staff may need to access the site outside of these hours. It is expected that the chemical deliveries and waste handling would happen in core operational hours and are summarised in Table 5.2.6. The chemical delivery traffic generation that has been considered in this assessment is in the upper range.

Table 5.2.6: Operational phase traffic generation

Description	Vehicle type	Daily vehicle trips (two way)	Peak hour volume
Staff (operators)	Light vehicle	3	3
Staff (maintenance)	Light vehicle	2	2
Chemical delivery	HGV	2	~1
Waste handling (screenings, grit and biosolids)	HGV	3	~1
Septage delivery	HGV	3	~1
Lime delivery	HGV	1	~1
Recycled water tankers	HGV	20	3
TOTAL		34	12

The same methodology was used to calculate the operational traffic impacts.

Table 5.2.7 provides an estimate of the traffic numbers for Railway Street during operation. These results show that there would be a minor increase in peak hour traffic during operation, though volumes are still within the theoretical capacity of Railway Street.

As historical data was not available for Mountain Road, only traffic relating to the QSTP would be using this road. Flows on Mountain Road are therefore expected to be lower than Railway Street and would be within the theoretical capacity.

Table 5.2.7: Operational traffic assessment for Railway Street

Traffic flows during operation base year (2024)	
Baseline vehicle movements. Annual Average Daily Traffic (AADT)	7,033
Peak hour volume. 10% of AADT	703
Peak hour flow during operation	12
% Increase	1.7%

The traffic and transport impact assessment indicates that the traffic generated by the construction and operation of the QSTP would have minimal impacts on the wider road network. This is particularly true once the facility is operational as it generates a very low number of vehicles daily. The increase in traffic would remain within the capacity of the existing road network.

5.2.5 Traffic and transport – Mitigation

The mitigation measures outlined in Table 5.2.8 will be implemented to manage potential impacts related to traffic and transport during the construction and operation of the Proposal.

Table 5.2.8: Traffic and transport mitigation measures

Impact	ID	Environmental mitigation measure	Responsible entity	Timing	Statutory / policy basis	Endorsement or approval agency
Increased traffic congestion and reduced road safety during construction.	T1	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site specific traffic control measures (including recommended signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access to the STP • Measures to complete necessary inspections of the access roads surface • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Monitoring, review and amendment mechanisms • Manage delivery of oversize overmass equipment and vehicles through consultation with appropriate Road Authorities and obtaining necessary approvals,	Contractor	Prior to and during construction	Standard measure	EPSDD as part of approval
Increased traffic during construction impacting structural capacity of network.	T2	Preconstruction and post construction road condition and dilapidation reports for local roads will be prepared. Any damage from construction (not normal wear and tear) will be repaired unless alternative arrangements are made with QPRC and TCCS where relevant.	Contractor	Prior to and post construction	Standard measure	TCCS to endorse as part of approval process
Disruption to access during construction.	T3	Existing access to properties, including access to the QSTP will be maintained in construction.	Contractor	During construction	Standard measure	EPSDD as part of approval

Impact	ID	Environmental mitigation measure	Responsible entity	Timing	Statutory / policy basis	Endorsement or approval agency
Reduction or loss of active or public transport options.	T4	A bicycle rail will be provided next to the Amenities Building QPRC to investigate adding end of trip facilities	Proponent	During design and construction	Standard measure	EPSDD as part of approval
Loss of parking areas.	T5	Design includes the provision of sufficient parking spaces for operational and maintenance staff.	Proponent	During design	Standard measure	EPSDD as part of approval
Increased trips by private vehicle in operation.	T6	A Green Travel Plan will be prepared and implemented as part of the CEMP so workers and contractors understand the options for travelling to QSTP by sustainable modes.	Contractor	During construction	Standard measure	EPSDD as part of approval
Impacts to access of existing STP site during construction	T7	A temporary access road will be built to allow access to the existing STP during construction.	Contractor	During Construction	Standard measure	EPSDD as part of approval

5.2.6 Traffic and transport – Residual risk

In accordance with the Scoping Document requirements, a residual risk assessment has been undertaken for the identified utilities impacts which were assessed as having a medium or greater risk rating prior to application of the proposed mitigation measures for the Proposal. Table 5.2.9 outlines the residual risk rating for the impact which is anticipated following the implementation of the identified measures. The risk has been calculated using the same methodology in Chapter 4.

Table 5.2.9: Traffic and transport residual risk

Impact	Unmitigated likelihood	Consequence	Risk level / significance	Environmental mitigation measure	Residual likelihood	Residual consequence	Residual risk level / significance
Increased traffic congestion and reduced road safety during construction.	Likely	Moderate	High	T1, T2, T3, T7	Unlikely	Minor	Very low