Environmental Impact Statement for Tripoli Way Extension

Albion Park

Shellharbour City Council

76 Cygnet Avenue
Shellharbour City Centre, NSW

Prepared by:

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Making Sustainability Happen

Executive Summary

Introduction

This Environmental Impact Statement (EIS) has been prepared by SLR Consulting (SLR) on behalf of Shellharbour City Council (Council) to identify and assess the environmental, and social impacts associated with the proposed construction and operation of the Tripoli Way Extension (TWE) at Albion Park. The Activity would traverse and extend Tripoli Way and The Expressway running east and parallel to the north of Tongarra Road / Illawarra Highway (the Activity area).

Tripoli Way is a local road located in Albion Park in the Shellharbour City Local Government Area (LGA) in NSW. Tripoli Way runs east to west in its current state and provides access to residential dwellings situated between Hamilton Road and Calderwood Road. Currently Tripoli Way consists of two separate main sections which are separated by residential lots and Moles Street.

The EIS has been prepared under Part 5, Section 5.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Activity Overview

The Project, herein referred to as “the Activity”, will involve the construction and operation of the TWE and once constructed the primary function of the Activity will be to alleviate the impacts of traffic growth along Tongarra Road, ease traffic congestion within the Albion Park town centre, increase the safety of roads within Albion Park, support development and provide a valuable addition to the transport network.

A summary of the Activity, listing details for which approval is sought, is summarised in **Table 1**.

Table 1: Activity Summary

Activity Element	Summary of the Activity
EIS Study Area	28.3 ha
Project Site Disturbance Footprint	8.8 ha
Project Location	Albion Park, Shellharbour City Local Government Area (LGA) in NSW
Lots	Lot 2 DP 1250747, Lot 1 DP 559819, Lot 12 DP 1205733, Lot 2 DP 220429, Lot 24 DP 1138317, Lot B DP 38838, Lot 1 DP 1069961, Lot 1 DP 1119325, Lot 1 DP 714125, Lot 2 DP 714125
New Road and Upgrade Works	• Significant road widening of the existing Tripoli Way alignment to allow four (4) travel lanes (two in each direction) for the section of Tripoli Way east of Calderwood Road. • Construction of new section of Tripoli Way west of Calderwood Road consisting of two (2) travel lanes and turning lanes (one in each direction), with capacity to upgrade to four (4) lanes in the future. • Works on Hamilton Road to the north and south where it intersects with Tripoli Way. • Works on Calderwood Road to the north and south where it intersects with Tripoli Way. • Construction of a 2.5 m shared path between the Broughton Avenue / Illawarra Highway intersection and the Hamilton Road intersection on the northern side. • Construction of a 1.5 m footpath on the northern side between Hamilton Road and Terry Street.

Activity Element	Summary of the Activity
	• Construction of a footpath (variable width 1.2-1.5 m) on the southern side of the new road. • Kerb and gutter, a minor and major stormwater drainage network and water treatment devices. • Construction of a 4-lane wide bridge crossing Hazleton Creek. • Construction of three signalised intersections from Calderwood Road to Terry Street. • Demolition of the Former Albion Park Butter Factory building.
Construction Hours	Construction working hours onsite would generally be between: • 7am and 6pm Monday to Friday. • 8am and 1pm Saturdays. Arrival and departure from compounds by work vehicles and security may occur either side of these times. Nighttime works and works outside the above hours may occur to prevent significant disruptions during daytime hours.
Construction Duration	Approximately 2 years
Construction Workforce	Approximately 60 workers
Ancillary Construction Activities	• Earthworks for site preparation. • Drainage works consisting of a formalised stormwater pit and pipe network and open swales to ensure sufficient drainage capacity. • Associated street lighting, noise abatement structures and landscaping. • Temporary ancillary construction facilities, creek crossing and works to facilitate construction of the work. • Traffic management controls to govern vehicle movements and manage speeds during construction. • Establishment of three temporary construction compound / laydown areas. • Perimeter and security fencing where required including signage. • Installation of underground and above ground cables as required. • Acoustic fencing and landscaping treatment around the Tulkeroo Homestead.
Operational Hours	24 hours a day, seven days a week
Operational Workforce	Various maintenance activities – Council.
Operational Duration	Ongoing.
Ancillary Operational Activities	Ancillary operational activities including property management and maintenance by Council.

Concept Design Plans for the Activity are contained in **Appendix A** of the EIS.

Need for the Activity

The construction of the TWE located along the northern periphery of the Albion Park Town Centre offers the potential to relieve traffic levels along Tongarra Road, which would then enable significant opportunities to implement verge and streetscape improvements within the core Town Centre area.

Transport for NSW (TfNSW) has recently completed construction of an extension of the M1 Princes Motorway between Yallah and Oak Flats to bypass Albion Park Rail, also known as the Albion Park Rail bypass. The bypass completes the 'missing link' between Sydney and Bomaderry and provides easy access to Dapto, Albion Park, and Oak Flats, while creating stronger road linkages to the Illawarra Highway. The Albion Park Rail bypass design and connecting ramps were developed through an extensive optioneering, stakeholder

consultation and design development process which has enabled evidence-based considerations of the project objectives and outcomes for TWE.

Activity Objectives

The primary objective of the Activity is to alleviate traffic impacts through the Albion Park Town Centre. In addition, the Activity aims to:

- Increase traffic flow efficiency and cater for future traffic volumes.
- Increase level of reliability in floods, providing a carriageway along the route that is not inundated during a storm event up to and including the 20-year ARI flood event.
- Cater for new residential development in the nearby development areas of Calderwood and Tullimbar.
- Provide reliable travel times through separation of through and local traffic.
- Increase the level of service of intersections as currently key intersections on the Illawarra Highway are significantly congested.
- Improve road safety as the bypass minimises the number of intersections traversed.
- Minimise private property acquisition.
- Minimise impacts on existing utilities.
- Minimise environmental impacts.

Options Considered

The TWE was identified by Council in 1961 as a long-term strategic plan to manage traffic impacts associated with the growing regional population. The Activity will reduce congestion on the Illawarra Highway through Albion Park and has been identified in Council's Section 94 Contributions Plan since 1993.

Design options considered for the design of the TWE alignment include:

- Illawarra Highway / Broughton Avenue / Tripoli Way intersection design.
- Moles Street / Tripoli Way intersection design.
- Tripoli Way alignment options in the vicinity of the Albion Park Butter Factory (former) and Tulkeroo Homestead.

Statutory Context

The Activity is permitted without consent under the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP), with Council required to prepare an Environmental Impact Statement (EIS) for the Activity to ensure all environmental and social matters are appropriately considered under Part 5, Section 5.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Council being both the proponent and the determining authority.

The EP&A Act and the EP&A Regulation form the statutory framework for planning approval and environmental assessment in NSW. The works will be carried out by Shellharbour City Council; accordingly, the works can be carried out without consent with assessment of the works under Part 5 of the EP&A Act.

The EIS has been prepared in accordance with the EP&A Regulations and under the guidance of the State Significant Development Guidelines - Preparing an Environmental Impact Statement (DPIE, 2021).

Council has engaged SLR Consulting Australia Pty Ltd (SLR) to prepare this EIS. The EIS has been prepared to address the EIS requirements of the Secretary of the NSW Department of Planning and Environment (DPE – now referred to as the Department of Planning, Housing and Infrastructure (DPHI)), known as the Secretary's Environmental Assessment Requirements (SEARs). The SEARS are dated 2 December 2022 and are contained in **Appendix B** of the EIS.

Consultation and Engagement

Consultation for the Activity began in 2016. Council and the authors of the EIS have undertaken consultation with various agencies, government departments and other stakeholders, as well as the local community, as required by the SEARs. The issues discussed and raised during these consultations have been addressed as part of the EIS. Consultation and outcomes are detailed in **Section 5.0** of the EIS.

Impact Assessment

Comprehensive technical investigations have been completed by appropriately qualified and experienced personnel to ensure potential environmental and social impacts associated with the development are appropriately assessed. The investigations have also identified management measures to be implemented during the construction phase to avoid or mitigate identified impacts.

The following have been identified as specific matters, refer to **Section 6.0** of the EIS for detailed information:

- Air Quality.
- Biodiversity.
- Contamination.
- Flooding / Hydrology.
- Aboriginal Heritage.
- Environmental Heritage.
- Landscape Character and Visual.
- Land and Water Use.
- Noise and Vibration.
- Soil and Water.
- Traffic, Transport and Access.
- Waste Management.
- Airport Environment
- Environmental Management and Monitoring.

The following sub-sections provide an overview of the key findings.

Air Quality

An Air Quality Assessment was prepared and concluded that the Activity would result in potential air quality impacts from construction as increased dust emissions and diesel vehicle exhaust. Activities likely to cause dust emissions include site preparation (clearing and earthworks), vehicle movement within project area over unsealed paths/roads, tracking

of dirt/mud from project site onto public roads, rock crushing and screening, and excavation and loading of spoil material.

For post-road construction, modelling was carried out to a worst-case scenario for sensitive receivers along the alignment and showed that the operation of the TWE would not result in an exceedance of the air quality criteria. Potential impacts to air quality from construction and operation of the TWE are low and can further be mitigated through implementation of recommended management measures, refer to **Section 6.1.4** of the EIS.

Biodiversity

The Flora and Fauna Assessment was prepared for the Activity and concluded that the Activity will not significantly impact threatened species, populations or ecological communities. The majority of the Activity Area exists within the location of exotic grassland, which provides limited foraging or habitat value to threatened species, populations or ecological communities. The proposed design has minimised impacts to native vegetation, and where impacts are likely to occur, they are limited to highly disturbed vegetation. Implementation of appropriate mitigation measures will further reduce the impacts of the project. No hollow bearing trees are to be removed and the habitat available to fauna will largely remain unchanged, with the exception of the removal of canopy trees. The overall impact to biodiversity of the Activity will not be significant and will be effectively managed through implementation of mitigation measures. No nationally listed Threatened Ecological Communities were considered to be present within the Activity area. The Activity is unlikely to have a significant impact on Biodiversity. Biodiversity impacts are detailed in **Section 6.2** of the EIS.

Contamination

A detailed site investigation (DSI) was carried out across the Activity area. The DSI identified a hotspot in the vicinity of the former Albion Park Butter Factory building and the site was further investigated. Consequently, a Remediation Action Plan (RAP) was prepared, which determined that remediation, via excavation and disposal, was the most appropriate method for remediation of the site.

The DSI and the RAP indicate that the Activity area can be made suitable for the proposed Activity subject to the mitigation and management measures proposed. An ongoing unexpected finds protocol will govern any further unforeseen contamination found on site. A detailed assessment of contamination is contained in **Section 6.3** of the EIS.

Flooding / Hydrology

An assessment was undertaken to assess the potential flooding impacts associated with the development of the TWE. The study found that the Activity was likely to have limited flooding impacts, with the Activity to utilise much of the existing drainage network within existing road reserves and the development or realignment of infrastructure. Based on the design criteria, the road should be flood immune in the 5% Annual Exceedance Probability (AEP) flood event. Flood impact mapping showing the difference in the existing and proposed flood elevation has been calculated to demonstrate that there are no adverse impacts due to the TWE. Overall impacts to trafficability from the project would be positive for the area, especially during the 1% AEP flood event with reductions in hazard categories reduced for the Activity area. A detailed assessment of flooding is contained in **Section 6.4** of the EIS.

Aboriginal Heritage

An Aboriginal Cultural Heritage Assessment (ACHA) has been prepared for the Activity. The ACHA included test excavations carried out in December 2023 and January 2024.

The Activity area was determined to have low aesthetic and historical significance, however consultation with Registered Aboriginal Parties (RAPs) acknowledged the social importance of the continued occupation of the wider Illawarra area and use of its resources over many generations.

An Aboriginal Heritage Impact Permit (AHIP) is required to authorise harm to the Aboriginal sites identified and registered with AHIMS that are located within the Activity area. These isolated sites cannot be impacted until an approved AHIP has been obtained, and all impacts must conform with the AHIP conditions. A detailed assessment of the impact on Aboriginal heritage is contained in **Section 6.5** of the EIS.

Environment Heritage

The Activity would result in the demolition of the Albion Park Butter Factory (former) building which is a local heritage item. The alignment of the Activity has been determined by Council through a process of design development which included consideration of two alignment options that avoided the former Butter Factory building. A design solution to reduce the permanent and temporary indirect impacts to the adjacent heritage item Tulkeroo Homestead as a result of the demolition of the Albion Park Butter Factory building and the construction of the new roadway in this location, in the form of suitable acoustic screening and landscaping will be constructed as part of the Activity.

Prior to construction in the vicinity of the Albion Park Butter Factory (Former) building, a detailed archival recording will be undertaken to document its relationship with Tulkeroo Homestead and the wider setting of the heritage item. An interpretation strategy and plan will be developed as part of the Activity to ensure that the history and context of the local heritage item is recorded. A detailed assessment of the impact on Environment heritage is contained in **Section 6.6** of the EIS.

Landscape Character and Visual

Once operational the Activity would result in localised impacts to visual amenity in almost all areas of the alignment. Due to much of the existing western extent being rural landscape, the TWE will have a visual impact on existing residents bordering the Illawarra Highway at Tullimbar and the future residents at Calderwood Valley. Residents in the middle portion of the alignment will be visually impacted by a four-lane road running adjacent to their front or rear boundaries. Landscape and visual impacts to the eastern extents of the Study Area will be seen from the existing Illawarra Highway/Terry Street intersection as well as traffic flow running north/south on the Illawarra Highway. Users of the Albion Park Showground may also experience a change in visual amenity due to the position of the final intersection at the eastern extent of the alignment. A detailed assessment of the impact on Landscape Character is contained in **Section 6.7** of the EIS.

Land and Water Use

The Activity will result in permanent traffic movement changes patterns with left in left out arrangements along the new roadway. Access to residents' driveways along Tripoli Way will be left in / left out with the addition of a central median.

In accordance with NSW Government guidelines, disturbance works within the riparian corridor of Hazelton Creek are designed to be stabilised and rehabilitated to restore the integrity of the riparian corridor and mimic the natural hydraulic, hydrologic, geomorphic, and ecological functions of the creek. Further details are contained in **Section 6.8** of the EIS.

Noise and Vibration

Construction activities would impact a number of residential receivers along the alignment during construction hours, primarily caused by the proximity of the dwellings to the construction works. Those impacted receivers are not expected to be highly noise affected due to implementation of the recommended mitigation measures.

Operational noise impacts of the TWE have been predicted to exceed the acceptable criteria levels in the year 2041, for a considerable number of residential receivers. Council will assess and identify specific noise attenuation mitigation measures for operational noise impacts for up to 147 properties. The operational noise impact assessment will be carried out during the detailed design phase or upon project completion. A detailed assessment of Noise and Vibration impacts is contained in **Section 6.9** of the EIS.

Soil and Water

Acid Sulphate Soils risk mapping indicates that the Activity Area lies outside the indicative regions mapped as being at risk of Acid Sulphate Soils. Testing of soils within the Activity Area indicates they are slightly to moderately acidic. Whilst soils are acidic the results indicate that sulphides and sulfidic ores do not appear to be present, suggesting that the acidity present within soil may not be attributable to Acid Sulphate Soils, however as a precautionary measure the soils will be appropriately considered and managed during construction.

Water quality impacts during construction can potentially affect the health of downstream receiving waters (including Macquarie Rivulet, Hazelton Creek, Frazers Creek and Lake Illawarra) including related impacts to recreational users of those waters.

It is considered that, provided the environmental safeguards to manage environmental impacts on water quality are implemented and monitored during the construction phase the impacts on water quality, aquatic ecosystems and water users will be minor. Soils and Water are discussed in detail in **Section 6.10** of the EIS.

Traffic, Transport and Access

As result of the TWE there would be a significant increase in traffic along The Expressway and Tripoli Way thereby impacting the nearby residences, however the significant improvements within the overall traffic network as a result of the TWE would be of significant benefit to the local community as a whole. In addition, the detailed design phase would consider opportunities to minimise traffic impacts on nearby residence where possible.

The TWE would contribute to an efficient and functional road network. The TWE would assist in meeting the increased demand of road users as future development and land use changes in the Calderwood area occur. The Activity would also reduce congestion within the surrounding road network and improve safety for motorists, pedestrians and cyclists. The Traffic Impact Assessment modelling suggests that the intersection upgrades and TWE will significantly improve the operational performance for the majority of key intersections.

Likely traffic impacts during the construction phase of the TWE include an increase in heavy vehicle traffic movements, potential disruption to property access and minor traffic delays. Traffic, Transport and Access are discussed in detail in **Section 6.11** of the EIS.

Waste Management

Impacts associated with waste are mainly attributed to the construction of the TWE. Waste streams that are likely to be produced during construction include green waste, road material, general construction litter, waste oils and redundant erosion and sediment controls. Once operational, and given the extent of the works, additional operational wastes

generated above the existing waste levels are expected to be negligible. Waste Management is discussed in detail in **Section 6.12** of the EIS.

Airport Environment

The TWE is in proximity to the Shellharbour Airport and as such an understanding of the Airport environment comprises part of the overall environmental assessment. An Aviation Impact Statement was prepared, and the Activity was assessed against the relevant National Airports Safeguarding Framework Guidelines.

The National Airports Safeguarding Framework aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise disclosure mechanisms.
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety related issues.

In summary impacts to the Airport environment are considered unlikely, however a review of the detailed design and detailed construction methodology is needed prior to construction. The Activity would not impact upon the Obstacle Limitation Surfaces (OLS) of Shellharbour Airport. All structures associated with the Activity would be below 52 m AHD. Further details of impacts to the Airport Environment can be found in **Section 6.13** of the EIS.

Justification and Conclusion

Following detailed investigation and traffic modelling, the Activity offers the best outcomes for the Albion Park Town Centre. This will be achieved through a reduction in traffic congestion in the Albion Park Town Centre and enabling a more efficient use of the locality and facilitate further economic development of the Albion Park Town Centre.

A number of potential environmental impacts from the Activity have been avoided or reduced during the concept design development and options assessment. Potential environmental impacts would be minimised through the implementation of mitigation measures summarised in the EIS.

The Activity is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994*. Therefore, a Species Impact Statement is not required. The Activity is also unlikely to affect Commonwealth land or have an impact on any Matters of National Environmental Significance.

Through the implementation of best practice management, the potential environmental impacts associated with the Activity can be appropriately managed, including social impacts identified during the stakeholder engagement process.

The Project is consistent with the objects and matters as per the EP&A Act and principles of Ecologically Sustainable Development.

The specialist studies supporting this EIS confirm that the Activity would not lead to any adverse environmental, social, or economic impacts and that residual impacts are manageable through the implementation of the stated mitigation measures.

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Appendix V Waste Management Plan
Appendix W Airport Environment Report
Appendix X Structural Assessment Report

Environmental Impact Statement Declaration

Project Details	
Project Name	Tripoli Way Extension
Application Number	No number - EIS under Part 5 of the EP&A Act.
Address of the land in respect of which the development application is made	Various land parcels – refer to Section 1.3.2 of the EIS.
Applicant Details	
Applicant Name	Shellharbour City Council
Applicant Address	76 Cygnet Avenue Shellharbour City Centre NSW 2529
Details of person by whom this EIS was prepared	
Name	Rob Dwyer, Technical Director, SLR Consulting
Address	10 Kings Road, New Lambton, NSW, Australia, 2305.
Professional qualifications	Bachelor of Science. Grad Urban and Regional Planning.
Declaration by registered environmental assessment practitioner	
Name	Rob Dwyer
Registration number	7608
Organization registered with	Planning Institute of Australia (PIA).

Declaration

The undersigned declares that this EIS:

- It is in accordance with section 5.5 of the EP&A Act and has been prepared in accordance with the *Environmental Planning and Assessment Regulation 2021.*
- Contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates.
- Does not contain information that is false or misleading.
- Addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project.
- Identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments.
- Has been prepared having regard to the Department's Guidelines - Preparing an Environmental Impact Statement (1999).
- Contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development.
- Contains a consolidated description of the project in a single chapter of the EIS.
- Contains an accurate summary of the findings of any community engagement.
- Contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.
- It examines and takes into account all matters affecting or likely to affect the environment as a result of the activities associated with this project.
- It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.
    - The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats or impact biodiversity values.
    - The EIS considers the effect of the activity on any wilderness area (within the meaning of the *Wilderness Act 1987*) in the locality in which the activity is intended to be carried on.

○ The proposed activity may be approved subject to mitigation measures detailed in this document. ○ The proposed activity is unlikely to present a significant risk of harm to the environment and approval would be in the public interest.	
Signature	
Date	23rd May 2024

Acronyms and Abbreviations

ABS	Australian Bureau of Statistics
ACHA	Aboriginal cultural heritage assessment
ACHMP	Aboriginal cultural heritage management plan
ADGC	Australian Dangerous Goods Code
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
ARI	Average Recurrence Interval
AUL	Auxiliary Left Lane Turn
BAL	Basic Left Turn
BAR	Basic Right Turn
BDAR	Biodiversity development assessment report
CEEC	Critically endangered ecological community
CICs	Critical Industry Clusters
CHR	Channelised Right Turn Treatment
Council	Shellharbour City Council
DA	Development Application
DCCEEW	Commonwealth Department of Climate Change, Energy, Environment and Water
DD	Due Diligence
DG	Dangerous Goods
DP	Deposited Plan
DPI	Department of Primary Industries
DPE	Department of Planning and Environment (now known as DPHI, see below)
DPHI	Department of Planning, Housing and Infrastructure.
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ES	Earth Sands
FCAS	Frequency Control and Ancillary Services
FFDI	Forest Fire Danger Index
GDEs	Groundwater Dependent Ecosystems
GFDI	Grassland Fire Danger Index
ha	Hectares
HFRA	Hydrology and Flood Risk Assessment
HHA	Historic Heritage Assessment
hr	Home Rule

HVACs	Heating Ventilation Air Conditioning
km	kilometres
kV	Kilovolt
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LPG	Liquified Petroleum Gas
LUCRA	Land Use Conflict Risk Assessment
LUSEA	Land Use, Soils and Erosion Assessment
MNES	Matters Of National Environmental Significance
NATA	National Association of Testing Authorities
NMLs	Noise Management Levels
NSW	New South Wales
NVIA	Noise And Vibration Impact Assessment
PAD	Potential Archaeological Deposit
PCT	Plant Community Type
PHA	Preliminary Hazard Analysis
PMST	Commonwealth Protected Matters Search Tool
RAPs	Registered Aboriginal Parties
RBLs	Rating Background Noise Levels
RFS	NSW Rural Fire Service
SC	Solodic Soils
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SLEP 2013	*Shellharbour Local Environmental Plan 2013*
SLR	SLR Consulting Australia Pty Ltd
SSAL	State Significant Agricultural Land
SSD	State Significant Development
TEC	Threatened Ecological Communities
TIA	Traffic Impact Assessment
TN	Total Nitrogen
TSS	Total Suspended Solids
TP	Total Phosphorus
VIA	Visual Impact Assessment
WMP	Waste Management Plan
WQIA	Water Quality Impact Assessment

1.0 Introduction

This Section provides an overview of the proposed activity, including an introduction to the project location, scope of works and planning approval process. It outlines the Secretary's Environmental Assessment Requirements (SEARs) and indicates where they have been addressed in this Environment Impact Statement (EIS).

1.1 Overview

Shellharbour City Council (Council) propose to develop the Tripoli Way Extension (TWE) at Albion Park, a road which would traverse and extend Tripoli Way and The Expressway running east / west and parallel to the north of Tongarra Road/Illawarra Highway (the Activity). Construction and operation of the Activity encompasses the full length of the existing Tripoli Way, connecting with Tongarra Road/Illawarra Highway at the intersection with Broughton Avenue at the western extent and continuing east to connect with Terry Street / Illawarra Highway. A plan showing the regional context of the Activity is shown in **Figure 1**. Concept Design Plans for the Activity are contained in **Appendix A**.

Once constructed the primary function of the Activity will be to alleviate the impacts of traffic growth along Tongarra Road, ease traffic congestion within the Albion Park town centre, increase the safety of roads within Albion Park, provide east west connectivity for current and future land uses and provide a valuable addition to the transport network.

The Activity is permitted without consent under the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP), with Council required to prepare an Environmental Impact Statement (EIS) for the Activity. Preparation of this EIS ensures all environmental and social matters are appropriately considered under Part 5, Section 5.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Council being both the proponent and the determining authority.

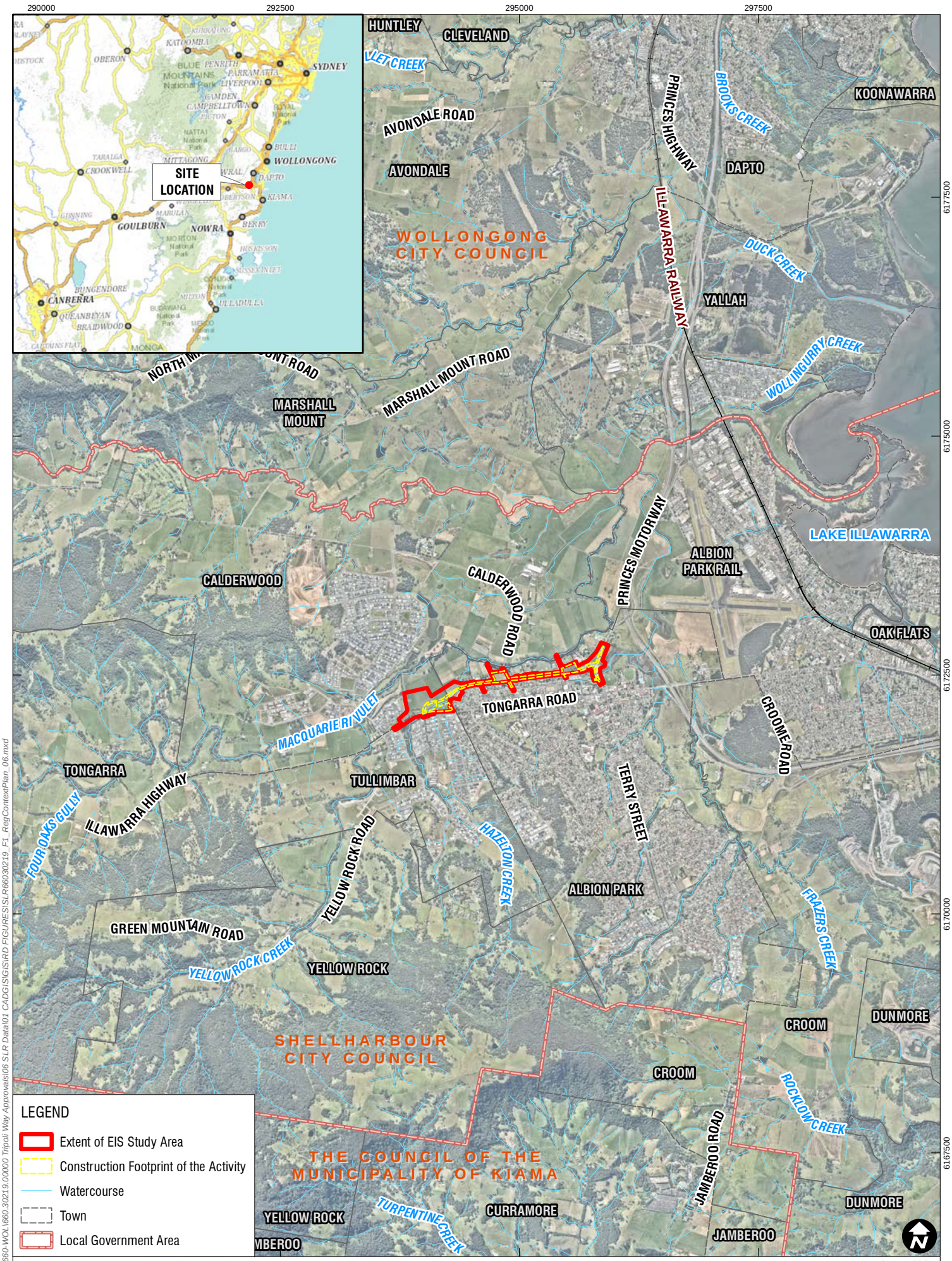
Council has engaged SLR Consulting Australia Pty Ltd (SLR) to prepare this EIS. The EIS has been prepared to address the EIS requirements of the Secretary of the NSW Department of Planning, Housing and Infrastructure (DPHI), known as the Secretary's Environmental Assessment Requirements (SEARs). The Project SEARs are dated 2 December 2022 and are contained in **Appendix B**. The EIS has also been prepared in accordance with the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulations).

1.2 Activity Background

The construction of the TWE will extend the existing Tripoli Way and The Expressway alignment which runs parallel and to the north of Tongarra Road/Illawarra Highway. It will connect to Terry Street in the east and Tongarra Road/Illawarra Highway at the Broughton Avenue roundabout in the west.

The proposed Activity will deliver improved traffic flow through Albion Park. Increased traffic within the surrounding areas of Albion Park, Tullimbar and Calderwood has increased congestion and decreased amenity.

The TWE was conceived as early as the 1960's, as evidenced by the land zoning shown in the then 'Illawarra Planning Scheme, 1961'. Since this time the alignment has undergone some minor amendments, however the intent remains consistent which is to alleviate traffic congestion through the surrounding areas.



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Drawn By: JH
Approved By: RD

Date Drawn: 10-May-2024
Project Number: 660.030219

Sheet Size : A4

Data Source: NearMap March 30, 2024

SLR

Shellharbour CITY COUNCIL

EIS FOR TRIPOLI WAY EXTENSION

Regional Context Plan

FIGURE 1

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1.3 The Activity

The Activity subject of this EIS is comprised of the following:

- Road widening of the existing Tripoli Way formation to allow four (4) travel lanes (two in each direction) for the section of Tripoli Way east of Calderwood Road to Terry Street.
- Construction of a new section of Tripoli Way west of the intersection with Calderwood Road, consisting of two (2) travel lanes (one in each direction with turning lanes) to the existing Broughton Avenue / Illawarra Highway roundabout, with capacity to upgrade to four (4) lanes in the future. Construction of this new section will include a four (4) lane bridge crossing Hazleton Creek. The bridge will have an overall length of approximately 52 m and three-span in order to cross the creek and minimise impacts to flood depths, velocity and minimise impacts on the riparian corridor.
- Works on Hamilton Road to the north and south where it intersects with Tripoli Way.
- Works on Calderwood Road to the north and south where it intersects with Tripoli Way.
- Construction of a 2.5 m shared path between the Broughton Avenue / Illawarra intersection and the Hamilton Road intersection on the northern side.
- Construction of 1.5m footpath on the northern side between Hamilton Road and Terry Street.
- Construction of a footpath (variable width 1.2-1.5 m) on the southern side of the new road.
- Three signalised intersections from Calderwood Road to Terry Street.
- Drainage works consisting of a formalised stormwater pit and pipe network and open swales to ensure sufficient drainage capacity.
- Associated street lighting, noise abatement structures and landscaping.
- Temporary ancillary construction facilities, creek adjustments and works to facilitate construction of the work.
- Operation of the TWE.

Once completed the TWE will be approximately 1,975 m in length and will have a speed limit of 60 km per hour.

Further details on the Activity description are provided in **Section 3.0**.

1.3.1 Activity Objectives

The primary objective of the Activity is to alleviate traffic impacts through the Albion Park Town Centre. In addition, the Activity aims to:

- Increase traffic flow efficiency and cater for future traffic volumes.
- Increase level of reliability in floods, providing a carriageway along the route that is not inundated during a storm event up to and including the 5% Annual Exceedance Probability (AEP) flood event.
- Cater for new residential development in the nearby development areas of Calderwood and Tullimbar.
- Provide reliable travel times through separation of through and local traffic.

- Increase the level of service of intersections as currently key intersections on the Illawarra Highway are significantly congested.
- Improve road safety as the bypass minimises the number of intersections traversed.
- Minimise private property acquisition.
- Minimise impacts on existing utilities.
- Minimise environmental impacts.

1.3.2 Activity Location

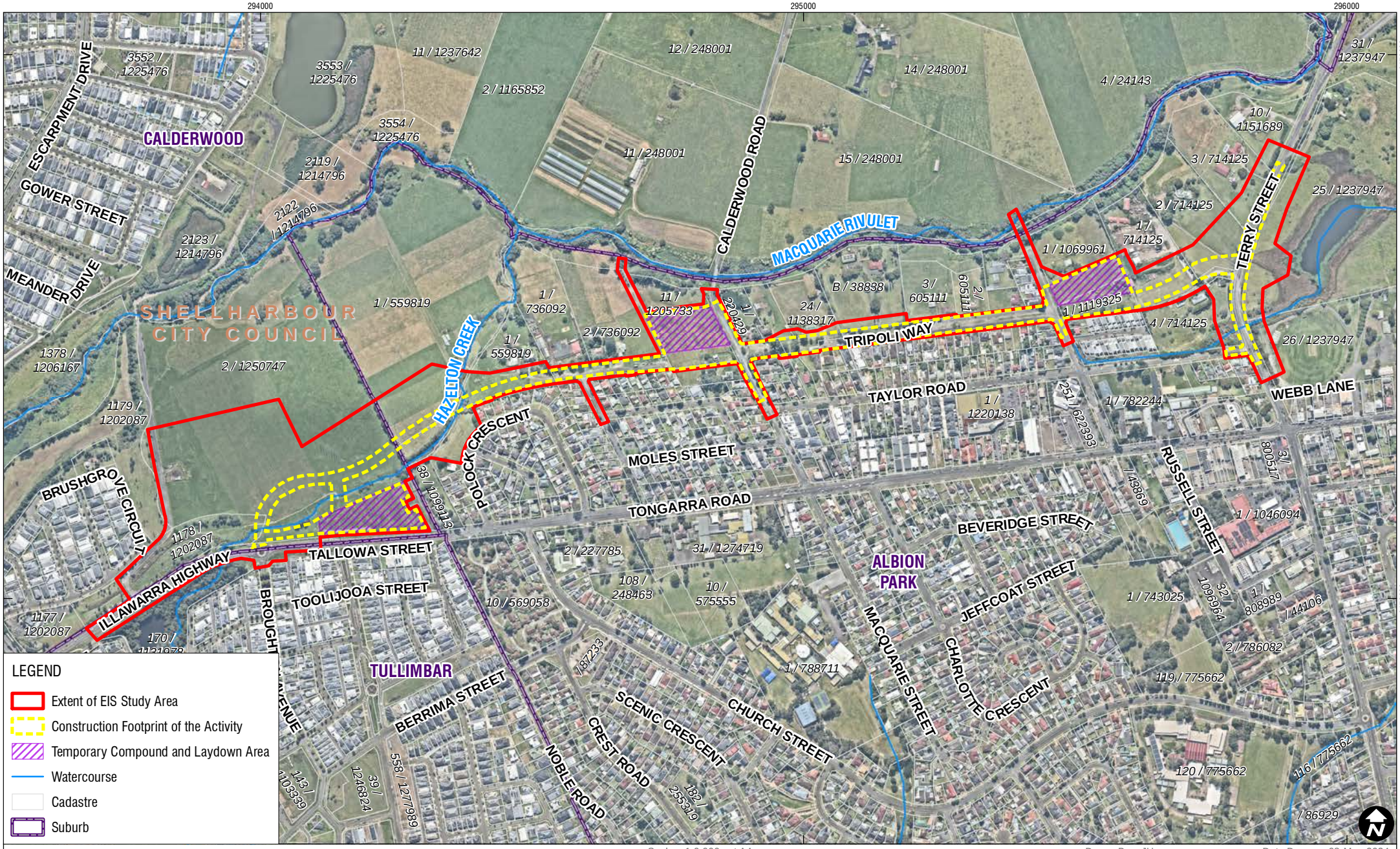
Tripoli Way is a local road located in Albion Park in the Shellharbour City Local Government Area (LGA) in NSW. Tripoli Way runs east to west in its current state and provides access to residential dwellings situated between Hamilton Road and Calderwood Road. Currently Tripoli Way consists of two separate main sections which are separated by residential lots. A plan showing the overall location, the study area for the EIS and the construction footprint of the Activity is provided in **Figure 2.**

Construction Footprint of the Activity Area

The Activity Area is approximately 8.8 (ha) in area. The Activity Area comprises of the construction footprint for the road infrastructure and three temporary compound / laydown areas. These areas will be subject to direct impacts.

The Activity Area is broken down into the following.

- Road infrastructure area – 5.9 ha.
- Temporary Compound / Laydown area No. 1 – 1.2 ha.
- Temporary Compound / Laydown area No. 2 – 0.9 ha.
- Temporary Compound / Laydown area No. 3 – 0.8 ha.



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Approved By: RD

Date Drawn: 08-May-2024
Project Number: 660.v30219.00000.0270

Data Source: NearMap March 30, 2024

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EIS FOR TRIPOLI WAY EXTENSION

Local Context and Activity Area

FIGURE 2

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EIS Study Area

The EIS Study Area is approximately 28.3 ha in area.

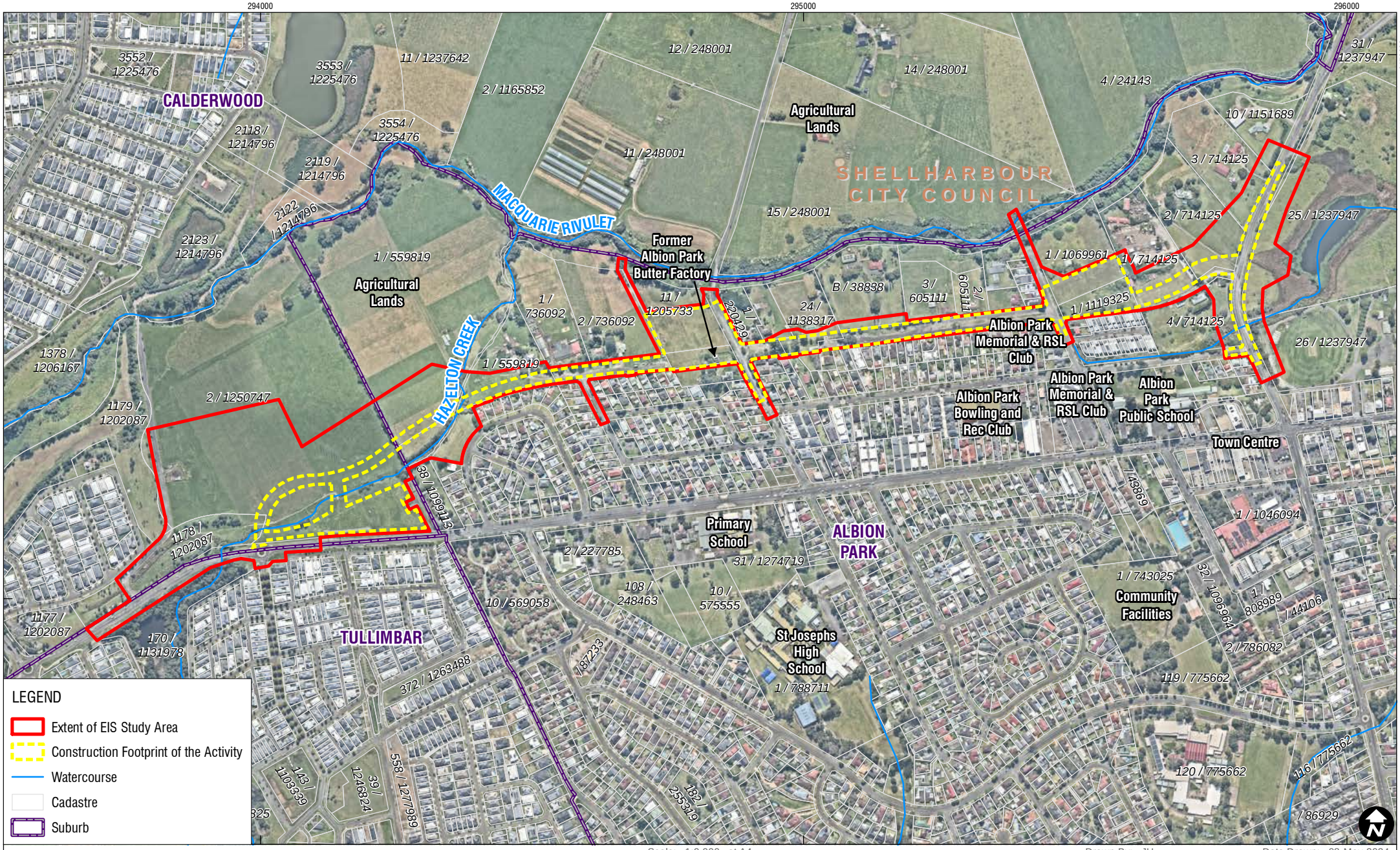
The Study Area comprises of the Activity Area elements as identified above and a buffer area surrounding the Activity Area allowing for various specialist studies to effectively assess. Some of these areas will be subject to indirect impacts. The land parcels within the Activity Area are described in **Table 2** below.

Table 2: Land within the Activity Area

Street Address	Real Property Description
Road reserve, Illawarra Highway, Calderwood.	Not applicable
40 Tongarra Road, Calderwood.	Lot 2 DP 1250747
The Expressway, Albion Park.	Lot 1 DP 559819
Road reserve, The Expressway, Albion Park.	Not applicable
Calderwood Road, Albion Park.	Lot 12 DP 1205733
Road reserve, Calderwood Road and Tripoli Way, Albion Park.	Not applicable
10 Calderwood Road, Albion Park.	Lot 2 DP 220429
43 Tripoli Way, Albion Park.	Lot 24 DP 1138317
8 Tripoli Way, Albion Park.	Lot B DP 38838
Road reserve, Hamilton Road, Albion Park.	Not applicable
14 Hamilton Road, Albion Park.	Lot 1 DP 1069961
Hamilton Road, Albion Park.	Lot 1 DP 1119325
30 Terry Street, Albion Park.	Lot 1 DP 714125
28 Terry Street, Albion Park.	Lot 2 DP 714125
Road reserve, Terry Street, Albion Park.	Not applicable
Road reserve, Illawarra Highway, Tullimbar.	Not applicable

The TWE will be situated in areas of low density residential and rural-residential dwellings within Albion Park. The route crosses a number of private properties and along The Expressway and the existing Tripoli Way Road alignments, both of which front existing house blocks. The alignment also follows the current entrance road into the Albion Park Landscaping Supplies. The alignment crosses Hazelton Creek and traverses across part of the Macquarie Rivulet floodplain zone which is an area used for cattle grazing. The land within the Activity Area is dominated by cleared land, historically used for livestock grazing, agriculture and low-density residential development. The clearing associated with these lands uses has severely interrupted native vegetation connectivity throughout the region resulting in limited to no native vegetation corridors outside of drainage lines. Most of the established remnant native vegetation is concentrated around drainage lines.

Key features of the Activity Area, EIS Study Area and surrounding lands are illustrated in **Figure 3**.



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Coordinate System: GDA 1994 MGA Zone 56

Drawn By: JH
Approved By: RD

Date Drawn: 08-May-2024
Project Number: 660.v30219.00000.0270

Data Source: NearMap March 30, December 2024

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Shellharbour CITY COUNCIL

EIS FOR TRIPOLI WAY EXTENSION

Key Features of the Activity Area

FIGURE 3

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1.3.3 Previous Review of Environmental Factors for the Activity

A Review of Environmental Factors (REF) was prepared for the Activity in February 2022. The REF included specialist and desktop environmental assessments for several priority impact areas to assess whether the Activity was likely to have a significant impact on the environment.

As part of the preparation of the REF, an Historic Heritage Assessment (HHA) and Statement of Heritage Impact (SoHI) were completed by Biosis (2021) in relation to the locally heritage listed Tulkeroo Homestead and Albion Park Butter Factory (Former). The Albion Park Butter Factory (Former) is proposed to be demolished as part of the Activity. The SoHI concluded that the proposed works would result in significant direct physical impacts and indirect impacts to the locally listed item, as well as to the area of high archaeological potential beneath and surrounding the structure.

Following review of the REF and specialist assessments, Council determined that the Activity was likely to have a significant impact on local heritage and therefore an EIS would be required prior to approving the Activity.

1.4 The Proponent

The proponent details for the Activity are outlined in **Table 3**.

Table 3: Proponent Details

Details	
Proponent	Shellharbour City Council
ABN/ACN	78 392 627 134
Postal Address	Shellharbour City Council, Dharawal Country, Locked Bag 155, Shellharbour City Centre, NSW, 2529
Contact	Daniel Brilsky, Executive Manager Infrastructure and Projects
Contact Details	Phone: (02) 4221 6143

1.5 EIS Purpose and Structure

The purpose of the EIS is to assess the impacts of the Activity under section 5.7(1)(a) of the EP&A Act.

The EIS has been prepared to assess the significance of the potential environmental impacts associated with the construction and operation of the Activity. The EIS has been undertaken in accordance with the EP&A Act, as mentioned above, and the EP&A Regulation.

The EIS has also been prepared based on the SEARs issued by DPHI on 2 December 2022, following review of the EIS Scoping Report prepared by SLR in September 2022. The SEARs and additional agency requirements are provided in **Appendix B.**

The structure and content of this EIS has been designed generally in accordance with the recommendations of Appendix B to the State Significant Infrastructure Guidelines – Preparing Environmental Impact Statements.

Table 4 outlines the sections and appendices which form this EIS.

Table 4: EIS Structure and Inclusions

Section or Appendix of this EIS	Inclusion
Section 1 Introduction	This section provides the context for the detailed assessment of the Activity.
Section 2 Strategic Context	This section provides the key strategic context issues that are relevant to the assessment of the Activity
Section 3 Activity Description	This section provides a consolidated description of the Activity that the proponent is seeking approval for.
Section 4 Statutory Context	This section identifies the relevant statutory framework within which the Activity will be assessed.
Section 5 Community and Stakeholder Engagement	This section summarises the findings of the community engagement that was carried out for the Activity prior to and during the preparation of the EIS and describes what further community engagement will be carried if the Activity is approved.
Section 6 Assessment of Impacts	This section provides a detailed summary of the results of the assessment of the potential impacts of the Activity.
Section 7 Summary of Mitigation Measures	This section provides a comprehensive summary of the measures to manage, mitigate, minimise or offset potential direct and indirect impacts associated with the proposed Activity.
Section 8 Activity Justification and Conclusion	This section provides a justification and evaluation of the Activity as a whole.
Appendix A	TWE Concept Design Plans
Appendix B	Project SEARs
Appendix C	SEARs Compliance Table
Appendix D	Consideration of 171 and MNES
Appendix E	Consultation Activities
Appendix F	Air Quality Assessment
Appendix G	Flora and Fauna Assessment (Biodiversity)
Appendix H	Independent Review of Flora and Fauna Assessment
Appendix I	Detailed Site Investigation
Appendix J	Remediation Action Plan (RAP)
Appendix K	Flooding Assessment
Appendix L	Aboriginal Cultural Heritage Due Diligence Assessment
Appendix M	Historical Heritage Assessment and Statement of Heritage Impact (SoHI)
Appendix N	Concept Plans for Screening and Landscaping – Tulkeroo Homestead
Appendix O	Assessment of Screening and Landscaping – Tulkeroo Homestead
Appendix P	Landscape Photos
Appendix Q	Photomontages
Appendix R	Project Fly Through Extracts
Appendix S	Land Use and Conflict Risk Assessment
Appendix T	Noise and Vibration Impact Assessment
Appendix U	Traffic and Transport Impact Assessment

Section or Appendix of this EIS	Inclusion
Appendix V	Waste Management Plan
Appendix W	Aviation Environment Report

At the beginning of each sub- section of **Section 6.0** (Assessment of Impacts) the EIS notes the relevant SEARs specific to the sub-section. **Appendix C** contains a SEARs Compliance Table that lists each SEAR item and directs the reader to the relevant sections and appendices of the EIS where the SEAR item has been addressed.

2.0 Strategic Context

This Section describes the strategic context for the Activity.

The relevant SEARs are listed in **Table 5**.

Table 5: SEARs – Strategic Context

Requirement	Relevant Section
A justification for the proposal and suitability of the proposed road corridor.	All of Section 2
A demonstration that the proposal is consistent with relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies.	Section 2.1 to Section 2.3 and Section 4.
Consideration of impacts of 'no action' and consideration of alternative options as well as construction technologies and why these options have been discounted.	Section 2.4
A list of any approvals that must be obtained under any other Act or law before (and during) the proposal may be lawfully carried out.	Section 4.3

Tongarra Road, Terry Street, and the Illawarra Highway are the main arterial roads leading into and running through the Albion Park town centre. Currently, major residential developments west of Albion Park such as Tullimbar and Calderwood have progressively increased traffic congestion within the town centre and continued urban development in the immediate surrounds threatens to further exacerbate traffic congestion and levels of service at intersections.

The construction of the Activity has been identified as a potential opportunity to significantly relieve increasing traffic volumes and impacts that have progressively added to pressures on the existing transport network in Albion Park. The Activity is highlighted within the endorsed Albion Park Town Centre Plan 2014 (SCC, 2014). The Plan is a key strategic driver for the Activity, with the overall plan aimed at providing written and graphic development guidelines for Albion Park Town Centre to feed into the Shellharbour Development Control Plan 2013 (DCP). Albion Park Town Centre Plan 2014 specifically references the Activity as follows:

> *"The construction of the Tripoli Way Extension located along the northern edge of the town centre offers the potential to significantly relieve traffic levels along the Tongarra Rd shopping strip, enabling opportunities to implement verge and streetscape improvements in the shopping strip."*

Population and household forecasts (Shellharbour City Council, 2024) estimates Albion Park having a population of 18,866 persons and Calderwood a population of 3,664 with future growth. Across these two localities, the average number of registered motor vehicles per occupied private dwelling is two. The Activity is therefore slated as a critical piece of infrastructure that will alleviate traffic pressures through Albion Park, noting that the residents of the Calderwood and Tullimbar subdivisions currently utilise the Illawarra Highway / Tongarra Road to access nearby regional centres of Wollongong and Shellharbour.

2.1 State Context

The following key State policies and strategies are relevant to the Activity and its strategic value, primarily associated with population growth and coordinated investment in infrastructure to ensure safety and serviceability of future residential hubs.

2.1.1 State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)

The Activity supports the goal of reducing localised congestion, improving safety, and mitigating amenity impacts in regional communities, specifically those experiencing rapid increase in demand of housing and infrastructure.

2.1.2 NSW Road Safety Plan 2021 (NSW Government, 2018)

The Activity aims to improve safety of pedestrians and commuters within the Albion Park town centre by alleviating traffic congestion and implementing verge and streetscape improvements.

2.1.3 Connecting to the Future - Our 10 Year Blueprint (Transport for NSW)

The Activity would deliver a necessary link within the road network to provide safe and timely journeys for people entering and leaving the Albion Park area.

2.1.4 Future Transport Strategy 2056

The Future Transport Strategy 2056 (Transport for NSW, 2022) sets a 40-year vision supported by guiding principles for the design of a future transport network that meets the demands of anticipated population growth in Greater Sydney and regions of NSW.

Transport for NSW (TfNSW) also developed the Illawarra-Shoalhaven Regional Transport Plan (TfNSW, 2021) in conjunction with DPHI's Illawarra- Shoalhaven Regional Plan 2041 to act as a supporting plan of the Future Transport Strategy. The Illawarra-Shoalhaven Regional Transport Plan outlines the local actions that must be taken to achieve the transport vision for the region across a number of key focus areas including improving connectivity between the Illawarra-Shoalhaven and Greater Sydney and increasing population within a 30-minute public transport trip of a regionally significant centre.

Nowra-Bomaderry is identified as a 'regional city,' with the Illawarra-Shoalhaven Regional Transport Plan noting that the regionally significant growth areas of West Lake Illawarra and Nowra-Bomaderry are expected to deliver approximately 30,000 new homes by 2041. As the Activity is close to Nowra it will offer full time employment to locals during construction and operation.

The Activity would provide a key component to meet the Plan's regional goal of improving connections between the City of Wollongong and the three cities of Greater Sydney, as well as expanding the 30-minute catchment for public transport to facilitate local trips by reducing traffic congestion in the local area.

The Activity is consistent with the objectives of the Future Transport Strategy 2056 and Illawarra-Shoalhaven Regional Transport Plan.

2.2 Regional Context

2.2.1 Illawarra – Shoalhaven Regional Transport Plan (Transport for NSW 2021)

The Plan identifies the expected population growth of the Illawarra Shoalhaven to be approximately 100,000 by 2041 with the need for efficient, reliable, and safe connectivity between the Illawarra-Shoalhaven region and Greater Sydney becoming a priority.

The Activity would work in tandem with existing infrastructure improvements in the surrounds including the Albion Park Rail Bypass to ensure appropriate provision of road infrastructure for the growing population.

2.2.2 Illawarra Shoalhaven Regional Plan 2041

The Illawarra Shoalhaven Regional Plan 2041 (Regional Plan) prepared in May 2021 is a 20-year land use plan that applies to the local government areas of Wollongong, Shellharbour, Kiama, and Shoalhaven.

The Regional Plan details 30 'Objectives' and nine 'Actions' for the Illawarra-Shoalhaven region that aim to protect and enhance the region's assets and plan for a sustainable future. Specifically, Objective 2 aims to promote the growth of regional cities within the Illawarra Shoalhaven region. This growth will likely include transport and connectivity as priorities to supplement the city and population growth. Additionally, Objectives 18 and 19 focus on the delivery of housing to meet population growth within the region. This focus on increased housing will likely accelerate population growth and as a result will require improved transport and connectivity between regional cities.

The activity is consistent with the Regional Plan in providing improved connectivity between ever growing regional cities and increased local housing provisions that will accelerate population growth within the region.

2.3 Local Context

2.3.1 Shellharbour City Council Local Strategy Planning Statement

The Shellharbour City Local Strategic Planning Statement (LSPS) outlines a vision for the future of the Shellharbour City LGA in regard to land use goals and land use strategy. It provides publicly available guidance and details on which Council can base planning decisions and drive future land use planning and management of key areas of growth over the next 20 years within the LGA, including:

- Economic.
- Social.
- Environmental.

The Planning Statement aims to communicate a proactive understanding of the future changes that will shape Shellharbour City's future and create positive community outcomes for the area.

The Activity is consistent with the vision outlined in the LSPS in regard to land use goals and land use strategy.

2.3.2 Shellharbour City Council Major Projects Advocacy Plan 2023/24

The 'advocacy plan' describes the key investments that Council is planning in the short and medium term. With Albion Park having the largest population of any other area within Shellharbour Local Government Area, it is vital that transport infrastructure is implemented and upgraded to cater for further projected population growth and connectivity.

Tripoli Way Extension Stages 1, 2, and 3 are included in the advocacy plan as a regional project that aims to alleviate traffic congestion in the town centre of Albion Park and help reduce the impacts of traffic growth along Tongarra Road over the next 20 years.

Within the advocacy plan Shellharbour City Council is advocating for the NSW Government to assist in the delivery of the first two stages. Stage 3 of the Tripoli Way Extension will be delivered by the NSW Government.

2.3.3 Albion Park Town Centre Plan

The Albion Park Town Centre Plan (APTCP) was developed to provide guidance for developments within Albion Park Town Centre for inclusion in the Shellharbour Development Control Plan (DCP), development guidance provided in the plan include (but not limited to):

- Development appearances.
- Integration of public and private domains.
- Parking and transport provisions.
- Public area designations.

The Activity is consistent with the guidance outlined in the APTCP in regard to transport provisions and the integration of public and private domains.

2.4 Alternatives Considered

2.4.1 Alternate Alignment Options

Design options considered for the design of the TWE alignment include:

- Illawarra Highway / Broughton Avenue / Tripoli Way intersection design.
- Moles Street / Tripoli Way intersection design.
- Tripoli Way alignment options in the vicinity of the Albion Park Butter Factory (former) and Tulkeroo Homestead.

Illawarra Highway / Broughton Avenue / Tripoli Way Intersection

An existing single lane roundabout currently services the Illawarra Highway and Broughton Avenue. As part of the design refinement, intersection design alternatives were considered, including the following:

- Upgrading to a dual lane entry roundabout to service TWE.
- Installation of signalised intersection.
- Retention of the single lane roundabout to service TWE.

Council decided to move forward with the retention of the existing single lane roundabout. It is acknowledged that a future upgrade of the intersection is conditioned to be undertaken by others under Modification 4 of the Calderwood development which is a generator of traffic movements. The proposed Council design does not constrain others from delivering the signalised intersection.

Moles Street / Tripoli Way Intersection Design.

Various iterations of the Moles Street intersection were considered as part of the progression of the traffic data analysis. The following options were considered for the Moles Street intersection.

- Closing off of Moles Street to become a cul-de-sac which would not allow traffic direct access to the TWE.
- Installation of a signalised intersection to allow traffic on Moles Street direct access to the TWE.
- Conversion of the street finish to a left in/left out give way arrangement to allow direct access to the TWE.

Following consideration and analysis of traffic data and road design constraints, the most appropriate option for the Moles Street / Tripoli Way intersection is a left-in, left-out access to and from Tripoli Way.

Alternate Alignments in the Vicinity of the Albion Park Butter Factory

Two alternate alignments were considered to avoid direct impacts to the locally heritage listed Tulkeroo Homestead and Albion Park Butter Factory (former). Both alignments bypass the Albion Park Butter Factory via construction to the north.

The first alternate alignment, as illustrated in **Figure 4**, passes through private dwellings east of the Albion Park Butter Factory and immediately east of Calderwood Road.

The second alternate alignment, as illustrated in **Figure 5**, also passes through private properties, but will be located further to the north and closer to the Macquarie Rivulet. Flood impacts from this alternate alignment have been considered and the additional impacts to flooding of surrounding properties would be significant. According to the Macquarie Rivulet Floodplain Risk Management Study and Management Plan (FRMS&P), adopted by Council in April 2024, this area of the alignment is considered High Hazard (H5 and H6) Floodway with **Figure 6** showing the location within the Floodway. **Figure 7** illustrates the high hazard location along the alternate alignment.

Filling and development within a Floodway area is not supported as it will significantly alter flow paths and cause additional flooding impacts to nearby properties. While a bridge structure could be considered across the Floodway area (approximately 360 m in length), structures within this area would be subject to very high flood flows and velocities and would require additional engineering measures to prevent structural damage during a flood event.

The requirement for a long bridge structure through the floodway would drastically increase capital expenditure for the project. The alternative alignments would also increase the project's impacts to private property with 6 additional properties impacted, leading to large increases in the cost of land acquisitions. Both alternative alignments have limited engineering feasibility due to poor connection with the proposed bridge for the Calderwood Road upgrade and substandard road geometry.

2.4.2 The "No Action" Option

The 'No Action' option would have no on-site environmental impacts at the construction stage however, this option would result in continued delays and further declines in traffic flows within Albion Park which would worsen as traffic flows increase with future predicted population increases in the Albion Park, Tullimbar and Calderwood areas. Waiting times at intersections would lengthen due to the increased traffic volumes. There would continue to be road closures due to flooding. Furthermore, the "No Action" Option would jeopardize any further economic development opportunities for the Albion Park Town Centre.

The Council is satisfied with the proposed benefits of constructing the TWE. The TWE will alleviate traffic congestion and facilitate east west connections to support residential development in the area.

Council has determined that the beneficial outcomes of the proposed Activity as assessed within this EIS outweigh the potential negative outcomes, provided adequate mitigation is implemented. Alternative alignment options have been considered however these options are considered to be sub-optimal in achieving the Activity objectives stated in Section 1.3.1.

Figure 4: Alternate Alignment passing through dwellings to the east of Calderwood Road

Figure 5: Alternate Alignment closer to the Macquarie Rivulet.

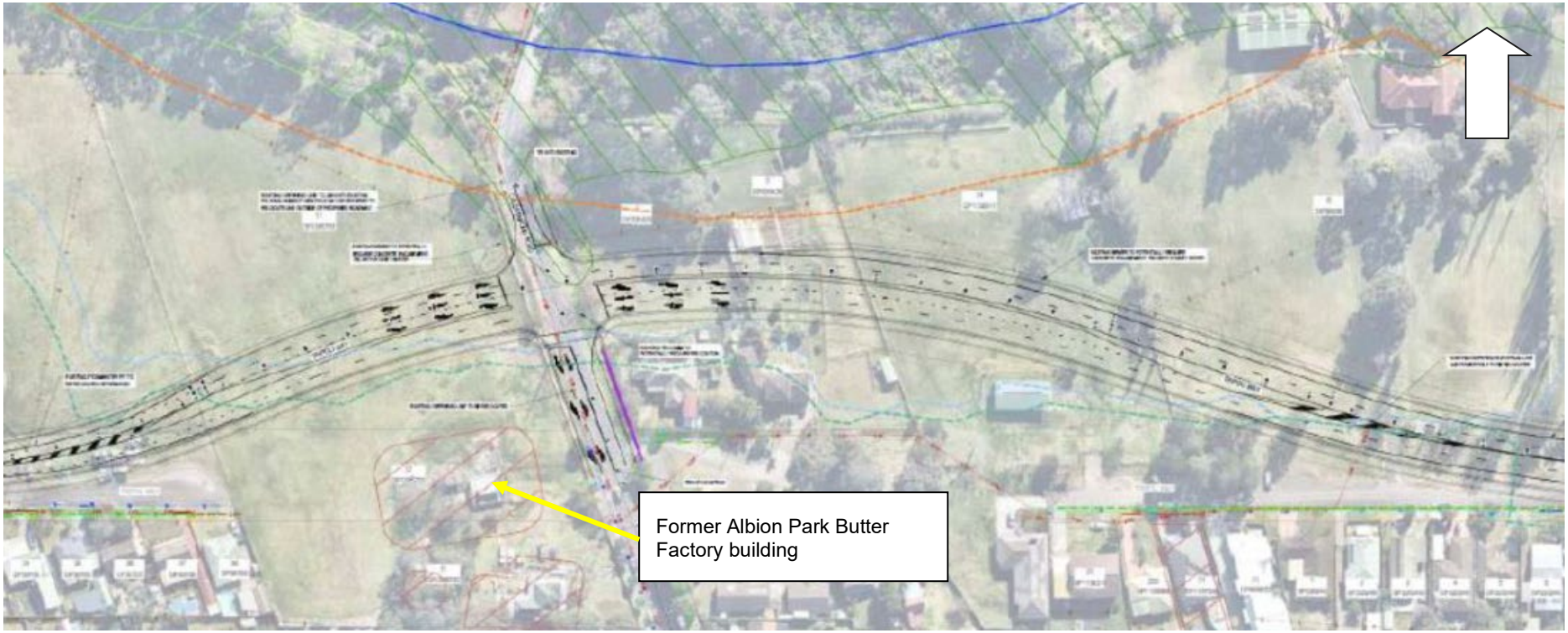
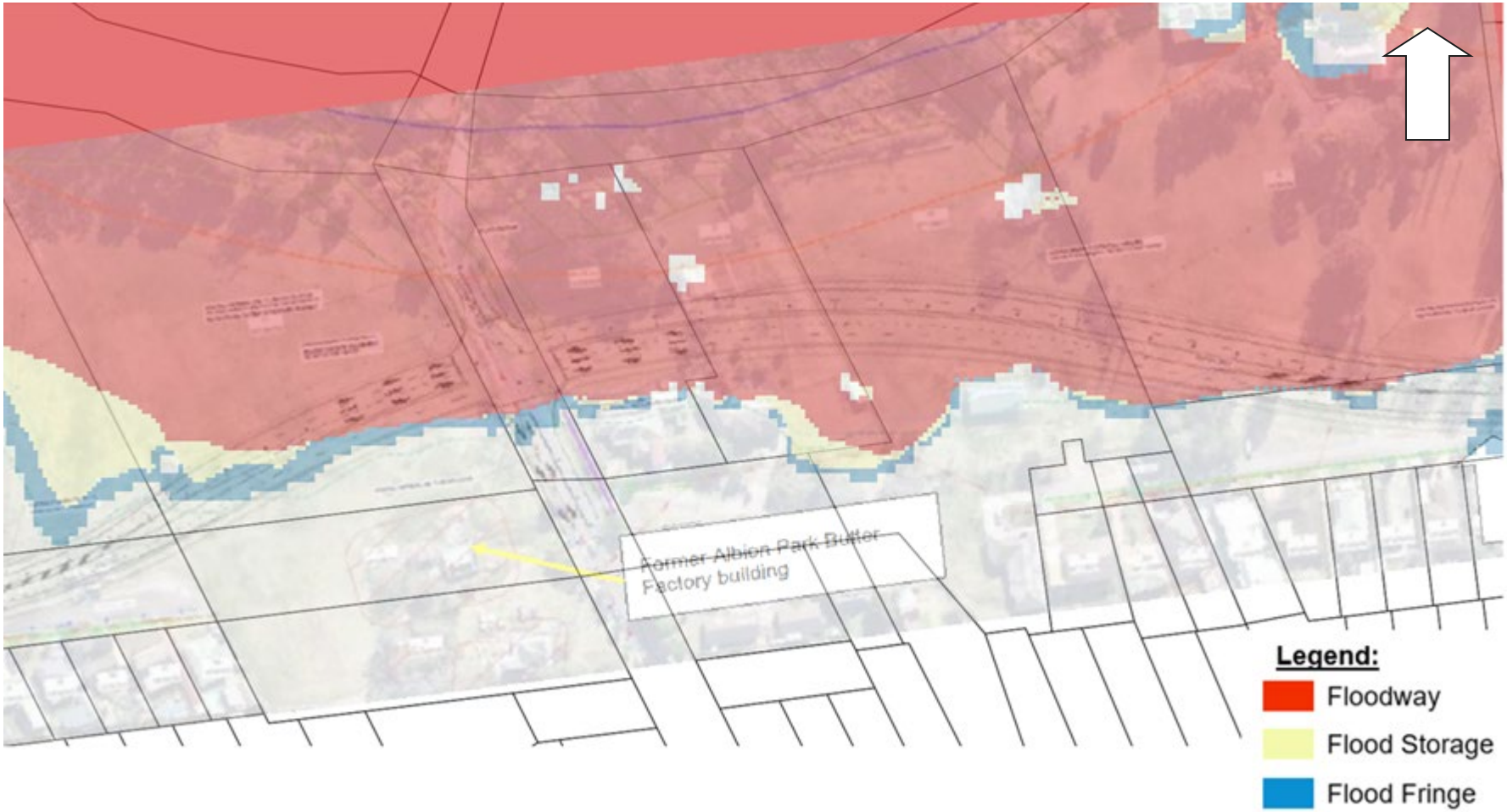
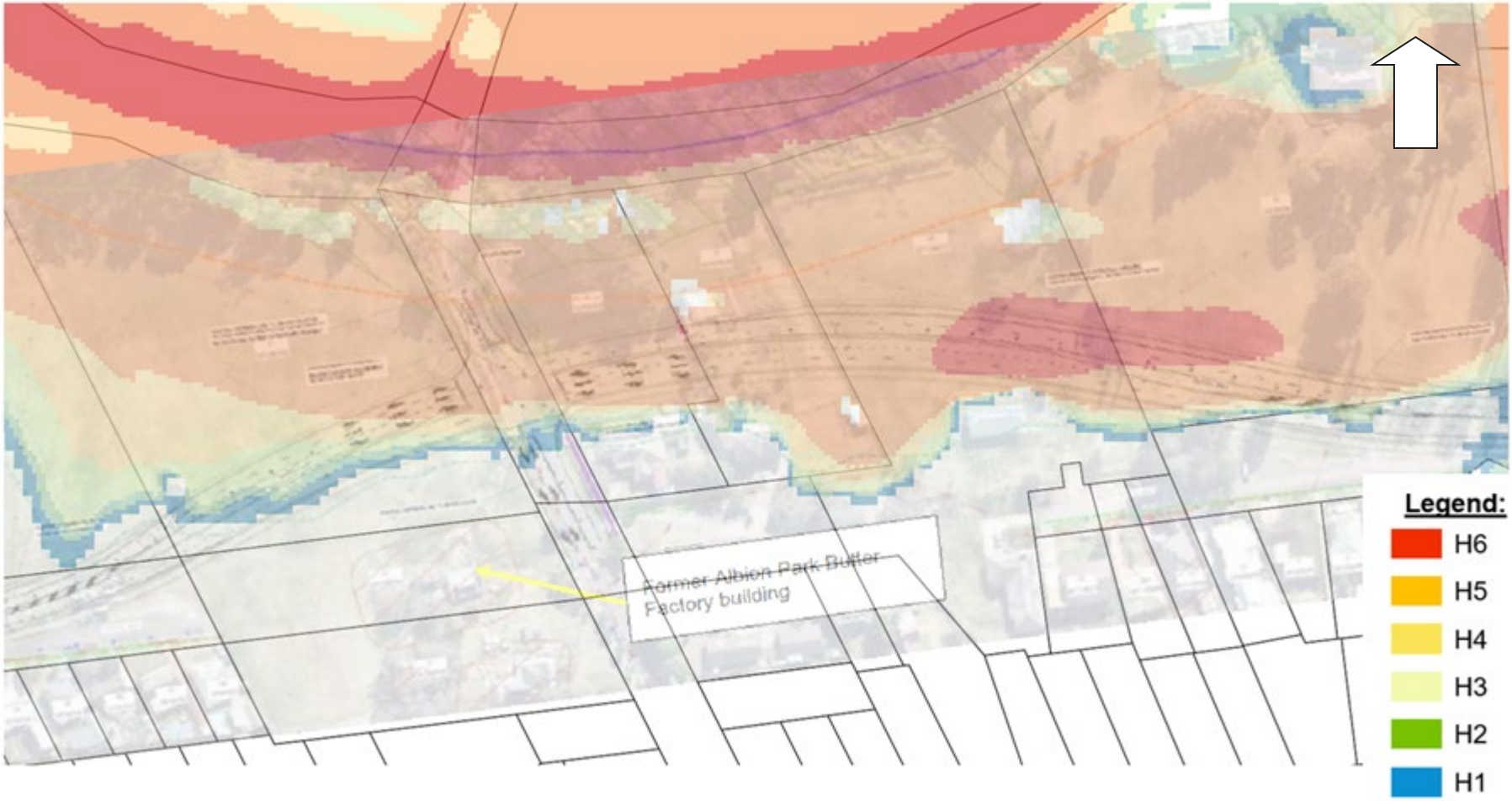


Figure 6: Floodway Designation and the Alternate Alignment Closer to the Macquarie Rivulet



Source: Macquarie Rivulet Floodplain Risk Management Study and Management Plan (April 2024).

Figure 7: High Hazard Flooding - Alternate Alignment Closer to the Macquarie Rivulet



Source: Macquarie Rivulet Floodplain Risk Management Study and Management Plan (April 2024).

2.4.3 Adopted Activity Alignment

Council has considered the need for the proposed Activity, the need for alternative alignment options and the 'No Action' option. The 'No Action' option would clearly be the option requiring little (if any) funding however the capital cost of the Activity would rise significantly if the project was re-instated in the future.

Ultimately, based upon due consideration of environmental, social and economic factors, Council's Executive Leadership Team endorsed the alignment as illustrated in **Figure 1**, **Figure 2** and the Concept Designs contained in **Appendix A**. The Activity will have significant impact on the Albion Park Butter Factory (former). Further detail on the impacts associated with these impacts are discussed in **Section 6.9**.

3.0 Project Description

This Section provides a detailed description of the Activity.

The relevant SEARs are listed in **Table 6**.

Table 6: SEARs Project Description

Requirement	Relevant Section
A detailed description of the proposed activity and its key components	Section 3.1 to Section 3.5
Facilities, activities and equipment required to construct the proposed activity.	Section 3.6 to Section 3.12

3.1 Proposed Development

The Activity will extend the existing Tripoli Way alignment to connect arterial roads, Terry Street and Broughton Avenue / Tongarra Road (Illawarra Highway) without directly passing through Albion Park Town Centre. The TWE includes the full length of these existing access roads and extends east and links them to the Albion Park Rail bypass and west into Tongarra Road (Illawarra Highway) at the roundabout on Broughton Avenue. The extension and linkages will be mainly through undeveloped rural properties with design objectives to limit impact on the environment and existing residential lots.

The Activity addressed within this EIS is comprised of the following.

- Significant road widening of the existing Tripoli Way alignment to allow four (4) travel lanes (two in each direction) for the section of Tripoli Way east of Calderwood Road.
- Construction of new section of Tripoli Way west of Calderwood Road consisting of two (2) travel lanes and turning lanes (one in each direction), with capacity to upgrade to four (4) lanes in the future.
- Works on Hamilton Road to the north and south where it intersects with Tripoli Way.
- Works on Calderwood Road to the north and south where it intersects with Tripoli Way.
- Construction of a 2.5 m shared path between the Broughton Avenue / Illawarra Highway intersection and the Hamilton Road intersection on the northern side.
- Construction of a 1.5 m footpath on the northern side between Hamilton Road and Terry Street.
- Construction of a footpath (variable width 1.2-1.5 m) on the southern side of the new road between Moles Street and Hamilton Road.
- Kerb and gutter, a minor and major stormwater drainage network and water treatment devices.
- Construction of a 4 lane wide bridge crossing Hazleton Creek, with an overall length of approximately 52 m and two (2)-span in order to cross the channel and minimise impacts to flood depths and velocity. Works within and near Hazelton Creek will be designed in accordance with *Controlled Activities - Guidelines for instream works on waterfront land, Controlled Activities - Guidelines for watercourse crossings on waterfront land*, and *Fish Passage Requirements for Waterway Crossings*. Stabilisation and rehabilitation of all disturbed areas along the creek, as a result of the Activity, will restore the integrity of the riparian corridor and will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.

- Box culvert works beneath the new roadway near the proposed intersection with the Illawarra Highway. Works beneath the roadway will be designed in accordance with *Controlled Activities - Guidelines for instream works on waterfront land, Controlled Activities - Guidelines for watercourse crossings on waterfront land*, and *Fish Passage Requirements for Waterway Crossings*. Stabilisation and rehabilitation of all disturbed areas along the creek, as a result of the Activity, will restore the integrity of the riparian corridor and will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.
- Construction of three signalised intersections from Calderwood Road to Terry Street.
- Drainage works consisting of a formalised stormwater pit and pipe network and open swales to ensure sufficient drainage capacity.
- Associated street lighting, noise abatement structures and landscaping.
- Temporary ancillary construction facilities, creek adjustments and works to facilitate construction of the work.
- Establishment of three temporary construction compound / laydown areas as identified in **Figure 3**.
- Acoustic fencing and landscaping treatment around the Tulkeroo Homestead, as identified in **Appendix N**. Advice provided in **Appendix O** recommends the acoustic fence to be of timber construction (untreated and unpainted) to provide a rustic look that will “settle” into the landscape setting and reduce the visual impact over time. This will be assisted by the addition of proposed plantings. Details of the acoustic screening and landscape treatments will be confirmed following consultation with the landowner.

Erosion and sediment controls will be implemented prior to disturbance in accordance with an Erosion and Sediment Control Plan (ESCP) to prevent uncontrolled sediment laden water leaving the Activity Area and affecting the local environment.

The Activity, from west to east, begins at a connection to the existing roundabout on the Illawarra Highway and Broughton Avenue. The proposed roadway will head northeast over an existing watercourse with levelling of the roadway corridor with engineered batter slopes along its length.

The proposed roadway then runs eastward underneath 133 KV transmission lines before the proposed roadway spans Hazelton Creek with a bridge and further east to a series of stormwater management devices past residential developments to the south until it meets with Moles Street.

Beyond the Moles Street intersection, the proposed roadway crosses Calderwood Road which runs north and south. Similarly, further to the east the corridor crosses Hamilton Road which runs north and south and adjacent to a residential area on the south side of Tripoli Way.

The corridor then meets Terry Street to the east which runs north and south onto the Princes Motorway. A section of this road and the existing intersection at Taylor Road will be subject to minor works to cater for the new traffic arrangement. Once completed the TWE will be approximately 1,975 m in length and likely to have a speed limit of 60 km per hour.

3.2 Design Features

Figure 1 and **Figure 2** show the extents of the Activity Area and project footprint. A description of the concept design is provided in the following sections with the concept design plans included in **Appendix A** and **Appendix N**. The concept designs will be further refined throughout the ongoing detailed design process.

3.2.1 Project Design Criteria

The design criteria is summarised in **Table 7**. Finalisation of the below details is subject to detailed design phase and authority review. Concept Plans are contained in **Appendix A** however will be subject to change throughout the ongoing detailed design process.

Table 7: Project Design Criteria

Design Constraint	Design Criteria
Batter Slope (maximum)	Cut - 1:3 (V:H) (if grassed) Fill - 1:4 (V:H) (unless landscaped)
Cross Fall (typical)	3%
Speed	Design – 70 km/h Posted – 60 km/h
Design Vehicles	Service vehicles (8.8 m) Single unit truck (12.5 m and 19 m)
Longitudinal Grade (maximum)	8%
Longitudinal Grade (minimum)	Desirable – 1% Absolute – 0.5%
Maximum Super Elevation	5%
Pathway Width	Footpath – Variable (1.2 m – 1.5 m) located on southern side of the road between Moles Street and Hamilton Road. 1.5m (Hamilton Road to Terry Street) located on the northern side of the road. Shared path - 2.5 m (Broughton Avenue to Road Hamilton Road) located on northern side of the road.
Road Hierarchy	Local Sub-arterial / Major collector
Road Width	Traffic lane - 3.5 m: Minimum 3.3 m. Turning lane - 3.5 m. Turning lane at intersection - 3.2 m. Shoulder – Variable, 2.4.m shoulder fronting residential zoned properties and 1 m shoulder fronting rural zoned properties.
Verge Width	1.5 m – 3.5 m.
Vertical Curve (minimum)	Desirable – 50 m Absolute (road junctions only) – 20 m

3.2.2 Design Constraints

The engineering constraints to the design and construction of the project include:

- A tightly constrained corridor for construction limiting horizontal alignment and vertical levels.
- Bridge design traversing Hazelton Creek.
- Existing utilities, drainage and associated structures.
- Maintaining access to existing residential and commercial properties.
- Maintaining traffic flow during construction.
- Minimising archaeological impacts.

- Minimising flood impacts.
- Minimising impacts to the built form including heritage items, where applicable.
- Minimising property acquisition.
- Retention of vegetation.

3.2.3 Design Features

TWE Concept Design Features

Concept design drawings for the TWE have been provided in **Appendix A** however it is noted that they will be subject to change throughout the ongoing detailed design process. The drawings outline the following for the project:

- Locality Plan – Drawing C2001.
- General Arrangement Key Plan – Drawing C2004.
- General Arrangement Layout Plan – Drawing C2005 – Drawing C2013.
- Boundary Layout Plan – Drawing C2014 – Drawing C2015.
- Typical Road Cross Sections – Drawing C2030 – Drawing C 2033.
- Typical Civil Details- Drawing 2034.
- Road Long Sections – Drawing 2040 – Drawing 2045.
- Road Cross Sections – Drawing 2050 – Drawing 2070.
- Intersection Layout Plan – Drawing C2090 – Drawing C2094.
- Road Pavement Layout Plan – Drawing C2110 – Drawing 2118.
- Line Marking and Signposting Layout Plan – Drawing C2120 – Drawing C2128.
- Property Acquisition Layout Plan – Drawing C2130 – Drawing C2138.
- Service Layout Plan – Drawing C2140 – Drawing C2148.
- Vehicle Turning Path Layout Plan – Drawing C1250 – Drawing C1261.
- Four lane bridge over Hazelton Creek General Arrangement – Drawing C2200 – Drawing C2201.
- Landscape Plan – Drawing L1000 – Drawing L1030.
- Acoustic fencing and landscaping treatment around the Tulkeroo Homestead – Group GSA for Indesco (1 March 2024) and recommended amendments to the fencing and landscaping treatments as contained in the Heritage Advice by Biosis (14 March 2024) contained in **Appendix O**. Details of the acoustic screening and landscape treatments will be confirmed following consultation with the landowner.

Intersections

Existing and new proposed intersections will be developed or upgraded due to the construction of the new roadway. The following intersections and their design have been proposed with the TWE and are detailed in **Appendix A**.

Illawarra Highway / Tongarra Road / Broughton Avenue / Tripoli Way

- 4-approach roundabout control intersection with single lane arrangement at all approaches in 2026.
  - Additional approach at northern side of Illawarra Highway / Tongarra Road / Broughton Avenue to connect TWE.
- Upgraded to a signalised 4-approach intersection in 2041 by others in the future.
  - Dual traffic lanes at northern and southern approaches.
  - Single traffic lane with additional shared through and left turn short bay at the eastern and western approaches along with a dedicated short right turn bay. Single lane exit lane with additional short 100 m downstream merge lane.

Moles Street / Tripoli Way

- Conversion of Moles Street to a left-in/left-out give-way arrangement (Moles Street giving way to Tripoli Way) with de-acceleration and acceleration lanes.

Calderwood Road / Tripoli Way

- 4-approach traffic signal control intersection.
- Single traffic lane with additional shared through & left turn short bay at western approach along with dedicated short right turn bay. Single lane exit lane with additional short 150 m downstream merge lane.
- Dual traffic lanes with additional short right turn bay at eastern approach. Dual lanes at eastern exit approach.
- Dual traffic lanes at northern and southern approaches.

Hamilton Road / Tripoli Way

- 4-approach traffic signal control intersection
- All movements are permissible. Note that the northern approach of Hamilton Road only serves eight dwellings and as such will have no effect on the intersection's performance.

Illawarra Highway / Terry Street / Tripoli Way

- 3-approach traffic signal control intersection.
- Dual traffic lanes at the northern approach, with an additional short lane dedicated for right turns. The middle lane is a shared through-and-right turn lane, and the outside lane allows for through movements only. Two lanes are provided for exit movements in the southbound direction.
- Dual traffic lane at southern approach. Single lane exit lane with additional short 150m downstream merge lane.
- Dual right turn traffic lanes with two additional short left turn bays at western approach. Dual exit lanes.

This EIS considers the traffic and noise impacts associated with an upgraded Broughton Ave / Illawarra Highway intersection in the year 2041 (i.e., a signalised, intersection rather than a roundabout). However, this EIS does not seek approval to construct the upgraded Broughton Ave intersection, and instead only seeks approval for connection to the existing roundabout formation.

The intent of this approach is to demonstrate the operational performance of what is expected to be the future road network, regardless of the future upgraded intersection being constructed by others.

Pedestrian and Cyclist Facilities

The Activity includes a 2.5 m shared path for active transport on the northern side of the alignment for the length of Tripoli Way between Broughton Avenue / Tongarra Road and Hamilton Road. From Hamilton Road to Terry Street a 1.5 m path will be provided. In addition, a variable width footpath (1.2 – 1.5 m) is proposed on the southern side of the alignment for general foot traffic between Moles Street and Hamilton Road.

Drainage

The design incorporates a system of formalised stormwater pit and pipe network and open swales to achieve a sufficient drainage capacity to cater for a 5% AEP storm event. The use of swales where practicable assists in reducing project cost and allows effective transmission of stormwater in lower sections of available grade.

Council requested that the amount of stormwater draining south along Hamilton Road is to be minimised as much as possible. A design was initially proposed with the section of Hamilton Road south of Tripoli Way draining against the grade to Macquarie Rivulet. However, due to the 5% AEP levels in the rivulet, this was not achievable. As a result, Tripoli Way is draining into the Macquarie Rivulet but the southern portion of Hamilton Road continues draining south.

Bridge Design

A bridge is required for the TWE to cross the existing Hazleton Creek towards the western extent of the works. The new bridge will have an overall span of approximately 52m and will has been documented as a two span bridge in order to span the channel and maintain hydrological constraints. Standard pre-stressed concrete 18 metre beams will be required to achieve this span. However, reducing the overall thickness of the superstructure as much as feasibly possible should be considered in order to maintain vertical clearance required for flooding constraints.

In order to support the 20 m (4 lane) trafficable roadway and 2.5 m shared path, approximately 24 Prestressed Concrete (PSC) girders will be required. A typical reinforced concrete deck of minimum 200 mm thick is recommended, capped with a 75 mm thick layer of asphaltic concrete and sealed with a waterproofing membrane. A 6 m approach slab is recommended to be installed from the back of the bridge abutment, incorporating the same cross section as the bridge deck.

Lighting

An indicative street lighting layout is being developed using design principles from AS 1158.1.1 – Lighting for Roads and Public Spaces, with Tripoli Way classified as having a V5 lighting subcategory under this standard.

Verge allocation assumptions in accordance with Endeavour Energy LDI0001 Section 5.1.4.2 and AS/NZS1158.1.3 Table B1:

- Min 0.7m from a kerbed road and 1m at an intersection (outside of Zone 1)
- Zone 2 and 3 with Zone 2 being Frangible – Impact Absorbing
- Spacing (based on a carriageway width between 12 m and 23 m)

Streetlights have been calculated at a maximum 55 m spacing based on a 23 m carriageway width using a mounting height of 10.5 m with a 4.5 m outreach and an 82 W LED luminaire.

The lighting design is shown on sheets C2140-C2148 of the 100% concept design of the Tripoli Way Extension.

Landscape

Mass planted landscaping in the form of single trunked trees, small shrubs, grasses and groundcovers has been provided along the earthwork batters of the new road alignment. Proposed planting within 5 m of a pedestrian and shared pathway is shrubs, grasses and ground covers lower than 1 m to encourage safety and surveillance. The main objectives of the landscaping design are to provide amenity, soften the appearance of the road and provide stability to the soil covering of the earthwork batters.

Plant species selected will be in accordance with Council's Development Control Plan planting guidelines. A Concept Landscape Plan is contained in the Concept Design Plan package contained in **Appendix A.**

Photomontages (artist impressions) of the Activity at three locations are contained in **Appendix Q**. Extracts from an animated flythrough contained on Council's website, which illustrate key aspects of the Activity when completed, are contained in **Appendix R**.

Tulkeroo Homestead Screening and Landscape Treatment

The Activity also includes a design solution to reduce the permanent and temporary indirect impacts to the heritage item Tulkeroo Homestead. The Activity will include the removal of the Albion Park Butter Factory (former) building. Screening and Landscape Treatment along the edge of the Activity Area adjacent to Tulkeroo Homestead is proposed. The Screening and Landscape Treatment has been prepared by Group GSA and is contained in **Appendix N**. The design solution has been reviewed by Biosis, refer to **Appendix O**, and recommends an acoustic timber fence that is untreated and unpainted that will settle the new fence into the landscape setting and reduce the visual impact over time, assisted by the addition of proposed plantings. The proposed hedge/shrub planting on either side of the boundary fence should be species which will grow to the height of the fence, are dense in their foliage, and are a suitable species for the location, growing to obscure the fence.

3.3 Proposed Construction Activities

Construction of the roadway will include.

- Location of existing utilities.
- Installation and erection of WHS signs and powerline safety measures.
- Installation of erosion and sediment controls prior to disturbance of the area with ongoing maintenance throughout the life of the activity.
- Establishment of temporary ancillary, laydown, stockpiling – both temporary and permanent and site compound facilities (including parking) – refer to **Figure 2** for locations.
- Installation of barricading and fencing where required for public safety and security.
- Tree clearing in the proposed road corridor.
- Earthworks including cutting and filling to achieve desired levelling and connection points for road corridor as per engineering drawings.
- Construction of suitable surface for road construction along the length of the corridor.
- Construction of drainage infrastructure and diversions along the length of the corridor.

- Construction of a vehicular bridge to traverse Hazelton Creek.
- Intersection works where proposed corridor interacts with existing roads (may include curbing, signage, lighting, traffic lights etc.).

3.4 Site Access and Egress

During construction access to the Activity Area will be via existing local roads. Access to the three temporary construction compound / laydown areas will also be via existing roads including the Illawarra Highway, Calderwood Road and Hamilton Road.

A number of properties / part properties will be acquired by Council. Details surrounding land acquisition are provided in **Section 3.8**.

3.5 Ancillary Facilities

Three temporary compound / laydown areas are proposed and identified in **Figure 2**. These areas will contain portable buildings with amenities (such as lunch facilities and toilets), secure and bunded storage areas for site materials, including fuel and chemicals, office space for on-site personnel, and associated parking.

Temporary Compound / Laydown Area No. 1 is located on part of Lot 2 DP 1250747 and is approximately 1.2 ha in area. The site is devoid of tree vegetation and is used for grazing. Temporary Compound / Laydown Area No. 1 includes the provision for a temporary crossing across Hazelton Creek. This crossing will be designed and constructed in accordance with the *Controlled Activities - Guidelines for instream works on waterfront land* (DPE, 2022), *Controlled Activities - Guidelines for watercourse crossings on waterfront land* (DPE, 2022), *Fish Passage Requirements for Waterway Crossings* (DPI Fisheries, 2003) and Policy and Guidelines for fish habitat conservation and management, (DPI Fisheries, 2013). Once construction works are completed the area will be rehabilitated back to its original condition.

Temporary Compound / Laydown Area No. 2 is located on part of Lot 11 DP 1205733, which is private land, and is approximately 0.9 ha in area. This site is devoid of tree vegetation and is used for grazing. Details of the proposed Temporary Compound / Laydown Area will be confirmed following discussions with the landowner.

Temporary Compound / Laydown area No. 3 is located on part of Lot 1 DP 1119325 and part of Lot 1 DP 1069961 (both of which are private land) and is approximately 0.8 ha in area. This site is devoid of tree vegetation and is used for grazing. Details of the proposed Temporary Compound / Laydown Area will be confirmed following discussions with the landowner.

Specific stockpile locations within each temporary compound / laydown area would be refined during the detailed design phase using the criteria set out in the Stockpile Management Guideline (EPA, 2017).

All three temporary compound / laydown areas will be securely fenced with temporary fencing. Signage will be erected advising the general public of access restrictions. Upon completion of construction, the temporary site compound, work areas and stockpiles will be removed, the site cleared of all rubbish and materials and rehabilitated.

3.6 Material Import / Export

The following materials would be required for construction:

- Erosion and sediment controls (e.g., coir logs, silt fencing, geofabric, sandbags).
- Earthwork materials (e.g., topsoil, gravel, sand, clean fill and drainage material) and other various materials for road formation.

- Bitumen and aggregates for pavement production.
- Stabilising binders to treat the road formation and culvert bases.
- Cement and aggregates for concrete (drainage construction, pavement construction, and kerbs and guttering).
- Precast concrete elements for drainage construction and miscellaneous work.

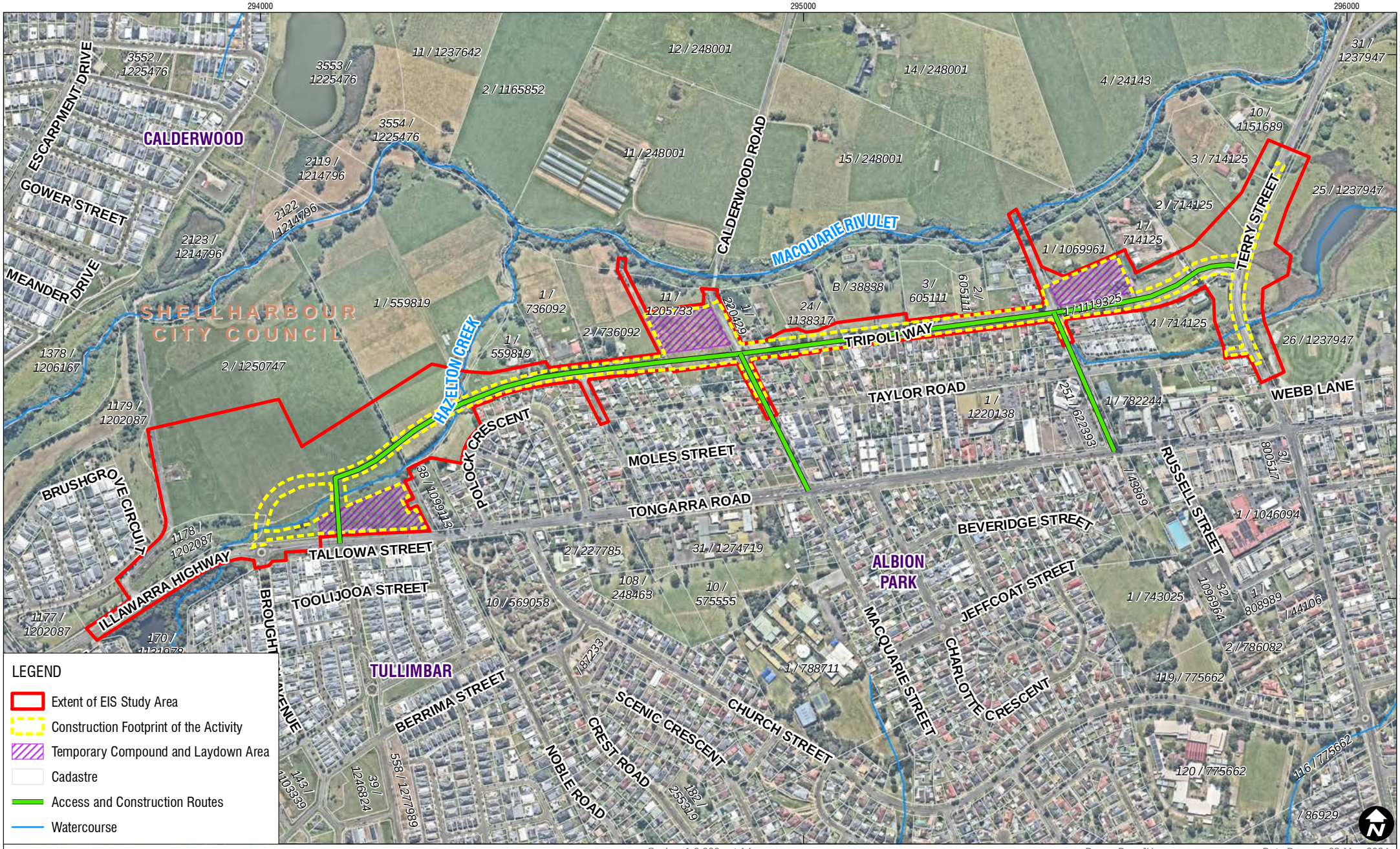
Materials requiring import to site during construction will be geotechnically suitable and classified in accordance with and to the satisfaction of an NSW EPA Resource Recovery Exemption / Order. The materials that are considered suitable for importation as fill will be specified in the CEMP. Materials being imported to site as fill during construction will require appropriate supporting documentation (i.e., evidence of classification), appropriate tracking and material validation at receipt of the site to satisfy quality control.

3.7 Construction Vehicles, Plant and Equipment

The Activity is likely to require the use of a range of plant and equipment including:

- Road sweepers.
- Asphalt pavers.
- Roller/compacters/compressors.
- Line marking vehicles.
- Graders.
- Scrapers.
- Concrete trucks and pumps.
- Generators.
- Chainsaws.
- Jackhammers.
- Mulchers.
- Cranes.
- Bulldozers.
- Backhoes.
- Dump trucks.
- Road trucks.
- Excavators.
- Piling rigs.
- Semi-trailers.
- Water trucks.
- Water pumps.

It is likely that Terry Street, Tongarra Road / Illawarra Highway and Calderwood Road will act as the main collector roads for construction vehicles and most heavy vehicles having direct access onto the road network. Construction traffic impact is unlikely to impact current operation. Vehicles will reach the area via the M1 bypass and then access the Activity area via the arterial and local road network as shown in **Figure 8.**



Scale: 1:9,000 at A4
Coordinate System: GDA 1994 MGA Zone 56

Drawn By: JH
Approved By: RD

Date Drawn: 08-May-2024
Project Number: 660.v30219.00000.0270

Data Source: NearMap March 30, 2024

SLR

Shellharbour CITY COUNCIL

EIS FOR TRIPOLI WAY EXTENSION

Indicative Access Construction Routes

FIGURE 8

H:\Projects-SLR\660-SrvWOL\660-WOL\660.30219.00000 Tripoli Way Approvals\06 SLR Data\01 CADGIS\GIS\RD FIGURES\SLR66030219_F6_ConstructionAccess_02.mxd

A traffic management plan will be prepared as part of the CEMP and will further refine / define the routes selected for construction traffic. The Works Authorisation Deeds from TfNSW are required for the four intersections.

3.8 Land Acquisition

An objective of the project is to minimise private property land acquisition where possible. Some sections of the corridor are not within Council ownership and will be acquired under the authority of the Council in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*.

3.9 Utility Adjustments

Consultation with public utility authorities has been carried out as part of the development of the concept design. The intent of consultation was to locate existing utilities and incorporate utility authority requirements for relocations and/or adjustments. Utility adjustments required as part of the works may include:

- Relocation and protection of existing Sydney Water sewer and water mains adjacent to Tripoli Way and The Expressway.
- Treatments for all road crossing assets including concrete encasement, relocation and no treatment required.
- Proposed underground relocation of Chainage (CH) 430 33kV overhead electrical line.
- Relocation of low voltage overhead power lines to the proposed verge.
- Concrete encasement of optic fibre.
- Isolation and protection of existing communication assets.
- Adjustments to the new surface level in the existing location.
- Relocation of communications to the proposed road verge.
- Localised protection or relocation of gas mains as required.

Liaison with the relevant service providers during the detailed design stage will be required to confirm the public utilities that may be adjusted and/or interfered with during the project.

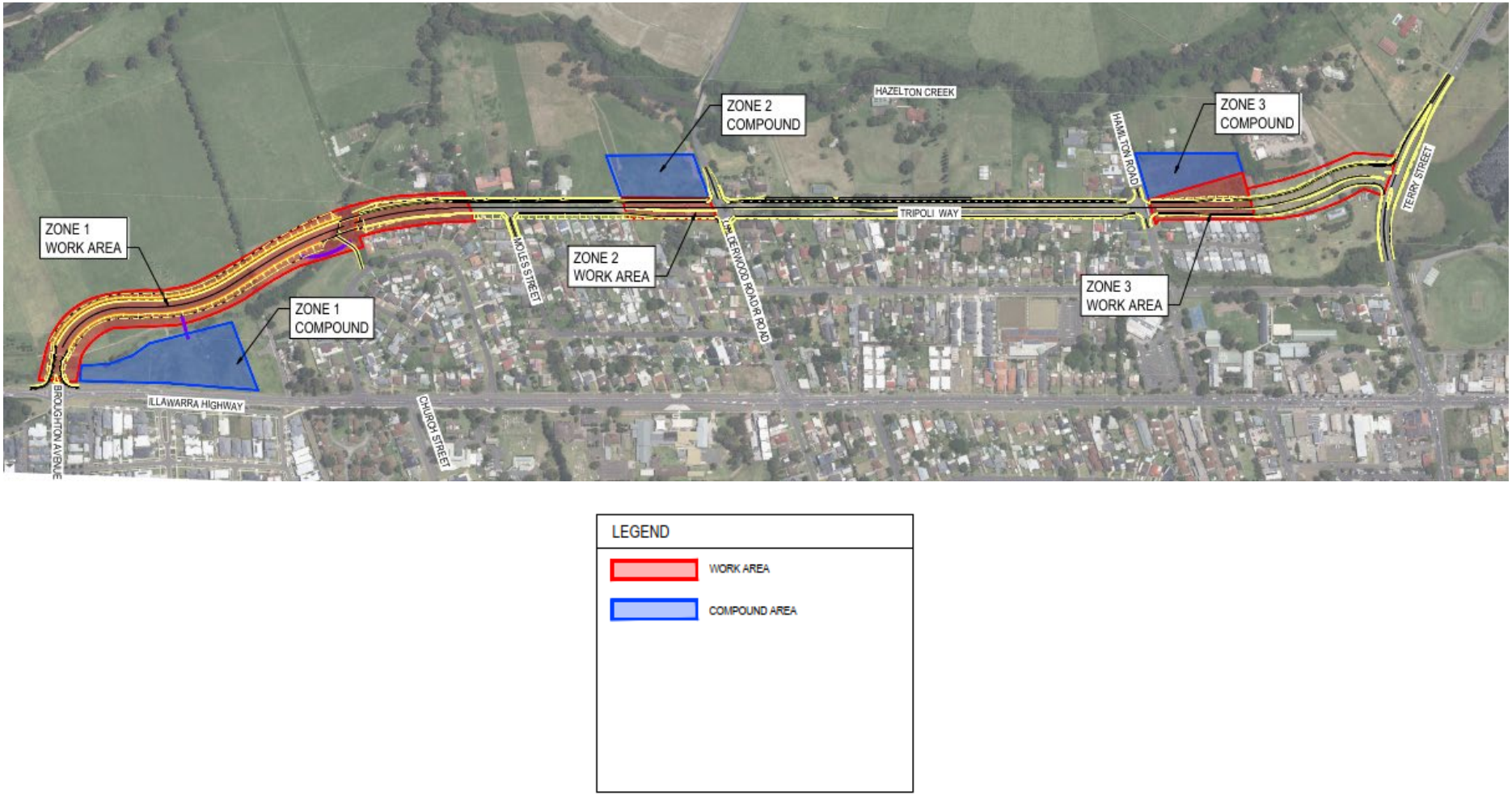
3.10 Construction Staging

A staged approach is to be to utilised for the construction phase of TWE. The construction will be broken into two distinct packages of works, being Early Works and Main Works. Description of early works is provided below.

3.10.1 Early Works Phase

The Early Works package is designed to take pressure away from the Main Works, allowing construction to commence whilst detailed design is ongoing. This will ultimately allow TWE to be made open to traffic at the earliest possible date. The Early Works will be split between 3 separate zones across the road's alignment. Zone 1 consists of most of the road alignment through the floodplain on the western extent of the subject site, Zone 2 directly west of the Calderwood Road intersection, and Zone 3 directly east of the Hamilton Road intersection. Early Works scope will generally include all works up to subgrade level within these 3 zones where practical to do so. A compound is to be provided to service each Zone, subject to consultation with the landowners. **Figure 9** illustrates the zones and compounds associated with the early works phase.

Figure 9: Early Works Zones and Compound Areas



The below is an anticipated scope of the works throughout each Zone during the Early Works phase but is not an exhaustive list of all works that may or may not be undertaken.

Zone 1

- Establishment of temporary ancillary, laydown, stockpiling and site compound facilities incl. parking.
- Install WHS signage and powerline safety measures.
- Install erosion and sediment controls.
- Install temporary fencing.
- Site preparation and clearing of trees and vegetation.
- Bulk earthworks including stripping of topsoil, import and placement of fill to achieve design levels through road alignment.
- Construct abutments for bridge over Hazelton Creek.
- Construct culverts at tie-in to Broughton to Avenue.
- Install stormwater infrastructure as per engineering drawings.
- Construct service road throughout zone to facilitate construction movements for plant and vehicles during both Early Works and Main Works.
- Upgrade existing creek crossing for use throughout construction phase for plant.
- Construct new creek crossing adjacent to bridge, facilitating construction movements over the creek prior to construction of the bridge itself.
- Construct access track to allow future maintenance of bridge abutments.
- Provide temporary driveway to existing rural property.
- Protection of existing vitrified clay sewer main.
- Protection of existing optic fibre cable.
- Works-as-executed survey.
- Provide temporary soil and water management measures to remain between Early Works and Main Works packages.

Zone 2.

- Establishment of temporary ancillary, laydown, stockpiling and site compound facilities incl. parking.
- Install WHS signage and powerline safety measures.
- Install erosion and sediment controls.
- Install temporary fencing.
- Site preparation and clearing of trees and vegetation.
- Demolition of former Albion Park Butter Factory.
- Remediation works as per Remediation Action Plan (**Appendix K**) in coordination with environmental scientist.
- Demolish existing kerb and gutter.
- Construct new permanent driveway to existing property.

- Provide landscape screening and acoustic measures for Tulkeroo Homestead in accordance with the recommendations of Biosis's letter.
- Undergrounding of existing transmission line.
- Existing utility relocation and protection.
- Install stormwater infrastructure including RCP pits and pipes.
- Bulk formation to subgrade level.
- Works-as-executed survey.
- Provide temporary soil and water management measures to remain between Early Works and Main Works packages.

Zone 3.

- Establishment of temporary ancillary, laydown, stockpiling and site compound facilities incl. parking.
- Install WHS signage and powerline safety measures.
- Install erosion and sediment controls.
- Install temporary fencing.
- Site preparation and clearing of trees and vegetation.
- Construct new permanent driveway to existing properties.
- Existing utility relocation and protection.
- Install stormwater infrastructure including RCP pits and pipes.
- Bulk formation to subgrade level.
- Works-as-executed survey.
- Provide temporary soil and water management measures to remain between Early Works and Main Works packages.

3.10.2 Main Works Phase

The Main Works package will follow soon after the Early Works reaches practical completion. The Main Works will consist of all works remaining across the site to make the TWE operational. Staging may be considered during the Main Works itself due to factors such as maintaining property access for residents, however, this is to be further developed through the detailed design phase.

Expected activities for the Main Works includes the following.

- Site preparation and establishment.
- Establishment of temporary ancillary, laydown, stockpiling and site compound facilities incl. parking.
- Install WHS signage and powerline safety measures.
- Install erosion and sediment controls.
- Install temporary fencing.
- Site preparation and clearing of trees and vegetation.
- Construct new permanent driveway to existing properties.

- Construction / installation of noise attenuation measures as required.
- Utility relocation and protection for sewer, potable water, gas, electrical and telecommunications.
- Construction of various drainage infrastructure.
- Earthworks.
- Construction of retaining walls.
- Construction of bridge deck over Hazelton Creek.
- Construction of pavement across entire road alignment including sub-base, base and wearing courses as per the pavement designs on the engineering drawings.
- Various civil works including construction of kerb and gutter.
- Intersection works under WAD agreement with TfNSW including pavement, kerb, lighting, services and traffic control signals.
- Tie-ins to existing cross-streets and state roads.
- Construction of footpaths and shared paths.
- Install street furniture.
- Landscape works including street tree planting and road batter landscaping.
- Install guardrails through clear zones and as identified on the engineering drawings.
- Construction of street lighting.
- Install road signage.
- Line marking and road delineation.
- Works-as-executed survey.
- Site de-establishment and clean-up.

3.11 Construction Hours and Schedule

Construction working hours onsite would generally be between:

- 7am and 6pm Monday to Friday.
- 8am and 1pm Saturdays.

Arrival and departure from compounds by work vehicles and security may occur either side of these times.

Nighttime works and works outside the above hours may occur to prevent significant disruptions during daytime hours.

3.12 Operation

The roadway will become a Council Asset and be maintained in accordance with the Council's standards and scheduling. As a public asset, the roadway will be available for use by users on 24 hours, 7 days a week basis. Reactive repairs may need to be carried out by Council from time to time.

3.13 Construction Environmental Management Plan (CEMP)

During construction, environmental controls and safeguards outlined in this EIS shall be implemented. It is recommended that a construction environmental management plan (CEMP) be prepared by Council (or delegate of) prior to commencement of construction to ensure that environmental controls and safeguards identified within the EIS are implemented and maintained effectively, and that any construction impacts are managed appropriately. The CEMP will be prepared in accordance with Section 4 of the NSW Environmental Management System Guidelines (1998).

At a minimum the CEMP will contain the following.

- Air Quality Management Plan.
- Pre-clearance protocols for fauna.
- Detailed erosion control and sediment control measures.
- Unexpected Finds Protocol (Contamination) provisions as contained within Appendix J of the EIS.
- An Updated Vegetation Management Plan.
- A Detailed Landscape Plan.
- Detailed Construction Noise and Vibration Management Plan.
- Soil and Water Management Plan.
- Traffic Management Plan.
- A Detailed Waste Management Plan.

4.0 Statutory Context

This Section describes the statutory context and the planning approval process for the Activity as well as other relevant environmental and statutory planning requirements.

The relevant SEARs are listed in **Table 8**.

The statutory provisions of the following NSW and Commonwealth legislation, regulations and Environmental Planning Instruments (EPIs) are relevant to the Activity and include:

- *Environment Protection and Biodiversity Conservation Act 1999*.
- *Environmental Planning and Assessment Act 1979* (EP&A Act) and Environmental *Planning and Assessment Regulation 2021* (EP&A Regulation).
- *Biodiversity Conservation Act 2016*.
- *Heritage Act 1977*.
- *National Parks and Wildlife Act 1974*.
- *Roads Act 1993*.
- *Protection of the Environment Operations Act 1997.*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021.*
- *State Environmental Planning Policy (Planning Systems) 2021.*
- *State Environmental Planning Policy (Resilience and Hazards) 2021.*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021.*
- *Shellharbour Local Environmental Plan 2013*.

Table 8: SEARs – Statutory Context

Requirement	Requirement Details	Relevant Section of Report
The EIS must address the following specific matters: Statutory and Strategic Context- including	As part of the EIS assessment, the following matters must also be addressed:	
	• a justification for the proposal and suitability of the proposed road corridor.	Section 2
	• a demonstration that the proposal is consistent with relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies.	Section 2 & 4.
	• consideration of impacts of 'no action' and consideration of alternative options as well as construction technologies and why these options have been discounted; and	Section 2.4
	• a list of any approvals that must be obtained under any other Act or law before (and during) the proposal may be lawfully carried out.	Section 4

4.1 Legislation

4.1.1 Environmental Planning and Assessment Act 1979 and Regulation 2021

The EP&A Act and the EP&A Regulation form the statutory framework for planning approvals and environmental assessment in NSW. Implementation of the EP&A Act is the responsibility of the Minister for Planning and Public Spaces, State government agencies, and local government authorities. The requirement for development consent and various development controls are set out in environmental planning instruments (EPIs), including State Environmental Planning Policies (SEPPs) and local environmental plans (LEPs).

The proposed development is consistent with the objects of the EP&A Act, in particular:

- Promotes social welfare of the community – improved traffic congestion.
- Promotes ecologically sustainable development by integrating relevant economic, environmental, and social considerations.
- Promotes the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).
- Promotes good design and amenity of the built environment.

The EP&A Act and the EP&A Regulation form the statutory framework for planning approval and environmental assessment in NSW. The works will be carried out by Shellharbour City Council. Accordingly, the works can be carried out without consent with assessment of the works under Part 5 of the EP&A Act.

The EIS has been prepared in accordance with the EP&A Regulations and under the guidance of the State Significant Development Guidelines - Preparing an Environmental Impact Statement (DPIE, 2021).

4.1.2 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters deemed to be of national environmental significance (MNES). A search of the Protected Matters Search Tool was undertaken on 24 June 2022 within a 10 km buffer of the Project area. The results of the search are provided in **Table 9**.

Table 9: Results of MNES Search

Matter of National Environmental Significance	Comment
World Heritage properties	There are no World Heritage properties listed within 10km of the Project area.
National Heritage Places	There are no National heritage places listed within 10 km of the Project area.
Wetlands of National Importance	There is no Wetlands of national importance within 10 km of the Project area.
Great Barrier Reef Marine Park	The Project is not located either within or adjacent to the Great Barrier Reef marine park.
Commonwealth Marine Park	The Project is not located either within or adjacent to the Commonwealth marine area.
Listed threatened ecological communities	There are 11 listed threatened ecological communities (TECs) located within 10 km of the proposal.
Listed threatened species	There are 109 listed threatened species located within 10 km of the proposal (listed in Section 6.5 and Appendix C of the Flora and Fauna Assessment contained in **Appendix G**).

Matter of National Environmental Significance	Comment
Listed migratory species	There are 73 listed migratory species located within 10 km of the proposal (listed in Section 6.5 and Appendix C of the Flora and Fauna Assessment contained in **Appendix G**).

There are unlikely to be significant impacts to MNES or Commonwealth land as a result of the Project.

4.1.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) protects threatened species, populations and ecological communities and their habitat in NSW. If threatened species, populations, ecological communities or their habitat could be impacted by an activity, an assessment of significance must be completed to determine the significance of the impact, in accordance with Section 5A of the EP&A Act.

A Flora and Fauna Assessment prepared in accordance with Part 7.3 of the BC Act was undertaken by Ecoplanning and is contained in **Appendix G**. The report assesses the potential impacts to threatened species and ecological communities that have the potential to occur in the area. Nine threatened fauna species were identified as having a moderate likelihood of occurrence within the Study Area as well as two endangered ecological communities which include:

- Swamp Oak Floodplain Forest – listed as endangered under the BC Act.
- Freshwater Wetlands on Coastal Floodplains – listed as endangered under the BC Act.

The Flora and Fauna Assessment found that it was unlikely that the Activity would cause significant impacts to the identified threatened species and communities.

The Flora and Fauna Assessment has determined that impacts would be minimal and therefore a Biodiversity Development Assessment Report (BDAR) would not be necessary. Impacts to vegetation are anticipated through the direct clearing of up to a total of 0.72 ha of native vegetation, which includes 0.10 ha of Riparian River Oak Forest, 0.28 ha of Floodplain Wetland and 0.34 ha of Acacia Scrub.

A subsequent ‘Test of Significance' under the BC Act has also determined that a Species Impact Statement (SIS) would not be required for the Activity. Investigations have considered the requirements of Section 5A of the EP&A Act and concluded that the project would be unlikely to result in a significant impact on threatened species, populations, ecological communities or their habitat.

Further details of the findings of the Flora and Fauna Assessment are contained in **Section 6.2.**

4.1.4 National Parks and Wildlife Act 1974

The objects of the NP&W Act are the conservation of nature and the conservation of objects, places, or features (including biological diversity) of cultural value within the landscape, fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, and providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation.

There are no National Parks located on or near the Activity Area.

An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared and is contained in **Appendix L**. The findings of the ACHAR are discussed in detail in **Section 6.5**

of this EIS. Once the Activity has been approved an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the NP&W Act will be required.

4.1.5 Heritage Act 1977

The *Heritage Act 1997,* administered by The Heritage Council under delegation by the Heritage, Department of Premier and Cabinet (DPC) is concerned conservation of heritage places and items. The statutory requirements within the Heritage Act protect historic buildings and places and include 'any place, building, work, relic, moveable object, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value.'

The Activity will have an impact on local heritage item I001 – Tulkeroo Homestead and the Albion Park Butter Factory (Former).

A Statement of Heritage Impact (SOHI) has been prepared and is contained in **Appendix M.** The findings of the SOHI and consideration of the controls within the *Heritage Act 1977* as relevant to the Activity are detailed in **Section 6.6**.

4.1.6 The Roads Act 1993

The *Roads Act 1993* (Roads Act) regulates the carrying out of various activities on public roads. Section 138 of the Roads Act requires consent from the relevant road authority (Transport for NSW (TfNSW)), previously the Roads and Maritime Services (RMS), for the carrying out of work in, on or over a public road. However, subject to Section 138(3):

> *"If the applicant is a public authority, the roads authority and, in the case of a classified road, RMS must consult with the applicant before deciding whether or not to grant consent or concurrence."*

Council as a public authority must consult with TfNSW, prior to determining the Section 138 application. However, subject to Schedule 2, Clause 5(1) of the Roads Act, public authorities do not require consent for work on unclassified roads, which is the case for any works that will be required by the Activity within the road reserves. Nevertheless, Council has been in regular communication with TfNSW regarding the Activity.

4.1.7 Water Management Act 2000

The *Water Management Act 2000* (WM Act) aims to provide for the sustainable management and use of State water sources. The WM Act regulates controlled activities that occur within 40 m of 'waterfront land', where 'waterfront land' means the bed of any river, lake or estuary, and the land within 40 m of the riverbanks, lake shore or estuary mean high water mark.

An approval is required to undertake controlled activities on waterfront land unless that activity is otherwise exempt. Under Schedule 4 of the *Water Management (General) Regulation 2018*, public authorities do not need to obtain a controlled activity approval under the WM Act as long as the activity does not cause any change in the course of a river, and the activity has been assessed under the EP&A Act and found to not be likely to significantly affect the environment.

The Activity will not cause any change in the course of Hazelton Creek. Interference with the groundwater aquifer is unlikely to require an aquifer interference licence. It is concluded that a controlled activity approval is not required. As far as possible the works in the vicinity of the creek will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions.

A box culvert is proposed near the intersection of the Activity with the Broughton Avenue / Illawarra Highway intersection. These works (along with any temporary crossing across Hazelton Creek), shall be designed and constructed in accordance with the *Controlled Activities - Guidelines for instream works on waterfront land* (DPE, 2022), *Controlled*

Activities - Guidelines for watercourse crossings on waterfront land (DPE, 2022)*, Fish Passage Requirements for Waterway Crossings* (DPI Fisheries, 2003) and *Policy and Guidelines for fish habitat conservation and management*, (DPI Fisheries, 2013).

4.1.8 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) aims to protect key fish habitats by regulation of the activities that can occur within these key habitat areas. Activities that involve dredging and reclamation work, temporarily or permanently obstruct fish passage, and/or harm marine vegetation are subject to a Fisheries Permit under Part 7 of the FM Act. The works required in the vicinity of Hazelton Creek are defined as reclamation works.

The TWE corridor and sections of the construction footprint will require the crossing of Hazelton Creek with a permanent bridge. In addition, a box culvert is proposed near the intersection of the Activity with the Broughton Avenue / Illawarra Highway intersection. Parts of Hazelton Creek are listed as Key Fish Habitat under the FM Act.

Detailed designs for works within the vicinity of Hazelton Creek will be prepared once the Activity has been approved and will have due regard to the following.

- *Controlled Activities - Guidelines for instream works on waterfront land* (DPE, 2022).
- *Controlled Activities - Guidelines for watercourse crossings on waterfront land* (DPE, 2022)*. Fish Passage Requirements for Waterway Crossings* (DPI Fisheries, 2003).
- *Policy and Guidelines for fish habitat conservation and management*, (DPI Fisheries, 2013).

During the construction phase, access means across the two waterways will be outlined in the CEMP. Stormwater discharge points and erosion sediment controls will be developed as part of pre-construction project stages.

A Part 7 FM Act permit will be obtained by Council prior to any reclamation work within the Activity Area.

4.1.9 Protection of the Environment Operations Act 1997

One of the aims of the *Protection of Environment Operations Act 1997* (PoEO Act) is to reduce risks to human health and prevent the degradation of the environment.

The proposed activities are not a scheduled activity pursuant to Schedule 1 of PoEO Act.

4.1.10 Crown Lands Management Act 2016

The *Crown Lands Management Act 2016* (CLM Act) provides the legislative framework for the administration of land that is vested in the Crown in NSW. Ministerial approval is required to grant a 'lease, licence, permit, easement or right of way over a Crown Reserve'.

The intersection at Broughton Avenue and the Illawarra Highway needs to be transferred as part of Council's Road infrastructure authority. The land that will be occupied by the Bridge over Hazelton Creek will also need to be acquired by Council prior to works commencing. If Council requires construction to commence without formally acquiring the land, a Licence Application for Crown Land Use and occupation must be attained under the CLM Act.

Consultation with the NSW Department of Planning, Industry and Environment – Crown Lands is discussed further in **Section 5.3**.

4.1.11 Protection of the Operations (Waste) Regulation 2014

The *Protection of the Environment Operations (Waste) Regulation 2014* provides for resource recovery exemptions that may be used without seeking approval from the EPA provided the waste generators, processors and consumer fully comply with the conditions.

The Resource Recovery Exemption: "excavated public road material exemption 2014" under Part 9, Clauses 91 and 92 of the *Protection of the Environment Operations (Waste) Regulation 2014*, is relevant to the Activity.

The exemption applies to excavated public road material that is, or is intended to be, applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities.

The following conditions apply:

- The excavated public road material can only be applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities.
- The excavated public road material can only be stored within the road corridor at the site where it is to be applied to land.
- The excavated public road material cannot be applied to private land.
- The consumer must ensure that any application of excavated public road material to land must occur within a reasonable period of time after its receipt.

This exemption allows for the reuse of excavated public road material to be used as fill within the Activity Area.

4.2 NSW Planning Framework

In accordance with SEARs, the relevant environmental planning instruments, including but not limited to:

- *State Environmental Planning Policy (Resilience and Hazards) 2021.*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021.*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021.*
- *Illawarra Shoalhaven Regional Plan 2041.*
- Shellharbour City Local Strategic Planning Statement.
- Albion Park Town Centre Plan.
- *Shellharbour Local Environmental Plan 2013.*
- Relevant development control plans.

During the preparation of the EIS consultation with the Department's Register of Development Assessment Guidelines has been sought.

4.2.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty and improved efficiency and flexibility in the location of infrastructure and service facilities, whilst also providing for adequate stakeholder consultation.

Clause 2.109(1) of the Transport and Infrastructure SEPP provides that development consent is not required for the purposes of a road or road infrastructure facilities if carried out by or on behalf of a public authority on any land.

An assessment of the Activity regarding the objects of Section 1.3 of the EP&A Act was completed within the original REF (refer to Section 1.3.3 of this EIS), and determined that as the SoHI, as contained in **Appendix M**, found the impact on the locally heritage listed Tulkeroo Homestead and Albion Park Butter Factory (Former) (Item no. I001) as significant, an EIS was necessary in accordance with Division 5.1, of the EP&A Act.

Accordingly, the Activity can be approved by Council, as the determining authority, under Part 5 of the EP&A Act, once due consideration of all matters within the EIS has occurred.

Consultation requirements within the Transport and Infrastructure SEPP have been met through the EIS preparation process with the SEARs identifying a range of agencies to be consulted. Further information on agency consultation is provided in **Section 5** of this EIS.

4.2.2 State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 3 of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP 2021) stipulates that no development can be undertaken without proper investigation and appropriate action into the remediation of land, in order to improve the health of the natural and human environment. This means, consent authorities should not grant approval unless the land has been assessed for contamination, and, if it is contaminated, that the land is suitable for its proposed use (or will be suitable after remediation).

Contamination

Chapter 4 of the Resilience and Hazards SEPP aims to provide a state-wide planning approach to contaminated land remediation and to promote the remediation of contaminated land to reduce the risk of harm.

A Detailed Site Investigation (DSI) for contamination has been prepared and is contained in **Appendix I.** The DSI concludes that subject to a number of conditions, including the preparation of a Remediation Action Plan and validation assessment, the site is suitable for the Activity. Further details on contamination are discussed in **Section 6.3**.

4.2.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 1 of *State Environmental Planning Policy (Biodiversity and Conservation) 2021* applies to the subject land. Part 2.2 sets out requirements in relation to clearing vegetation in non-rural areas.

Impacts to vegetation are anticipated through the direct clearing of up to a total of 0.72 ha of native vegetation, which includes 0.10 ha of Riparian River Oak Forest, 0.28 ha of Floodplain Wetland and 0.34 ha of Acacia Scrub. Vegetation clearing and its impacts are discussed in **Section 6.2** and **Appendix G** and **Appendix H**.

4.3 Shellharbour Local Environmental Plan 2013

LEPs provide a framework to guide planning decisions within a specific LGA. Through prescribing land zoning and development controls LEPs allow Councils to guide land use. Council LEPs may list heritage items that are of local heritage significance.

The application of the Transport and Infrastructure SEPP overrides the need to consider zoning controls as prescribed under the SLEP 2013, with the development identified by the Transport and Infrastructure SEPP as permissible on any land without consent.

Nevertheless, a review of the land use zones and the objectives of the zones from SLEP 2013 that are within the Activity Area is provided below.

The Activity Area is within Zones RU2, R2, SP2, RE1 and RU6 under SLEP 2013 as illustrated in **Figure 10.** The objectives of these zones are as follows:

RU2 – Rural Landscape:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*

R2 – Low Density Residential:

- *To provide for the housing needs of the community within low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residen*ts.

SP2 – Infrastructure:

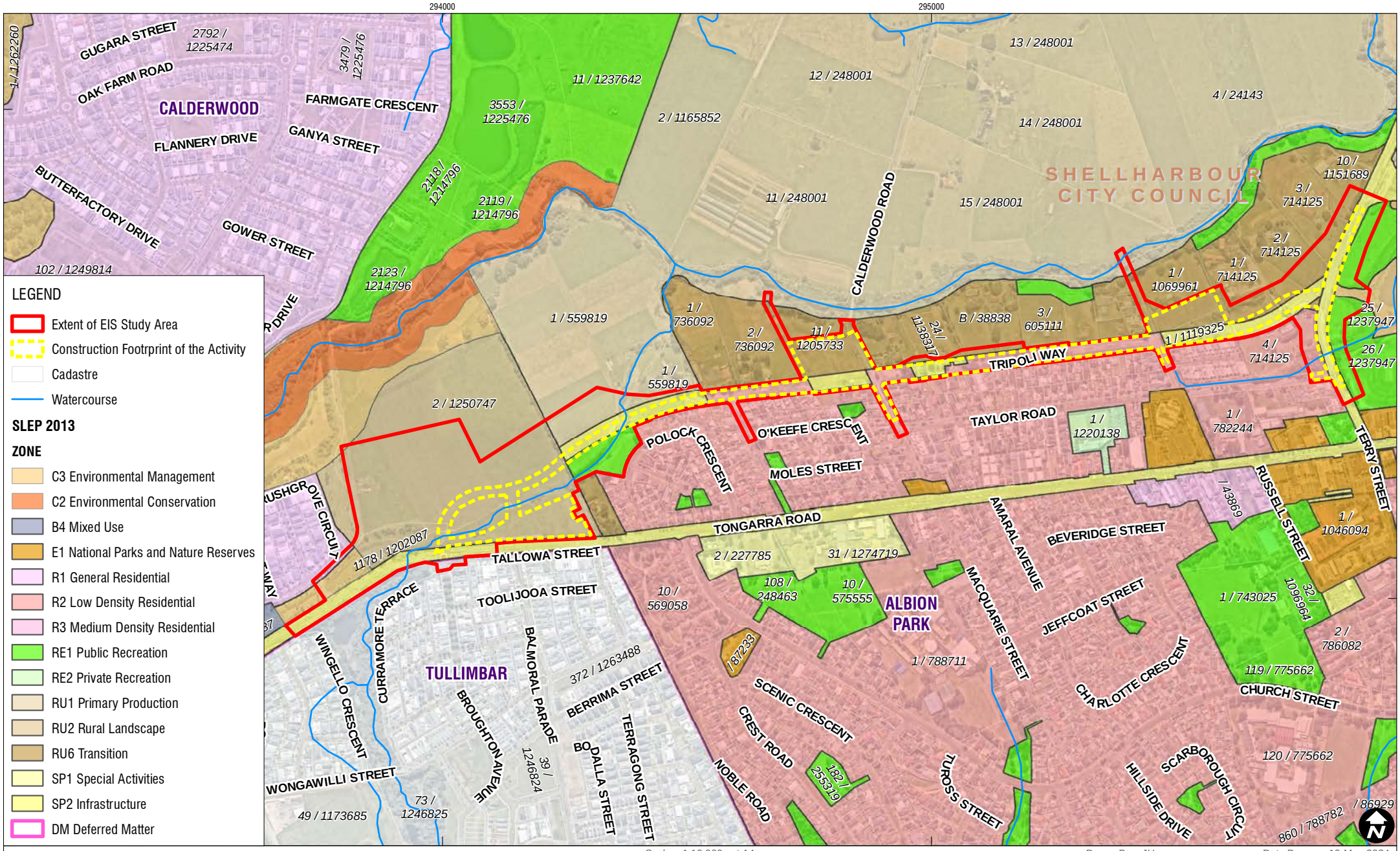
- *To provide for infrastructure and related uses.*
- *To prevent development that is not compatible with or that may detract from the provision of infrastructure.*
- *To provide for key transport corridors.*

RE1 – Public Recreation:

- *To enable land to be used for public open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*

RU6 – Transition zone:

- *To protect and maintain land that provides a transition between rural and other land uses of varying intensities or environmental sensitivities.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*



Scale: 1:10,000 at A4
Coordinate System: GDA 1994 MGA Zone 56

Drawn By: JH
Approved By: RD

Date Drawn: 10-May-2024
Project Number: 660.v30219.00000.0270

Data Source: NearMap March 30, 2024

SLR

Shellharbour CITY COUNCIL

EIS FOR TRIPOLI WAY EXTENSION

Land Zoning as per SLEP 2013

FIGURE 10

H:\Projects-SLR\660-SrvWOL\660-WOL\660.30219.00000 Tripoli Way Approvals\06 SLR Data\01 CADGIS\GIS\RD FIGURES\SLR66030219_F8_LandZoning_06.mxd

The Activity is consistent with objectives within each of the zones as it will:

- Provide a compatible land use, being road infrastructure.
- Enable other surrounding land uses that provide facilities or services to meet the day to day needs of residents.
- Provide a key transport corridor.
- By the nature of its design minimise conflict between land uses within the Activity and land uses within adjoining zones.

4.4 Shellharbour Development Control Plan 2013

The Shellharbour Development Control Plan 2013 (DCP) is divided into 6 parts consisting of 38 chapters plus appendices.

'Part 3: Provisions applying to various types of uses' applies various types of current use and development within the LGA. Part 3 refers to traffic and transport aspects including access and design, traffic movement and pedestrian amenity.

Objective 4 of chapter 14.4 Traffic Movement is to 'improve connectivity between existing and proposed traffic generating development. The TWE is consistent with this aspect in improving traffic flow and connecting rural areas and developments.

4.5 Native Title Act 1993

The *Native Title Act 1993* (NT Act) provides a framework for the determination of native title claims within Australia, and for negotiations and decision making regarding the use and management of native title lands and waters. Exclusive rights to land are only available on certain unallocated or vacant Crown lands.

A Native Title Registrar is responsible for maintaining three Registers under the Act: the National Native Title Register, the Register of Native Title Claims and the Register of Indigenous Land Use Agreements (ILUAs).

A review of the National Native Title Register revealed there are currently no active native titles within the Shellharbour LGA. A search of the Register of Native Title Claims identified one claim within the Shellharbour LGA, being South Coast People (NSD1331/2017), which includes the Project area. As the Project is not being undertaken on unallocated or vacant Crown land, Native Title considerations do not apply.

5.0 Community and Stakeholder Engagement

This Section provides a description of the consultation undertaken with the local community and key stakeholders.

5.1 Overview

The extension of Tripoli Way has been part of the Council's long-term strategic plan since 1961, designed to efficiently manage the growing local community. The following is a summary of the communication and consultation tools established for use across the life of the Tripoli Way Extension project. Shellharbour City Council has used these consultation tools from 2019. They include the following.

- Lets Chat web page (https://letschatshellharbour.com/tripoli-way-extension-project) (including: online survey, Information Sheet, Map, FAQ page, chronology, Review of Environmental Factors and Concept Plan documents, and animated "fly over"). Lets Chat web page and Information Sheet become key community consultation tools.
- Road corridor "door knock".
- Community information sessions.
- Tripoli Way Extension project brochure.
- Face-to-face meetings with individual owners/residents of properties that may be directly affected by the project.
- Advertisements in the local press.
- Local radio announcements.
- Mail-outs (addressed and un-addressed).
- Updates to Councillors.
- Letter box drops.
- Variable message signs.

5.2 Consultation Process and Activities to date

Table 10 provides an overview of the consultation processes and activities undertaken by Council to date.

Table 10: Council Consultation Process and Activities to date

Phase	Activity Undertaken by Council	Outcomes
Project Phase		
April 2005 – Draft Section 94 Contributions Plan	Council resolved the draft Section 94 Contributions Plan 2005 be placed on exhibition for 28 days and that a further report is presented to Council after this exhibition is complete. That in the review of traffic management options for Albion Park, Council reaffirm its commitment to only consider the Tripoli Way By-pass Road on the basis that Stages 1 and 2 are constructed together. Draft Plan placed on exhibition for 28 days.	**20 September 2005** – Section 94 Contributions Plan 2005 adopted on 20 September 2005 Council. The Plan includes the TWE project.

Phase	Activity Undertaken by Council	Outcomes
Define Phase		
October 2015 – Council resolution. The define phase work includes a revised project estimate and a funding strategy for the project.	Council resolves to proceed with land acquisition licence agreement for continued occupation and define phase and planning approval for Tripoli Way, Stages 1 and 2, to coincide with the construction of the Yallah to Oak flats M1 extension. **November 2015** – Council wrote to the Regional Manager, Southern Roads and Maritime Services detailing Council's resolution and seeking confirmation that all exit and entry ramps will be construction at the same time as the M1 bypass of Albion Park Rail. Council officers sought RMS assistance as Council progressed with the design of Tripoli Way.	No Response recorded. Refer to dates of meetings with Government officials in **Appendix E**.
February 2020 – Council endorsed the commencement of community consultation to take place on the preferred alignment of Tripoli Way Extension (Albion Park Bypass). (Council Resolution referenced)	Consultation conducted for project included: Business paper publicly available. **November 2019** – Council officers hand delivered a copy of the Tripoli Way letter and spoke with 20 property owners likely to be impacted by an acquisition associated with the Tripoli Way Extension Project. **March 2020** – Tripoli Way Lets Chat page goes live covering: How subscribers could find out more; progress to date; map; Information Sheet; FAQ; and invitation to provide feedback on the project until 8 May 2020. 88 comments received through the survey and 45 responses issued. Ongoing project updates provided through Lets Chat page.	All feedback collected informed the environmental assessment and approval, detailed design and construction phases.
March 2021 - That Council endorse the commencement of community consultation to take place on the preferred alignment of Tripoli Way Extension (Albion Park Bypass). (Council resolution referenced)	Consultation conducted for project included: Business paper publicly available. **April 2021** – Mayor and Councillor Memo issued advising that a Drop-in Session would be held. **April 2021** – Drop-in Sessions held – Centenary Hall Albion Park. Session attended by staff from Council, Cardno (REF), and NSW Public Works (acquisitions). Invitation hand delivered one week prior to event to residents on preferred alignment. 21 comments collected during session and 15 responses issued.	All feedback collected informed the environmental assessment and approval, detailed design and construction phases.

Phase	Activity Undertaken by Council	Outcomes
October 2021 – Letter to select residents on Tripoli Way.	**October 2021** – Letter to 48 residents concerning the proposed alignment of the Tripoli Way Extension project and the desire for an introductory meeting to progress the acquisition process. **January 2022** – Councillor Memo issued advising face-to-face meetings being arranged with residents potentially effected by acquisition process. **October 21 –** Allen Price & Scarratts Pty Ltd contact select residents to advise they intent to mark the proposed extents of road acquisition relation to the TWE project. **February 2022** - Public Works contacts residents effected by acquisition process to arrange face-to-face meetings.	Letter commenced acquisition process on Tripoli Way. Process ongoing. Mayor and Councillor advised of face-to-face meetings being arranged with residents potentially effected by acquisitions. Residents on road alignment notified of survey work. Public Works commence acquisition process with residents.
Environmental Approvals		
May 2016 – Stage 1 Planning & Concept Design consultancy Services	Consultation conducted for project included: Consultation with landowners in works extent for property access for specialised consultants relating to: noise level monitoring, contamination investigation, Aboriginal and Non-Aboriginal Heritage Investigation, Ecology Investigation, Service location, Geotech test pits, heritage/environmental walk, surveying.	Property site visits inform development of the REF.
August 2021 – Completion - Review of Environmental Factors (REF) & Concept Design	**May 2022** – Draft REF added to Lets Chat page	REF publicly available.
April 2022 - Commencement of Environmental Impact Statement (EIS)	Consultation conducted for project included: Consultation with landowners in works extent for property access for specialised consultants relating to contamination studies, geotechnical pits, indigenous artifacts. **August 2022** – Animated flythrough added to Lets Chat page.	Site visits inform development of the EIS.
Funding - Council receives $4.2M in funding towards environmental approvals, design and acquisitions.		
April 2023 - Council receives $16.6M in Accelerated Infrastructure Fund (Round 3) funding	**October 2023** - Lets Chat page updated providing notification of additional $16.6M in funding.	Funding accelerates delivery of Tripoli Way Extension project as per grant conditions.
February 2024 - Council receives $4.2M in funding from Transport for New South Wales	**February 2024** - Lets Chat page updated providing notification of additional $4.2M in funding.	Funding supports delivery of Tripoli Way Extension project.

Phase	Activity Undertaken by Council	Outcomes
May 2023	Report to Council noted the Tripoli Way Extension – Update and consideration of project timeline report and officers instructed to write to State Government agencies advising of the importance of the processing timeframes. Business paper publicly available.	Council wrote to State Government agencies and utilities providing an update of the project and stressing the importance of adhering to processing timeframes.
October 2023	Report to Council for information – Tripoli Way Extension Project – Status update. Business paper publicly available.	Status update provided.
March 2024	Report to Council for information – Tripoli Way Extension Project – Status update (Council Resolutions referenced). Business paper publicly available.	Status update provided.
May 2024	Letter distributed to broader consultation area providing an update on the Tripoli Way Extension project.	Letter includes invitation to community members to become followers of the Tripoli Way Lets Chat website.
Detailed Design		
September 2023 – Indesco engaged to prepare detailed design and Maker ENG engaged to provide project management and design review services.	Consultation conducted for project included: **October 2023** - Lets Chat page updated providing information on the detailed design and Early Works package. Detailed design expected late 2024. **October 2023** - Consultation with landowners for specialised consultant site visits for: survey, geotechnical pits, and service location.	Community informed of detailed design commencement and pending Early Works package. Residents on road corridor informed of site visits as precursor to detailed design.

5.3 Issues Raised by the Community

Community consultation actions undertaken are outlined in the proceeding table (**Table 10**). **Appendix E** contains further details on these consultations.

Issues raised by community members and local businesses during the consultation process are detailed in **Table 11**. **Table 11** also identifies the section of this EIS that addresses each issue.

Table 11: Issues raised by the Community

Issue	Details	Where Addressed in this EIS
Acquisition	Concerns regarding process, quantity of land acquired and impact on property values.	Section 3.9.
	Concern regarding future land rezoning	Outside of the scope and purpose of the EIS.
Flooding	Drainage and stormwater impacts. Flooding and impacts on road access.	Section 6.4 and **Appendix F**.
Program	Enquiries associated with start date, duration and sequencing.	Section 3 and **Appendix A**.
Access	Property access and egress concerns. Road treatment and formalisation. Heavy vehicle access.	Section 3 and **Appendix A**.

Issue	Details	Where Addressed in this EIS
	Access during construction.	
Design	Suggestion – roundabouts. Questions – regarding speed and alignment selection, set out distances, elevations and number of lanes.	Section 3 and **Appendix A**.
Design	A number of alternate local road improvements or upgrades were suggested in preference to completion of the Tripoli Way extension.	Section 3 and **Appendix A**.
Traffic	Concerns regarding congestion issues being eased such as around schools, heavy vehicles, signalling, lengthy queues, and access to specific streets within Albion Park.	Section 6.11 and **Appendix U**.
Noise	Concern expressed regarding potential noise impacts, attenuation measures under consideration and their funding, and noise attenuation measures for Tullimbar.	Section 6.9 and **Appendix T**.
Vibration	Concern expressed at vibration impact	Section 6.9 and **Appendix T**.
Safety	Concern expressed regarding increased vehicle numbers and speed and mitigation measures, pedestrian safety, property security, and the construction of new paths and crossings.	Section 3 and **Appendix A**.
Consultation	Concerns regarding lack of consultation with the western section landowners.	Section 5 and **Appendix E**.
Aesthetic	Concern expressed over impact on rural setting.	Section 6.7 and Section 6.8, **Appendix P**, **Appendix Q** and **Appendix R.**
Construction	Impacts to be kept to a minimum and resident privacy protected.	Section 3 and **Appendix A**.
Environment	Enquiries concerning post construction clean-up, maintenance of air quality and re-forestation.	Section 6.1, Section 6.2, Section 6.7, Section 6.12, **Appendix F**, **Appendix G** and **Appendix N**.
General	A number of General issues beyond the scope of the project were also raised.	Whole of the EIS.

5.4 Issues Raised by Special Interest Groups

Issues raised by special interest groups and local businesses during the consultation process are detailed in **Table 12**. **Table 12** also identifies the section of this Environmental Impact Statement that addresses each issue.

Table 12: Issues raised by Special Interest Groups

Issue	Details	Where Addressed in this EIS
Butter Factory	National Trust raise issues around the proposed demolition of the Albion Park Butter Factory	Section 6.6 and **Appendix M, Appendix N** and **Appendix O**.
Albion Park Chamber of Commerce	The Chamber sought information on the body that could be lobbied for TWE funding.	Not relevant for inclusion with EIS.

Issue	Details	Where Addressed in this EIS
Illawarra Local Aboriginal Land Council (ILALC) (Illawarra ALC)	Issues raised through the consultation process associated with the ACHAR.	Section 6.5 and **Appendix L**.

5.5 Agency Consultation

Engagement with agency stakeholders has been underway for a number of years. The SEARs for the Activity requires consultation with the following agencies.

- Environmental Protection Agency (EPA).
- Environment and Heritage Group of DPHI.
- Department of Primary Industries (Fisheries).
- Department of Agriculture.
- Heritage NSW.
- DPE Water.
- TfNSW.
- State Emergency Services.
- Rural Fire Service.
- Civil Aviation Safety Authority (CASA).
- Air Services Australia.
- Special interest groups, including Local Aboriginal Land Councils (Illawarra Local Aboriginal Land Council).
- Councils Aboriginal Community Development Officer.
- Utilities and Service Providers (AGL).

Agencies consulted, as well as summarised responses, are provided in **Table 13**.

Table 13: Summary of Agency Consultation

Agency	Date and Summary of Consultation	Where Addressed in this EIS
Environment Protection Authority	**Letter to agency** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 12 May 2020 - The EPA advised Council on the elements the of the then Tripoli Way Extension REF should contain. The EPA advised that the Tripoli Way Extension works must comply with the *Protection of the Environment Operations Act 1997*. • 23 June 2023 – automatic response received by SLR.	Section 6.1, Section 6.2, Section 6.3, Section 6.5 and **Appendix G**, **Appendix H**, **Appendix I** and **Appendix L**.

Agency	Date and Summary of Consultation	Where Addressed in this EIS
	• 28 June 2023 – response from Paul Wearne - Senior Regional Programs Officer. The Senior Regional Programs Officer provided SLR with a response stating that: ○ No further consultation was required. ○ The EPA will be the Appropriate Regulatory Authority for environmental matters regulated by the EPA under the *Protection of the Environment Act 1997* (POEO Act). ○ Activities associated with this project will need to demonstrate and comply with the POEO Act and its associated regulations. • 17 Oct 2023 - Manager Regulatory Operations contact information confirmed and email address of info@epa.nsw.gov.au. Acknowledgement EIS prepared under Part 5 of the Environmental Planning and Assessment Act 1979 with Council as proponent and determining authority. The EIS prepared based on the Secretary's Environmental Assessment Requirements (SEARs), developed in consultation with the EPA.	
Environment and Heritage Group of Department of Planning and Environment	**Letter to agency** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 23 June 2023 –response from Mariyam Nizam - Senior Heritage Assessments Officer. The Senior Heritage Assessments Officer requested SLR to send to Heritage NSW record system instead. SLR redirected request as per advice on 23 June 2023. • 23 June 2023 – automatic response received by SLR. • 23 June 2023 - automatic response from Customer Concierge Team (Environment and Heritage) received by SLR. • 11 Oct 2023 - Council directed to approach contacts listed in SEARS document for response timeframes.	Section 6.5 and Section 6.6 and **Appendix L** and **Appendix M**.
Department of Primary Industries (Fisheries)	**Letter to agency** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 27 June 2023 –The Senior Fisheries Manager, Coastal Systems informed SLR that DPI Fisheries made comments on the proposal at SEARs stage and Planning have attached these comments to the SEARs. • 11 Oct 2023 - Senior Fisheries Manager Coastal Systems contact information confirmed. Council advised that applications lodged through the Planning Portal will be referred to Fisheries. Fisheries permit applications to be lodged via : Ahp.central@dp.nsw.gov.au. Standard process times are: (i) - IDA referrals up to 40 days as per the EP&A Regulations, and (ii) Fisheries permits up to 28 days.	Section 3, and **Appendix G** and **Appendix H**.

Agency	Date and Summary of Consultation	Where Addressed in this EIS
Department of Agriculture (DPI Ag)	**Letter to Agency** • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. • 20 Feb 2024 – Letter providing plans, SEARs and contact details of SLR. **Response/s:** • 10 Oct 2023 – Enquiries to be directed to Local Land Services. • 21 Feb 2024 - Response from DPI Ag requiring additional information. Scoping Report that informed the SEARs was emailed to DPI Ag.	Section 6.6 and **Appendix S**.
Heritage NSW	**Request/s:** • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 23 June 2023 - automatic response from Customer Concierge Team (Heritage NSW) received by SLR. Customer Concierge Team (Heritage NSW) provided automatic response providing information regarding common enquiries. • 24 Nov 2023 - Senior Heritage Assessments Officer contact information confirmed. Council advised that applications are to be lodged through the Planning Portal or via email to heritagemailbox@enviornment.nsw.gov.au. Alternatively, an account may be set up through the Heritage Management System and applications lodged directly there. Timeframes were provided for a number of process application types.	Section 3 and **Appendix A**.
DPE Water	**Letter to agency** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s**: • 24 Nov 2023 - Major Projects (State Significant Projects and Infrastructure) contact information confirmed. Council advised if a State significant EIS then it must be lodged and exhibited. Once EIS lodged with NSW Planning it will be referred to water.assessments@dpie.nsw.gov.au and advice provided within the prescribed EIS exhibition timeframe.	Section 3 and **Appendix A**.
TfNSW	**Letter to agency** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 21 May 2020 – TfNSW provided date at 50% Concept Design. Upon development of 80% Concept Design of the TWE and completion of the Traffic impact Assessment (TIA) Council will seek further input from TfNSW. • 07 Oct 2021 – Project update email to TfNSW.	Section 3 and Section 6.11 and **Appendix A** and **Appendix U**.

Agency	Date and Summary of Consultation	Where Addressed in this EIS
	• 19 June 2023 - requested for comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 - provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s**: • 08 July 2020 - TfNSW consent is required under Section 87 of the Roads Act, 1993, for the three new sets of traffic signals and for the connection to key State roads in the location. TfNSW acknowledges the project's merit and supports the project as a local road in the short to medium term. TfNSW's role in the project will be in accordance with "RMS process for Council delivered intersections" and include (i) Phase 1: Assessment and in-principle acceptance and (ii) Phase 2: Oversight of design and construction of intersections with the Illawarra Highway and local road traffic signals. Once in-principle acceptance is received Council would need to enter into a works authorisation deed (or other suitable agreement with TfNSW to deliver the works. • 12 Nov 2021 - TfNSW acknowledge Council's email of 07/10/21 and provided 'in-principle acceptance' of the concept design. TfNSW noted Council's response to TfNSW letter of 23/09/2021 addressing TfNSW concerns. Tripoli Way is a local road and TfNSW advice relates to intersections for which it is approval authority and connection points to State roads Illawarra Highway/Broughton Ave and Terry Street/Taylor Road intersection. • 15 Feb 2022 - TfNSW provides 'in-principle acceptance' to: (i) the proposed new signalised intersections at Tripoli Way/Calderwood Road, Tripoli Way/Hamilton Road and Tripoli Way/Terry Street; (ii) adjustments to the existing roundabout at the Illawarra Highway/Broughton Ave and connection to Tripoli Way and, (iii) adjustments to the Taylor Road/Terry Street intersection. • 26 June 2023 – automatic response received by SLR. • 17 Oct 2023 - Director Planning South contact information confirmed. Contact will work with Council to progress the detailed design, finalise the scope of works and determine the best approach for delivery. Development Services team will assist through that process.	
State Emergency Services	**Letter to agency**: • 3 June 2020 - provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s**: • 2 Sept 2020 - SES believe the proposed works provide minimal risk to NSW SES response operations. Council advised to consider the implications of the Probably Maximum Flood (PMF) event and the possibility of improving flood immunity during the upgrade. SES requested advise if the upgrade causes disruption to the operation of the road. • 23 June 2023 – SES Administrative Support Officers forwarded the request to NSW SES Planning Community Planning. • 26 June 2023 – SES Program Support Officer responded noting receival and specific response will be forthcoming.	Section 3 and **Appendix A.**

Agency	Date and Summary of Consultation	Where Addressed in this EIS
	• 13 Oct 2023 - Email contact address confirmed as rra@ses.nsw.gov.au, and referrals will be responded to within 21 days, if deemed applicable.	
Rural Fire Service	**Request/s**: • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 - provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 25 June 2023 - automatic response from NSW RFS Planning and Environment Services received by SLR. • 3 July 2023 – response received from Martha Dotter Manager Planning & Environment Services (RFS). • 11 Oct 2023 - provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. NSW RFS reviewed the Tripoli Way Extension Concept Plan and raise no objection to the proposed road extension. A/Supervisor Development Assessment & Planning contact Information confirmed.	Section 3 and **Appendix A.**
Civil Aviation Safety Authority (CASA)	**Letter to agency:** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author). • 10 Oct 2023 - provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 6 May 2020 - Council referred to: National Airports Safeguarding Framework (NASF) Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports; Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports; Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports (in the event that tall cranes or drilling rigs are required); Guideline G Protecting Aviation Facilities - Communications, Navigation and Surveillance (CNS). • 23 June 2023 - automatic response from CASA\Guidance Delivery Centre received by SLR. • 28 Nov 2023 - Aerodrome Engineer, Civil Aviation Safety Authority contact information confirmed. Council referred to: National Airports Safeguarding Framework (NASF) Guidelines A Measures for Managing Impacts of Aircraft Noise; Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports; Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports; Guideline E: Managing the Risk of Distractions to pilots from lighting in the Vicinity of Airports; Guideline F: Managing the Risk of intrusions into the Protected Airspace of Airports; Guideline G Protecting Aviation Facilities - Communications, Navigation and Surveillance (CNS), Guideline H Protecting Strategically Important Helicopter Landing Sites and Guideline I Managing the Risk in public Safety Areas at the Ends of Runways.	Section 3 and Section 6.13 and **Appendix A** and **Appendix W.**
Air Services Australia	**Request/s:** • 19 June 2023 - requested comment on SEARs, Location Plan and EIS Project / Activity Description sent from SLR (EIS Author).	Section 3 and Section 6.13 and **Appendix A** and **Appendix W.**

Agency	Date and Summary of Consultation	Where Addressed in this EIS
	• 10 Oct 2023 - provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. **Response/s:** • 27 June 2023 - automatic response from CASA\Guidance Delivery Centre received by SLR. • 28 June 2023 – response from CASA\Guidance Delivery Centre received by SLR. • 12 Oct 2023 - Airport Developments & Engagement Advisory contact information confirmed. Development application can take approximately 6 weeks to complete.	
Special Interest Groups including Illawarra Local Aboriginal Land Council (Illawarra ALC)	**Letter to Agency:** • 25 Jan 2023 – Contacted by Extent Heritage regarding preparation of ACHA. • 15 Feb 2023 – Illawarra LALC acknowledged as a RAP. • 26 June 2023 - field survey methodology for the ACHA was provided. • 18 and 19 July 2023 – Field survey attendance. • 20 Sep 2023 – Provided with the proposed test excavation methodology. • 10 Oct 2023 – provided Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Agency feedback. • Between 4 Dec 2023 and 17 Jan 2024 - attended test excavations. • 14 Feb 2024 – Extent Heritage provided Draft ACHA for comment. **Response/s:** • 11 Oct 2023 - Illawarra Local Aboriginal Land Council Contact information confirmed. Council advised that the approach to consultation and timeframes are legislated under the NPW Act 1974 and Consultation Requirements for proponents.	Section 6.5 and **Appendix L**.
Department of Primary Industry - Crown Lands	**Letter to agency:** • 22 April 2020 – provided project background and requesting comment / interest and ongoing communication details. **Response/s:** • 6 May 2020 - Council was advised that the road where Broughton Avenue meets the Illawarra Highway seems to have not been transferred to Council which would need to occur prior to construction. Crown Lands contact working to transfer constructed Crown roads and Crown roads supporting approved developments to Council as the relevant roads authority. In terms of Hazelton Creek, the land occupied by the bridge needed to be acquired. The details are to be sent to cl.acquisitions@crownland.nsw.gov.au. A licence would need to be obtained for occupation prior to acquisition. Obtaining a licence would take at least 2 months.	Section 3 and **Appendix A**.
AGL	**Letter to agency:** • 10 Oct 2023 - Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Utility feedback. **Response:** • 17 Oct 2023 - Council advised to contact Jemena Gas Networks, the asset owner.	Section 3 and **Appendix A**.

Agency	Date and Summary of Consultation	Where Addressed in this EIS
Endeavour Energy	**Letter to agency:** • 10 Oct 2023 - Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Utility feedback. **Response:** • 12 Oct 2023 - Advice to Council assumes submission to concurrence and referrals received via the Planning Portal. Council referred to Standard Type conditions, especially EE Shellharbour12147058 Albion Park Bypass.	Section 3 and **Appendix A**.
Sydney Water	**Letter to agency:** • 10 Oct 2023 - Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Utility feedback. **Response:** • No response to date	Section 3 and **Appendix A**.
Zinfra	**Letter to agency:** • 10 Oct 2023 - Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Utility feedback. **Response:** • 10 Oct 2023 - Contact information confirmed. Council advised to raise a formal inquiry through Jemena Portal at http:mygasservices.jemena.com.au and the application pathway should be 'Complex Works'>'External Works'. The application will be reviewed briefly to determine that it is a Class B or lower complexity project and Council will be assigned a Project Manager to assist further in this line of inquiry. The project is expected to fit the Routine Program team. Zinfra will answer questions on timeframes etc.	Section 3 and **Appendix A**.
NBN	**Letter to agency:** • 10 Oct 2023 - Project Status Update / Request for Key Contact name and details / Request for clarification of Process Methodology and Expected Timeframes for Utility feedback. **Response:** • 24 Oct 2023 - Council referred to the Relocations Team via: https://www.nbnco.com.au/develop-or-plan-with-the-nbn/relocation-works. The Relocations Team for approval timeframes and any other caveats.	Section 3 and **Appendix A**..
The surrounding landowners and occupiers that are likely to be impacted by the proposal	• A summary of the community consultation actions undertaken with landowners and occupiers, and matters raised during consultation is included in **Table 10** and **11.**	Section 5.

5.6 Aboriginal Consultation

Consultation with Aboriginal stakeholders has been undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010a; the 'Consultation Requirements').

Council engaged the services of Extent Heritage Pty Ltd (Extent Heritage) to prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project and the ACHA is contained in **Appendix L**.

In accordance with the Consultation Requirements, Extent Heritage corresponded with the following organisations to obtain the names of Aboriginal people who may hold cultural knowledge of the study area.

- Greater Sydney Local Land Services.
- Shellharbour City Council.
- Native Title Service Corporation (NTSCorp).
- Illawarra LALC.
- Nowra LALC.
- Heritage NSW – DPC.
- National Native Title Tribunal.
- Office of the Registrar, *Aboriginal Land Rights Act 1983*.

An advertisement was placed in the Illawarra Mercury inviting Aboriginal individuals or organisations to register an interest in the project. On 25 January 2023, correspondence was sent to all Aboriginal individuals and organisations identified above inviting them to register an interest in the Project.

The process resulted in the identification of thirteen (13) Registered Aboriginal Parties (RAPs). A follow-up email was sent to the RAPs on 15th February 2023 formally acknowledging their registration and providing further information on the Project. On 26th June 2023 the field survey methodology for the ACHA was provided to the RAPs. At the end of the period required for the RAP review of the methodology no comments were received.

Two RAPs, being representatives of Wodi Wodi Traditional Owner and Illawarra Local Aboriginal Council, were invited to participate in the site survey conducted by Extent Heritage. The site survey occurred on 18th and 19th July 2023.

Resulting from the identification of potential archaeological deposits (PAD) during the site survey a test excavation program for the PADs and other items was prepared by Extent Heritage. A copy of the proposed test excavation methodology was provided to the RAPs for a 28-day review on 20 September 2023. At the end of this period, only one group (Gumaraa) provided a comment on the proposed methodology acknowledging receipt of the email.

The test excavation program was carried out in three sessions between 4 December 2023 and 17 January 2024. Along with Extent Heritage, representatives from the Illawarra Local Aboriginal Land Council, South Coast People, Wodi Wodi Traditional Owner, and Woronora Plateau Gundungara Elders Council undertook the excavations and provided cultural knowledge and expertise.

A draft copy of the ACHA was presented to the RAPs on 14th February 2024.

The ACHA was finalised on 1 May 2024.

5.7 Amendment to the Activity in Response to the Matters Raised

Amendments to the Activity layout and project description have occurred because of feedback from the community, agencies and other stakeholders. The refinement to the Activity design includes the following.

- A commitment to ensuring bridge and culvert design and construction is in accordance with NSW Guidelines and Policies with respect to watercourse crossings which will ensure the integrity of the riparian corridor in those areas and the built form will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.
- Reduction in the extent of disturbance works required at the proposed Terry Street intersection.
- The identification of three temporary compound and laydown areas as illustrated in **Figure 3**.

The Activity, as refined, will reduce impacts on the riparian environment, reduce traffic impacts during construction and generally reduce visual impacts.

5.8 Ongoing Stakeholder and Community Consultation

Ongoing Stakeholder and Community consultation and engagement shall be undertaken through all construction stages of the Activity, via:

- Continuous consultation with government agencies.
- Distribution of householder letters, community updates, mailouts, and letterbox drops to those living along the alignment.
- Providing regular project updates via the Let’s Chat project page, social media platforms, and the Council Website.
- Email notifications to registered stakeholders.
- Including updates in the Council's eNewsletter – Snapshot Shellharbour.
- Arranging stakeholder and property owner meetings upon request.
- Handling enquiries through the project page and the nominated contractor/dedicated staff member for residents to liaise.
- Issuing media releases.
- Placement of onsite signage.

6.0 Assessment of Impacts

This Section provides a detailed assessment of the key environmental issues and recommended mitigation measures for the Activity and addresses the requirements of the SEARs and outlines the mitigation measures proposed to address any potential impacts. Specialist studies prepared for the detailed assessment are appended to the EIS.

The relevant Secretary's Environmental Assessment Requirements (SEARs) are outlined in **Appendix B** and a SEARs compliance table is provided in **Appendix C**.

The following specific matters were identified in the EIS Scoping Report and in the SEARs for detailed assessment:

- Air Quality.
- Biodiversity.
- Contamination.
- Flooding / Hydrology.
- Aboriginal Heritage.
- Environmental Heritage.
- Landscape Character and Visual.
- Land and Water Use.
- Noise and Vibration.
- Soil and Water.
- Traffic, Transport and Access.
- Waste Management.
- Environmental Management and Monitoring.

For each of these matters, the EIS describes the assessment approach, existing environment, assessment potential impacts, and mitigation measures.

A conservative assessment approach has been undertaken to allow flexibility for the Activity. The conservative assessment approach has utilised the highest estimate or value of the Activity components in **Section 3.0.** The potential risks and impacts identified and assessed in this EIS may be higher than those resulting from the actual construction and operation of the Activity.

6.1 Air Quality

An Air Quality Assessment was prepared by ERM Environmental and is contained in **Appendix F**. The Assessment has determined potential impacts of construction and operational vehicle emissions from the Activity on any nearby sensitive receptors. It is noted that the Assessment was based on the 80% concept design of the TWE which had minimal changes compared to the 100% concept design contained in **Appendix A**. A summary of the findings is presented below.

6.1.1 Existing Environment

Climate

Climate data for the project site was obtained from the Albion Park Automatic Weather Station (AWS) (Site number 062841), located in the middle of the project area.

The annual average maximum temperature recorded at the Albion Park AWS was 22.5°C, with the average minimum annual temperature recorded was 11.4°C. On average, January is the hottest month, with an average maximum temperature of 27.1°C, and an average minimum temperature of 17.1°C. July is the coldest month, with average maximum temperature of 17.8°C, and an average minimum temperature of and 6.2°C. The annual average relative humidity reading collected at 9am from the Albion Park AWS is 67% and at 3pm the annual average is 59%.

Rainfall data collected from the Albion Park AWS shows that February is the wettest month, with an average rainfall of 145.5 mm over an average of 12.0 rain days. The average annual rainfall is 893 mm with an average of 120.6 rain days per year.

Wind speed and direction was derived from wind roses compiled in 2014. Annually, the most common winds were from the west, above 7.5 m/s. The winds are also more frequent from the western and north-eastern quadrants. Seasonally, the westerly winds dominate through the autumn, winter, and spring. During summer months the north-easterly wind direction is more common. The mean wind speed in 2014 was 3.8 m/s and the annual mean percentage of calms (wind speeds of less than 0.5 m/s) was 6.3%.

Air Quality and Pollutants

Existing air quality data were derived from the DoPIE managed Albion Park South monitoring site, located south of the Shellharbour Airport. Data from 2014 to 2018 were used to establish an existing air quality environment. Data from 2019 were not included due to the extreme bushfire conditions of the latter half of the year.

The existing air quality of the project area is generally good, with all background concentrations of Nitrogen dioxide (NO2), PM10, and PM2.5 falling below the annual mean air quality criteria drawn from the National Environment Protection (Ambient Air Quality) Measures for Ambien Air Quality (AAQ NEPM) (NEPC, 2016).

Sensitive receptors associated with the Activity are shown in **Figure 11**.

6.1.2 Assessment Methodology

Emissions and dispersion models were run for two different operational scenarios listed below:

- Opening year (2026) with the Activity.
- Opening year +15 years (2041) with the Activity.

Roads and Maritime's Model TRAQ (Tool for Roadside Air Quality)

It was determined that the most appropriate tool for calculating emissions from road traffic was considered to be Roads and Maritime's model TRAQ (Tool for Roadside Air Quality). TRAQ includes simplified algorithms and emission factors from the NSW Greater Metropolitan Region (GMR) emission inventory model (NSW EPA, 2012). The inventory was updated in 2012, with significant refinements to the road transport methodology. The inventory model is specifically designed for use in NSW, and takes into account the characteristics of vehicle fleets in the NSW GMR. Many of the emission factors were derived using an extensive database of Australian measurements. The algorithms in TRAQ were converted by ERM into a spreadsheet tool which could be used for multiple road links and any year between 2008 and 2050.

Figure 11: Sensitive Receptors – Air Quality and Noise

Source: ERM, 2021

The TRAQ model was used to calculate emissions of the following pollutants:

- NOx
- PM10
- PM2.5

The method for calculating hot running emissions involves the use of average-speed emission factors for various vehicle types (CP, CD, LDCP, LDCD, HDCP, RT, AT, BusD and MC). Separate emission factors are provided for five road categories - residential, arterial, commercial arterial, commercial highway and highway/freeway. Correction factors are also applied to allow for the effects of road gradient on hot running emissions.

The method for calculating cold-start emissions involves the application of adjustments to the hot emission factors to take into account the extra emissions which occur before a vehicle's engine and after-treatment system have reached their full operational temperatures. Cold-start emissions are only calculated for light-duty vehicles. No cold-start adjustment is made for particulate matter. The amount of 'cold running' depends on the road category, and no cold running is assumed for residential roads and highways.

Emission factors for non-exhaust PM are provided in TRAQ. The method is drawn from the European Environment Agency's Air Pollutant Emission Inventory Guidebook (EEA, 2013), and includes tyre wear, brake wear and road surface wear.

Dispersion Modelling

The USEPA-approved CAL3QHCR7 dispersion model was used to assess the impacts of the project on ambient concentrations of NOX, PM10, and PM2.5. CAL3QHCR is an enhanced version of the CALINE Gaussian dispersion model and is designed specifically for the assessment of road traffic emissions.

CALINE has been widely used in road traffic pollution studies across Australia and has been validated for Australian conditions. CAL3QHCR determines pollutant concentrations at receptors downwind of roads located in relatively uncomplicated terrain. The model is applicable for any wind direction, road orientation and receptor location, and the model is able to process up to a year of meteorological data. For the project the model was set up and run using the CALRoads View software.

The following information was required as input to the model:

- Link type. Different link types can be defined in CAL3QHCR (e.g. 'at grade', 'fill', 'bridge' and 'cut section'). It should be noted the link type (which influences pollutant dispersion) is not the same as the road category used to estimate emissions.
- Meteorological conditions.
- Receptor locations.
- Traffic volume by road link.
- Vehicle emission rate (grams per vehicle-kilometre per hour)8 of each pollutant for each road link.

6.1.3 Assessment of Potential Impact

Potential air quality impacts from construction are most likely to present as increased dust emissions and diesel vehicle exhaust. Activities likely to cause dust emissions include site preparation (clearing and earthworks), vehicle movement within project area over unsealed paths/roads, tracking of dirt/mud from project site onto public roads, rock crushing and screening, and excavation and loading of spoil material.

The maximum measured background concentrations, the predicted air quality impacts from the operation of the TWE and the predicted cumulative impacts of the TWE are shown in **Table 14** and compared with the annual mean air quality criteria.

Table 14: Maximum Predicted Concentrations

Pollutant	Background (µg/m3)	Operation of TWE	Cumulative (µg/m3)	Criteria Levels (µg/m3)
Maximum 1-hour average NO2 (µg/m3)	179 (NOx)	75.7 (NOx)	157.5 (NO2)	146
Annual average NO2 (µg/m3)	8.2 (NOx)	3.9 (NOx)	10.9 (NO2)	62
Maximum 24-hour average PM10 (µg/m3)	40.5	0.6	41.1	50
Annual average PM10 (µg/m3)	17.8	0.2	18.0	25
Maximum 24-hour average PM2.5 (µg/m3)	16.5	0.4	16.9	25
Annual average PM2.5 (µg/m3)	7.2	0.1	7.3	8

(Source: ERM 2021)

Modelling was carried out to a worst-case scenario for sensitive receivers along the existing alignment and the project alignment and showed that the operation of the TWE would not result in an exceedance of the air quality criteria. Potential impacts to air quality from construction and operation of the TWE are low and can further be mitigated through implementation of recommended management measures as per below.

6.1.4 Mitigation and Management Measures

Table 15: Mitigation and Management Measures for Air Quality

No.	Impact	Environmental Safeguards	Responsibility
AQ1	General air quality impacts	An Air Quality Management Plan will be prepared as part of the CEMP to detail the air quality control measures and procedures to be undertaken during construction, including: • Air quality and dust management objectives that are consistent with DPIE guidelines. • Potential sources and impacts of dust identifying all dust-sensitive receptors. • Mitigation measures to minimise dust impacts on sensitive receptors and the environment. • A dust monitoring program to assess compliance with the identified objectives. • Contingency plans to be implemented in the event of non-compliances and/or complaints about dust.	Project Manager
AQ2	General air quality impacts	• Areas of exposed surface are to be minimised throughout the construction site planning and	Project Manager

No.	Impact	Environmental Safeguards	Responsibility
		programming, to reduce the area of potential construction dust emission sources. • Control measures, such as stabilisation or covering will be implemented in order to minimise dust from stockpile sites. • Dust suppression measures, such as the use of water carts, will be used in any unsealed road surfaces and other exposed areas. • All trucks will be covered when transporting materials to and from the site. • Activities that generate dust will be avoided or modified during high wind periods. • Work activities will be reviewed if the dust suppression measures are not adequately restricting dust generation. • Rehabilitation of completed sections, where practical, will be progressively undertaken.	
AQ3	Exhaust emissions	• Construction plant and equipment will be maintained in good working condition to limit impacts on air quality. • Where practicable, vehicles will be fitted with pollution reduction devices and switched off when not in use.	Project Manager

6.2 Biodiversity

A Flora and Fauna Assessment was prepared by Ecoplanning to determine the predicted flora and fauna impacts associated with the Project. The Flora and Fauna Assessment is contained in **Appendix G**.

SLR were engaged to provide an independent review of the Flora and Fauna Assessment and it is contained in **Appendix H**. Whilst the independent review identified additional detail that could have been included in the original Flora and Fauna Assessment it concluded that the issues assessed and recommendations within the Flora and Fauna Assessment were adequate to address the relevant SEARS for the Activity and can be used as part of the EIS.

A summary of the findings of the Flora and Fauna Assessment and the independent review is presented below.

6.2.1 Existing Environment

The Flora and Fauna Assessment considered land within the EIS Study Area as identified in **Figure 2.** The Study Area includes a number of partial lots covering both public and private residential land, as well as privately owned agricultural allotments.

Biodiversity Values

The Study Area has land mapped as ‘Protected Riparian Land’ (PRL) on the DoPIE Biodiversity shown in **Figure 12.**

Areas of land mapped as PRL include Macquarie Rivulet, and parts of Hazelton Creek. The Study Area is intersected by the Hazelton Creek PRL in the western section, and the Macquarie Rivulet PRL near Broughton Avenue, with a small area at the northern end of Hamilton Road. Both the Macquarie Rivulet and Hazelton Creek are considered Key Fish Habitat under the FM Act.

Small areas of the Study Area are mapped as ‘Terrestrial Biodiversity’ under the SLEP 2013.

Vegetation Communities

The total area mapped as native vegetation within the Study Area is approximately 0.72ha, comprising Riparian River Oak Forest, Floodplain Wetland, and Acacia Scrub. Two of the communities' present form components of Endangered Ecological Communities (EECs) under the EPBC Act.

Two additional native vegetation communities were identified within the study area, being Riparian River Oak Forest, and Acacia Scrub. Neither of these communities' form components of EECs listed under the EPBC Act or BC Act. Both communities were in a highly disturbed condition, with dense patches of exotic and invasive species, including Weed of National Significance, Lantana camara (Lantana).

A further area of approximately 1.45ha was mapped as containing aquatics and emergent, and native and non-native plantings. The remaining vegetation mapped was categorised as exotic grassland.

Vegetation mapping is shown in **Figure 13**.

Threatened Species

Though desktop studies revealed up to nine threatened species have a moderate or high likelihood to use the study area for foraging or nesting, field surveys did not record any threated flora or fauna species present listed under the EPBC Act or BC Act.

Fauna Habitat

A number of fauna habitat areas were identified during the field survey. Based on the habitat values identified, a range of fauna species are likely to use the study area for foraging, refuge, nesting, or breeding habitat. Habitat areas present and the fauna species they support are listed in **Table 16**.

Table 16: Fauna Habitat Areas Present Across Study Area

Habitat Area	Fauna Species
Open grassland	Birds, microchiropteran bat, reptiles, and frogs
Planted vegetation	Diurnal and nocturnal birds, arboreal mammals and microchiropteran bats
Watercourses	Fish, birds, microchiropteran bats., reptiles, and frogs
Coarse woody debris	Arboreal mammals. Microchiropteran bats, reptiles, and frogs

There were no hollow bearing trees identified within or near the project area, therefore there is no suitable roosting or nesting habitat for hollow dependent bird species. No large stick nests associated with breeding habitat for threatened birds of prey were observed.

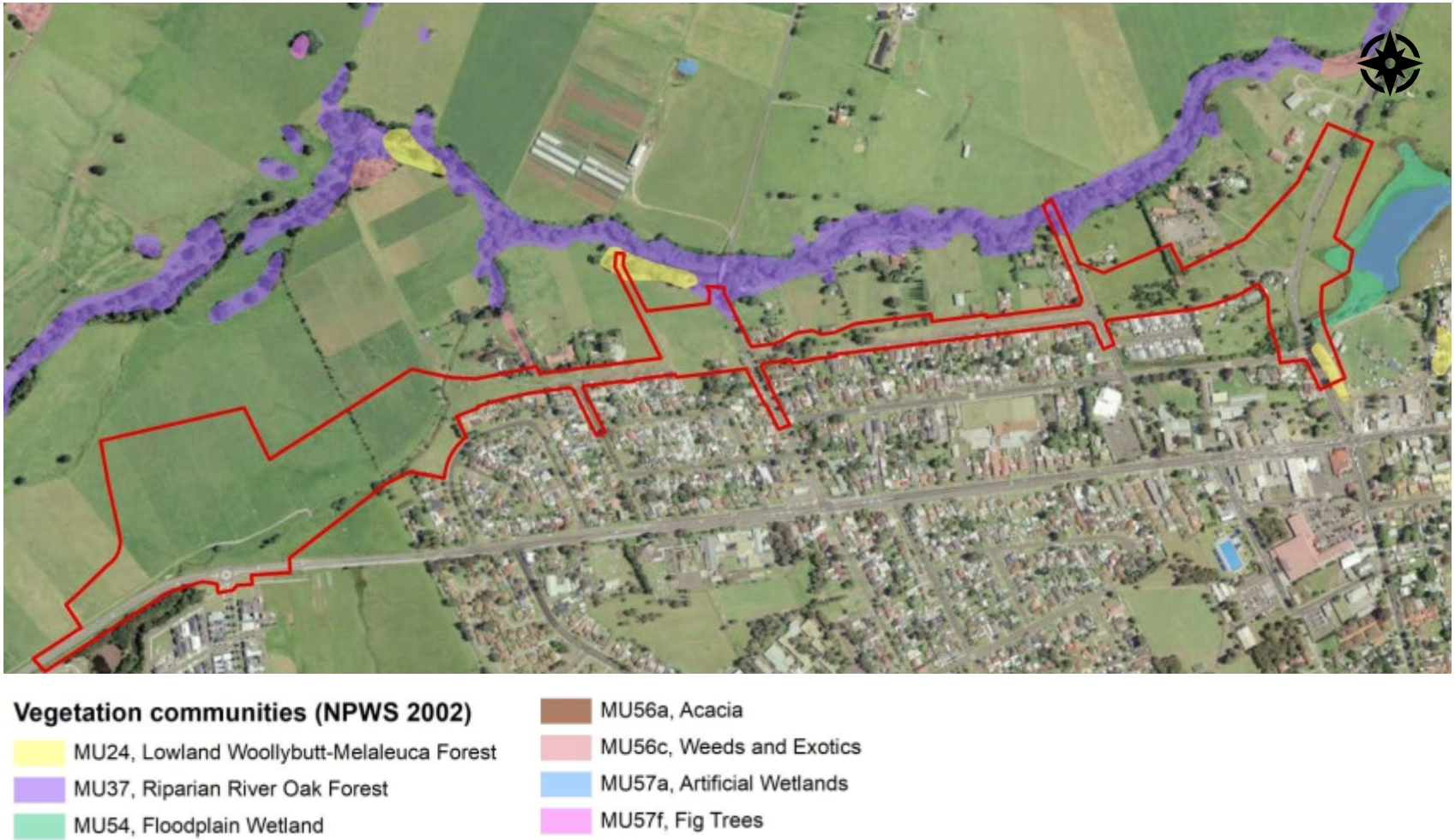
Figure 12: Biodiversity Values Map DPIE and SHLEP

Legend

- Study area
- Biodiversity values map (DPIE 2020)
- Terrestrial biodiversity (SHLEP 2013)

Source: EcoPlanning 2020

Figure 13: Vegetation Mapping



Source: EcoPlanning 2020

6.2.2 Assessment Methodology

Literature and Database Review

A site-specific literature and database review were undertaken prior to field survey and report preparation. This included desktop analysis of aerial photography and regional scale information from the following sources:

- BioNet Atlas (NSW Department of Planning, Industry and Environment (DPIE) 2020b).
- NSW Planning Viewer (DPIE 2020c).
- Protected Matters Search Tool (Commonwealth Department of the Environment and Energy (DoEE) 2020).
- SIX Maps (Land and Property Information (LPI) 2020).
- South East Local Land Services Biometric Vegetation Map (ELA 2015).
- Native Vegetation of the Illawarra Escarpment and Coastal Plain (NPWS 2002) Polices and guidelines relating to the proposal:
- Threatened Species Test of Significance Guidelines (OEH 2018).

Threatened species, populations and migratory species recorded within 5 km of the study area in a search of the BioNet Atlas of NSW Wildlife (DPIE 2020b) were consolidated and their likelihood of occurrence was assessed by:

- Review of location and date of recent (< 5 years) and historical (> 5-20 years) records.
- Review of available habitat within the study area and surrounding areas.
- Review of the scientific literature pertaining to each species and population.
- Applying expert knowledge of each species.

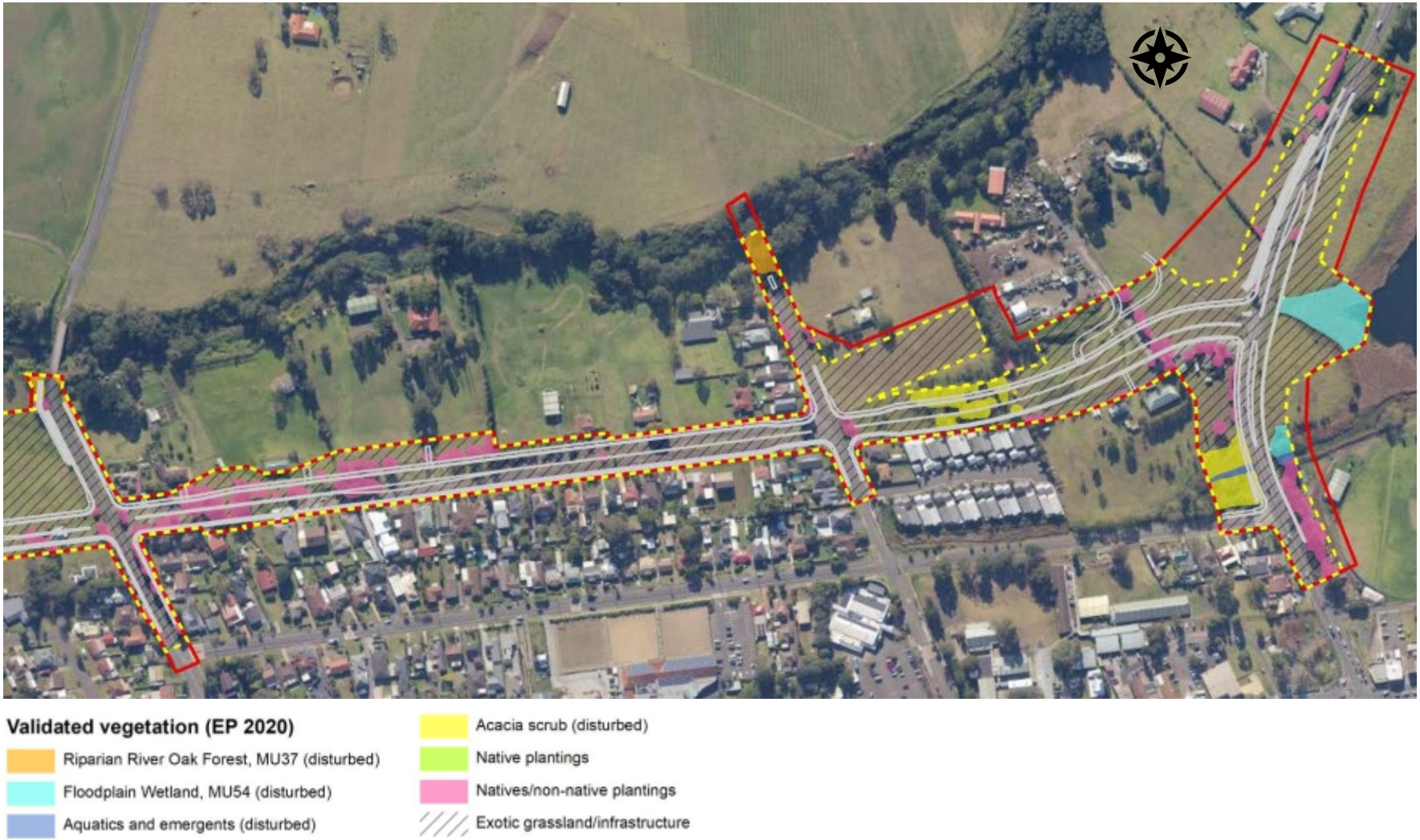
The potential for threatened species, populations and/or migratory species to occur was then considered and the necessity for targeted field surveys was determined. Following field survey and review of available habitat within the study area, the potential for species to use the site and to be affected directly or indirectly by the proposal were considered.

Field Survey

A field survey was undertaken on 16 January 2020 by Lucas McKinnon (Principal Ecologist) and John Gollan (Ecologist). The field survey included a general flora and fauna habitat and vegetation community assessment. Weather conditions on the day were warm and overcast with light showers in the morning and moderate winds in the afternoon.

Field Validation mapping is shown in **Figure 14** and **Figure 15**.

Figure 14: Field Validated Vegetation within the Eastern Portion of the Study Area



Source: Eco Planning 2020

Figure 15: Field Validated Vegetation within the Western Portion of the Study Area

Validated vegetation (EP 2020)

- Riparian River Oak Forest, MU37 (disturbed)
- Floodplain Wetland, MU54 (disturbed)
- Aquatics and emergents (disturbed)
- Acacia scrub (disturbed)
- Native plantings
- Natives/non-native plantings
- Exotic grassland/infrastructure

Source: Eco Planning 2020

6.2.3 Assessment of Potential Impacts

Direct impacts of the Activity involve clearing of vegetation and the associated loss of fauna habitat.

The Study Area is approximately 28.3 ha with native vegetation communities to be cleared comprising 0.72 ha. This represents a comparatively small amount of native vegetation (approximately 2.5%) within the Study Area. This small coverage of native vegetation represents marginal value foraging habitat, and its removal is unlikely to have more than a negligible impact on local fauna, especially given the amount of remaining habitat areas along the Macquarie Rivulet to the north of the Study Area.

Indirect impacts of the Activity could include erosion and water quality impacts associated with construction activities. Likelihood of these impacts can be minimised through the development and implementation of a CEMP. Operational impacts could arise from increased litter, and pest introduction including weeds or pathogens. Given the disturbed nature of the Study Area, these impacts would be minor in nature, and with the implementation of recommended mitigation measures, are unlikely to occur.

It can be concluded that it is unlikely that the Activity would produce a loss of vegetation cover that would have a significant impact on a threatened species, ecological community or its habitat listed under the BC Act (i.e. No loss of habitat for a threatened species or ecological community).

No nationally listed Threatened Ecological Communities were considered to be present within the Activity area and the Activity is unlikely to have a significant impact.

6.2.4 Mitigation and Management Measures

The following mitigation measures are recommended to minimise impacts associated with biodiversity during construction.

Table 17: Mitigation and Management Measures for Biodiversity

No.	Impact	Environmental Safeguards	Responsibility
B1	Impact to threatened species and native vegetation	• Areas of native vegetation outside of the construction footprint will be “No Go-Zones” for people and machinery and will be clearly delineated using temporary fencing. • Within the works extent, temporary tree protection fencing around trees not marked for removal. Tree protection is required around the trunk of each tree greater than 150mm in diameter. • Removal of vegetation is to be undertaken by a qualified arborist following all relevant industry standards. Trees to be removed have been identified and if any other trees require pruning or removal call Council’s environment team 4221 6014. • Any biomass cleared within the construction footprint will be removed from the Activity area and disposed of appropriately. • The CEMP for the Activity is to address pollution and contamination issues, such as silt control, and oil/fuel/chemical storage/spill management, which could arise during construction.	Project Manager

No.	Impact	Environmental Safeguards	Responsibility
		• No vehicles, machinery, tools, or equipment, fuel, chemicals or waste, gravels, soils or other materials are to be located within the drip zone of any trees. • Erosion and sediment control measures will be established before work begins and maintained in effective working order throughout the duration of the works, and until the Activity Area has been stabilized to prevent off-site transport of eroded sediments. • Landscaping works are to be outside areas of bushland and do not include environmental weed. • Removal of environmental weeds from the site and their ongoing control is to occur.	
B2	Harm or injury to fauna during clearing	• Pre-clearance protocols for fauna shall included in the CEMP. • Council's environment staff must inspect all vegetation one week prior to removal for any roosting or nesting native fauna present. If hollows or fissures are identified during the preclearance survey, nest boxes are required to be installed to replace potential habitat. • Inspect all vegetation for the presence of fauna species prior to removal. • Rocks, logs, debris that may provide fauna habitat must be retained on-site. • Any large machinery must be inspected for trapped fauna prior to cessation of work. • In the event of injury to native fauna, contact a local vet or Wildlife Rescue South Coast on 0418 427 214 immediately.	Project Manager
B3	Indirect offsite impacts during construction	• The CEMP for the Activity will include erosion and sediment control measures that will be established before work begins and maintained in effective working order throughout the duration of the works, and until the Activity area has been stabilised to prevent off-site transport of eroded sediments.	
B4	Impacts to key fish habitat during reclamation works	• A Part 7 Fisheries Permit under the FM Act must be obtained prior to commencement of reclamation works (bridge abutment, bridge and temporary crossing of Hazelton Creek works) and designs for construction must be consistent with the Policy and Guidelines for fish habitat conservation and management, (DPI Fisheries, 2013). • All construction and maintenance access tracks across the creek will follow the Policy and Guidelines for fish habitat conservation and management, (DPI Fisheries, 2013).	Project Manager
B5	Impact to nearby water ways and stormwater outlets	• Plant operators are to ensure minimal disturbance to areas outside of the works site through the establishment of entry points and tracks. No equipment should be operated near or from the waterways.	Contractor

No.	Impact	Environmental Safeguards	Responsibility
B6	Damage to surrounding	• Any damage to landscaped or grassed areas must be restored at the completion of the works including replacing native plants and mulch as required.	

6.3 Contamination

A Detailed Site Investigation (DSI) and a Remediation Action Plan have been prepared by Raw Earth Environmental to assess the extent and nature of any potential soil and groundwater contamination in the Activity and to demonstrate that the area is suitable (or will be after remediation) for the proposed Activity. The DSI is contained in **Appendix I** and the Remediation Action Plan is contained in **Appendix J** and a summary of the observations, findings and recommended mitigation measures of the two documents are provided below.

6.3.1 Existing Environment

Geology

The Geological Map of Shellharbour-Kiama Area (Coastal Quaternary Geology, 9028-I, Scale 1:50,000 and 1:25,000, Trodeson A.L, Hashimoto T.R ,12013), published by the NSW Trade & Investment Resources & Energy indicates the site is underlain by Quaternary Alluvium deposits and Permian Age siltstone of the Berry formation comprising the following:

- Quaternary alluvium comprising gravel, swamp deposits and sand dunes is located at the eastern and western portions of the site, within close proximity to Macquarie Rivulet.
- Permian aged undifferentiated siltstone, shale, and sandstone of the Shoalhaven Group Berry Formation), are located in the central portion of the site.
- Pleistocene alluvial deposits are located along the eastern portion of the site, with more recent Holocene deposits characterising the floodplain at the western end of the alignment.

Hydrogeology

A search of the Water NSW Groundwater Map was undertaken on the 16th of January 2024. The search identified one (1) registered groundwater bore within a 500 m radius of the site. Details are summarised below:

Groundwater bore with identification of GW107819 is located 450m southwest of Activity Area with a depth of 150m in Clay/Siltstone. The screen depth of this bore is 12-30m and has a standing water level of 0.2m.

Based on local topography and the nearest surface water source, groundwater is expected to flow north towards Hazelton Creek and Macquarie Rivulet.

Topography

A search of the Shellharbour Council GIS Viewer was undertaken on the 15th of January 2024. The topography of the site is highly modified, with a gradual fall from west to east, towards the Macquarie Rivulet and has an elevation ranging from 15 m Australian Height Datum (AHD) in the west to 9 m AHD in the east.

Surface Water Receptors

A search of the Shellharbour Council GIS Viewer was undertaken on the 15th of January 2024. The closest surface water receptor is Hazelton Creek, which is in situated in the

southwestern portion of the Activity Area. Hazelton Creek is a tributary of Macquarie Rivulet, Macquarie Rivulet is located approximately 75 m north of the site at its closest point, and flows in an easterly direction, ultimately discharging to Lake Illawarra, which is located approximately 3.7 km to the northeast.

Acid Sulphate Soils

A search of the NSW Espade Acid Sulphate Soil (ASS) Risk Mapping was undertaken on the 15th of January 2024. The ASS Risk Map indicated the northern portion of the site (to the north of Macquarie Rivulet) was classified as Class 4. The remainder of the Activity area is located within an area which has no available data regarding the presence or absence of ASS.

Previous ASS testing indicates that soils beneath the Activity area are slightly to moderately acidic with several exceedances of the ASSMAC (1998) Potential Ass Sulphate Soil (PASS) Indicator Values and Action Criterion for Titratable Peroxide Acidity (TPA) and Titratable Sulfidic Acidity (TSA). Whilst soils are acidic, the SPOCAS and SCR results indicate that sulfides and sulfidic ores do not appear to be present, suggesting that the acidity present within soil may not be attributable to ASS, however, as a precautionary measure the soils must be managed during construction.

Considering site-based observations noted during the investigation, no field indicators for actual or potential acid sulphate soil conditions such as clear or milky blue-green drainage water, iron stains on surfaces, evidence of corrosion of concrete or steel structures, presence of swamp-tolerant vegetation, presence of waterlogged, unripe muds or estuarine silty sands or sands, or obvious odour (sulphuric, rotten egg smells), were observed.

Per & Poly Fluoroalkyl Substances

The Australian potential per- and poly-fluoroalkyl substances (PFAS) Chemicals Map was viewed on the 15th of January 2024. Minor concentrations of PFAS were identified in some surface and groundwater samples collected from drainage channels, associated with Albion Park Fire and Rescue situated approximately 2.4 km northeast of the site. The detection of PFAS is not unexpected due to the historical use of Aqueous Fire Fighting Foam (AFFF) at the aforementioned property. Upon review of these findings and given the distance from the aforementioned property and the clayey nature of the underlying soils at the site, it is unlikely that PFAS has migrated from the original source into the site.

Areas of Environmental Concern (AEC)

Based on the investigations within the DSI potential areas of environmental concern (AECs) for the Activity area are identified in **Figure 16** and **Figure 17** and summarised in **Table 18**.

Figure 16: Areas of Environmental Concern (AECs)

Legend:

Areas of Environmental Concern (AECs)

Figure 17: AEC 3 Hotspot Location

Legend:

AEC3

Hotspot Location

Table 18: Potential Areas and Contaminants of Concern

Potential Area of Environmental Concern	Potential Source of Contamination	Contaminants of Potential Concern (CoPC)
Farm Laydown Area (AEC02)	Farm laydown area was observed in the southern portion of Lot 1 in DP559819 and contained a variety of agricultural plant and equipment. Whilst no contaminant sources were observed to be stored on the ground surface during the inspection, aerial imagery suggests that the area has been used for storage since at least 1993	• Heavy metals • PAHs • TRHs • BTEXN • Asbestos
Former Dairy and Butter Factory (AEC03)	The Tulkeroo Homestead and the Albion Park Butter Factory (former) are located on Lot 12 / DP 1205733. The Albion Park Butter Factory operated between 1887 to 1908. Depending on the scale of the operation there may have been potential contaminant sources at the site associated with industrial processes such as storage of petroleum products. Whilst potential contamination associated with the operations may have degraded, such as hydrocarbons, it is possible that more persistent contaminants may still exist. Current and former structures may also have been constructed of hazardous building materials such as asbestos and/or lead based paints.	• Heavy metals • PAHs • TRHs • BTEXN • Phenols • OCP • OPP • PCBs • Asbestos
Stockpiles (AEC04)	Two stockpiles were observed in Lots 11 and 12 / DP1205733 north of the Tulkeroo Homestead and the Albion Park Butter Factory (former). The contents of each stockpile were unknown.	
Fill Areas (AEC05)	Two (2) areas of obvious filling were observed during the site walkover within vacant Lot 1 / DP 1119325 and Lot 24 / DP1138317. The nature of the fill material was not assessed.	
Landscape Supplies Activities (AEC06)	Albion Park Landscaping Supplies occupies Lot 1 / DP 714125. The current commercial operations are situated north of the site, however, a portion of vacant land that has historically contained a large stockpile and equipment is within the site. Current and historical commercial operations may have included storage of potentially contaminated materials.	
Potential Coal Tar Asphalt Pavement (AEC07)	There is potential for existing remnant asphalt pavement within the site to contain coal tar. This includes pavement within Terry Street, Tripoli Way, The Expressway, Moles Street, Calderwood Road and the Illawarra Highway.	• Phenol • PAH
Potential Filling with Keith Grey Oval (AEC09)	A portion of Keith Grey Oval is situated in the south-eastern extremity of the site within Lot 1000 / DP813443. During construction of the oval imported fill may have contained contaminated material, solid waste and/or asbestos containing materials.	• Heavy metals • PAHs • TRHs • BTEXN • Phenols • OCP

6.3.2 Assessment Methodology

The investigation methodology of the DSI and the Remediation Action Plan included the following.

- Soil Investigation – targeted borehole sampling, collection of primary and stockpile soil samples.
- Visual inspection of the ground surface across the entire site.

- Laboratory Analytical Testing.
- Analysis and Reporting.

6.3.3 Assessment of Potential Impacts

The DSI indicated that Potential ACM and lead-based paint (flaking) was present at the dilapidated building at AEC3. Potential evidence of fill was observed at AEC5 (East) with stressed vegetation observed and topographical differences. Fill material was encountered in all AECs with the exception of AEC6. Minor surface hydrocarbon staining was observed within the vicinity of AEC3-6.

The elevation of the site topography ranges from 15 m AHD (in the west) to 9 m AHD (in the east), which is above the elevation of 5 m AHD up to which ASS materials are generally found. Works are unlikely to be more than 2m below the natural ground surface however, should this occur an Acid Sulphate Soils Management Plan shall be developed in accordance with the recommendations of the DSI.

The DSI identified a hotspot in the vicinity of AEC 3-6 require remediation and accordingly was further investigated by the Remediation Action Plan which determined that remediation, via excavation and disposal, was the most appropriate method for remediation.

The DSI and the subsequent Remediation Action Plan indicate that the Activity area can be made suitable for the proposed Activity subject to the mitigation and management measures detailed below.

6.3.4 Mitigation and Management Measures

Table 19 identifies safeguards and management measures that would be implemented to assess potential impacts of the project on Contamination, as outlined in the DSI.

Table 19: Mitigation and Management Measures for Contamination

No.	Impact	Environmental Safeguards	Responsibility
C1	Contamination remediation	• Remediation of AEC3-6 is to occur in accordance with the Remediation Action Plan (Raw Earth 2024).	Project Manager
C2	Contamination remediation	• Once remediation works associated with AEC3-6 have occurred a Site Validation Report is to be prepared to confirm that the site has been effectively remediated.	Project Manager
C3	Potential contamination	• A HAZMAT building survey of the dilapidated building in AEC3 will be undertaken.	Project Manager Contractor / consultant
C4	Identified contamination remediation	• Across the Activity area disposal of contaminated fill material will be in accordance with NSW Environmental Protection Authority, Waste Classification Guidelines Part 1: Classifying Waste, 2014.	Project Manager
C5	Potential contamination	• The Unexpected Finds Protocol for the discovery of contaminated materials such as underground storage tanks, ACM, odorous and/or stained soil material during excavation activities, as contained within the RAP (**Appendix J**), will be	Project Manager

No.	Impact	Environmental Safeguards	Responsibility
		prepared and implemented throughout construction works.	
C6	Potential contamination	• Should design plans change for the Activity in the future and the potential for significant soil excavation works or dewatering, contamination specialists may need to be engaged to re-attend site and undertake further soil or groundwater samples to ensure all potential contamination impacts to human health and the environment are addressed.	Project Manager Contractor
C7	Acid Sulphate Soils	• If excavation earthworks to more than 2 m below the natural ground surface or works by which the water table is likely to be lowered beyond 2 m below the natural ground surface, An Acid Sulphate Soil Management Plan (ASSMP) will be prepared for the excavation of natural soils in the northern portion of the site, based on testing results.	Project Manager Contractor / consultant

6.4 Flooding / Hydrology

A Flood Assessment was prepared by Cardno to examine flood behaviour within the Activity Area and inform the design of the TWE. A summary of findings is presented below, and the full flooding assessment is located at **Appendix K**.

6.4.1 Existing Environment

Catchment

The Macquarie Rivulet Catchment is located to the southwest of Lake Illawarra and covers a total catchment area of approximately 110 km2. The catchment extends from the Illawarra escarpment and runs for a distance of approximately 23 km before entering Lake Illawarra.

The catchment is dominated by rural landscapes with some existing urban development in Albion Park, Albion Park Rail, and the Illawarra regional airport.

The headwater area within the escarpment is very steep, falling from an elevation of 770 m AHD over a short distance before travelling across a relatively flat catchment to approximately sea level at Lake Illawarra.

A number of tributaries contribute to the wider catchment area, including the main Macquarie Rivulet, Frazers Creek, Marshall Mount Creek, Hazelton Creek, and Yellow Rock Creek.

Previous Studies

Council engaged WMA Water for the Macquarie Rivulet Flood Study (MRFS). The study utilised an extensive library of existing flood studies, research and data within the Macquarie Rivulet to create an array of hydrologic and hydraulic models. These models consider the entire Macquarie Rivulet catchment in combination with backwater flooding from Lake Illawarra.

The Macquarie Rivulet Floodplain Risk Management Study and Management Plan (FRMS&P) was adopted by Council in April 2024. The FRMS&P follows on from the MRFS. The MRFS determined the nature and extent of the flood problem within the Macquarie Rivulet catchment under existing conditions and was prepared in accordance with industry

guidelines. The FRMS&P seeks to investigate methods by which to reduce existing, future and continuing flood risk in the Macquarie Rivulet catchment and ultimately develop a Floodplain Risk Management Plan in accordance with best practice, which can be implemented by Council.

The EIS Study Area and Activity Area are located within the vicinity of the Macquarie Rivulet and would be directly impacted by flooding events.

6.4.2 Assessment Methodology

The scope of the hydrology and hydraulic investigation for the Flood Assessment includes the review, modelling and reporting at the 50%, 80% and 100% concept design phase. As part of the 50% design phase, hydraulic structures including three culverts and a bridge were sized. The bridge and road design were refined through additional modelling during the 80% concept design phase to inform the design. Following that, additional modelling was undertaken as part the 100% concept design submission to resolve offsite impacts as a result of the proposed road extension.

Detailed design of the Activity is currently underway and will be consistent with the adopted FRMS&P.

Flood Model

The most recent flood modelling adopted by Council was adopted for the flood assessment of the Activity. The model files comprise:

- Watershed Bounded Network Model (WBNM, 2012). WBNM is an advanced storage-routing model that allows simulation of catchment behaviour and key structures within a catchment and is a recognised network model in Australian Rainfall and Runoff.
- TULFOW model set-up and inputs can be found in the MRFS (2023). The MRFS model utilises a combined one and two dimensional hydrodynamic TUFLOW model to define flood behaviour within the catchment. Modifications to the existing model were made as part of this assessment to incorporate detailed earthworks designs from the Calderwood subdivision, which is located west and northwest of the TWE.

Flood Levels, Extents and Velocities

The 5% and 1% AEP design events were simulated for the 9-hour and 2-hour storm durations (critical duration). The culvert blockages were applied as specified in the MRFS and design criteria, as outlined in **Appendix K**. In its existing state, it is predicted that deeper inundation occurs within the watercourses immediately upstream of the proposed culvert and bridge located within the roadworks extents during the 1% AEP event. Existing flood extents for a 5% AEP event and velocities are shown in **Figure 18** and **Figure 19**, respectively. Existing flood extents for a 1% AEP event and velocities are shown in **Figure 18** and **Figure 19**, respectively.

Shallow inundation within the floodplain is demonstrated to the north of Hazelton Creek whilst deeper inundation occurs within the floodplain to the north of the Macquarie Rivulet. It should be noted that the existing culvert underneath Terry Street is at capacity in the 5% and 1% AEP event and causes overtopping over Terry Street. Depths of inundation is predicted to reach up to 1000 mm across the location of the overtopping flows in the 1% AEP event.

Figure 18: Existing 5% AEP Flood Extent

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- > 1.50

Figure 19: Existing 5% AEP Flood Velocities

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Velocity (m/s)

- 0 - 1
- 1 - 2
- 2 - 3
- > 3

Figure 20: Existing 1% AEP Flood Extent

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- > 1.50

Figure 21: Existing 1% AEP Flood Velocities

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Velocity (m/s)

- 0 - 1
- 1 - 2
- 2 - 3
- > 3

Hazard classification measuring vehicle trafficability (stability) for the Activity area was mapped according to criteria provided by the Australian Emergency Management Institute (2014). Descriptions of the classifications are provided below:

H1 - *Relatively benign flow conditions. No vulnerability constraints.*

H2 – *Unsafe for small vehicles.*

H3 – *Unsafe for all vehicles, children and the elderly.*

H4 – *Unsafe for all people and all vehicles.*

H5 – *Unsafe for all people and all vehicles. Buildings require special engineering design and construction.*

H6 - *Unconditionally dangerous. Not suitable for any type of development or evacuation access. All building types considered vulnerable to failure.*

A hazard classification of between H1 – H4 is predicted during a 1% AEP event in the western section of the Activity area, across the Illawarra Highway. The culvert crossing at Terry Street in the east, Calderwood Road, and Hamilton Road also have a hazard classification category of H5, with localised areas of the floodplain reaching a category of H6. During a 5% AEP event, the western extent of the Activity area has a category of H5, while the Terry Street culvert crossing is categorised as H1.

6.4.3 Assessment of Potential Impacts

Based on the design criteria, the TWE is designed to be flood immune in the 5% AEP event. Flood impact mapping showing the difference in the existing and proposed flood elevation has been calculated to demonstrate that there are no adverse hydraulic impacts due to the TWE.

Adverse impacts have been considered to be impacts that exceed the criteria adopted in the Hydrology and Flooding Assessment conducted previously for the Albion Park Rail Bypass by Hyder and Cardno in 2015. In this assessment the following flood level impact objectives were adopted for the relevant land zones:

- Less than 50 mm increase for 5% and 1% AEP events in houses, urban and commercial areas.
- Less than 100 mm increase for 5% and 1% AEP events in recreational areas.
- Less than 250 mm increase, with allowance for up to 400 mm increases (if localised within 5-hectare areas), for 5% and 1% AEP events in agricultural areas.

The proposed 5% and 1% AEP flood extent, velocity and flood impact mapping is shown in **Figure 22** to **Figure 25.**

Impacts up to 100 mm increase are predicted in the 5% and 1% AEP events at the proposed Calderwood Road tie in. Localised impacts are also predicted to the north of the Broughton Avenue / Illawarra Highway intersection. The impacts in both storm events are within road reserves and agricultural land.

An afflux of 480mm is also predicted directly adjacent to the TWE within the agricultural land in the 5% AEP event and a 440 mm afflux is predicted in the 1% AEP event within the agricultural area directly adjacent to the proposed box culvert structure near the Illawarra Highway intersection. The impacts in both storm events are within rural agricultural land and have no consequential damages.

Figure 22: Proposed 5% AEP Flood Extent

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- > 1.50

Figure 23: Proposed 5% AEP Flood Velocity

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Velocity (m/s)

- 0 - 1
- 1 - 2
- 2 - 3
- > 3

Figure 24: Proposed 1% AEP Flood Extent

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- > 1.50

Figure 25: Proposed 1% AEP Flood Velocity

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Flood Velocity (m/s)

- 0 - 1
- 1 - 2
- 2 - 3
- > 3

Figure 26: Flood Impact Mapping 5% AEP Event

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Change in Flood Levels (m)

- Was Wet Now Dry
- < - 0.4
- -0.4 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.4
- > 0.4
- Was Dry Now Wet

Figure 27: Flood Impact Mapping 1% AEP Event

Legend

- Study Area
- 1m Flood Height Contour
- Watercourse (LPI)
- Cadastre (NSW SS, 2019)

Change in Flood Levels (m)

- Was Wet Now Dry
- < - 0.4
- -0.4 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.4
- > 0.4
- Was Dry Now Wet

Mitigation measures such as the bridge structure and large box culverts to reduce the afflux were considered, however these measures did not correlate to any meaningful reduction in flooding levels. Impacts of the 1% AEP event within the proposed property acquisition boundaries are minimal and those impacts outside of the property acquisition boundaries are below the acceptable impacts criteria for agricultural land.

Impacts of 64 mm are predicted across Taylor Road immediately upstream of the Terry Street culvert in the 5% AEP storm however the depth of inundation across the road is greater than 150 mm in both the existing and the proposed scenarios. As such there is not expected to be a change in flood levels as a result of the Activity.

6.4.4 Mitigation and Management Measures

Table 20 identifies Mitigation and Management Measures that would be implemented to minimise potential impacts of the Activity on Flooding and Hydrology.

Table 20: Mitigation and Management Measures for Flooding and Hydrology

No.	Impact	Environmental Safeguards	Responsibility
F1	Residential inundation and runoff	• Adequate drainage systems are in place to alleviate runoff capabilities	Project Manager
F2	Ancillary site flooding	• Ancillary sites are not to be established in flood prone areas unless an assessment is undertaken by the contractor with an appropriate flood management plan developed or approval by Council.	Project Manager
F3	Surface water accumulation	• Appropriate drainage design be developed and implemented at ancillary sites.	Project Manager

6.5 Aboriginal Heritage

An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared by Extent Heritage Pty Ltd and is provided in **Appendix L**.

The ACHAR was prepared in general accordance with the Code of Practice for Archaeological Investigation in NSW (DECCW 2010) and guided by the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH 2011). The following provides a summary of the ACHAR.

6.5.1 Existing Environment

Recent research has identified the potential that Aboriginal peoples have inhabited Australia for at least 65,000 years and possessed a distinctive stone tool assemblage. The Illawarra region is the traditional land of the Wodi Wodi, a group of people who spoke a variant of the Dharawal language. The area occupied by this group extended from Botany Bay down the coast to around Nowra. Early historic references record Aboriginal groups moving frequently between the coast and the escarpment and travelling for special ceremonies, although camps were also noted along the coast and coastal plains. However, during the 19th and 20th centuries, the arrival of settlers to the Illawarra, created competition for resources, which restricted the movement of Aboriginal inhabitants, and their traditional lifestyle was severely affected.

Extensive Aboriginal heritage assessments have been completed within the vicinity of the Study Area and are detailed further in **Appendix L**.

An extensive search of the AHIMS database were undertaken on 21 July 2022. Land surrounding the Study area was included within the search parameters to gain information

on the regional archaeological context and inform predictive statements regarding the archaeological potential of the study area. The AHIMS search results identified 62 registered sites. There are 20 standard AHIMS site features and a site can include more than one feature. The frequency of AHIMS site features in the Study Area is included in **Table 21**.

Table 21: AHIMS Sites within the Vicinity of the Study Area

Site Feature	Number	Frequency (%)
Isolated Artefact	26	42%
Artefact(s)	22	35%
Artefact(s), Potential Archaeological Deposit (PAD)	6	10%
PAD	8	13%
Total	102	100%

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area.

Large parts of the Study area have been subject to significant ground disturbance, such as the initial agricultural activities inclusive of intensive grazing and cultivation, road infrastructure and the development of residential subdivisions in Albion Park. The disturbances observed within the study area have had an influence on site heritage integrity.

6.5.2 Assessment Methodology

The ACHAR was prepared in general accordance with:

- The *Code of Practice for Archaeological Investigation in NSW* (DECCW 2010).
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH 2011).
- Aboriginal cultural heritage consultation requirements for proponents 2010 [the Consultation Requirements] (DECCW 2010b).
- The Burra Charter 2013 (Australia ICOMOS 2013).

The assessment involved three main components, consultation, a desktop study and an archaeological field survey and test excavation. An outline of these components is outlined below and further documented within **Appendix L.**

Consultation

Consultation for the Activity commenced early February 2023. Consultation with Aboriginal stakeholders was conducted in accordance with the Aboriginal cultural heritage consultation requirements for proponents (DECCW 2010).

The consultation process resulted in the identification of 13 Registered Aboriginal Parties (RAPs) as detailed in **Table 22**.A follow-up email formally acknowledging their registration and presenting the Activity was sent on 15 February 2023.

Table 22: Registered Aboriginal Parties

Organisation
Freeman & Marx
Gumaraa Aboriginal Experience Pty Ltd
Wodi Wodi Traditional Owner

Organisation
Kamilaroi Yankuntjatjara Working Group
Thoorganura
Tungai Tonghi
Illawarra Local Aboriginal Land Council
South Coast People via NTSCorp
Gunjeewong Cultural Heritage Aboriginal Corporation
Coomaditchie
Murra Bidgee Mullangari Aboriginal Corporation
Woronora Plateau Gundungara Elders Council

A copy of the proposed ACHAR survey methodology was provided to the RAPs for review on 26 June 2023 following confirmation of site access. At the end of this period, no comments were received.

A copy of the proposed test excavation methodology was provided to the RAPs for a 28-day review on 20 September 2023. At the end of this period, only one group (Gumaraa) provided a comment on the proposed methodology acknowledging receipt of the email.

Desktop review

Desktop review included the following.

- Review of existing archaeological data, including assessments previously completed within the vicinity of the Activity area and relevant heritage databases.
- Investigation of the environmental context of the EIS study area.
- Synthesise background information into a predictive model to inform an assessment of archaeological potential across the EIS study area.
- AHIMS searches.

Archaeological Investigation

The archaeological investigation included a full coverage survey of the EIS study area to test the results of predictive modelling and further inform an assessment of archaeological potential. The archaeological investigation included a site survey followed by separate text excavations.

Site Survey

Aboriginal site officers from two separate RAPs, as listed below, participated in the archaeological site survey on 19th July 2023.

- Wodi Wodi Traditional Owner.
- Illawarra Local Aboriginal Land Council.

Test Excavations

The test excavation program was carried out in three sessions between 4 December 2023 and 17 January 2024. Along with Extent Heritage, representatives from the Illawarra Local Aboriginal Land Council, South Coast People, Wodi Wodi Traditional Owner, and Woronora Plateau Gundungara Elders Council undertook the excavations and provided cultural knowledge and expertise. **Table 23** lists all participants in the test excavation program.

Table 23: Participants in the Test Excavation Program

Organisation	Role
Illawarra Local Aboriginal Land Council	Traditional owner representatives
(Wodi Wodi Traditional Owner)	Traditional owner representatives
South Coast People	Traditional owner representative
Woronora Plateau Gundungara Elders Council	Traditional owner representative

6.5.3 Assessment of Potential Impacts

The test excavation program investigated TWE_PAD1, TWE_PAD2, the Eastern Transect, and Hamilton Road as illustrated in **Figure 28**. The investigations revealed Aboriginal archaeological remains across TWE_PAD1, TWE_PAD2, the Eastern Transect, and Hamilton comprise low-density background scatters.

One isolated surface artefact, Tulkeroo ISO: ground edge axe (AHIMS ID 52-5-0961), was identified as having been imported to the site with a deposit of introduced gravels.

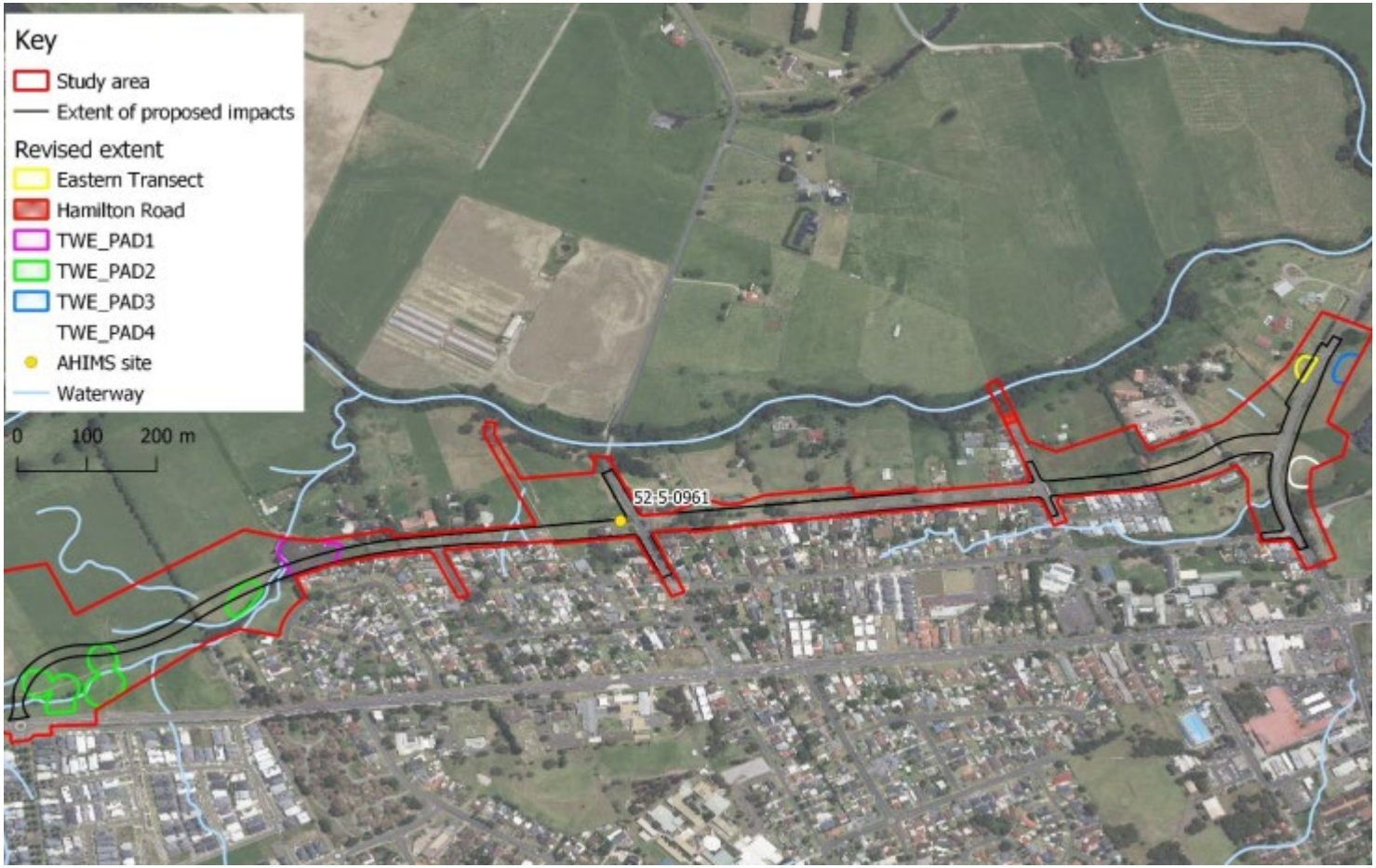
All the identified artefacts and assemblages, and their wider sites, were assessed as having low scientific value due to the limited assemblage which restricted detailed analysis and information that could contribute substantially to the understand of Aboriginal archaeology and cultural heritage in the region.

The Activity area was determined to have low aesthetic and historical significance, but Community consultation acknowledged the social important of the continued occupation of the wider Illawarra area and use of its resources over many generations.

No archaeological investigations of TWE_PAD3 and TWE_PAD4 were carried out as they would not be impacted by the proposed Activity. These two areas still hold archaeological potential and unknown significance.

An Aboriginal Heritage Impact Permit (AHIP) is required to authorise harm to the Aboriginal sites identified and registered with AHIMS that are located within the study area. These sites cannot be impacted until an approved AHIP has been obtained, and all impacts must conform with the AHIP conditions.

Figure 28: Areas of Proposed Impacts in Relation to Areas of Identified Archaeology.



6.5.4 Mitigation and Measurement Measures

The following recommendations have been formulated to respond to the need for the TWE and the significance of the site. The recommendations are presented in **Table 24**.

Table 24: Mitigation and Management Measures for Aboriginal Heritage

No.	Impact	Environmental Safeguards	Responsibility
AH1	Impacts to Aboriginal Heritage	• Prior to construction works commencing an AHIP is to be obtained for all Aboriginal sites identified and registered with AHIMS within the Activity area.	Project Manager
AH2	Potential impacts to Aboriginal Heritage	• If the proposed concept design changes during the course of the project and results in anticipated impacts to TWE_PAD3 and TWE_PAD4, a test excavation program must be undertaken prior to harm.	Project Manager Contractor
AH3	Impacts to unexpected Aboriginal heritage	• Throughout the duration of the construction works the following procedures must be followed. ○ Immediately cease all activity at the location. ○ Ensure no further harm occurs, secure the area. ○ Notify the Manager Project Delivery, Shellharbour City Council. The Council contact is to advise the Illawarra Local Aboriginal Land Council Aboriginal Sites Officer and the Department of Housing, Planning and Infrastructure (DHPI). ○ No further action to be undertaken until the required investigations have been completed and any permits or approvals obtained, where required, in accordance with the *National Parks and Wildlife Act 1974*.	Project Manager Contractor
AH4	Potential Impact to Aboriginal ancestral remains	• If human remains are found during the works, then all works shall cease immediately. The area must be secured within an exclusion zone to prevent unauthorised access and the NSW Police and DHPI must be informed as soon as possible.	Project Manager Contractor
AH5		• An appropriate Keeping Place or reburial site must be determined to house the Aboriginal objects. The location of this Keeping Place must be chosen in consultation with the RAPs and Illawarra LALC.	Project Manager Contractor
AH6		• If changes are made to the proposed works which result in impact to locations outside of the current study area, further archaeological investigation and survey may be required.	Project Manager Contractor

6.6 Environment Heritage

A Historic Heritage Assessment and a Statement of Heritage Impact (SoHI) for the Activity has been prepared by Biosis and is contained **Appendix M**. The Assessment investigated the historical background of the Albion Park area and in doing so identified various heritage features of the town that have the potential to be impacted upon by the Activity. The SoHI identifies impacts and details the range of mitigation measures that should be employed to ensure the retention of Albion Park's historical past. A summary of the findings from the Assessment and SoHI are presented below.

6.6.1 Existing Environment

The Illawarra district was first noted by James Cook in 1770 when he located the headland of Port Kembla, naming it 'Red Point'. He also identified a large hill which looked like the crown of a hat. This was Mount Kembla, which was known as Hat Hill in the early days of the settlement. The Illawarra region was attractive not only for its rich pasture, but also for its Red Cedar, which was exploited by the early timber cutters.

Between the cattlemen and the cedar cutters, passage into the Illawarra region was found. The first settlement in the Illawarra region was established by Charles Throsby in 1815, who cut a cattle track from Glenfield and spent his first night in the Illawarra at Bulli.

The Activity Area is situated in what would become the Shellharbour district. Surveyor-General John Oxley was sent to the Illawarra region to make a general survey of the area and to connect it to the known parts of the colony, as well as identify specific lands for prospective grantees. The first five grants in the Illawarra region were made in 1821 to absentee landlords, who ran cattle on their lands with a few stockmen present.

By 1829, most of the land grants within the current Shellharbour district had come under the control of four families:

- Wentworth, Peterborough Estate, 14,050 acres (5,686 hectares)
- Johnston, 'Johnston's Meadows' later known as 'Weston's Meadows', 2,800 acres (1,133 hectares)
- Terry and Hughes, 'Terry Meadows', later known as 'Albion Park', and 'Tongarra', 5,300 acres (2,145 hectares)
- Osbourne, 'Marshall Mount', 2,860 acres (1,157 hectares).

The Activity Area is situated within the original land grant made to Samuel Terry – Terry Meadows.

The review of historical documents provide evidence to the potential archaeological remains that may exist within the vicinity of the Activity Area. This research coupled with extensive desktop review of Federal, State, and local Heritage registers has identified a list of Heritage items and sites to be studied in order to determine the extent of any impact caused from the Activity. **Table 25** details the heritage items identified within the Activity Area or within the vicinity of the Activity Area.

Table 25: Summary of Heritage Listings Within or Within Proximity to the Activity Area

Site Number	Site Name	Address/Property Description	Individual Item	As a Conservation Area	Significance
Items within or partly within the Activity Area					
I001	Tulkeroo Homestead and Albion Park Butter Factory (Former)	23 Calderwood Road, Albion Park, Lot 1 DP 910045	Shellharbour LEP		Local
I138	Boles Meadows	2105 Illawarra Highway, Albion Park, Lot 1001 DP 81344	Shellharbour LEP		Local
I301	Albion Park Showground	Tongarra Road, Albion Park, Lot 1000 DP 813443	Shellharbour LEP		Local
Items within the vicinity of the Activity Area					
I012	St Andrews Presbyterian Church and tree	253 Tongarra Road, Albion Park, Lot 250 DP 109226	Shellharbour LEP		Local
I011	Albion Park School and headmasters' residence	154-156 Tongarra Road, Albion Park, Lot 1 DP 782244	Shellharbour LEP		Local
I010	ES&A Bank (Former)	148 Tongarra Road, Albion Park, Lot 4 DP 703238	Shellharbour LEP		Local
I015	All Saints Anglican Church and tree	253 Tongarra Road, Albion Park, Lot 2 DP 227785	Shellharbour LEP		Local
I014	Anglican and Roman Catholic cemeteries	247-253 Tongarra Road, Albion Park, Lot 2 DP 227785, and Lot 7004 DP 1124374			
I208	Condon's Surgery	175 Tongarra Road, Albion Park, Lot 1 DP 1088776	Shellharbour LEP		Local

6.6.2 Assessment Methodology

The Assessment and SoHI were conducted and prepared in accordance with current heritage guidelines including Assessing Heritage Significance, Assessing Significance for Historical Archaeological Sites and 'Relics' and the Burra Charter.

The Assessment involved three main components, a desktop study, a physical inspection and a significance assessment. Inclusions to these components of the assessment are further documented within **Appendix M**.

Heritage items within or within proximity of the Activity Area are shown in **Figure 29**

Figure 29: Heritage Items Within or Within Proximity of the Activity Area

Legend

Study area

Local heritage item

Item - General

Item - Landscape

6.6.3 Assessment of Potential Impacts

Impacts of the Activity can be quantified under three main categories:

- Direct Impacts – direct impacts are where the completion of the development will result in a physical loss or alteration to a heritage item which will impact the heritage value or significance of the place. Direct impacts can be divided into whole or partial impacts. Whole impacts essentially will result in the removal of a heritage item as a result of the development whereas partial impacts normally constitute impacts to a curtilage or partial removal of heritage values.
- Indirect Impacts – indirect impacts to a heritage item relate to alterations to the environment or setting of a heritage item which will result in a loss of heritage value. This may include permanent or temporary visual, noise or vibration impacts caused during construction and after the completion of the development. Indirect impacts diminish the significance of an item through altering its relationship to its surroundings; this in turn impacts its ability to be appreciated for its historical, functional, or aesthetic values.
- No Impact – this is where the project does not constitute a measurable direct or indirect impact to the heritage item.

A summary of potential impacts to heritage items is provided in **Table 26**..

Table 26: Assessment of Impacts Heritage Items Within or Within the Proximity to the Study Area

Heritage Item	Significance	Discussion	Assessment
Items within or partly within the Study Area			
Tulkeroo Homestead and the Albion Park Butter Factory (Former)	Local	This item comprises two buildings and the curtilage of both. • The manager's residence or Tulkeroo Homestead ("Tulkeroo"), constructed in 1885. • The demolition of the Albion Park Butter Factory (Former) building will have a significant negative effect on the heritage significance of the item as a whole (i.e., loss of connectivity associated with industrial/agricultural use and adjacent manager's residence), and will result in a loss of local heritage, which is significant for its local historical contribution, rarity and representativeness, technical achievement, and association with individuals and local groups. • Any bulk earthworks, vegetation clearing, relocation and installation of sub-surface services, construction of the roadway, and landscaping and remedial works are highly likely to disturb or remove any intact archaeological deposits within the area of high archaeological potential, which may contain remains of equipment/machinery positioning, yard surfaces, footings, well, secondary deposits, artefact scatters, cut and fill deposits, postholes and associated cuts and deposits. The archaeological resource has the potential to be valuable in answering research questions relating to	Direct physical impact- whole

Heritage Item	Significance	Discussion	Assessment
		late-19th and early-20th century industrial technology involved in the factory production of butter, including the equipment, tools and materials used in the process. This information could then be compared with other similar sites outside of the Shellharbour district to consider how this site differs from others. • The archaeological resource also has the potential to contribute to knowledge regarding the lives of John Fraser, Desmond King and their families, and the kinds of private lives they lived. • The works will also result in a direct impact to the relict evolved rural landscape within the heritage item. The concept design has adopted an alignment that will require the demolition of the Albion Park Butter Factory, and hence have a direct impact, however, the measures proposed will be implemented to minimise the indirect impacts. • The Visual Condition Report for the Albion Park Butter Factory building notes that the structural elements of the building appear to be significantly inadequate to modern Australian building standards and codes. Any construction work to rectify this would also likely involve damage to or removal of original fabric. While this may potentially detract from the heritage significance of the building, maintenance and conservation works would enable the continued use and/or public enjoyment of the Albion Park Butter Factory (Former).	
		• The removal of the Butter Factory structure and construction of the road will result in an indirect visual impact to Tulkeroo Homestead, the setting of the heritage item as a whole and views to and from the heritage item. The setting and views will be permanently altered through the construction of the new road. • The Shellharbour Development Control Plan states in Section 28.312 that development at Tulkeroo Homestead and Albion Park Butter Factory (Former) must retain the visual relationship between the buildings and the Macquarie Rivulet. This relationship contributes to the heritage significance of the item and if disrupted will detract from the item's significance. • The current concept designs include some detail for landscaping, but it is noted that this is to be refined at detailed design stage. The concept designs do not include provision for any noise barrier structures. Appropriate landscaping and noise barriers could be used to reduce visual and noise impacts to Tulkeroo Homestead. • The Program of works will also have temporary and potentially permanent indirect	Indirect impact-visual, noise and vibration.

Heritage Item	Significance	Discussion	Assessment
		impacts to Tulkeroo Homestead. The construction of the road will result in a permanent visual impact, disrupting views to and from Tulkeroo Homestead and the relict evolved rural landscape. • Temporary noise and vibration impacts may also occur during works as a result of plant and movement of materials. Vibration impacts could potentially impact subsurface deposits or parts of the structure that are vulnerable to disturbance, such as elements that require repair or maintenance. These impacts are unavoidable due to the nature of works required.	
Boles Meadows	Local	The works will have temporary indirect impacts to Boles Meadows and will likely consist of temporary visual and noise impacts. However, temporary impacts will only occur during the construction phase and will be resolved upon completion of the project and is unlikely to affect the significance of Boles Meadows.	Indirect impact-visual and noise
Albion Park Showground	Local	The works will have temporary indirect impacts to the Albion Park Showground and will likely consist of temporary visual and noise impacts. However, temporary impacts will only occur during the construction phase and will be resolved upon completion of the project and is unlikely to affect the significance of the Albion Park Showground.	Indirect impact-visual and noise
Items Within the Vicinity of the Study Area			
St Andrews Presbyterian Church and tree	Local	St Andrews Presbyterian Church and tree is located 100 m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise
Albion Park School and headmasters' residence	Local	Albion Park School and headmaster's residence is located 45m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise
ES&A Bank (Former)	Local	ES&A Bank (Former) is located 115m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise
All Saints Anglican Church and tree	Local	All Saints Anglican Church and is located 200m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise
Anglican and Roman Catholic cemeteries	Local	Anglican and Roman Catholic cemeteries is located 200m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise
Condon's Surgery	Local	Condon's Surgery is located 200m south of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item.	Indirect impact-visual and noise

Heritage Item	Significance	Discussion	Assessment
"Riversford"	Local	"Riversford" is located 295m west of the Study Area. Any proposed development may result in a minor noise and visual impact; however, this is unlikely to affect the significance of the item. It is understood that the homestead building within this item has been demolished	Indirect impact-visual and noise

A Structural Assessment of the Albion Park Butter Factory (former) has been carried out and is contained in **Appendix X**. The Assessment concluded that the overall building is in poor to fair condition and the structural integrity of some of the building elements have been compromised.

The Activity would result in the complete demolition of the Albion Park Butter Factory (former) building thus removing its heritage significance. The removal of the Albion Park Butter Factory (Former) and the construction of the Activity in this location will have a significant visual impact on the views to and from Tulkeroo Homestead and will disrupt the setting of the heritage item as a whole.

The alignment of the Activity has been determined by Council through a process of design development which included consideration of two alignment options that avoided the former Albion Park Butter Factory building. Having regard for flood impacts and associated flood mitigation measures and the likely area of property acquisition and demolition required, the concept design as adopted within this EIS, refer to **Appendix A**, was chosen as the preferred option.

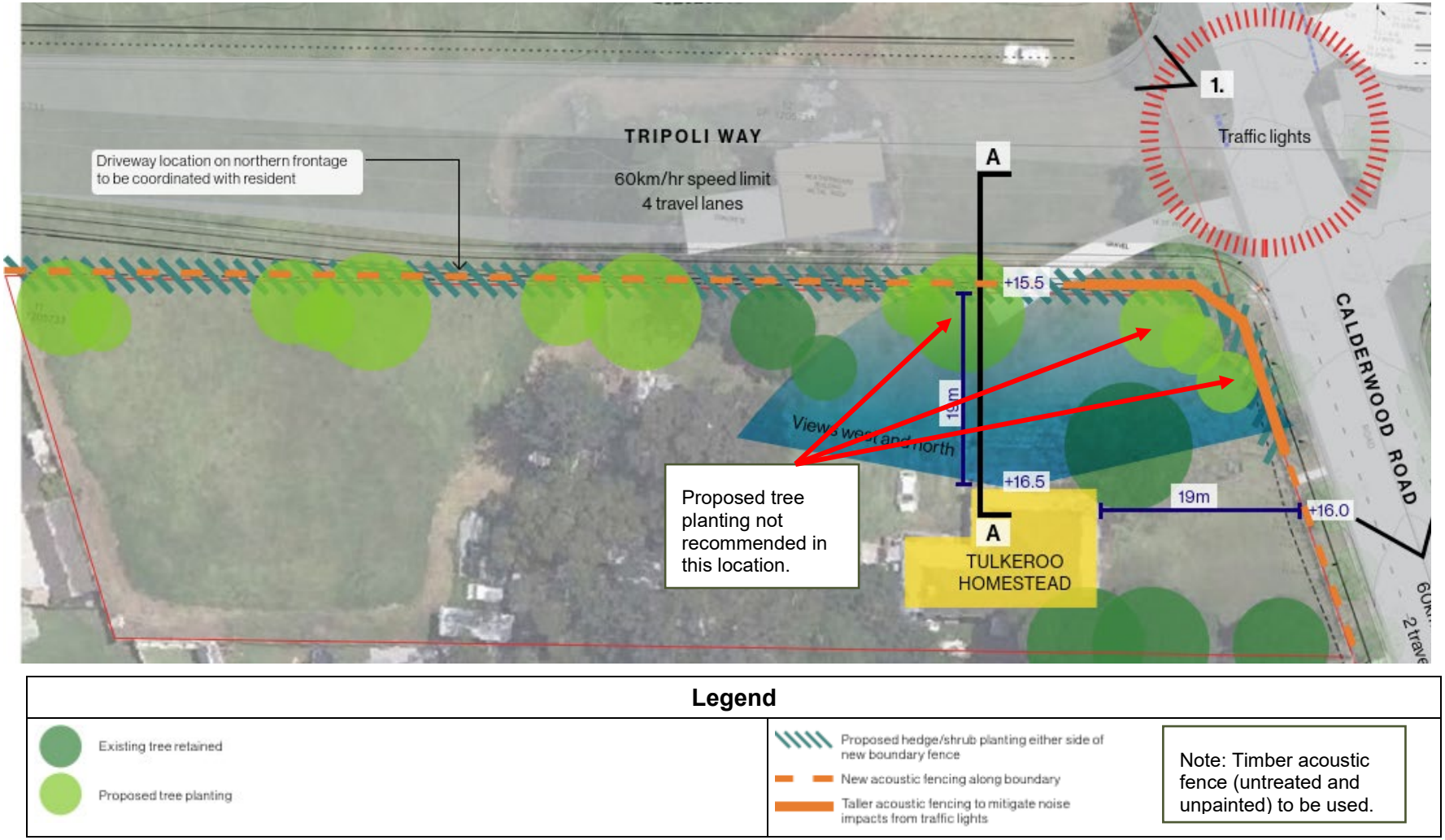
A design solution to reduce the permanent and temporary indirect impacts to the Tulkeroo Homestead, in the form of screening and landscape treatment has been prepared by Group GSA and is contained in **Appendix N**, with the treatment concept illustrated in **Figure 30**.

The combined screening and landscape treatment around the Tulkeroo Homestead has been considered by Biosis (author of the Historic Heritage Assessment and SoHI) and their assessment of the proposed treatment is contained in in **Appendix O**. Details of the acoustic screening and landscape treatments will be confirmed following consultation with the landowner.

A number of general permanent and temporary indirect impacts will also occur during construction works, including visual, noise and vibration impacts.

In relation to Boles Meadows and Albion Park Showground, the proposed works will have indirect impacts on the two heritage items and include temporary visual, noise and vibration impacts during works. However, temporary impacts will only occur during the construction phase and will be resolved upon completion of the Activity and not result in any lasting impacts to Boles Meadows and Albion Park Showground.

Figure 30: Concept for Screening and Landscape Treatment around Tulkeroo Homestead



6.6.4 Mitigation and Management Measures

The measures within **Table 27** will be implemented to mitigate direct and indirect impacts.

Table 27: Mitigation and Management Measures for Historical Heritage

No.	Impact	Environmental Safeguards	Responsibility
H1	Loss of heritage significance and documentation	• Prior to construction in the vicinity of the Albion Park Butter Factory (Former) building, a detailed archival recording should be undertaken to document its relationship with Tulkeroo Homestead and the wider setting of the heritage item. Archival recordings should be undertaken in accordance with the NSW Heritage Office documents How to Prepare Archival Records of Heritage Items (Heritage Office 1998) and Photographic Recording of Heritage Items Using Film or Digital Capture (Heritage Office 2006). This should include both photographic and architectural recordings.	**Consultant Archaeologist Project Manager**
H2	Loss of heritage significance and documentation	• Screening and landscape treatments around Tulkeroo Homestead are to be generally in accordance with the Concept Plans contained in **Appendix N** and the advice provided in **Appendix O.** Details of the acoustic screening and landscape treatments will be confirmed following consultation with the landowner.	Project Manager
H3	Construction Impacts	• Establish an exclusion zone along the boundary between Lots 11 and 12, DP 1205733 to protect and minimise any potential damage to Tulkeroo Homestead which could occur during construction.	Project Manager
H4	Construction Impacts	• Use discrete fencing to minimise the temporary visual impact of the works on Tulkeroo Homestead and the site setting.	Project Manager
H5	Construction Impacts	• On a fort nightly basis, monitor the impact of any temporary noise or vibration from construction works so as to mitigate any potential physical damage that these may cause to Tulkeroo Homestead.	Project Manager
H6	Loss of heritage significance and documentation	• An interpretation strategy and plan is to be developed as part of the Activity to ensure that the history and context of the study area is recorded.	Project Manager

6.7 Landscape Character and Visual

6.7.1 Existing Environment

Key landscape features at the site include the Illawarra Highway, Broughton Avenue, Calderwood Road, and Terry Street. These road features are present within a mixed setting that comprises vegetation adjacent to roads and along medians and verges.

In addition to this, open rural areas occupy the western extent of the Activity Area as well as grasslands and the Macquarie Rivulet to the north. To the west the TWE is bordered by the Illawarra escarpment and surrounding hills that create a visually appealing backdrop for residencies in the area.

The alignment will traverse along residential properties towards the central and eastern extents of the Activity Area. Key landscape features of the existing environment are provided in **Appendix P**.

6.7.2 Assessment of Potential Impacts

Construction

The works are likely to result in short term visual impacts during the construction phase due to the use of construction equipment, stockpiling and storage of materials and establishment of ancillary sites. These impacts would be most visible from the Illawarra Highway, Tripoli Way, and Terry Street. The construction area would also be visible from the Calderwood residential subdivision which is located to the west and north-west of the Activity Area.

Operation

Once operational, the Activity would result in localised changes to visual amenity in almost all areas of the alignment. Due to much of the existing western extent being rural landscape, the development of a road will have a visual impact on residents bordering the Illawarra Highway at Tullimbar and the current and future residents at Calderwood Valley subdivision. The existing residents in the middle portion of the alignment will be visually impacted by a four-lane road running parallel to their front and rear boundaries.

Landscape and visual impacts to the eastern extents of the Activity Area will be seen from the existing Illawarra Highway/Terry Street intersection as well as traffic flow running north/south on the Illawarra Highway, connecting to the Princes Highway. Users of the Albion Park Showground, which is east of the Activity area, may experience a change in visual amenity due to the position of the intersection at the eastern extent of the alignment with Terry Street. Photomontages of the proposed Activity are contained in **Appendix Q**. Project Fly Through images, extracted from the Tripoli Way Project page of Councils' website are contained in **Appendix R**.

6.7.3 Mitigation and Management Measures

Table 28 identifies mitigation and management measures that would be implemented to reduce visual amenity impacts.

Table 28: Safeguards and Management Measures for Landscape and Visual Amenity

No.	Impact	Environmental Safeguards	Responsibility
V1	Some short-term visual impacts would result from the works due to disturbed areas, site fencing, machinery and equipment working on the Illawarra Highway, Tripoli Way, and Terry Street.	• Work areas near residential dwellings must be fenced and include the use of visual screening (shade cloth or similar). • Lights utilised for night works will be directed away from residential dwellings and roadways to minimise light impacts on surrounding residential areas. • The site must be kept neat and clean of general litter and neat for the duration of works.	Contractor
V2	Longer term impacts on visual amenity	• The vegetation management plan contained in Appendix G shall be implemented. • A detailed landscaping plan shall be prepared in conjunction with detailed design of the construction works.	Project Manager Contractor

6.8 Land and Water Use

6.8.1 Existing Environment

The Activity Area is surrounded by existing residential dwellings, predominately located to the south and by a mixture of Primary Production, Rural Landscape and Transition zoned land to the north. Various segment lengths of the Activity Area are already within the control of SCC, whilst other segments are zoned SP 2 Infrastructure under SC LEP 2013 and are subject of acquisition by SCC. Potential sensitive receptors to impacts associated with construction and operation of the Activity are largely located on the southern side of Activity Area, with approximately ten (10) residences located on the northern side.

Hazelton Creek runs through the western portion of the Activity Area and in this location, Hazelton Creek is a 3rd order ephemeral waterway.

Construction of the Activity is unlikely to require large scale excavation, particularly having regard for the proposed bridge design over Hazelton Creek.

6.8.2 Assessment Methodology

A desktop study of environment data sources was undertaken to identify existing land uses and water resources and included:

- NSW Planning Portal Spatial Viewer.
- NSW Six Maps.
- Key Fish Habitat Mapping, DPI Fisheries website.
- Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings, DPI Fisheries website.
- Policy and guidelines for fish habitat conservation and management, DPI Fisheries, 2003.
- Controlled Activities - Guidelines for instream works on waterfront land, DPE 2022.
- Controlled Activities - Guidelines for watercourse crossings on waterfront land, DPE 2022.

A Land Use Conflict Risk Assessment (LUCRA), that explores potential conflicts affecting existing or proposed agricultural developments as a result of the Activity, has been carried out. The LUCRA report is contained in **Appendix S** and has been prepared generally in accordance with the Department of Primary Industries – Agriculture (DPI - Agriculture) Land Use Conflict Risk Assessment Guide.

6.8.3 Assessment of Potential Impacts

Construction

Land Use

The construction phase of works would result in land use impacts from reduced access, increased congestion and reduced visual amenity in the locality. These impacts have the potential to reduce the short-term attractiveness of the area. Given the direction of the alignment and most of the works being away from the main arterial roads in Albion Park it is anticipated that the current condition and use of these roads will not be significantly impacted.

Notification of construction works and potential for delays will be provided to the public. Variable messaging signs may be used to inform road users of imminent construction works and restricted speed limits.

During construction it is likely that approximately 4.3 hectares ha of RU2 zoned land will be disturbed. Construction of the Activity will not prohibit existing agricultural land uses on the surrounding lands.

Water Use

The Activity will not cause any change in the course of Hazelton Creek. Interference with the groundwater aquifer is unlikely to require an aquifer interference licence. Scour protection will be provided at the base of each side of the proposed bridge using rip rap and revegetation. Stabilisation and rehabilitation of all disturbed areas along the creek, including topsoiling, revegetation, mulching, weed control and maintenance will occur in order to adequately restore the integrity of the riparian corridor. As far as possible the works will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek. Likewise, should a temporary crossing across Hazelton Creek be required, it shall be designed and constructed in accordance with the *Controlled Activities - Guidelines for instream works on waterfront land* (DPE, 2022), *Controlled Activities - Guidelines for watercourse crossings on waterfront land* (DPE, 2022)*, Fish Passage Requirements for Waterway Crossings* (DPI Fisheries, 2003) and *Policy and Guidelines for fish habitat conservation and management*, (DPI Fisheries, 2013).

Operation

Land Use

The Activity will result in permanent traffic movement changes patterns with left in left out arrangements along the new roadway. Access to residents' driveways along Tripoli Way will be left in / left out with the addition of a central median.

Once construction is complete and the TWE is operational it is likely that up to 2.6 ha of the 4.3 ha of disturbed land will be remediated to existing conditions (grazing land). The remaining 1.7 ha will be occupied by the road and its associated infrastructure. The amount of land suitable for agriculture that would be lost is relatively small (i.e. 1.7 ha). It is considered that the operation of the Activity will not prohibit existing agricultural land uses on the surrounding lands and the direct impact to local agricultural land and production is therefore considered acceptable.

Water Use

Providing that works within the riparian corridor are designed in accordance with *Controlled Activities - Guidelines for instream works on waterfront land* and *Controlled Activities - Guidelines for watercourse crossings on waterfront land*, stabilisation and rehabilitation of all disturbed areas along the creek will restore the integrity of the riparian corridor and will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.

6.8.4 Mitigation and Management Measures

Table 29 identifies safeguards and management measures that would be implemented to assess potential impacts of the project on Land and Water Use.

Table 29: Mitigation and Management Measures for Land and Water Use

No.	Impact	Environmental Safeguards	Responsibility
L&W1	Short-term changes during construction	• The CEMP for the Activity shall include Notification Procedures for the informing of the public of construction works and potential for delays.	Contractor
L&W2	Construction impacts of Hazelton Creek	• All works within the riparian corridor are designed in accordance with Controlled Activities - *Guidelines for instream works on waterfront land* and *Controlled Activities - Guidelines for watercourse crossings on waterfront land*, to ensure that stabilisation and rehabilitation of all disturbed areas along the creek will restore the integrity of the riparian corridor and will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.	Contractor

6.9 Noise and Vibration

A Noise Impact Assessment was prepared and is contained in **Appendix T**. A summary of the findings of the Assessment is provided below.

6.9.1 Existing Environment

The existing noise environment for the Activity Area is consistent with a typical suburban area. Ambient noise affecting residential receivers is primarily caused by varying levels of traffic. There is little acoustic impact to residents from industrial or commercial activities. Some moderate impact to the area may be experienced from overhead aircraft using the nearby Shellharbour Airport. The proposed Activity is located in a semi-rural area, with low density residential to the north, and adjacent to some higher density residential areas to the south.

Sensitive receivers immediately adjacent to the TWE are predominantly residential receivers located on the southern side of Tripoli Way, with some receptors at greater distances from the road, on the northern side of Tripoli Way. There are some commercial shops, the Albion Park-Shellharbour Presbyterian Church and Albion Park Public School located south of Tripoli Way, but north of Tongarra Road. Albion Park Anglican Church, St Paul's Catholic Church, and St Paul's Catholic Primary School are located immediately south of Tongarra Road and up to 250 metres south of the TWE. Most commercial shops are located southeast of the Activity area.

Sensitive receivers are shown in **Figure 11** in **Section 6.1** of this EIS.

The observed noise environment that would affect measured noise levels at each monitor along the alignment is summarised in **Table 30**. This environmental descriptor assists in determining key sources of noise impacts associated with project construction and operational noise.

Table 30: Observed Existing Noise Environment

Logger	Location	Observed Noise Environment
1	3 Broughton Avenue, Tullimbar	The primary source of noise was from traffic on Tongarra Road. Noise generated by high wind speeds was also recorded.
2	23 Calderwood Road, Albion Park	The primary source of noise was from rustling leaves due to relative high wind speeds. Noise as a result of intermittent traffic on Calderwood Road was also observed. Traffic noise from Tongarra Road was also recorded.

Logger	Location	Observed Noise Environment
3	6 Tripoli, Albion Park	The primary source of noise was from rustling leaves due to relatively high wind speeds. Noise as a result of intermittent traffic on Tripoli Way was also observed. Traffic noise from Tongarra Road was also recorded.
4	12 Hamilton Road, Albion Park	The primary source of noise was from rustling leaves due to relatively high wind speeds. Noise as a result of intermittent traffic on the local roads were also observed. Traffic noise from Tongarra Road was also noticed. Noise from domestic activities within the dwelling was also identified.
5	28 Terry Street, Albion Park	The primary source of noise was from traffic on Terry Street. Noise generated by rustling leaves was also identified.

Existing background noise levels were determined in accordance with the Noise Policy for Industry (EPA, 2017), with Rating Background Noise Level (RBL) used for assessment purposes. The single figure RBL represents each assessment period (day/evening/night) over a 24-hour measurement period. The measured RBL of the existing project area is shown in **Table 31**.

Table 31: Rating Background Noise Level

Logger	Location	Measured Rating 07:00-18:00	Background Noise Level 18:00-22:00	Db(A) 22:00-07:00
1	3 Broughton Avenue, Tullimbar	45	33	27
2	23 Calderwood Road, Albion Park	39	33	30
3	6 Tripoli, Albion Park	41	35	29
4	12 Hamilton Road, Albion Park	38	34	28
5	28 Terry Street, Albion Park	50	43	33

6.9.2 Assessment Methodology

Unattended Noise Monitoring Methodology

Unattended noise monitoring was conducted between 4 and 12 September 2017 at the following locations.

- Logger 1 was located at 3 Broughton Avenue, Tullimbar. The microphone was located approximately 1 m from the dwelling façade, 28 m from the centreline of Tongarra Road and approximately 40 m from the roundabout between Tongarra Road and Broughton Avenue.
- Logger 2 was located at 23 Calderwood Road, Albion Park. The logger was located approximately 15 m from the centre of Calderwood Road in a free field location.
- Logger 3 was located at 6 Tripoli Way, Albion Park. The microphone was located 1.4 metres above ground level and approximately 11 m from the kerb in a free field location.
- Logger 4 was located at 12 Hamilton Rd, Albion Park. The microphone was located approximately 1.3 m above ground level and 1 m from the dwelling.

- Logger 5 was located on the property of 28 Terry St, Albion Park. The microphone was located 1.3 m above ground level and approximately 30 m from the centreline of Terry Street and in a free field location.

6.9.3 Assessment of Potential Impacts

Construction

Noise

The calculated RBLs were used to divide the Activity area into catchment areas containing similar ambient noise levels in order to assess potential construction noise impacts on surrounding receivers. Works are mostly scheduled to occur during standard construction hours, it is likely that outside of standard construction hours work would be required. Traffic diversion for large periods of construction would also be required. Construction noise management levels of each noise catchment area were therefore calculated for standard and non-standard construction hours, as well as potential sleep disturbance thresholds. These are shown in **Table 32**.

Table 32: Sample Construction Noise Management Levels

Noise Catchment Area	Day (RBL + 10dB(A))	Evening (RBL + 5Db(A))	Night (RBL+5Db(A))	Sleep Disturbance. LA1, 1min
1	55	38	35	45
2	49	38	35	45
3	51	50	35	45
4	48	39	35	45
5	60	48	38	48

Construction requirements for the Activity are not yet known, as such a further assessment will be required once final construction details are available. Modelling was completed based on previous similar projects and assumed immediate proximity to receivers. The results of the construction noise modelling should therefore be considered conservative, and representative of a ‘worst case’ scenario.

Results of this conservative construction noise model show that construction noise levels are likely to exceed noise management levels during non-standard hours of operation for all phases of construction for nearby residential receivers. Receivers exposed to construction noise above 75dB(A) are considered ‘highly noise affected’.

There are no receivers projected to be highly noise affected by the works.

Sleep disturbance from night work is most likely to arise from the use of a pneumatic hammer/s or saw cutting during utilities relocation and/or road pavement works, or from truck movements on site, in particular the application of truck air brakes. High impact noise sources such as piling or jackhammering may cause sleep disturbances, however, they are not scheduled to be carried out for the project, therefore sleep disturbance is unlikely to occur as a result of project construction activities.

Vibration

Vibration from construction activities could potentially impact upon the amenity of occupants of buildings located close to the project construction. Vibration impacts are categorized as having either an effect on human comfort or causing a structural or cosmetic damage to buildings. Detailed criteria for maximum vibration levels during construction, for both human comfort and structural damage can be found in Section 5.3 of the Noise Impact Assessment.

Potential vibration impacts to buildings from construction activities could occur where works involve vibratory rollers within 10m of buildings. Pre-construction dilapidation surveys and construction vibration monitoring can be implemented to minimise any impacts.

Human comfort can be impacted by vibratory rolling within 100m of buildings. It is recommended vibratory rolling not be carried out at night due to the high potential for sleep disturbance.

Operation

The completion of the TWE would see an increase in traffic volume along Tripoli Way, Tongarra Road, the Illawarra Highway, and Calderwood Road. This increase has the potential to impact upon up to 147 dwellings, with an impact level in exceedance of the NSW Department of Roads and Maritime Noise Criteria Guideline (RMS, 2015) (NCG) criteria. Properties where the noise criteria are predicted to be exceeded are eligible for consideration of at-property acoustic treatments to mitigate traffic noise.

Options for mitigation include road surface treatments, acoustic barriers, and at-property treatments. The road surface for the project is Dense Graded Asphalt (DGA - AC14), therefore options for quieter pavements are limited. Barriers and earth mounds are not a feasible treatment option for all properties in order to maintain driveway access from Tripoli Way.

Council will assess and identify specific noise attenuation mitigation measures for operational noise impacts for up to 147 properties. The operational noise impacts assessment will be carried out during the detailed design phase or upon project completion.

6.9.4 Mitigation and Management Measures

Table 33 identifies safeguards and management measures that would be implemented to assess potential impacts of the project on noise vibration.

Table 33: Safeguards and Management Measures for Noise and Vibration

No.	Impact	Environmental Safeguards	Responsibility
N1	Construction noise and vibration	Implement best practice construction noise and vibration mitigation measures in accordance with recommendations provided within the NSW Interim Construction Noise Guidelines (DECCW, 1999) (ICNG) and Australian Standard AS2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites. Measures include: • Development and implementation of all reasonable and feasible site-specific mitigation measures to meet noise criteria applicable to the project in consultation with residents. • Use of noise attenuation controls at source, such as mufflers, acoustic screens etc. • Maintaining plant and equipment • Locating static sources of noise such as generators as remotely as possible from noise sensitive receivers • Developing proposed hours of operation in consultation with the residents/occupants of the affected receivers and TfNSW • Allowing construction to occur only during approved construction hours, unless otherwise required as a condition of TfNSW safety requirements.	Project Manager

No.	Impact	Environmental Safeguards	Responsibility
		• Informing potentially affected receivers with adequate notice of the construction program and any planned activities that may exceed noise and vibration targets. • Conducting noise monitoring during operations for the purposes of assisting in noise mitigation and to verify the findings of this noise assessment, if complaints are received or proposed activities and number of plants exceed those assumed in this assessment. • Use of temporary noise barriers where practical. • Application of respite periods for noisy activities • Reduce the number of plants operating at one time where works are required to be carried out outside of standard hours. • Preference should be for electric powered plant over combustion engine powered plant. • Preference should be for hydraulic or electric powered plant over pneumatic powered plant. • Avoid metal to metal contact on equipment to reduce impulsive or scraping noise. • Use of broadband reversing alarms, or “quackers”, on mobile equipment in accordance with the relevant health and safety regulations • Modification of work activities if reasonably practical where noise or vibration is found to cause unacceptable impact. • Should operations be required outside daytime hours, all reasonable and feasible efforts should be undertaken to ensure noise levels would not exceed the INP Noise criteria stated in Section 5.2 and Table 5-1 of the Noise Impact Assessment (**Appendix T**) by carrying out night-works adjacent to the school rather than nearby residential receivers for example implementing a procedure for dealing with complaints to ensure that all complaints are registered and dealt with appropriately.	
N2	Sleep disturbance to nearby receivers	• Avoid scheduling construction activities during non-standard hours of operation where possible. • Develop a detailed Construction Noise and Vibration Management Plan.	Project Manager
N3	Construction vibration impacting upon human comfort	• Vibratory rolling should not be carried out within 10 m of nearby receivers during Standard Construction Hours. • Vibratory rolling should not be carried out at night to avoid sleep disturbance.	Project Manager
N4	Construction vibration causing structural or cosmetic damage to buildings	• Vibratory rolling should not be carried out within 10 m of residential dwellings. • The Construction Vibration Management Plan within the CEMP shall determine management methodology and monitoring procedures.	Project Manager
N5	Operational traffic noise	• Consideration of quieter pavement surfaces. • Consideration of noise barriers, including noise mounds and noise walls. • Assessment of suitability of at property treatments (mechanical ventilation, upgraded glazing etc.).	

No.	Impact	Environmental Safeguards	Responsibility
		• An operational Noise and Vibration Management Plan should be prepared for the project, to include, but not be limited to, the above measures. • The results of Noise Impact Assessment and recommendations for mitigation are based on the assumption the Broughton Avenue intersection will be upgraded by others prior to 2041. Should this not occur, Council will need to reassess the traffic and transport impacts in the vicinity of the project and ensure all appropriate mitigation measures are applied.	
N6	Site specific measures	Site Controls: • Due to the proximity of residents to the project, temporary barriers (i.e. 2 m high solid screens) may be a feasible treatment option to mitigate noise from activities such as services relocations or other activities that may occur during the night period. • Site offices, carparks, and hard stand areas should ideally be located at the western extent of the project, on the northern side of the alignment in order to maximise separation distance to as many residents as possible. Arrival and departure may occur either side of construction hours. Manage hours of operation: • Carrying out construction works within daytime hours as follows: ○ 7:00am to 6:00pm Monday to Friday ○ 8:00am to 1:00pm Saturdays ○ No work on Sunday and public holidays. ○ Nighttime works and works outside the above hours may occur to prevent significant disruptions during daytime hours. • Do not carry out operations during evening or night-time hours, unless absolutely necessary for road safety reasons. Management and Behavior Controls: • Ensure that managers effectively communicate acceptable and unacceptable work practices for the site, though staff site inductions, notice boards, and prestart meetings. • Avoid the need for reversing in the new area by creating a loop road or similar. • Avoid dropping materials from height. • Workers should avoid shouting, minimise talking loudly, and avoid slamming vehicle doors.	

6.10 Soil and Water

This section includes an assessment of soil and water impacts associated with the Project along with mitigation and management measures to effectively address likely impacts.

6.10.1 Existing Environment

Topography

Generally, the topography within the site is highly modified and typically situated in areas of low density residential and rural-residential dwellings within the suburb of Albion Park. The site has a gradual fall from west to east toward Macquarie Rivulet and has an elevation

ranging from 9 m Australian Height Datum (AHD) in the east to 15 m AHD in the west. Macquarie Rivulet is located approximately 130 m north of the Study Area and runs roughly parallel with the proposed road corridor. In the developed parts of the site, surface water is expected to drain to existing stormwater drainage infrastructure and discharge into the Macquarie Rivulet.

Soils

The western portion of the Activity Area is within the Fairy Meadow landscape which is characterised by gently undulating broad alluvial plains with slopes of less than 5% gradient, and floodplains and valley flats with minor terraces and scattered swamps. The remainder, and majority, of the Activity Area is situated within the Albion Park landscape, which is characterised by short steep upper slopes grading into long gently inclined foot slopes.

The central portion of the site is located on the Albion Park Erosional Landscape which is characterised by short steep upper slopes grading into gently inclined foot slopes. The landscape is known to encounter waterlogging, seasonally high-water table, shrink-swell; low wet bearing strength, high available water holding capacity.

Geology

The geology of the site is summarised below:

- Quaternary age alluvium and Permian age Shoalhaven Group geology of the Berry Formation. Alluvium is located at the eastern and western end of the site and at areas within close proximity to Macquarie Rivulet. The alluvium can be described as, gravel, swamp deposits and sand dunes.
- Permian age Shoalhaven Group geology of the Berry Formation is located in the central portion of the site and is characterised by undifferentiated siltstone, shale and sandstone.
- Older (Pleistocene) alluvial deposits over the eastern section of the site, with more recent Holocene deposits characterising the floodplain at the western end of the alignment.

Water Quality

The Activity area drains into the Macquarie Rivulet and ultimately Lake Illawarra. The watercourses within the area are characterised by largely rural landscapes which are predominantly cleared for rural purposes such as grazing. As these watercourses reach Lake Illawarra, they flow through townships located adjacent to the shoreline, where they are influenced by directed stormwater from urban areas. Large scale land developments such as Tullimbar and Calderwood, upstream of the catchment, also has the potential to result in impacts to the watercourses.

It was noted that Macquarie Rivulet is already impacted in its current state from the existing road network and other activities within the catchment.

Groundwater

A search of the NSW Department of Primary Industries (Water) groundwater database of registered groundwater bores was undertaken. The search identified one registered groundwater bore located within 500 m of the site, which is located approximately 110 m south of the site (Bore ID: GW107819).

Three boreholes, BH003, BH006 and BH007, were drilled by Cardno in 2016 in the low-lying western portion of the Activity Area in the vicinity of Hazleton Creek. Each borehole was converted to a permanent groundwater monitoring well and groundwater levels were gauged

on up to seven occasions between 17 August 2016 and 3 July 2017. The data obtained by Cardno showed that the depth to groundwater ranged from 0.78 to 1.56 metres below ground level (mbgl), indicative of a shallow groundwater table. Groundwater samples were not collected or submitted for laboratory testing during the geotechnical investigation.

Acid Sulphate Soils

With reference to SH LEP 2013 Acid Sulphate Soils (ASS) risk maps, the Activity Area lies outside the indicative regions mapped as being at risk of ASS. A large portion of land to the north of the Activity Area, north of Macquarie Rivulet, is mapped as a Class 4 ASS area.

Whilst the SH LEP 2013 does not indicate the presence of ASS beneath the site, given the alluvial nature and low relative elevation the presence of ASS cannot be discounted.

Salinity

The Fairy Meadow Landscape indicates that salinity may be present in olive brown heavy clay subsoil, however, the report does not specify the depth at which this material may be encountered.

6.10.2 Assessment Methodology

The assessment of soil and water outlined in this section was conducted via a combination of desktop searches and field survey results (including soil sampling) conducted by Cardno in 2020.

6.10.3 Assessment of Potential Impacts

Construction

Soils

Laboratory testing confirmed that soils beneath the site are slightly to moderately acidic with several exceedances of the ASSMAC (1998) PASS Indicator Values and Action Criteria for TPA and TSA. Whilst soils are acidic, the SPOS and SCR results indicate that sulfides and sulfidic ores do not appear to be present, suggesting that the acidity present within soil may not be attributable to ASS, however as a precautionary measure the soils must be appropriately considered and managed during construction.

Water Quality

Water quality impacts during construction can potentially affect the health of downstream receiving waters (including Macquarie Rivulet, Hazelton Creek, Frazers Creek and Lake Illawarra) including related impacts to recreational users of those waters. The key risks to downstream water quality during construction would be associated with:

- Vegetation clearing and exposure of soils (through topsoil stripping, excavation, stockpiling and transport of soil) which could result in soil erosion and transport into waterways.
- Earthworks or dewatering which could result in exposure to potential ASS in some parts of the project area, which could result in acidic runoff into watercourses.
- Disturbance of contaminated materials, which if not managed correctly could lead to mobilisation of contaminants into surface water.
- The use of vehicles, plant and machinery on site, which would create potential for an accidental spill or leak of fuel, oil, greases or other chemicals, which could pollute surface water and/or groundwater.

- Activities at ancillary sites, which could adversely impact surface water and groundwater. These activities include the storage of chemicals and hazardous materials, stockpiling, vehicle wash downs and vehicle re-fuelling. These ancillary sites would generally experience a higher volume of traffic movements, which could generate dust emissions. All these activities could result in mobilisation of soils, leading to increased turbidity and sedimentation of waterways. There is potential for accidental spills or other releases of pollution to surface water and/or groundwater.
- General construction activities generating waste and spoil which could result in solid waste and contaminants entering surface water. Spoil generation and movement could result in sediment transport, leading to increased turbidity and sedimentation of watercourses.
- Excavation as part of the project has the potential to intersect the groundwater table leading to incidental discharge of groundwater. This has the potential to reduce groundwater levels in the immediate vicinity and impact on surrounding environments when the water is discharged downstream.

It is considered that, provided the environmental safeguards to manage environmental impacts on water quality are implemented (outlined in Section 6.10.4), the impacts on water quality, aquatic ecosystems and water users will be minor.

Operation

Once the Activity is operational, there would be potential for indirect impacts on soils as a result of run-off and drainage. This potential impact would be managed through revegetation of exposed soils.

During operation, water quality impacts are considered minor and would likely be associated with contaminated run-off, which may arise from normal vehicle operation (tyre wear, minor leaks of lubricants and fuels, etc.), maintenance practices, or a spill or accident.

Treatment of the proposed additional run-off as a result the project has been considered as part of the design development process. Water quality measures include the implementation of road side swales at piped stormwater discharge points and gross pollutant traps (GPT) at piped stormwater discharge points. Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software was used to assess impacts to the discharge water quality associated with this project. The MUSIC modelling resulted in a reduction in all parameters assessed, indicating that with reasonable water quality treatment measures such as swales at the discharge point, the water quality of the discharged stormwater will not be adversely impacted, and this stormwater will not result in further degradation of the receiving environment.

6.10.4 Mitigation and Management Measures

Table 34 identifies safeguards and management measures that would be implemented to assess potential impacts of the project on Soil and Water.

Table 34: Mitigation and Management Measures for Soil and Water

No.	Impact	Environmental Safeguards	Responsibility
S1	Soil and Water	• A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Project Manager
S2		• Any future works involving soil disturbance should incorporate an unexpected finds protocol to facilitate the	Contractor

No.	Impact	Environmental Safeguards	Responsibility
	Site disturbance may result in increased erosion, sedimentation risk.	identification and management of previously undocumented contamination	
S3		• Soil disturbance is to occur only within the construction footprint. Minimise disturbance wherever possible.	Contractor
S4		• Cut vegetation to be removed to allow the roots to remain and stabilize soil on slopes. Use jute matting or similar to stabilize banks and prevent erosion.	Contractor
S5		• Adequate sediment controls are required to prevent disturbed sediment from entering the nearby waterways and stormwater outlets during heavy rainfall. • All sediment and erosion control measures are to be installed prior to works commence and maintained throughout the life of the project • No activities (including drilling and/or excavation) are to be undertaken immediately after heavy rainfall events or if it is likely for rain to occur. Unless it is certain that no sediment would be discharged from site.	Contractor
S6		• Any imported fill must be from a known source, free of contaminants and compatible with the local soil types. If any potential contamination or suspect material is encountered cease works immediately and contact Council's environment team.	Contractor
S7	Disturbance of Acid Sulphate Soils	• Where required, supplementary testing must be undertaken to confirm that the risk of acid sulphate soils has been adequately assessed. This applies particularly to areas of deep cut and at the locations of foundations and piling.	Project Manager
		• In locations where excavations will exceed 2 m in depth from natural ground level it is recommended that a management plan be prepared prior to the commencement of earthworks and construction. The management plan should be prepared in consideration of the ASSMAC Guidelines (ASSMAC 1998) and should be included as a sub-plan of the broader project Construction. • The management plan within the CEMP must include the following: ○ Review and interpretation of field testing and analytical results from previous investigations, and in doing so identify areas of the site that may contain ASS / acidic soils. ○ Describe the construction works and identify those works that may result in the disturbance of ASS / acidic soils. ○ Detail the mitigation measures and actions that would be required to mitigate potential risks associated with disturbance of ASS / acidic soils. This includes but is not limited to excavated soils, excavation surfaces, soil treatment performance criteria, validation testing, stockpiling durations, soil treatment areas, prescribed liming rates, groundwater and surface water management and contingencies (e.g. weather events, over-liming and offsite disposal of soil). ○ Monitoring oversight and reporting requirements including environmental monitoring programs (surface water and stockpile), inspection and	Contractor

No.	Impact	Environmental Safeguards	Responsibility
		oversight and provision of suitable reporting and deliverables. The ASSMP (or equivalent) must adhere to Part 6.1 of the Shellharbour LEP and any other relevant local, state or national government planning and regulatory instrument. Additional testing may be required prior to or during construction to confirm the neutralising capacity of soil.	
S8	Groundwater	• Any incidental groundwater discharge that may occur during construction will need to be captured, tested and if necessary treated before disposal to the surrounding environment. • If groundwater discharge is expected to exceed 3ML per year an aquifer interference licence will be required under the Water Management Act. • Measures will need to be put in place to ensure no ongoing groundwater discharge occurs after completion of construction.	Contractor

6.11 Traffic, Transport and Access

A Traffic and Transport Impact Assessment was prepared by Cardno and is contained in **Appendix U**. The Assessment was undertaken to determine the predicted traffic impacts associated with the Activity and is summarised in the following.

6.11.1 Existing Environment

The key road network within and within the vicinity of the Activity Area consists of the following roadways:

Tripoli Way

Tripoli Way is an unclassified road under the care and maintenance of Council. It is currently a two-lane carriageway with one lane in each direction. It is a no through road separated by a median for the eastern 230 m with street-side parking. Under the existing configuration, Tripoli Way serves only to provide access to private properties from Hamilton Road. There is no posted speed limit hence a default speed of 50 km/h applies.

Illawarra Highway / Tongarra Road

Tongarra Road / Illawarra Highway is a state road, part of the Illawarra Highway and under the care and control of TfNSW for the length between Princes Highway, 0.8 km south of Albion Park Railway Station to Albion Park. Tongarra Road / Illawarra Highway is a two-lane carriageway with one lane in each direction, expanding into a four-lane configuration from the eastern entry to Albion Park until 490 m west of Terry Street.

Tongarra Road serves as the major east-west distributor to Shellharbour and the greater area. The road is approved for B-doubles up to 26 m in length from Princes Highway until Calderwood Road. Its speed limit is posted at 60 km/hr with 40 km/hr school limits in the vicinity of the east side of Tongarra Road. The posted speed at its western extent (west of Yellow Rock Road) is 100 km/hr.

Calderwood Road

Calderwood Road is a local road under the care and maintenance of Council. It is a two-lane carriageway with one lane in each direction with street side parking on both sides. Calderwood Road runs north-south from the intersection with Tongarra Road until

approximately 1.25 km north of Tongarra Road where it reorientates west. The proposed alignment of Tripoli Way is planned to join with Calderwood Road. The posted speed limit is 60 km/h.

Illawarra Highway / Terry Street

Terry Street is a state road and a part of the Illawarra Highway. It is a primarily two-lane carriageway with one lane in each direction, expanding to four lanes (two lanes per direction) between the intersection with Tongarra Road and Cawdell Drive. It becomes part of the Illawarra Highway north of the Tongarra Road intersection and carries traffic northbound along the north western boundary of the Illawarra Regional Airport. Terry Street south of the Tongarra Road intersection carries a significant volume of the Albion Park residential traffic. The posted speed limit is 60 km/h, which changes to 80 km/h on its northern extremity (north of Taylor Road).

Church Street

Church Street is a local road under the care and control of Council. It is a two-lane carriageway with one lane in each direction and street side parking on both sides. Church Street meets Tongarra Road on the west portion the Albion Park residential area and carries mostly residential traffic south of Tongarra Road until Terry Street. The posted speed limit is 60 km/h.

Pedestrian and Cycling Facilities

Paved pedestrian footpaths are provided on both sides of Tongarra Road through the Albion Park Town Centre and on at least one side of the road for all residential areas in Albion Park. Paved footpaths are also provided on Terry Street and parts of Calderwood Road. A non-signalised children's crossing is situated on Tongarra Road directly outside St Paul's Catholic Parish Primary School. A marked pedestrian crossing is provided on Church Street outside Albion Park High School.

There are no dedicated cycling paths within the Activity Area and cyclists must share the roads with motorised vehicles.

6.11.2 Assessment Methodology

Modelled Future Network Performance without TWE

The Traffic Impact Assessment performed an analysis of future network performance within Albion Park Town Centre. The analysis focussed on the two options considered in Section 2.4 of this EIS being the road network operating with the TWE in place and the road network operating in its current configuration (i.e. without the TWE).

In its present form and left unchanged, the traffic network in 2026 within the Albion Park Town Centre is unsatisfactory in its operation at the intersection of Macquarie Street / Tongarra Road / Calderwood Road and the intersection at Terry Street / Tongarra Road. Under the 2041 model, all key intersections within the Albion Park Town Centre are operating unsatisfactorily and considered to have major delays. Essentially, the traffic demand by 2041 is too high for the present capacity available within the Albion Park Town Centre to be absorbed. This leads to a standstill and vehicle blockage across all roads within the Albion Park Town Centre. This does not allow the traffic demand to be released within the modelled network.

Current Road Safety Performance

Crash data statistics have been compiled from 2013 – 2018 and a total of 45 traffic incidents have occurred within the Albion Park Town Centre. At 23 of the identified accidents the

drivers were injured (14 serious, 6 moderate and 3 minor) which accounts for 51% of all crashes within Albion Park Town Centre. The majority of vehicular accidents are on Terry Street and Russell Street.

6.11.3 Assessment of Potential Impacts

Construction

Construction of the Activity would result in temporary traffic and transport related impacts. Potential impacts include:

- Changed traffic conditions.
- Potential short delays to traffic along the existing road network during construction.
- Construction traffic including an increase in heavy vehicle movements.
- Temporary changes to the existing road network.
- Disruption to property access.
- Potential for minor traffic delays.

Due to the location of the Activity Area it is anticipated that traffic impacts during construction would be considered minor as the construction would be located away from the main arterial road for the Albion Park Town Centre.

Along with the required fencing and traffic control measures, there would be various items of construction plant on site as outlined in **Section 3.0**, as well as temporary stockpiles materials in designated areas.

Appropriate safety precautions will be taken during the construction of the works, such as incorporation of security fencing and construction barrier fencing and temporary traffic changes such as detours and short delays, to ensure public and worker safety. It would be a requirement of the CEMP for the construction contractor to employ or contract persons to control vehicular and pedestrian movements on adjacent roads, as required to ensure safety.

Construction Access

The majority of access to the area will be via local and arterial roads onto Council controlled roads. An objective of the Activity is to minimise private property land acquisition where possible. The sections that will connect Tripoli Way into the corridor are zoned as 'SP2 Local Road' under the SH LEP 2013 and will be acquired under the authority of the Council in accordance with the SH LEP 2013 and the *Land Acquisition (Just terms Compensation) Act 1991*.

Operation

The Activity has been designed in line with the Austroad classification of a collector road and will cater for heavy vehicles up to the following sizes:

- Design vehicle: 12.5 m single unit truck or bus.
- Checking vehicle: 19 m articulated vehicle.

Heavy vehicles over this size would need to continue along Tongarra Rd / Illawarra Highway as per their current arrangement.

Once constructed there would be a significant increase in traffic along The Expressway and Tripoli Way thereby impacting the nearby residence, however the significant improvements within the overall traffic network as a result of the construction would be of significant benefit

to the local community as a whole. In addition, the detailed design phase would consider opportunities to minimise traffic impacts on nearby residence where possible.

Modelled future network performance within the Assessment performed an analysis of future network performance within Albion Park Town Centre.

The modelled Activity shows significant traffic circulation improvements in the 2026 model and will improve the operational performance for the majority of key intersections. Key statistics derived from the traffic modelling suggest that the average speed of the network will increase by 13-18% with an average vehicle delay time reduced by 48%-65%. The upgrade to and extension of Tripoli Way would contribute to an efficient and functional road network.

The 2041 model also shows a significant improvement in operational capacity and efficiency at all major intersections. The introduction of TWE shows improvements in average speed with increases in travel speed of approximately 28% (AM peak) and 24% (PM peak) in the 2041 traffic modelling. The TWE would assist in meeting the increased demand of road users as future development and land use changes in the Calderwood area occur. The Activity would also reduce potential congestion within the surrounding road network and improve safety for motorists, pedestrians and cyclists.

Pedestrian and Cyclist Facilities

A shared path is to be provided on the northern side of the road between the Broughton Avenue intersection and the Hamilton Road intersection. A 1.5 m footpath will be provided from the Hamilton Road intersection to the Terry Street intersection.

A variable width (1.2-1.5 m) footpath will be provided on the southern side from Moles Street to Hamilton Road. The layout of the proposed paths can be seen in the concept design drawing set at **Appendix A**.

Signalised pedestrian crossings will be provided at the TWE / Calderwood Road intersection, TWE / Hamilton Road intersection and TWE / Terry Street intersections. This will provide greater pedestrian safety and provide greater access to the Albion Park Town Centre.

The inclusion of these facilities enhances the existing pedestrian network within the Albion Park Town Centre and provides for an accessible and safe environment for pedestrians and cyclists.

6.11.4 Mitigation and Management Measures

Table 35 identifies mitigation and management measures that would be implemented to assess potential impacts of the project on Traffic, Transport and Access.

Table 35: Mitigation and Management Measures for Traffic, Transport and Access

No.	Impact	Environmental Safeguards	Responsibility	Timing
T1	Operational capacity of Broughton venue/Illawarra Highway/Tripoli Way intersection and Calderwood Road/Tripoli Way intersection by 2041	• The performance of the Illawarra Highway/Broughton Ave/Tripoli Way intersection in the 2041 year should be investigated further as part of broader traffic network management arrangements potentially involving Council, TfNSW and others (such as local property developers subject to Voluntary Planning Agreements).	Shellharbour City Council	Ongoing
T2	Increased heavy vehicle traffic and	• A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in	Project Manager	Pre-construction

No.	Impact	Environmental Safeguards	Responsibility	Timing
	light vehicle traffic during construction	accordance with the RMS Traffic Control at Work Sites Manual and the worksite manual RMS Specification G10. The TMP must restrict vehicle movements and parking to approved project areas and manage speed limits near the work.		
T3	Temporary Road Closures	• Road closures are to be limited during peak traffic periods to ensure impacts to traffic flows are minimal. • Suitable traffic control measures are to be in place during the movement of equipment and machinery in order to ensure the safety of pedestrians and other road users.	Project Manager	Construction
T4	Limited access to impacted residents within the Study Area	• Impacted residents must be contacted prior to any works commencing. Accessibility and movements must be allowed for the residents that will be directly impacted as part of the TMP. • Works are not to block access along footpaths, except for the minimum possible time when moving equipment or machinery.	Project Manager	Pre-construction Construction
T5	Pedestrian crossings	• Signalised pedestrian crossings will be provided at the TWE / Calderwood Road intersection, TWE / Hamilton Road intersection and TWE / Terry Street intersection within the Study Area as part of the detailed design process for the Activity.	Council	Detailed design

6.12 Waste Management

A Waste Management Assessment has been prepared by SLR Consulting and is contained in **Appendix V**.

6.12.1 Existing Environment

There are no significant waste generating activities currently being carried out within the Activity area.

Potential wastes that would be generated during construction of the Activity include existing road pavement, road base, kerbing, topsoil and vegetation. It is unlikely that existing road base will be recycled to create new asphalt. More likely that the existing wearing course (possibly asphalt and/or two coat seal in places) and road base will be reused on site as pavement subbase or subgrade replacement material.

6.12.2 Assessment of Potential Impacts

Construction

The following waste streams are expected to be produced during the construction phase of the project:

- Green waste generated during tree removal and vegetation clearing. Green waste will be reused where possible as mulch or alternatively sent to a composting facility. Weed species would be separated and disposed of in line with the Biosecurity Act 2015 recommendations.
- Waste road material from the decommissioning of the existing roadways.

- General construction litter.
- Waste oils and other materials from the maintenance of construction machinery may also be produced in relatively small quantities.

Redundant erosion and sediment control materials including sediment fencing, stakes, hay bales and socks.

All waste generated during construction activities would be managed in accordance with the POEO Act, POEO (Waste) Regulation 2014, *Waste Avoidance and Resource Recovery Act 2001* and applicable resource recovery orders and exemptions.

Fill material considered unsuitable to remain on site would be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) and disposed of at an appropriately licensed facility. Waste classification would be carried out by a suitably qualified and experienced environmental professional and could be done so while the materials are in-situ (i.e. in ground) or ex-situ (i.e. stockpiled). Surplus materials may also be suitable for reuse offsite subject to satisfaction of an NSW EPA Resource Recovery Exemption/Order and appropriate classification.

Improper management and handling of stockpiled materials may lead to the need to dispose of materials that would otherwise be able to be reused during construction. Stockpiled materials must be kept separate where possible to maximise potential for reuse either for this proposal or used offsite, and any potentially contaminated material must be managed in accordance with the CEMP to ensure that it is not mixed or blended with other materials.

Short term impacts may include a slight increase in the general domestic waste as a result of escape from construction bins or littering.

Materials requiring import to site during construction must be geotechnically suitable and have been classified in accordance with and to the satisfaction of an NSW EPA Resource Recovery Exemption / Order. The materials that are considered suitable for importation as fill would be specified in the CEMP. Materials being imported to site as fill during construction would require appropriate supporting documentation (i.e. evidence of classification), appropriate tracking and material validation at receipt of the site to satisfy quality control.

Operation

Waste is not expected to be generated during the operational phase of the Activity with the exception of surficial litter, debris and materials lost from vehicles as unsecured loads. It is anticipated that the quantities of waste would be minimal and would be managed by Council during routine maintenance activities such as road-side litter picking and cleaning of gross pollutant traps.

6.12.3 Mitigation and Management Measures

Table 36 identifies safeguards and management measures that would be implemented to assess potential impacts of the project on waste.

Table 36: Safeguards and Management Measures for Waste

No.	Impact	Environmental Safeguards	Responsibility
WM1	Waste material including green waste, construction waste and general litter generated during construction.	• The Waste Management Plan from the EIS will be implemented as part of the CEMP. The Plan will outline: ○ Compliance with the resource management hierarchy principles. ○ Measures and controls to monitor and minimise waste generation. ○ Lawful handling and disposal of unavoidable waste.	Contractor

No.	Impact	Environmental Safeguards	Responsibility
		○ The plan will be updated if required and updates be in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (2014), the NSW Waste Classification Guidelines (2014) and relevant RMS Waste Fact Sheets. ○ Unsuitable fill material and all other waste streams must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) and disposed of at an appropriately licensed facility. ○ Any excess excavated soil, spoil, green waste or general waste will be loaded into trucks and disposed of at a licensed Recycling and Waste Disposal Depot.	
WM2	General domestic waste is expected to be generated during construction activities.	• General waste and recycling bins will be provided at the site ancillary sites and throughout project areas for the duration of construction. • Ancillary sites and work areas will be maintained, kept free of rubbish and cleaned up at the end of each working day. • Important to prevent material to enter the nearby waterways and stormwater outlets.	Contractor
WM3	Waste oils and other materials from the maintenance of construction machinery may be generated.	• Any uncontrolled spills of waste oils, fuels and other materials will be contained using a spill kit and managed by an environmental professional. All waste generated as a result of uncontrolled spills and maintenance will be managed in accordance with the protocol in Safeguard WM1. • Spills and uncontrolled releases of fluids and dangerous goods must be managed in accordance with a procedure specified in the CEMP and government regulators (i.e. NSW EPA) notified as required.	Contractor Project Manager

6.13 Airport Environment

An Aviation Impact Statement was prepared by Rehbein Airport Consulting and is included in full at **Appendix W**. The Activity was assessed against the relevant National Airports Safeguarding Framework Guidelines and is summarised below.

6.13.1 Existing Environment

Shellharbour Airport (previously known as the Illawarra Regional Airport) is located approximately 1km north-east of the Study Area's eastern extents. Shellharbour Airport is owned and operated by Council. The airport operates a range of general aviation business and is home to the HARS Aviation Museum and annual 'Wings over Illawarra' air show. Airline services are available from Shellharbour Airport to Brisbane and Melbourne.

The airport consists of two runways, Runway 16/34 and Runway 08/26. Runway 16/34 is lit for nighttime operations whereas Runway 08/26 is only utilised during the daylight hours. However, this assessment has incorporated Runway 08/26 as a future possible lit runway as a precautionary measure to assess all potential impacts.

6.13.2 Potential Impacts

The Aviation Impact Statement defines each of the National Airports Safeguarding Framework that aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise disclosure mechanisms.
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety related issues.

The framework currently consists of nine guidelines and have been assessed and outlined in summarised in **Appendix W**, as potential impacts to aviation safety and their relevance to the TWE.

In summary impacts to the Airport environment are considered unlikely, however a review of the detailed design and detailed construction methodology is needed prior to construction. The Activity would not impact upon the Obstacle Limitation Surfaces (OLS) of Shellharbour Airport. Any structures must remain below 52m AHD to avoid infringing the OLS. All structures associated with the Activity would be below 52m AHD.

6.13.3 Mitigation and Management Measures

Table 37 identifies safeguards and management measures that would be implemented to assess potential impacts of the Activity on the airport environment.

Table 37: Mitigation and Management Measures for Airport Environment

No.	Impact	Environmental Safeguards	Responsibility
A1	Structures exceeding 13m in height	• Substantial (building-like) structures should not exceed 13m in height in the assessment trigger area to avoid further assessment.	Project Manager Contractor
A2	Increase of wildlife activity	• Shellharbour Airport to review and comment on the plant species list specified in the detailed Landscape Plans. • Stormwater management should ensure that any basins incorporated into the design are intended for short-term holding of water only i.e. emptied within approximately one (1) day.	Project Manager Contractor
A3	Lighting impacts to safety	• Zone C and D (identified in **Appendix W**) lighting restrictions should be taken into account in the final lighting design, to accommodate for potential future lighting of Runway 08/26.	Project Manager
A4	Impact to the Protected Operational Airspace	• Any impact on the PANS-OPS procedures will need to be confirmed by Airservices Australia at the request of the airport operator.	Project Manager
A5	Potential impacts during construction	• Construction sequencing and methodology should be considered in relation to the OLS and PANS-OPS surfaces. The most restrictive limit over the site is the OLS inner horizontal at 52m AHD. All intrusions above 52m AHD, including equipment during construction such as cranes, must be reviewed and assessed by the airport operator in consultation with the relevant aviation authorities.	Contractor

6.14 Climate Change and Hazards

This section describes the potential climate change and hazard impacts associated with the Activity.

An increase in the global concentration of greenhouse gas has led to an increase in the earth's average surface temperature and has contributed to the phenomenon of 'climate change'. The State of the Climate 2020 (CSIRO and Bureau of Meteorology 2020) report confirms that Australia's climate has warmed on average by 1.44 ± 0.24 °C since national records began in 1910, leading to an increase in the frequency of extreme heat events.

Other findings from the report indicate that in the southeast of Australia there has been a decline of around 12 per cent in April to October rainfall since the late 1990s. There has been a decrease in streamflow at the majority of streamflow gauges across southern Australia since 1975. Rainfall and streamflow have increased across parts of northern Australia since the 1970s. There has been an increase in extreme fire weather, and in the length of the fire season, across large parts of the country since the 1950s, especially in southern Australia.

Oceans around Australia are acidifying and have warmed by around 1°C since 1910, contributing to longer and more frequent marine heatwaves. Sea levels are rising around Australia, including more frequent extremes, that are increasing the risk of inundation and damage to coastal infrastructure and communities.

The NSW and ACT Regional Climate Modelling (NARCliM) is a partnership between the NSW, ACT and South Australian governments and the Climate Change Research Centre at the University of NSW. NARCliM provides high resolution climate projections at a scale that supports local decision makers.

With the implementation of management measures identified below there are not expected to be any significant impacts associated with climate change during construction.

- The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.
- Recycled materials will be incorporated where possible.
- The energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment.

The specific integration of environmental engineering techniques into the detailed design will provide a resilient solution to minimising erosion, reducing impact upon riparian areas and reducing impact on key fish habitat in the future.

During operation, routine inspections and maintenance would be carried out to ensure any issues are identified and appropriately managed. As such, there are not expected to be any significant impacts associated with climate change during operation.

6.14.1 Safeguards and Mitigation Measures

Table 38 identifies safeguards and management measures that would be implemented to assess potential impacts of the Activity on climate change and associated hazards.

Table 38: Mitigation and Management Measures for Airport Environment

No.	Environmental Safeguards	Responsibility
CCH 1	• The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.	Project Manager
CCH 2	• Recycled materials will be incorporated where possible.	Contractor
CCH 3	• Appropriate spill kits, advocated for use in association with fuels and chemicals are to be maintained on-site. These are to include spill booms and other methods aimed at the containment of fuels and chemicals spilled within the aquatic environment.	Project Manager

No.	Environmental Safeguards	Responsibility
CCH 4	• Fuels and chemicals are to be stored off-site, however, if required to be stored on-site, they are to be located in a bunded area away from drainage lines	Contractor
CCH 5	• No refuelling is recommended within the subject site. If however, refuelling is required at the subject site, areas designated for the storage, refuelling and maintenance of plant are to be established where native vegetation has previously been cleared and at least 30 m from a waterway.	Project Manager
CCH 6	• Forecast checks of the Bureau of Meteorology site shall be undertaken daily. In the event that heavy rain is predicted, arrangements are to be made immediately to remove any plant and equipment from within the banks of the waterway prior to the rain event. All plant and equipment would be removed to higher ground above the 1 in 100 year flood level.	Contractor
CCH 7	• Any debris and spoil accumulated within the works site as a result of flooding would be removed to the designated stockpile area.	Project Manager
CCH 8	• All environmental controls would be reinstated as soon as possible following flooding.	Contractor

6.15 Cumulative Impacts

This section describes the potential cumulative impacts and mitigation measures associated with the Activity.

The impacts on the environment due to the construction of the proposed activity are considered to be minor. There will be a change in the type of vehicles entering the Activity area during construction namely construction and delivery vehicles and employee vehicles.

Cumulative impacts could occur if the construction of the proposed Activity coincided with the construction of other projects particularly any that may be contemplated within adjacent land.

It is anticipated that potential adverse cumulative impacts would relate to the temporary increase in construction traffic and cumulative noise and air impacts. These impacts would be largely avoidable through the implementation of mitigation measures detailed in this EIS and through consulting with respective divisions within Council, if necessary, to ensure that the proposed construction works do not coincide with other as yet unknown developments and/or routine maintenance activities.

Where conflicting construction schedules are unavoidable, cumulative construction impacts would be manageable through the implementation of the safeguards and mitigation measures identified in this EIS.

The assessment within this EIS indicates that the Activity is not likely to have a significant effect on the environment. A range of environmental factors as listed in Clause 171 of the Environmental Planning and Assessment Regulation 2021 (as amended) and Commonwealth Matters of National Environmental Significance have been considered, refer to **Appendix D.**

Implementation of the mitigation measures and safeguards identified above will minimise the risk of any impact and therefore further reduce the significance of any effect of cumulative impacts.

6.16 Ecologically Sustainable Development (ESD)

This section describes the potential ESD aspects associated with the Activity.

Ecologically Sustainable Development (ESD) is a primary objective of environmental protection in NSW, ESD is an objective of the EP&A Act under section 1.3, is defined under Section 1.4 of the EP&A Act and is a required assessment consideration under section 171 of the Environmental Planning and Assessment Regulation 2021. ESD has the same meaning it has in section 6(2) of the Protection of the Environment Administration Act 1991 and requires environmental assessments to include the reasons justifying the carrying out of the proposed activity in the manner proposed, having regard to biophysical, economic and social considerations.

ESD is defined as:

> *"ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs—*
>
> *a.the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*
>
> *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
>
> *(ii) an assessment of the risk-weighted consequences of various options,*
>
> *b.inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
>
> *c.conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
>
> *d.improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:*
>
> *(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
>
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
>
> *(iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The overall objectives of ESD are to use, conserve and enhance natural resources. This ensures that ecological processes are maintained, facilitating improved quality of life, now and into the future.

The proposed Activity will be effectively managed to avoid significant and/or costly environmental impact or degradation. This EIS has been developed to appropriately identify, avoid, mitigate and manage environmental risk in line with the principles and objectives of ESD including:

- The Precautionary Principle.
- Social Equity, Inter-Generational Equity.

- Conservation of Biological Diversity and Ecological Integrity.
- Improved Valuation and Pricing of Environmental Resources.

Each of these principles is explained below:

6.16.1 The Precautionary Principal

The precautionary principle, in summary, holds that where there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Specialist assessment for the design of the activity for impacts on the vegetation that will be removed has occurred. To this end, there has been careful evaluation undertaken in order to avoid where possible, serious or irreversible damage to the environment. In the circumstances where avoidance was not possible, appropriate mitigated measures have been developed.

6.16.2 Social Equity, Inter-Generated Equality

Intergenerational equity is centred on the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. There is a moral obligation to ensure that today's economic progress, which will benefit both current and future generations, is not offset by environmental deterioration.

The various consultation activities have ensured that the planning, design and environmental assessment phases of the activity have been transparent. The content of this EIS (including appendices) has enabled an understanding of the potential implications of the Activity and therefore identify the required management strategies and mitigation measures to ensure potential for impact is appropriately minimised.

6.16.3 Conservation of Biological Diversity and Ecological Integrity

The principle of conservation of biological diversity and ecological integrity holds that the conservation of biological diversity and ecological integrity should be a fundamental consideration for the proposed activity.

6.16.4 Improved Valuation and Pricing of Environmental Resources

The principle of improved valuation, pricing and incentive mechanisms deems that environmental factors should be included in the valuation of assets and services. The cost associated with using or impacting upon an environmental resource is seen as a cost incurred to protect that resource. Bases for evaluating costs relating to issues of biodiversity, noise, air quality, soil and water, traffic and transport, heritage and visual impacts have been considered in the preparation of the EIS.

The approach taken in the EIS acknowledges and accepts the financial costs associated with all the measures required for the activity to avoid, minimize, mitigate and manage potential environmental and social impacts for the proposed Activity.

6.17 Environmental Management and Monitoring

This chapter describes how the project would be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided with reference to environmental management plans and relevant specifications. A summary of site-specific mitigation and management measures is provided as detailed in **Section 7.0** and the licence and/or approval requirements required prior to construction are also listed.

6.17.1 Environmental Management Plans (or System)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the project. Should the project proceed, these management measures will be incorporated into the detailed design and applied during the construction and operation of the project.

A Project Environmental Management Plan (PEMP) and a CEMP will be prepared to describe safeguards and management measures identified. These plans will provide a framework for establishing how these measures will be implemented and who will be responsible for their implementation.

The plans would be prepared prior to construction of the project and must be reviewed by Council, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP will be developed in accordance with TfNSW specifications set out in the:

- QA Specification G36 – Environmental Protection (Management System).
- QA Specification G38 – Soil and Water Management (Soil and Water Plan).
- QA Specification G40 – Clearing and Grubbing.

7.0 Summary of Mitigation Measures

Table 39 below contains a summary of mitigation measures to be implemented for the activity for each environmental aspect assessed in **Section 6.0**.

Table 39: Summary of Mitigation Measures

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
General		G 1	• A CEMP shall be prepared prior to commencement of construction to ensure that all safeguards and management measures detailed in this EIS are implemented, and that construction impacts on the locality are managed. The CEMP shall include all plans and protocols as stated as required within the EIS.
Air Quality	6.1	AQ1	• An Air Quality Management Plan will be prepared as part of the CEMP to detail the air quality control measures and procedures to be undertaken during construction, including: ○ Air quality and dust management objectives that are consistent with DPIE guidelines. ○ Potential sources and impacts of dust, identifying all dust-sensitive receptors. ○ Mitigation measures to minimise dust impacts on sensitive receptors and the environment. ○ A dust monitoring program to assess compliance with the identified objectives. ○ Contingency plans to be implemented in the event of non-compliances and/or complaints about dust.
		AQ2	• Areas of exposed surface are to be minimised throughout the construction site planning and programming, to reduce the area of potential construction dust emission sources. • Control measures, such as stabilisation or covering will be implemented in order to minimise dust from stockpile sites. • Dust suppression measures, such as the use of water carts, will be used in any unsealed road surfaces and other exposed areas. • All trucks will be covered when transporting materials to and from the site. • Activities that generate dust will be avoided or modified during high wind periods. • Work activities will be reviewed if the dust suppression measures are not adequately restricting dust generation. • Rehabilitation of completed sections, where practical, will be progressively undertaken.
		AQ3	• Construction plant and equipment will be maintained in good working condition to limit impacts on air quality. • Where practicable, vehicles will be fitted with pollution reduction devices and switched off when not in use.
Biodiversity	6.2	B1	• Areas of native vegetation outside of the construction footprint will be “No Go-Zones” for people and machinery and will be clearly delineated using temporary fencing. • Within the works extent, temporary tree protection fencing around trees not marked for removal. Tree protection is required around the trunk of each tree greater than 150mm in diameter. • Removal of vegetation is to be undertaken by a qualified arborist following all relevant industry standards. Trees to be removed

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			have been identified and if any other trees require pruning or removal please call Council's environment team 4221 6014. • Any biomass cleared within the construction footprint will be removed from the area and disposed of appropriately. • The CEMP for the Activity is to address pollution and contamination issues, such as silt control, and oil/fuel/chemical storage/spill management, which could arise during construction. • No vehicles, machinery, tools, or equipment, fuel, chemicals or waste, gravels, soils or other materials are to be located within the drip zone of any trees. • Erosion and sediment control measures will be established before work begins and maintained in effective working order throughout the duration of the works, and until the study area has been stabilized to prevent off-site transport of eroded sediments. • Landscaping works are to be outside areas of bushland and do not include environmental weeds. • Removal of environmental weeds from the site and their ongoing control.
		B2	• Pre-clearance protocols for fauna shall be included in the CEMP. • Council's environment staff must inspect all vegetation one week prior to removal for any roosting or nesting native fauna present. If hollows or fissures are identified during the preclearance survey, nest boxes are required to be installed to replace potential habitat. • Inspect all vegetation for the presence of fauna species prior to removal. • Rocks, logs, debris that may provide fauna habitat must be retained on-site and disturbance to these features minimised. • Any large machinery must be inspected for trapped fauna prior to cessation of work. • In the event of injury to native fauna, contact a local vet or Wildlife Rescue South Coast on 0418 427 214 immediately.
		B3	• The CEMP for the Activity will include erosion and sediment control measures that will be established before work begins and maintained in effective working order throughout the duration of the works, and until the Activity area has been stabilised to prevent off-site transport of eroded sediments.
		B4	• A Part 7 Fisheries Permit under the FM Act must be obtained prior to commencement of reclamation works (bridge abutment, bridge and temporary crossing of Hazelton Creek works) and designs for construction must be consistent with the Policy and Guidelines for fish habitat conservation and management, (DPI Fisheries, 2013). • All construction and maintenance access tracks across the creek will follow the Policy and Guidelines for fish habitat conservation and management, (DPI Fisheries, 2013).
		B5	• Plant operators are to ensure minimal disturbance to areas outside of the works site through the establishment of entry points and tracks. No equipment should be operated near or from the waterways.
		B6	• Any damage to landscaped or grassed areas must be restored at the completion of the works including replacing native plants and mulch as required.

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
Contamination	6.3	C1	• Remediation of AEC3-6 is to occur in accordance with the Remediation Action Plan (Raw Earth 2024).
		C2	• Once remediation works associated with AEC3-6 have occurred a Site Validation Report is to be prepared to confirm that the site has been effectively remediated.
		C3	• A HAZMAT building survey of the dilapidated building in AEC3 will be undertaken.
		C4	• Across the Activity area disposal of contaminated fill material will be in accordance with NSW Environmental Protection Authority, Waste Classification Guidelines Part 1: Classifying Waste, 2014.
		C5	• The Unexpected Finds Protocol for the discovery of contaminated materials such as underground storage tanks, ACM, odorous and/or stained soil material during excavation activities, as contained within the RAP (**Appendix J**), will be implemented throughout construction works.
		C6	• Should design plans change for the Activity in the future and the potential for significant soil excavation works or dewatering, contamination specialists may need to be engaged to re-attend site and undertake further soil or groundwater samples to ensure all potential contamination impacts to human health and the environment are addressed.
		C7	• If excavation earthworks to more than 2 m below the natural ground surface or works by which the water table is likely to be lowered beyond 2 m below the natural ground surface, An Acid Sulphate Soil Management Plan (ASSMP) will be prepared for the excavation of natural soils in the northern portion of the site, based on testing results.
Flooding / Hydrology	6.4	F1	• Adequate drainage systems are in place to alleviate runoff capabilities
		F2	• Ancillary sites are not to be established in flood prone areas unless an assessment is undertaken by the contractor with an appropriate flood management plan developed or approval by Council.
		F3	• Appropriate drainage design be developed and implemented at ancillary sites.
Aboriginal Heritage	6.5	AH1	• Prior to construction works commencing an AHIP is to be obtained for all Aboriginal sites identified and registered with AHIMS within the Activity area.
		AH2	• If the proposed concept design changes during the course of the project and results in anticipated impacts to TWE_PAD3 and TWE_PAD4, a test excavation program must be undertaken prior to harm.
		AH3	• Throughout the duration of the construction works the following procedures must be followed. ○ Immediately cease all activity at the location. ○ Ensure no further harm occurs, secure the area. ○ Notify the Manager Project Delivery, Shellharbour City Council. The Council contact is to advise the Illawarra Local Aboriginal Land Council Aboriginal Sites Officer and the Department of Housing, Planning and Infrastructure (DHPI). ○ No further action to be undertaken until the required investigations have been completed and any permits or

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			approvals obtained, where required, in accordance with the *National Parks and Wildlife Act 1974*.
		AH4	• If human remains are found during the works, then all works shall cease immediately. The area must be secured within an exclusion zone to prevent unauthorised access and the NSW Police and DHPI must be informed as soon as possible.
		AH5	• An appropriate Keeping Place or reburial site must be determined to house the Aboriginal objects. The location of this Keeping Place must be chosen in consultation with the RAPs and Illawarra LALC.
		AH6	• If changes are made to the proposed works which result in impact to locations outside of the current study area, further archaeological investigation and survey may be required.
Environmental Heritage	6.6	H1	• Prior to construction in the vicinity of the Albion Park Butter Factory (Former) building, a detailed archival recording should be undertaken to document its relationship with Tulkeroo Homestead and the wider setting of the heritage item. Archival recordings should be undertaken in accordance with the NSW Heritage Office documents How to Prepare Archival Records of Heritage Items (Heritage Office 1998) and Photographic Recording of Heritage Items Using Film or Digital Capture (Heritage Office 2006). This should include both photographic and architectural recordings.
		H2	• Screening and landscape treatments around Tulkeroo Homestead are to be generally in accordance with the Concept Plans contained in **Appendix N** and the advice provided in **Appendix O**. Details of the acoustic screening and landscape treatments will be confirmed following consultation with the landowner.
		H3	• Establish an exclusion zone along the boundary between Lots 11 and 12, DP 1205733 to protect and minimise any potential damage to Tulkeroo Homestead which could occur during construction.
		H4	• Use discrete fencing to minimise the temporary visual impact of the works on Tulkeroo Homestead and the site setting.
		H5	• On a fortnightly basis, monitor the impact of any temporary noise or vibration from construction works so as to mitigate any physical damage that these may cause to Tulkeroo Homestead.
		H6	• An interpretation strategy and plan is to be developed as part of the Activity to ensure that the history and context of the study area is recorded.
Landscape Character and Visual	6.7	V1	• Work areas near residential dwellings must be fenced and include the use of visual screening (shade cloth or similar). • Lights utilised for night works will be directed away from residential dwellings and roadways to minimise light impacts on surrounding residential areas. • The site must be kept neat and clean of general litter and neat for the duration of works.
		V2	• The vegetation management plan contained in **Appendix G** of the EIS shall be implemented. • A detailed landscaping plan shall be prepared in conjunction with detailed design of the construction works.

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
Land and Water Use	6.8	L&W1	• The CEMP for the Activity shall include Notification Procedures for the informing of the public of construction works and potential for delays.
		L&W2	• All works within the riparian corridor are designed in accordance with Controlled Activities - Guidelines for instream works on waterfront land and Controlled Activities - Guidelines for watercourse crossings on waterfront land, to ensure that stabilisation and rehabilitation of all disturbed areas along the creek will restore the integrity of the riparian corridor and will mimic the natural hydraulic, hydrologic, geomorphic and ecological functions of Hazelton Creek.
Noise and Vibration	6.9	N1	Implement best practice construction noise and vibration mitigation measures in accordance with recommendations provided within the NSW Interim Construction Noise Guidelines (DECCW, 1999)(ICNG) and Australian Standard AS2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites. Measures include: • Development and implementation of all reasonable and feasible site-specific mitigation measures to meet noise criteria applicable to the project in consultation with residents. • Use of noise attenuation controls at source, such as mufflers, acoustic screens etc. • Maintaining plant and equipment. • Locating static sources of noise such as generators as remotely as possible from noise sensitive receivers. • Developing proposed hours of operation in consultation with the residents/occupants of the affected receivers and TfNSW. • Allowing construction to occur only during approved construction hours, unless otherwise required as a condition of TfNSW safety requirements. • Informing potentially affected receivers with adequate notice of the construction program and any planned activities that may exceed noise and vibration targets. • Conducting noise monitoring during operations for the purposes of assisting in noise mitigation and to verify the findings of this noise assessment, if complaints are received or proposed activities and number of plants exceed those assumed in this assessment. • Use of temporary noise barriers where practical. • Application of respite periods for noisy activities. • Reduce the number of plants operating at one time where works are required to be carried out outside of standard hours. • Preference should be for electric powered plant over combustion engine powered plant. • Preference should be for hydraulic or electric powered plant over pneumatic powered plant. • Avoid metal to metal contact on equipment to reduce impulsive or scraping noise. • Use of broadband reversing alarms, or “quackers”, on mobile equipment in accordance with the relevant health and safety regulations. • Modification of work activities where noise or vibration is found to cause unacceptable impact. • Should operations be required outside daytime hours, all reasonable and feasible efforts should be undertaken to ensure

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			noise levels would not exceed the INP Noise criteria stated in Section 5.2 and Table 5-1 of the Noise Impact Assessment (**Appendix T**) by carrying out night-works adjacent to the school rather than nearby residential receivers for example. • Implementing a procedure for dealing with complaints to ensure that all complaints are registered and dealt with appropriately.
		N2	• Avoid scheduling construction activities during non-standard hours of operation where possible. • As part of the CEMP for the site develop a detailed Construction Noise and Vibration Management Plan.
		N3	• Vibratory rolling should not be carried out within 10 m of nearby receivers during Standard Construction Hours. • Vibratory rolling should not be carried out at night to avoid sleep disturbance.
		N4	• Vibratory rolling should not be carried out within 10 m of residential dwellings. • The Construction Vibration Management Plan within the CEMP shall determine management methodology and monitoring procedures.
		N5	• Consideration of quieter pavement surfaces. • Consideration of noise barriers, including noise mounds and noise walls. • Assessment of suitability of at property treatments (mechanical ventilation, upgraded glazing etc.). • An operational Noise and Vibration Management Plan should be prepared for the project, to include, but not be limited to, the above measures. • The results of Noise Impact Assessment and recommendations for mitigation are based on the assumption the Broughton Avenue intersection will be upgraded by others prior to 2041. Should this not occur, Council will need to reassess the traffic and transport impacts in the vicinity of the project and ensure all appropriate mitigation measures are applied.

		N6	Site Controls:
			• Due to the proximity of residents to the project, temporary barriers (i.e. 2m high solid screens) may be a feasible treatment option to mitigate noise from activities such as services relocations or other activities that may occur during the night period.
			• Site offices, carparks, and hard stand areas should ideally be located at the western extent of the project, on the northern side of the alignment in order to maximise separation distance to as many residents as possible.
			Manage hours of operation:
			• Carrying out works within daytime hours as follows:
			  ○ 7:00am to 6:00pm Monday to Friday
			  ○ 8:00am to 1:00pm Saturdays
			  ○ No work on Sunday and public holidays.
			• Do not carry out operations during evening or night-time hours, unless absolutely necessary for road safety reasons.
			• Management and Behaviour Controls:

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			• Ensure that managers effectively communicate acceptable and unacceptable work practices for the site, though staff site inductions, notice boards, and prestart meetings. • Avoid the need for reversing in the new area by creating a loop road or similar. • Avoid dropping materials from height. • Workers should avoid shouting, minimise talking loudly, and avoid slamming vehicle doors.
Soil and Water	6.10	S1	• A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.
		S2	• Any future works involving soil disturbance should incorporate an unexpected finds protocol to facilitate the identification and management of previously undocumented contamination
		S3	• Soil disturbance is to occur only within the construction footprint. Minimise disturbance wherever possible.
		S4	• Cut vegetation to be removed to allow the roots to remain and stabilize soil on slopes. Use jute matting or similar to stabilize banks and prevent erosion.
		S5	• Adequate sediment controls are required to prevent disturbed sediment from entering the nearby waterways and stormwater outlets during heavy rainfall. • All sediment and erosion control measures are to be installed prior to works commence and maintained throughout the life of the project • No activities (including drilling and/or excavation) are to be undertaken immediately after heavy rainfall events or if it is likely for rain to occur. Unless it is certain that no sediment would be discharged from site.
		S6	• Any imported fill must be from a known source, free of contaminants and compatible with the local soil types. If any potential contamination or suspect material is encountered cease works immediately and contact Council's environment team.

		S7	• Where required, supplementary testing must be undertaken to confirm that the risk of acid sulphate soils has been adequately assessed. This applies particularly to areas of deep cut and at the locations of foundations and piling.
			• In locations where excavations will exceed 2 m in depth from natural ground level it is recommended that a management plan be prepared prior to the commencement of earthworks and construction. The management plan should be prepared in consideration of the ASSMAC Guidelines (ASSMAC 1998) and should be included as a sub-plan of the broader project Construction.
			• The management plan must include the following:
			  ○ Review and interpretation of field testing and analytical results from previous investigations, and in doing so identify areas of the site that may contain ASS / acidic soils
			  ○ Describe the construction works and identify those works that may result in the disturbance of ASS / acidic soils

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			○ Detail the mitigation measures and actions that would be required to mitigate potential risks associated with disturbance of ASS / acidic soils. This includes but is not limited to excavated soils, excavation surfaces, soil treatment performance criteria, validation testing, stockpiling durations, soil treatment areas, prescribed liming rates, groundwater and surface water management and contingencies (e.g. weather events, over-liming and offsite disposal of soil) ○ Monitoring oversight and reporting requirements including environmental monitoring programs (surface water and stockpile), inspection and oversight and provision of suitable reporting and deliverables. The ASSMP (or equivalent) must adhere to Part 6.1 of the Shellharbour LEP and any other relevant local, state or national government planning and regulatory instrument. Additional testing may be required prior to or during construction to confirm the neutralising capacity of soil.
		S8	• Any incidental groundwater discharge that may occur during construction will need to be captured, tested and if necessary treated before disposal to the surrounding environment • If groundwater discharge is expected to exceed 3ML per year an aquifer interference licence will be required under the Water Management Act • Measures will need to be put in place to ensure no ongoing groundwater discharge occurs after completion of construction.
Traffic, Transport and Access	6.11	T1	• The performance of the Illawarra Highway/Broughton Ave/Tripoli Way intersection in the 2041 year should be investigated further as part of broader traffic network management arrangements potentially involving Council, TfNSW and others (such as local property developers subject to Voluntary Planning Agreements).
		T2	• A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the RMS Traffic Control at Work Sites Manual and the worksite manual RMS Specification G10. The TMP must restrict vehicle movements and parking to approved project areas, and manage speed limits near the work.
		T3	• Road closures are to be limited during peak traffic periods to ensure impacts to traffic flows are minimal. • Suitable traffic control measures are to be in place during the movement of equipment and machinery in order to ensure the safety of pedestrians and other road users.
		T4	• Impacted residents must be contacted prior to any works commencing. Accessibility and movements must be allowed for the residents that will be directly impacted as part of the TMP. • Works are not to block access along footpaths, except for the minimum possible time when moving equipment or machinery.
		T5	• Signalised pedestrian crossings will be provided at the TWE / Calderwood Road intersection, TWE / Hamilton Road intersection and TWE / Terry Street intersection within the Study Area as part of the detailed design process for the project.
Waste Management	6.12	WM1	• The Waste Management Plan from the EIS will be implemented as part of the CEMP. The Plan will outline: ○ Compliance with the resource management hierarchy principles.

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
			○ Measures and controls to monitor and minimise waste generation. ○ Lawful handling and disposal of unavoidable waste. ○ The plan will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (2014), the NSW Waste Classification Guidelines (2014) and relevant RMS Waste Fact Sheets. ○ Unsuitable fill material and all other waste streams must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) and disposed of at an appropriately licensed facility. ○ Any excess excavated soil, spoil, green waste or general waste will be loaded into trucks and disposed of at Dunmore Recycling and Waste Disposal Depot.
		WM2	• General waste and recycling bins will be provided at the site ancillary sites and throughout project areas for the duration of construction • Ancillary sites and work areas will be maintained, kept free of rubbish and cleaned up at the end of each working day • Important to prevent material to enter the nearby waterways and stormwater outlets.
		WM3	• Any uncontrolled spills of waste oils, fuels and other materials will be contained using a spill kit and managed by an environmental professional. All waste generated as a result of uncontrolled spills and maintenance will be managed in accordance with the protocol in Safeguard WM1. • Spills and uncontrolled releases of fluids and dangerous goods must be managed in accordance with a procedure specified in the CEMP and government regulators (i.e. NSW EPA) notified as required.
Airport Environment	6.13	A1	• Substantial (building-like) structures should not exceed 13m in height in the assessment trigger area to avoid further assessment.
		A2	• Shellharbour Airport to review and comment on the plant species list specified in the Landscape Plans. • Stormwater management should ensure that any basins incorporated into the design are intended for short term holding of water only i.e. emptied within approximately one (1) day.
		A3	• Zone C and D (identified in **Appendix W**) lighting restrictions should be taken into account in the final lighting design, to accommodate for potential future lighting of Runway 08/26.
		A4	• Any impact on the PANS-OPS procedures will need to be confirmed by Airservices Australia at the request of the airport operator.
		A5	• Construction sequencing and methodology should be considered in relation to the OLS and PANS-OPS surfaces. The most restrictive limit over the site is the OLS inner horizontal at 52m AHD. All intrusions above 52 m AHD, including equipment during construction such as cranes, must be reviewed and assessed by the airport operator in consultation with the relevant aviation authorities.
Climate Change and Hazards	6.14	CCH 1	• The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.

Environmental Assessment Section	EIS Section No.	Code	Mitigation Measures
		CCH 2	• Recycled materials will be incorporated where possible.
		CCH 3	• Appropriate spill kits, advocated for use in association with fuels and chemicals are to be maintained on-site. These are to include spill booms and other methods aimed at the containment of fuels and chemicals spilled within the aquatic environment.
		CCH 4	• Fuels and chemicals are to be stored off-site, however, if required to be stored on-site, they are to be located in a bunded area away from drainage lines
		CCH 5	• No refuelling is recommended within the subject site. If however, refuelling is required at the subject site, areas designated for the storage, refuelling and maintenance of plant are to be established where native vegetation has previously been cleared and at least 30 m from a waterway.
		CCH 6	• Forecast checks of the Bureau of Meteorology site shall be undertaken daily. In the event that heavy rain is predicted, arrangements are to be made immediately to remove any plant and equipment from within the banks of the waterway prior to the rain event. All plant and equipment would be removed to higher ground above the 1 in 100 year flood level.
		CCH 7	• Any debris and spoil accumulated within the works site as a result of flooding would be removed to the designated stockpile area.
		CCH 8	• All environmental controls would be reinstated as soon as possible following flooding.

8.0 Project Justification and Conclusion

8.1 Summary of Findings

Assessment of Impacts

The following have been identified as specific matters, refer to **Section 6.0** for detailed information:

- Air Quality.
- Biodiversity.
- Contamination.
- Flooding / Hydrology.
- Aboriginal Heritage.
- Environmental Heritage.
- Landscape Character and Visual.
- Land and Water Use.
- Noise and Vibration.
- Soil and Water.
- Traffic, Transport and Access.
- Waste Management.
- Airport Environment
- Environmental Management and Monitoring.

The assessment of the key environmental issues has confirmed the above aspects have the potential to impact the environment (without adopting adequate environmental mitigation measures). Therefore, a detailed assessment of the above environmental issues has been undertaken in **Section 6.0** as part of this EIS.

Matters Of National Environmental Significance (EPBC Act)

As outlined in Section 4.1.2 the Matters of National Environmental Significance (MNES) search results indicated that there are unlikely to be significant impacts to MNES or Commonwealth land as a result of the Project.

Consideration of Section 171 EP&A Regulations

As outlined in **Appendix D**, there is unlikely to be significant impacts in regard to Section 171 of the EP&A Regulation as a result of the Activity.

Summary

Through the implementation of best practice management, the potential environmental impacts associated with the Activity can be appropriately managed, as summarised in **Section 7.0**.

8.2 Summary of Beneficial Effects

The proposed Activity will facilitate safe, ongoing, and uninterrupted operation of TWE to reduce traffic congestion for the current and future road users in the area.

Environmental, economic and community benefits include:

- Improved traffic flow efficiency and cater for future traffic volumes.
- Increased level of reliability in floods, providing a carriageway along the route that is not inundated during a storm event up to and including the 5% Annual Exceedance Probability (AEP) flood event.
- Improved safety for pedestrians and cyclists with the addition of designated pathways.
- Increased level of service of intersections as currently key intersections on the Illawarra Highway that are significantly congested.

Council has determined that the beneficial outcomes of the proposed Activity as assessed within this EIS outweigh the potential negative outcomes, provided adequate mitigation is implemented. Alternative alignment options have been considered however these options are considered to be sub-optimal in achieving the Activity objectives.

On balance the Activity is justifiable and suitable for approval.

9.0 References

- Department of Environment and Climate Change (2009), Interim Construction Noise Guideline.
- Department of Environment, Climate Change and Water (DECCW) (2010), Due diligence code of practice for the protection of Aboriginal objects in NSW
- Department of Planning, Industry and Environment (2020), eSPADE
- Department of Planning, Industry and Environment (2020), Major Projects Register.
- Department of Planning, Industry and Environment (2021), Illawarra Shoalhaven Regional Plan 2041.
- DUAP (1996), Roads and Related Facilities
- DUAP (1999), 'Is an EIS required?'
- Environment Protection Authority (2014), Waste Classification Guidelines
- Environment Protection Authority (2017), Stockpile Management Guideline
- Infrastructure NSW, State Infrastructure Planning Strategy 2018 - 2038
- Macquarie Rivulet Floodplain Risk Management Study and Plan
- NSW Government (2018), NSW Future Transport Strategy 2056
- NSW Government (2018), NSW Road Safety Plan 2021
- NSW Government (2018), NSW Future Transport Strategy 2056
- Shellharbour City Council Local Environmental Plan 2013
- Shellharbour City Council (2014), Albion Park Town Centre Plan
- Shellharbour City Council (2022), Local Strategic Planning Statement.
- Shellharbour City Council (2023), Major Projects Advocacy Plan 2023/24.
- Shellharbour City Council (2024), Macquarie Rivulet Floodplain Risk Management Study and Plan
- Transport for NSW, Connecting to the future – 10 years blueprint
- Transport for NSW (2014), Illawarra Regional Transport Plan
- Transport for NSW (2018), Traffic Control at Work Sites Version 5
- Transport for NSW (2020), Crash and Casualty Statistics – Shellharbour

Appendix A TWE Concept Design Plans

Environmental Impact Statement for Tripoli Way Extension

Albion Park

Shellharbour City Council

SLR Project No.: 660.V30219.00000

23 May 2024

Appendix B Project SEARs

Environmental Impact Statement for Tripoli Way Extension

Albion Park

Shellharbour City Council

SLR Project No.: 660.V30219.00000

23 May 2024

Appendix C SEARs Compliance Table

Environmental Impact Statement for Tripoli Way Extension

Albion Park

Shellharbour City Council

SLR Project No.: 660.V30219.00000

23 May 2024

Appendix D Consideration of Section 171 and MNES

Environmental Impact Statement for Tripoli Way Extension

Albion Park

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Appendix E Consultation Activities

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Appendix F Air Quality Assessment

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Appendix G Flora and Fauna Assessment

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Appendix H Independent Review of Flora and Fauna Assessment

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Appendix I Detailed Site Investigation

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Appendix J Remediation Action Plan

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Appendix K Flooding Assessment

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Appendix L Aboriginal Cultural Heritage Assessment

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Appendix M Historic Heritage Assessment and SoHI

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Appendix N Concept Plans for Screening and Landscaping – Tulkeroo Homestead

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Appendix O Assessment of Screening and Landscaping Treatment – Tulkeroo Homestead

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Appendix P Landscape Photos

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Appendix Q Photomontages

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Appendix R Project Fly Through

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Appendix S Land Use Conflict Risk Assessment

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Appendix T Noise and Vibration Assessment

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Appendix U Traffic and Transport Impact Assessment

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Appendix V Waste Management Plan

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Appendix W Airport Environment Report

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Appendix X Structural Assessment Report

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