Review of Environmental Factors: Upgrade of Junction Island Bridge and walking trail

greenedge environmental

For Wentworth Shire Council

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Disclaimer

Green Edge Environmental Pty Ltd has undertaken to prepare this Review of Environmental Factors after receiving instruction from the Wentworth Shire Council.

Green Edge Environmental Pty Ltd accepts no responsibility for any omission of regulatory referrals that may have been required by any NSW Agency.

Statement of Compliance

Statement of Compliance with Clause 171 of Environmental Planning and Assessment Regulation 2021, NSW.

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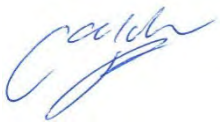
Declaration by Person Preparing the Review of Environmental Factors
This Review of Environmental Factors has been prepared in accordance with Clause 171 of the Environmental Planning and Assessment Regulation 2021 and contains all available information that is relevant to the environmental assessment of the activity to which the statement relates, and the information contained in the statement is neither false nor misleading.



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Executive Summary

The Wentworth Shire Council have received funding to upgrade the Junction Island bridge and walking trail located in Wentworth. Council proposes to complete the works in the next six months.

The Review of Environmental Factors has been developed to assess the potential environmental impacts from the proposed works and in doing so fulfil the requirements of Section 111.

The proposed works areas is zoned public recreation (RE1) under the Wentworth Shire Local Environmental Plan (2011).

Being located on the Murray and Darling River floodplain, the proposed development area has potential to contain biodiversity and cultural heritage artefacts.

No other existing or likely future uses or activities on or near the site would be disadvantaged by this proposal. The proposal will not affect any world heritage properties, national heritage places, wetlands of international importance (Ramsar sites) or Commonwealth marine areas.

The existing bridge will be demolished and removed to then be replaced and significantly upgraded. The existing walking trail will be levelled for pedestrian safety and better access following wet weather.

Conclusion

This REF has been prepared in accordance with the provisions of Section 5.5 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The proposal would provide the following benefits:

- Safer user access
- Improved user access
- Minimal environmental impact

This REF has considered and assessed these impacts in accordance with clause 171 of the EP&A Regulation 2021 and the requirements of the EPBC Act (refer Appendix C and Appendix D). Based on the assessment contained in this REF, it is considered that the proposal is not likely to have a significant impact upon the environment or Matters of National Environmental Significance, with the application of recommended mitigation measures in Table 10.

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1.0 The proposal

1.1 Locality

The Wentworth Shire Council (WSC) have received funding to upgrade the Junction Island Bridge and existing walking trail located in Wentworth.

WSC proposes to carry out the deconstruction and reconstruction of Junction Island Bridge and walking trail as described within this Review of Environmental Factors (REF) as follows:

Junction Bridge replacement:

- Demolition of the existing bridge
    - Removal of timbers
    - Cutting of steel frame and removal
    - Preference would be to remove all existing concrete footings in possible
- Clearing of required alignment of ramps by skid steer and hand tools. This may require removal of some bushes and small trees on the Island side (<10 River Cooba).
- Installation of screw piles for bridge abutments by skid steer
- Construction of the bridge ramps and abutments to screw piles
- Installation of the prefab bridge span to the abutments
- Materials will likely be moved to the island via crane, potentially on a barge
- Install erosion protection to the bank near the new abutments, incorporating geofabric with rip rap.

Footpath and raised walkways (approximately 50m of raised walkway, mostly towards the west end):

- Use a light skid steer loader and hand tools to level the existing track and clear new growth in preparation for the construction of the path
- Transport crushed stone to island
- Spread crushed stone with light skid steer loader and hand tools to 1.8m width
- Install screw piles at raised walkway locations
- Construct timber walkways to 1.8m width.

A REF is required to assess the impacts and support the proposed project.

1.2 Objective of the proposal

A REF is required to be developed to satisfy Part 5 of the E*nvironmental, Planning and Assessment Act 1979* (EP&A Act), with the Wentworth Shire Council being the proponent and determining authority. Section 5.5 of the EP&A Act outlines the duty of the determining authority to consider the environmental impacts of an 'activity'. When considering an activity, the determining authority is required to 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment'.

This REF has been developed to assess the potential environmental impacts from the proposed activities/works and in doing so, fulfil the requirements of Section 111.

The proposed works areas is zoned public recreation (RE1) under Wentworth Local Environmental Plan (LEP) (2011). The objective of zone is to:

- 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.

Being located adjacent to Murray River floodplain, the proposed development area could contain biodiversity and cultural heritage artefacts. The proposed project has the following details (refer Table 1).

Table 1: Details of the proposed project

Lot and DP	Zoning	Planning controls	Tenure
2/-/DP817572	RE1 - Public Recreation	Flood planning Riparian lands and waterway Terrestrial biodiversity Wetlands	Native title – not extinguished or excluded Reserve number R55602 Managed by Wentworth Shire Council

1.3 Timeline

The proposed project is expected to take approximately six months to complete.

1.4 Consideration of the alternatives and justification

All viable alternatives have been considered, including:

- **Option 1:** Do nothing. Proposal outcomes would not be achieved, and bridge and walking trail user safety would not be improved. There would be no environmental impact should the proposal not proceed.
- **Option 2:** Preferred Option. Carry out the bridge and walking trail upgrades as described within this REF as follows

All above options have been considered and costed. The preferred option is presented in this REF as **option 2**. The option relevant to this proposal is favoured, as it:

- will utilise existing the existing infrastructure footprint
- will have minimal impact on the immediate and surrounding environment
- will not cause impacts to threatened flora or fauna
- will not impact areas of cultural heritage sensitivity.

No other existing or likely future uses or activities on or near the site would be disadvantaged by this proposal. The proposal will not affect any world heritage properties, national heritage places, wetlands of international importance (Ramsar sites) or Commonwealth marine areas.

2.0 Planning context

2.1 Purpose of this report

This Review of Environmental Factors (REF) has been prepared by Green Edge Environmental on behalf of WSC who are the proponent and the consent authority under the Wentworth Local Environmental Plan 2011 (Reg 1.6) and Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) are.

The EP&A Act contains two parts which impose requirements for planning approval:

- Part 4 provides for control of local development that requires development consent from the local Council
- Part 5 provides for control of 'activities' that do not require development consent or approval from the Minister for Planning.

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail mitigation measures to be implemented.

The description of the proposed works and associated environmental impacts have been undertaken in context of clause 171 of the Environmental Planning and Assessment Regulation 2021, the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This REF helps to fulfil the requirements of Regulation 5.6 of the EP&A Act that WSC examine and consider to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- whether the proposed project is likely to have a significant impact on the environment and therefore the necessity for an Environmental Impact Statement (EIS) to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act
- the significance of any impact on threatened species as defined by the BC Act and/or FM Act, under the EP&A Act and therefore the requirement for a Species Impact Statement
- The potential for the proposal to significantly impact a matter of National Environmental Significance or Commonwealth land, and the need to make a referral to the Australian Government Department of the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2.2 Legal permissibility

2.2.1 Environmental, Planning and Assessment Act and Regulations

The WSC is the consent authority to which this Review of Environmental Factors (REF) will be assessed. The proposed location is in southwestern New South Wales.

The overarching State legislation in relation to this activity is the *EP&A Act* and Environmental Planning and Assessment Regulation 2021.

The project does not require development consent from Council, under Part 4 of the EP&A Act due to the application of the 2.73 of the Transport and Infrastructure State Environmental Planning Policy (SEPP) 2021.

2.2.2 National Parks and Wildlife Act

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) and does not affect land or development regulated by State Environmental Planning Policy No. 14 – Coastal Wetlands, State Environmental Planning Policy No. 26 – Littoral Rainforests or State Environmental Planning Policy (Major Projects) 2005.

The NPW Act, administered by the DPE - Environment, Energy and Science (EES), is the primary legislation for the protection of some aspects of Aboriginal cultural heritage in New South Wales.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. There are a number of defences and exemptions to the offence of harming an Aboriginal object or Aboriginal place. One of the defences is that the harm was carried out under an Aboriginal Heritage Impact Permit (AHIP).

This project has assessed that an AHIP is not required (refer to section 3.7).

2.2.3 Aboriginal Lands Rights Act

The *Aboriginal Land Rights Act 1983* (ALR Act) introduced land rights for Aboriginal people in New South Wales, allowing the Aboriginal Land Councils constituted under the Act to claim land as compensation for historic dispossession of land and to support the social and economic development of Aboriginal communities. The ALR Act recognises the traditional ownership and occupation of the land by Aboriginal peoples and the importance of their connection to land. This means the ALR Act recognises the spiritual, social, cultural and economic importance of land to the State's Aboriginal peoples.

The ALR Act also acknowledges that past governments' decisions have progressively reduced the lands set aside for Aboriginal people without compensation.

The purposes of the ALR Act are set out in Section 3:

- To provide land rights for Aboriginal persons in New South Wales
- To provide for representative Aboriginal Land Councils in New South Wales
- To vest land in those Councils
- To provide for the acquisition of land, and the management of land and other assets and investments, by or for those Councils and the allocation of funds to and by those Councils
- To provide for the provision of community benefit schemes by or on behalf of those Councils

The principle of self-determination underpins the ALR Act. Since the introduction of the ALR Act many of the powers within its provisions, and the right to make decisions, have been gradually transferred to Aboriginal Land Councils.

The ALR Act provides a role and responsibility for the relevant Local Aboriginal Land Council (LALC) with respect to Aboriginal culture and heritage. As such, the Dareton LALC has been consulted on this proposal.

As identified in Table 1, no Aboriginal Land Claims exist on the land parcel subject to this assessment, so no further requirements exist.

2.2.4 Native Title Act

The *Native Title Act 1993* establishes a framework for the protection and recognition of native title. The Australian legal system recognises native title where:

- the rights and interests are possessed under traditional laws and customs that continue to be acknowledged and observed by the relevant Indigenous Australians,
- by virtue of those laws and customs, the relevant Indigenous Australians have a connection with the land or waters,
- the native title rights and interests are recognised by the common law of Australia.

Under Subdivision 24JA Reservations - *Native Title Act 1993*, is relevant to this project. The Native Title Act sets up processes to determine where native title exists, how future activity impacting upon native title may be undertaken, and to provide compensation where native title is impaired or extinguished. The Act gives Indigenous Australians who hold native title rights and interests—or who have made a native title claim—the right to be consulted and, in some cases, to participate in decisions about activities proposed to be undertaken on the land. Indigenous Australians have been able to negotiate benefits for their communities, including in relation to employment opportunities and heritage protection.

The Act also establishes a framework for the recognition and operation of representative bodies that provide services to native title claimants and native title holders. The Australian Government provides significant funding to resolve native title issues in accordance with the Act, including to native title representative bodies, the National Native Title Tribunal and the Federal Court of Australia.

The Future Act is also required to be assessed and consulted on with a notification letter sent to NTSCorp. The Future Act fits the purpose of the reserve being public recreation, therefore is aligned with Subdivision - **24JA(1)(e)(i)** Reservations under the *Native Title Act 1993.*

2.2.5 Heritage Act

The Heritage Act 1977 identifies and protects heritage items, administered by the Energy, Environment and Science Group within DPIE. Any developments which would impact on an item listed on the State Heritage Register would require approval from the Heritage Council under section 60 of the Act.

No items are listed on the Wentworth Local Environments Plan (LEP) that will be impacted by the proposed works or on the Lot and DP. Under the State Heritage Act, no sites will be impacted by the proposed works.

2.2.6 Local Lands Services Act

The *Local Lands Services Act 2013* (LLS Act) identifies what is classed as native vegetation and regulates the clearing of native vegetation in rural areas. Clearing of native vegetation is defined under the Act as:

(a) cutting down, felling, uprooting, thinning or otherwise removing native vegetation,

(b) killing, destroying, poisoning, ringbarking or burning native vegetation.

However, this Act does not apply to any clearing that is, or is part of, an activity carried out by a determining authority within the meaning of Part 5 of the EP&A Act if the determining authority has complied with that Part. As this project would be an activity within the meaning of Part 5 of the EP&A Act, the LLS Act does not apply. The proposed development crosses at flood runner crossings described on the Native Vegetation Regulatory Map as vulnerable regulated land (refer Appendix A).

Western Local Land Services also issues stock permits, in accordance with Part 6 of the *Local Land Services Act 2013*. None of the proposed work is on Travelling Stock Routes (TSR's) under the management of the LLS.

2.2.7 Biodiversity Conservation Act

The purpose of the *Biodiversity Conservation Act 2016* (BC Act) is:

- To conserve biological diversity at bioregional and state scales
- To maintain the diversity and quality of ecosystems
- To support biodiversity conservation in the context of a changing climate
- To assess the extinction risk of species and ecological communities, and identify key threatening processes
- To establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity.

The threatened species assessment process under section 5A of the EP&A Act includes a Test of Significance (also known as the Five-part test). These factors must be considered by decision makers regarding the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats.

An assessment of the potential impacts of the proposal on threatened species, populations, ecological communities, and Outstanding Biodiversity Values listed on the BC Act was carried out in accordance with section 5A of the EP&A Act. A test of significance was conducted to characterise the significance of any potential impacts within Appendix C and concluded that there would be no significant impact on threatened species, populations or ecological communities, or their habitats.

Under the Act, proponents proposing to clean native vegetation can offset their obligations through the Biodiversity Offset Scheme. Activities assessed and determined under Part 5 of the *Environmental Planning and Assessment Act 1979* (generally,

proposals by government entities), if proponents choose to 'opt in' to the Scheme. In this case WSC do not choose to opt in.

2.2.8 Protection of the Environment Operations Act

The object of the *Protection of the Environment Operations Act 1997* is to achieve the protection, restoration, and enhancement of the quality of the NSW environment. The Act provides for the issuing of three types of environment protection notices: clean-up, prevention, and prohibition notices.

Clean-up notices can be issued to deal with pollution incidents (e.g. a spill of pollutants). Prevention notices can be issued where an activity is being carried out in an environmentally unsatisfactory manner. Clean-up and prevention notices are issued by the regulatory authority for the activity or premises concerned. In emergencies, the EPA can issue a clean-up notice even though it is not the regulatory authority in the circumstances.

2.2.9 Fisheries Management Act

Under Section 198A of the *Fisheries Management Act 1994*, dredging is defined as:

- any work that involves excavating water land
- any work that involves the removal of material from water land that is prescribed by the regulations as being dredging work to which this Division applies.

This section describes water land as land submerged by water:

a) whether permanently or intermittently

b) whether forming an artificial or natural body of water.

The proposal will involve excavation of material and thus, does not constitutes dredging, as defined by the Fisheries Management Act.

The Fisheries Management Act lists threatened aquatic species, endangered populations and ecological communities and key threatening processes. Potential impacts on species, populations and communities, subject to the Fisheries Management Act, would need to assess impacts on threatened aquatic species.

Any such public authority is to notify the Minister of any dredging or reclamation work that it proposes to carry out, this will be done through the reviewing of the draft REF and advising Fisheries 3 days prior to works commencing.

Section 3 of the REF includes an assessment of the impacts of the proposed development.

2.2.10 Water Management Act

The objectives of the *Water Management Act (2000)* (WM Act) are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations. One key aim is to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna.

The Water Management (General) Regulation 2018 specifies a number of water use approval exemptions.

The WM Act is administered by the Department of Planning and Environment, and they are the consent authority for a **Controlled Activity Approval** (CAA) where works are located within 40m of a waterway in NSW. A CAA is not required in this situation as the works will be undertaken by WSC. Under the Water Management (general) Regulation (2004) - Regulation 39a, an exemption from the requirements for having CAA is applicable if the works are undertaken by or on behalf of …"(1) Public authorities and local councils …"

Despite an approval not being required, best management practice needs to be adhered to and the 'Guidelines for Controlled Activities on Waterfront Land (NRAR 2018) will be considered in this case. The suite of guidelines include:

- In-stream works
- Laying pipes and cables in watercourses
- Outlet structures
- Riparian corridors
- Vegetation Management Plans
- Watercourse crossings

2.2.11 Crown Land Management Act

The objectives of the *Crown Land Management Act 2016* are:

(a) to provide for the ownership, use and management of the Crown land of New South Wales, and

(b) to provide clarity concerning the law applicable to Crown land, and

(c) to require environmental, social, cultural heritage and economic considerations to be taken into account in decision-making about Crown land, and

(d) to provide for the consistent, efficient, fair and transparent management of Crown land for the benefit of the people of New South Wales, and

(e) to facilitate the use of Crown land by the Aboriginal people of New South Wales because of the spiritual, social, cultural and economic importance of land to Aboriginal people and, where appropriate, to enable the co-management of dedicated or reserved Crown land, and

(f) to provide for the management of Crown land having regard to the principles of Crown land management.

Nothing further required.

2.2.12 Environmental Protection and Biodiversity Conservation Act

Under the federally administered *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), actions which are likely to have a significant impact on matters of National Environmental Significance (MNES) require approval from the Commonwealth Minister for Environment and Heritage. MNES include:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

No matters of NES will be impacted upon by the proposed project.

2.3 Relevant policies

2.3.1 State Environemtnal Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP) aims to assist in the effective delivery of public infrastructure across NSW by improving certainty and regulatory efficiency. This is to be achieved through a consistent planning assessment and approvals regime for public infrastructure and services, and through the clear definition of environmental assessment and approval process for public infrastructure and services facilities.

2.73 Development permitted without consent

(3) Any of the following development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council—

(a) development for any of the following purposes—

(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,

(ii) recreation areas and recreation facilities (outdoor), but not including grandstands,

(iii) visitor information centres, information boards and other information facilities,

(iv) lighting, if light spill and artificial sky glow is minimised in accordance with the Lighting for Roads and Public Spaces Standard,

(v) landscaping, including landscape structures or features (such as art work) and irrigation systems,

(vi) amenities for people using the reserve, including toilets and change rooms,

(vii) food preparation and related facilities for people using the reserve,

(viii) maintenance depots,

(ix) portable lifeguard towers,

(b) environmental management works,

(c) demolition of buildings (other than any building that is, or is part of, a State or local heritage item or is within a heritage conservation area).

2.3.2 State Environemtnal Planning Policy (Biodiveristy and Conservation)

This SEPP contains:

- planning rules and controls for the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application
- the land use planning and assessment framework for koala habitat
- provisions which establish a consistent and co-ordinated approach to environmental planning and assessment along the River Murray
- provisions seeking to protect and preserve bushland within public open space zones and reservations
- provisions which aim to prohibit canal estate development
- provisions to support the water quality objectives for the Sydney drinking water catchment
- provisions to protect the environment of the Hawkesbury-Nepean River system
- provisions to manage and improve environmental outcomes for Sydney Harbour and its tributaries
- provisions to manage and promote integrated catchment management policies along the Georges River and its tributaries
- provisions which seek to protect, conserve and manage the World Heritage listed Willandra Lakes property.

Chapters 2 (Vegetation in non-rural areas), 4 (Koala habitat protection 2021) and 5 (River Murray Lands) are relevant to this project. As no trees suitable for koalas are proposed to be cleared, chapters 2 and 4 are not applicable.

The objectives of Chapter 5 are—

> (a) to ensure that appropriate consideration is given to development with the potential to adversely affect the riverine environment of the River Murray, and
>
> (b) to establish a consistent and co-ordinated approach to environmental planning and assessment along the River Murray, and
>
> (c) to conserve and promote the better management of the natural and cultural heritage values of the riverine environment of the River Murray.

Part 5.3 Planning requirements and consultation outlines when consultation should be undertaken:

(2) Consultation by an authority or person with a listed agency must be carried out as follows—

> (a) the authority or person must write to the listed agency giving a description of the proposed development,
>
> (b) the authority or person must request the listed agency to comment on the proposed development within 21 days from the date the agency receives the notice,

(c) the authority or person must consider any comments made on the proposed development by the listed agency within those 21 days.

Part 5, Section 22 -Recreation Facility Adjoining River Murray Or On Flood Liable Land has consultation requirements for this project.

Definition—A building, work or place, adjoining the River Murray or on flood liable land, used for sporting activities, recreation or leisure activities, whether or not operated for the purpose of gain, but not a building, work or place referred to elsewhere in this Table.

Planning control—

Council consent.

Consultation—

Transport for NSW.

Department of Planning, Industry and Environment, if the development is—

(a) likely to significantly affect threatened species, within the meaning of the Biodiversity Conservation Act 2016, section 7.2, and

(b) in the flood planning area.

Specific matters for consideration—

Recreational facilities should not obstruct, alienate or pollute the river.

Based on the above information, consultation with Transport for NSW and the Department of Planning, Industry and Environment is required as the development is in a flood planning area.

2.4 Local environmental plans

Wentworth Local Environmental Plan (LEP) 2011

The site is located within the Wentworth Local Government area and as such the Wentworth LEP 2011 applies.

(1) This Plan aims to make local environmental planning provisions for land in Wentworth in accordance with the relevant standard environmental planning instrument under section 3.20 of the Act.

(2) The aims of this Plan are as follows—

(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,

(a) to encourage and manage ecologically sustainable development within Wentworth,

(b) to encourage the retention and enhancement of land that supports the primary economic activities within Wentworth for productive agriculture and other primary production purposes,

(c) to conserve and protect items of European and Aboriginal cultural heritage,

(d) to conserve and protect areas of environmental significance, particularly conservation parks, reserves and the Murray and Darling River systems.

The following sections of the LEP are relevant to this project.

5.21 Flood planning

Part 5.21 of the LEP states the following for flood planning

(1) The objectives of this clause are as follows—

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,

(c) to avoid significant adverse impacts on flood behaviour and the environment.

The proposed works will not contravene the objectives of the LEP. An assessment of the impacts from the proposal is located in Section 5.2 of this REF.

7.1 Earthworks

(1) The objectives of this clause are as follows—

(a) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land,

(b) to allow earthworks of a minor nature without requiring separate development consent.

(2) Development consent is required for earthworks unless—

(a) the work is exempt development under this Plan or another applicable environmental planning instrument, or

(b) the work is ancillary to other development for which development consent has been given.

7.4 Terrestrial biodiversity

The objective of Part 7.4 is to maintain aquatic and terrestrial biodiversity by:

(1) The objective of this clause is to maintain terrestrial biodiversity by—

(a) protecting native fauna and flora, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

(2) This clause applies to land identified as "Terrestrial Biodiversity" on the Natural Resource—Terrestrial Biodiversity Map.

(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider whether or not the development—

(a) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and

(b) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and

(c) has any potential to fragment, disturb or diminish the biodiversity structure, function, and composition of the land, and

(d) is likely to have any adverse impact on the habitat elements providing connectivity on the land.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that—

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

The proposed works will not contravene the objectives of the LEP. An assessment of the impacts from the proposal is located in Section 5.2 of this REF.

7.6 Development on river front areas

(1) The objectives of this clause are as follows—

(a) to support natural riverine processes, including the migration of the Murray River's channels,

(b) to protect and improve the bed and bank stability of the Murray River,

(c) to maintain and improve the water quality of the Murray River,

(d) to protect the amenity, scenic landscape values and cultural heritage of the Murray River and to protect public access to its riverine corridors,

(e) to conserve and protect the riverine corridors of the Murray River, including wildlife habitat.

(2) Despite any other provision of this Plan, development consent may only be granted to development on land in a river front area for the following purposes—

(a) boat building and repair facilities, boat launching ramps, boat sheds, charter and tourism boating facilities or marinas,

(b) the extension or alteration of an existing building that is wholly or partly in the river front area, but only if the extension or alteration is to be located no closer to the river bank than the existing building,

(c) environmental protection works,

(d) extensive agriculture and intensive plant agriculture,

(e) walking trails, cycleways, picnic facilities, recreation facilities and recreation facilities (outdoors),

(f) water recreation structures.

7.7 Riparian land and Murray River and other watercourses—general principles

(1) The objective of this clause is to maintain terrestrial biodiversity by—

(a) protecting native fauna and flora, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats

(2) This clause applies to land—

(a) identified as "Watercourse" on the Natural Resource—Watercourse Map, and

(b) situated within 40 metres of the top of the bank of a watercourse (being a watercourse situated on land referred to in paragraph (a)).

An assessment of the impacts from the proposal is located in Section 3 of this REF.

2.5 Summary of approvals

This project will be assessed under Part 5 of the EP&A Act. Table 2 outlines the applicable approval and concurrences required.

Table 2: Approvals required for the project

Act	Provision	Approval/concurrence
Fisheries Management Act 1994	Section 201	Exempt form a permit to carry out dredging and or reclamation, but notification is required. No works are proposed on the bed or banks of the Junction Creek
Water Management Act 2000	Part 3 Chapter 3	Exempt from a controlled activity approval
National Parks and Wildlife Act 1974	n/a	Not required if works undertaken in line with the Aboriginal Cultural Heritage Due Diligence Assessment (Austral, 2022).
Native Title Act 1993	Subdivision 24JA Reservations	Concurrence required under the Future Act
Heritage Act 1977	Section 60	No requirements
Crown Lands Management Act 2016	Division 5.6	No requirements. The proposal fits the purpose of the reserve. The project is being conducted on crown land where Council is the Crown Land manager. The project is for replacement of existing structure within a similar type footprint

2.6 Determining authority

The determining authority is the Wentworth Shire Council.

2.7 Stakeholder consultation

Under the T&ISEPP, no consultation is required (refer section 2.7.1).

Based on the above information, consultation with Transport for NSW and the Department of Planning, Industry and Environment is required as the development is in a flood planning area.

Council have advised they will consult with:

- landowners
- public (council website)
- DPE - Water (formerly NRAR)
- DPE - (Biodiversity and Conservation division)

2.7.1 T&ISEPP Consultation

Part 2.2 of the T&ISEPP 2021 contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. This is detailed below:

Is consultation with Council required under division 1 of the T&I SEPP?		
Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	☐ Yes	☒ No

Are the works likely to generate traffic to an extent that will strain the capacity of the existing road system in a local government area?	☐ Yes	☒ No
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	☐ Yes	☒ No
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	☐ Yes	☒ No
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	☐ Yes	☒ No
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	☐ Yes	☒ No
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than minor or inconsequential?	☐ Yes	☒ No
Are the works located on flood liable land? If so, will the works change flooding patterns to more than a minor extent?	☐ Yes	☒ No

Is consultation with Council required under division 1 of the T&I SEPP?		
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	☐ Yes	☒ No
Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	☐ Yes	☒ No
Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	☐ Yes	☒ No
Is the proposal in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998*?	☐ Yes	☒ No
Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional facility or group home in bush fire prone land?	☐ Yes	☒ No
Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	☐ Yes	☒ No
Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhart LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).	☐ Yes	☒ No
Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	☐ Yes	☒ No

3.0 Environmental impacts and management

This section provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. The factors specified in clause 171 of the Environmental Planning and Assessment Regulation 2021 and the matters of national environmental significance under the Federal *Environment Protection and Biodiversity Conservation Act 1999* are also considered in section 3. Mitigation measures are provided to ameliorate the identified potential impacts.

3.1 Land use

3.1.1 Existing environment

The Darling and Murray River has been highly modified through adjacent historical camping and recreation since European settlement. The Junction Island is estimated to have been developed in the 1970's. The proposed works area contains a pedestrian trac tracks and bridge to cross to the Island. The works site is zoned RE1– Recreation, which is currently managed for recreation purposes.

To access the Junction Island, Crown land will need to be used. Consent to access the site will be sought from DPE – Crown Lands. The proposed works are in accordance with the Plan of Management (WSC, 1997).

3.1.2 Impact assessment

The impact footprint will be on the existing impacted footprint. All impacts are considered low risk in nature and can be mitigated by the following measures.

3.1.3 Mitigation measures

- use existing tracks to access the site
- maintain a rubbish free and tidy work area
- seek consent to access the site from DPIE - Crown Lands

3.2 Hydrogeology and geomorphology

3.2.1 Existing environment

The proposed works area is located on the Darling and Murray River Floodplain, which becomes inundated at times of high flow. All services are proposed to be installed underground, with the aboveground infrastructure design to be either inundated or removed and does not impede flooding.

The works will occur on an island between the Murray and Darling River, just upstream of the junction between the two Rivers.

The proposed infrastructure has been designed not to impede the hydrology and geomorphology of the site.

3.2.2 Impact assessment

Junction Bridge replacement:

- Demolition of the existing bridge
  - Removal of timbers
  - Cutting of steel frame and removal
  - Preference would be to remove all existing concrete footings in possible
- Clearing of required alignment of ramps by skid steer and hand tools. This may require removal of some bushes and small trees on the Island side.
- Installation of screw piles for bridge abutments by skid steer
- Construction of the bridge ramps and abutments to screw piles
- Installation of the prefab bridge span to the abutments
- Materials will likely be moved to the island via crane, potentially on a barge.
- Install erosion protection to the bank near the new abutments, incorporating geofabric with rip rap.

Footpath and raised walkways (approximately 50m of raised walkway, mostly towards the west end):

- Use a light skid steer loader and hand tools to level the existing track and clear new growth in preparation for the construction of the path
- Transport crushed stone to island
- Spread crushed stone with light skid steer loader and hand tools to 1.8m width
- Install screw piles at raised walkway locations
- Construct timber walkways to 1.8m width.

The works are minor in nature and are not expected to impact the hydrology and geomorphology of the site.

3.2.3 Mitigation measures

- No new river bank accesses to be created
- Site remediation to ensure loose soils are compacted to match surrounding soils
- All works to be carried out in accordance with the controlled activities guidelines.

3.3 Water quality, erosion and sedimentation

3.3.1 Existing environment

Water quality is variable, depending on the origin of the water. Groundwater quality generally ranges from 25-50,000 EC and surface water quality is highly variable in the order of 50 to 800 EC.

The proposed works location is on the floodplain. The bank soils consist of silty soil underlain by clay. The proposed works are back from the Junction Creek bank. No major signs of erosion or sedimentation are evident, and this will be further mitigated rock pip rap.

3.3.2 Impact assessment

The proposed works are minor in nature and will offer an existing modified location with no impacts expected. To ensure the land is stable and no impacts to water quality occur following construction, the mitigation measures in Section 3.3.3 are proposed. Minor erosion and scouring could occur if there is a substantial flood event during, or soon after construction, before the area has been re-stabilised. The risk of sedimentation to the waterways will be managed through appropriate erosion and sediment controls listed below.

3.3.3 Mitigation measures

- refuelling of small plant would only take place on level ground and in bunded areas which is at a distance no less than 40m from drainage lines and waterways
- spill containment measures (such as drip trays and bunds) to be used when refuelling within 40m of a waterway
- compaction of disturbed soils will be similar to the surrounding soils
- all excess soil will be removed from the site and a similar topography to the surrounding site will be achieved following construction.

3.4 Soil

3.4.1 Existing environment

The soils associated with the subject land are predominately grey, brown silty clays. These soils are common on the riverine environment and are derived from alluvial material. Topographical variation is moderate over the majority of the area, and consistent with nearby banks.

The project areas contain generally sandy clay soil and the topography of the land system is generally flat to slightly undulating.

A search of the NSW EPA Contaminated Land Register (7 June 2022) did not identify any contaminated lands on or adjacent to the project area.

A search of the eSpade V2.1 (ASRIS) was conducted on 7 June 2022, the area of the proposed works is not mapped for any probability of Acid Sulphate Soils (DPIE, 2021).

3.4.2 Impact assessment

The proposed works would not pose any major impact to landform or geology. Some soil disturbances would occur, but will be minor in nature.

Fuel and oil from the construction plant and the ancillary facilities are potential sources of pollution. Any spills could potentially be transported into the waterway/ nearby drainage systems and impact water quality. Mitigation measures would be implemented to reduce the impacts associated with works. No significant changes to the topography, geology and soils will occur, as works proposed are on an existing structure.

The characteristics of the soils mean they become very sticky when it rains (even a small amount), which could result in difficulties accessing the site and ultimately result in scouring and damage to roads.

The excess spoil will be removed from the project area and can be disposed of offsite.

3.4.3 Mitigation measures

- minimising the movement of machinery along the alignment, particularly after rainfall
- ceasing works during heavy rainfall
- Appropriate erosion and sediment controls would be installed prior to the commencement of works in accordance with the technical document, Landcom (2006) Edition 4 'Managing Urban Stormwater: Soils and Construction' (the Blue Book), where the disturbed catchment exceeds 250m² and when soil is likely to be left exposed for more than two weeks
- Spill kits would be available with each refuelling area and all staff would be trained in their use
- Spill containment measures (such as drip trays) to be used when refuelling within 40 metres of a waterway, where possible refueling should occur greater than 40 meters from a waterway
- Inspection and maintenance of sediment and erosion controls until site has been stabilised post construction
- Spoil to be removed from the site and legally disposed of as per the NSW waste classification guidelines.

3.5 Flora

3.5.1 Bioregion and PCT type

The proposed project area is located in the Riverina Bioregion and the Murray Scroll belt subregion, identified under the Interim Biogeographic Regionalisation for Australia.

The New South Wales plant community type (PCT) classification was developed in 2011 to establish an unambiguous master community-level classification for use in vegetation mapping programs, biometric-based regulatory decisions, and as a standard typology for other planning and data gathering programs. One vegetation community occurs within the works area:

- River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (PCT 11)

Table 3: PCT characteristics

PCT	PCT name and length of road alignment	Description
11	River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Tall open forest or woodland with trees to about 20 m high, dominated by River Red Gum (*Eucalyptus camaldulensis*) to 20 m high with patches of River Cooba (*Acacia stenophylla*), Lignum (*Muehlenbeckia florulenta*) and Nitre Goosefoot (*Chenopodium nitrariaceum*) as a shrub understorey. Black Box (*Eucalyptus largiflorens*) is sometimes present. Ground cover is usually mid-dense or sparse and is dominated by Warrego Grass (*Paspalidium jubiflorum*) and forb species such as *Pratia concolor, Alternanthera denticulata, Wahlenbergia fluminalis, Chenopodium pumilio, Brachyscome basaltica var. gracilis, Eclipta platyglossa, Senecio*

PCT	PCT name and length of road alignment	Description
		quadridentatus, *Asperula gemella*, *Euchiton sphaericus*, *Minuria integerrima*, *Rorippa laciniata*, *Centipeda minima var. minima*, *Rumex tenax*, *Damasonium minus* and *Ranunculus undosus*. The sedge *Cyperus gymnocaulos* is commonly present. Occurs on heavy grey clay soil in drainage depressions and flood-outs of major water courses on the floodplains along western sections of Murray, Murrumbidgee and Lachlan Rivers and extending up the Darling River to Wilcannia. Mainly in the Riverina and Murray-Darling Depression Bioregions of the semi-arid (warm) climate zone.

3.5.2 Threatened species

A database search was undertaken on 7 June 2022 of the NSW Department of Planning and Environment. (BioNet Atlas of NSW Wildlife) and the Department of Agriculture, Water and Environment websites to identify threatened species that may be found within the proposed works area as listed under the BC Act and the EPBC Act.

A desktop search of the online databases was undertaken as follows:

- NSW Department of Planning and Environment BioNet Atlas of NSW Wildlife (refer to Appendix B)
- Department of the Agriculture, Water and Environment, Environmental Protection and Biodiversity Conservation (EPBC) Protected Matters Report (refer to Appendix B).

Six threatened flora species were identified within the study area with a 10km search radius. Table 4 identifies these species, their threat level, predicted occurrence and a comment on potential to occur on site. Two species were identified as having potential, so are subject to the 'test of significance', as set out in Section 7.3 of the BC Act.

Table 4: Threatened flora predicted

Common name	Species name	State	National	Occurrence	Comment
Mossgiel Daisy	*Brachyscome papillosa*	Vulnerable	Vulnerable	Species or species habitat may occur within area	No potential habitat, Recorded primarily in clay soils on Bladder Saltbush (Atriplex vesicaria) and Leafless Bluebush (Maireana aphylla) plains, but also in grassland and in Inland Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris spp.*) woodland.
Winged Peppercress	*Lepidium monoplocoides*		Endangered	Species or species habitat likely to occur within area	Potential habitat, occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by *Allocasuarina luehmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses.
Desert Greenhood	*Pterostylis xerophila*	Critically endangered	Vulnerable	Species or species habitat likely to occur within area	No habitat, found further east.
Menindee Nightshade	*Solanum karsense*		Vulnerable	Species or species habitat likely to occur within area	Potential to occur, grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils. Habitats are generally lake beds or floodplains of heavy grey clays with a highly self-mulching surface. Also found on sandy floodplains and ridges and in calcareous soils, red sands, red-brown earths and loamy soils.
Slender Darling-pea	*Swainsona murrayana*		Vulnerable	Species or species habitat likely to occur within area	Unlikely, found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree.
Yellow Swainson-pea	Swainsona pyrophila	Vulnerable	Vulnerable	Species or species habitat likely to occur within area	No habitat, grows in mallee scrub on sandy or loamy soil, usually found only after fire. Sites include cleared and burnt mallee scrub on red loam to sand, previously burnt Eucalyptus dumosa mallee, disturbed woodland in sheltered aspects, a bulldozed firebreak adjacent to wheat

Common name	Species name	State	National	Occurrence	Comment
					paddocks, roadsides, claypans and at the edge of fire ash.

3.5.3 Threatened communities

The above-mentioned databases were also searched for threatened communities. Six threatened communities were listed, including:

- Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions
- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW Southwestern Slopes bioregions.
- Mallee Bird Community of the Murray Darling Depression Bioregion

None of these communities meeting the PCT criteria occur within the proposed work area or will be impacted upon by the proposal.

3.5.4 Flora site assessment

A general flora assessment was conducted across the proposed work site and the surrounding area on 12 June 2022. The assessment, adhering to Table 5.1 Survey Effort (DEC, 2004), focused on areas of likely higher vegetation values and active searches of likely habitat for reptiles and small mammals. Weather conditions were a clear sky, a maximum temperature of 12ºC, strong breeze and overcast skies.

One plant community type (PCT 11) occurs within the assessment (works footprint) area. The study area does form part of a corridor, with ample vegetation surrounding the site. No connectivity values will be lost due to the impact on vegetation along the works corridor. Small and large hollow bearing trees were observed within the study area, as a mitigation measure no mature, hollow bearing trees are proposed to be removed.

The flora assessment revealed no vegetation species; populations or communities, which are of local, regional or state conservation significance (refer to Table 5 for a general list of species surrounding the work zone). The project will require the removal of less that 10 River Cooba (*Acacia stenophylla*) (<20cm DBH) from the sides of the track to maintain safety and allow access to the walking trail (Appendix A).

Table 5: Flora Species recorded on-site

Scientific name	Common name	Threatened/Status
Acacia stenophylla	River Cooba	No
Amyema miquelii	Mistletoe	No
Atriplex nummularia	Old Man Saltbush	No
Atriplex semibaccata	Creeping Saltbush	No
Azolla filiculoides	Azolla	No
Calotis cuneifolia	Purple burr-daisy	No
Chenopodium nitrariaceum	Nitre goosefoot	No
Cyperus gymnocaulos	Spiny sedge	No
Disphyma crassifolium subsp. clavellatum	Round-leaved pigface	No
Einadia nutans subsp. nutans	Climbing saltbush	No
Enchylaena tomentosa	Ruby saltbush	No
Eremophila divaricata subsp. divaricata	spreading emu bush	No
Eucalyptus camaldulensis subsp. camaldulensis	River Red Gum	No
Eucalyptus largiflorens	Black box	No
Melaleuca lanceolata	Moonah	No
Muehlenbeckia florulenta	Lignum	No
Myoporum parvifolium	Creeping boobilia	No
Phragmites australis	Phragmites	No
Rhagodia spinescens	Spiny saltbush	No
#Asparagus asparagoides	Bridal creeper	Regional Recommended Measure and WoNS
#Cenchrus clandestinus	Kikuyu	Nil
#Conyza bonariensis	Flaxleaf fleabane	Nil
#Foeniculum vulgare	Fennel	General Biosecurity Duty
#Hordeum leporinum	Barley grass	Nil
#Lycium ferocissimum	African box thorn	Regional Recommended Measure and WoNS
#Medicago polymorpha	Burr medic	Nil
#Onopordum acanthium	Scotch thistle	General Biosecurity Duty
#Rapistrum rugosum	Turnip Weed	Nil

Scientific name	Common name	Threatened/Status
#*Solanum nigrum*	Black nightshade	Regional Recommended Measure
#*Sonchus oleraceus*	Dandelion	Nil
#*Sisymbrium erysimoides*	London rocket	Nil
#*Typha latifolia*	Typha	Nil
#*Xanthium spinosum*	Bathurst burr	General Biosecurity Duty

# Denotes introduced species

General Biosecurity Duty - All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Regional Recommended Measure* (for Regional Priority - Asset Protection). Land managers mitigate the risk of the plant spreading from their land.

WoNS – Wed of National Significance

3.5.5 Mitigation measures

- no new access tracks to be created
- trimming and lopping of the minimum extent of trees below 20cm DBH and no trees larger that 20cm DBH to be removed
- the tree retention zone (12x Diameter at Breast Height) shall be cordoned off and no parking or stockpiling will occur within this zone.

3.6 Fauna

3.6.1 Threatened species

A database search was undertaken on 7 June 2022 of the NSW Department of Planning and Environment (BioNet Atlas of NSW Wildlife) and the Department of the Agriculture, Water and Environment websites to identify threatened species that may be found within the proposed works area as listed under the *BC Act* and the EPBC Act.

A desktop search of the online databases was undertaken as follows:

- NSW Department of Planning and Environment BioNet Atlas of NSW Wildlife (refer to Appendix B)
- Department of the Agriculture, Water and Environment, Environmental Protection and Biodiversity Conservation (EPBC) Protected Matters Report (refer to Appendix B).

None of these species were recorded during site assessments.

Table 6 lists the fauna species with state and national conservation significance that have the potential to occur within the study area. The column in Table 6 headed 'comment', identifies the suitability of the site for the particular species, such as for

habitat utilisation, nesting/burrowing requirements, food and water requirements and the vegetation type preferred by the species. Eight of those species, has 'potential habitat' so no 'test of significance', as set out in Section 7.3 of the BC Act has been undertaken. None of these species require further assessment of a species impact statement.

Table 6: Listed fauna species

Class	Common name	Species name	State	National	Occurrence	Comment
Bird	Eastern Curlew	*Numenius madagascariensis*		Critically Endangered	Species or species habitat may occur within area	No habitat, it generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts.
Bird	Plains-wanderer	*Pedionomus torquatus*	Endangered	Critically Endangered	Species or species habitat may occur within area	No habitat, Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species.
Bird	Curlew Sandpiper	*Calidris ferruginea*	Endangered	Critically Endangered	Species or species habitat likely to occur within area	No habitat, it generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland
Bird	Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Endangered	Species or species habitat known to occur within area	Potential habitat, Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly

						at night on frogs, fish, yabbies, spiders, insects and snails.
Bird	Australian Painted Snipe	*Rostratula australis*	Endangered	Endangered	Species or species habitat known to occur within area	No habitat, prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.
Bird	Night Parrot	*Pezoporus occidentalis*	Extinct	Endangered	Species or species habitat may occur within area	No habitat, the Night Parrot is known to occur within Spinifex grasslands in stony or sandy areas and samphire and chenopod associations on floodplains, salt lakes and clay pans. Suitable habitat is characterized by the presence of large and dense clumps of Spinifex, and it may prefer mature spinifex that is long and unburnt.
Bird	Black-eared Miner	*Manorina melanotis*	CE	Endangered	Species or species habitat likely to occur within area	No habitat, the Black-eared Miner occurs in a restricted area of inland south-eastern Australia, inhabiting mature and old-growth mallee that has not been burnt for more than 50 years
Bird	Painted Honeyeater	*Grantiella picta*	Vulnerable	Vulnerable	Species or species habitat may occur within area	Potential habitat inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the

						fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.
Bird	Grey Falcon	*Falco hypoleucos*	Endangered	Vulnerable	Species or species habitat likely to occur within area	No habitat impacted, usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.
Bird	Regent Parrot (eastern)	*Polytelis anthopeplus monarchoides*	Endangered	Vulnerable	Breeding likely to occur within area	No habitat impacted, the species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers, and possibly the Darling River downstream of Pooncarie. Typical nest trees are large, mature healthy trees with many spouts (though dead trees are used) and are usually located close to a watercourse. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands. Mallee woodland within 20 kilometres of nesting sites is critical foraging habitat for breeding birds.
Bird	Malleefowl	*Leipoa ocellata*	Endangered	Vulnerable	Species or species habitat known to occur within area	No habitat, predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher

						rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species.
Fish	Silver Perch	*Bidyanus bidyanus*	Vulnerable	Critically Endangered	Species or species habitat known to occur within area	Potential habitat
Fish	Flathead Galaxias	*Galaxias rostratus*		Critically Endangered	Species or species habitat likely to occur within area	Unlikely habitat, they have not been recorded and are considered locally extinct in the lower Murray, Murrumbidgee, Macquarie and Lachlan Rivers. The species is now only known from the upper Murray River near Tintaldra and wetland areas near Howlong.
Fish	Macquarie Perch	*Macquaria australasica*	Endangered	Endangered	Species or species habitat may occur within area	Unlikely habitat, Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries.
Fish	Murray Hardyhead	*Craterocephalus fluviatilis*	CE	Endangered	Species or species habitat known to occur within area	Potential habitat
Fish	Trout Cod	*Maccullochella*		Endangered	Species or species	Unlikely habitat, Trout

		macquariensis			habitat may occur within area	Cod is endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. The species was once widespread and abundant in these areas but has undergone dramatic declines in its distribution and abundance over the past century. The last known reproducing population of Trout Cod is confined to the Murray River below Yarrawonga downstream to Tocumwal.
Fish	Murray Cod	*Maccullochella peelii*		Vulnerable	Species or species habitat known to occur within area	Potential habitat
Frog	Growling Grass Frog	*Litoria raniformis*	Endangered	Vulnerable	Species or species habitat likely to occur within area	Potential habitat
Mammal	Koala	*Phascolarctos cinereus*	Endangered	Endangered	Species or species habitat likely to occur within area	Potential habitat
Mammal	Corben's Long-eared Bat	*Nyctophilus corbeni*	Vulnerable	Vulnerable	Species or species habitat likely to occur within area	Potential habitat

3.6.2 Fauna site assessment

A general fauna assessment (opportunistic survey based on potential habitat, transects across the site, based on potential habitat, active searches under habitat) was conducted across the proposed area, including nearby areas of intact vegetation. The assessment also focused on potential habitat areas, trees, and surrounding habitats. The assessment was undertaken on a cold wintery day, and the fauna activity was low.

The fauna assessment revealed no species; population or communities, which are of local, regional, or state conservation significance (refer to Table 7). The number of species recorded on site was average for the timing of the assessment and the weather conditions encountered.

Table 7: Fauna species recorded on site

Scientific name	Common name	Threatened
Aquila audax	Wedge tailed eagle	No
Anas supercilios	Pacific black duck	No
Macropus fuliginosus	Western grey kangaroo	No

#Denotes introduced species

Description of existing environmental and potential impacts		
Have relevant database searches been carried out? Searches of the following databases were searched in June 2022 • OEH Bionet NSW Atlas of Wildlife • Protected Matters Search Tool	☒ Yes	☐ No
Did the database searches identify any endangered ecological communities, threatened flora and/or threatened or protected fauna, or migratory species within the vicinity of the proposed works? Both Federal and State listed matters must be considered. The database searches identified a number of threatened ecological communities, threatened flora and/or threatened or migratory fauna species within a 10-kilometre buffer of the proposed work area. A threatened and migratory species evaluation of the potential for these species to occur onsite has been undertaken. A field survey was undertaken 12 June 2022 by an experienced ecologist, during which one Plant Community Type was recorded. A general biodiversity assessment was carried out to determine the potential impacts of the proposal. A Test of Significance for the potential impact to these threatened flora and fauna species with the potential to occur within the proposals is provided. This concluded that the proposed work is unlikely to have a significant effect on threatened species, communities, populations and their habitats.	☒ Yes	☐ No
Is the proposal likely to impact nationally listed threatened species, ecological communities or migratory species?	☐ Yes	☒ No
Would the proposal require the removal of any other vegetation? Yes. Minimal vegetation removal is anticipated along both sides of the walking track. This vegetation is considered low quality given that these areas have been the subject of considerable past disturbance. All mature trees are to be avoided.	☐ Yes	☒ No

Would the proposal affect any tree hollows or hollow logs?	☐ Yes	☒ No
Are there any known areas of outstanding value, SEPP 14 wetland area or SEPP 26 littoral rainforest area within the vicinity of the proposed work?	☐ Yes	☒ No
Would the proposal provide any additional barriers to the movement of wildlife?	☐ Yes	☒ No
Would the proposal disturb any natural waterways or aquatic habitat?	☐ Yes	☒ No
Would the proposal disturb any crevices or other locations (such as on bridges and culverts) for potential bat habitat?	☒ Yes	☐ No

3.6.3 Mitigation measure

- Refer to Section 3.5.5 mitigation measures.

3.7 Heritage

3.7.1 Existing environment

The proposed work site is in an area previously impacted by recreation, including camping and fishing. This has caused a significant modification of the site and good ground visibility, via the modification to native vegetation.

A Cultural heritage due diligence assessment was undertaken by Austral Archaeology (2022) and the full report is presented in Appendix C.

The allotment is not subject to an Aboriginal Lands Claim but is not exempt from the Barkandji Native Title Determination. The Barkandji Native Title Group Aboriginal Corporation will be consulted through NTS Corp.

3.7.2 Impact assessment

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW, 2010) was reviewed to determine if an Aboriginal Heritage Impact Permit (AHIP) is required.

An Aboriginal Cultural Heritage Due Diligence Assessment was undertaken to assess the archaeological potential for Aboriginal material to be impacted as part of a business case being prepared by Wentworth Shire Council to determine the feasibility of the projects. The ACHDDA has been undertaken in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (Department of Environment Climate Change and Water NSW 2010) [the Code].

The Murray and Darling Rivers and the associated floodplains are extremely rich in Aboriginal heritage objects and sites. The riverine plains are considered culturally sensitive for the Aboriginal people of the region. A search of previously registered sites resulted in 103 known sites within a 10 km radius of the study area. These sites mainly consist of burials and earth mounds, with artifact sites and modified trees also being present. Whilst the Murray and Darling Rivers have been subject to many archaeological assessments, few have been done in close proximity to the study area. The registered Aboriginal heritage site types such as burials, middens surrounding the study area along the lagoons and lakes associated with these rivers, are considered to have high to

moderate significance but the construction of an existing structure such as footbridge and walking trails have impacted the original surface features within the study area and altered it to a certain extent, therefore, it can be said that the proposed works would have no impact on the Aboriginal heritage present within the study area.

No AHIP is required if the mitigation measures on section 3.7.4 are followed.

3.7.3 Other cultural heritage

The State Heritage Register (NSW Environment, Energy and Science) database was used to determine if any areas of historic value were located on or nearby the proposed project site.

No sites will be impacted upon. Additionally, there are no World Heritage or National Heritage items and/or places within 10 kilometres of the proposed work site.

3.7.4 Mitigation measures

- 1.The proposed upgrade works can proceed with caution.
- 2.Identified culturally modified tree should be protected by putting in temporary fencing/boundaries denoting restriction of construction activities in the vicinity of the scarred tree to avoid any harm during the proposed works.
- 3.All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act (1974*). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.
- 4.Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:
    - immediately cease all work at that location and not further move or disturb the remains
    - notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location
    - not recommence work at that location unless authorised in writing by Heritage NSW.

3.8 Air quality

3.8.1 Existing Environment

The nearest permanent residence and receptor is located approximately 300m of the proposed works site. The nearest public road is west of the works.

3.8.2 Impact assessment

While the site is within an existing township, near to dwellings and public roads, there will only be minimal impact from the expected minor raised dust along access tracks that

may occur from time to time during heavy vehicle movements. Due to the minor nature of the works, no air impacts are expected at the works site.

The key performance indicator will be no complaints or raised dust received at the residences, 300m away. Ongoing monitoring will occur visually by dust observed around the residences. The response mechanism will be to stop activity causing dust if possible or to mitigate using sprayed water.

Practices associated with the project that could affect air quality include bush fire, exhaust emissions from vehicles and plant and windblown dust during the activity.

3.8.3 Mitigation measures

- No burning of timber or other combustible materials will occur on-site
- Adherence to appropriate Australian Standards
- Minimise works during windy periods to minimise dust creation to ensure no dust impacts are occurring along public roads or at sensitive receivers
- Ensure all plant and equipment complies with part 4 of the Protection of the Environment Operations (Clean Air) Regulation 2002
- Tip trucks and dog loads should be covered during transportation e.g tarpaulins
- Utilise dust suppression techniques such as watering dusty work areas in response to visual cues.

3.9 Socio and economic

3.9.1 Existing environment

The Junction Island has undergone considerable upgrades, walking trail maintenance and interpretive signage.

3.9.2 Impact assessment

The proposal is considered unlikely to result in any adverse social or economic impacts due to the small scale of the project. The project aims to improve the social aspect of the Wentworth region.

3.9.3 Economic assessment

The expected capital expenditure of the upgrade is approximately $200,000, completed by local contractors where possible. This will have important flow on effects to other service providers within the township of Wentworth.

3.9.4 Social assessment

The proposal will not disadvantage any individuals or communities and consultation with all known affected groups has been undertaken.

As required by any work site in NSW, appropriate signage will be placed around the work area, including PPE and general safety signs.

3.9.5 Impact on the community

Although the character of the area would be slightly affected through the proposed works, by minimising the extent of the impact and undertaking rehabilitation, there will be minimal long-term impacts.

3.9.6 Visual impact

The proposed works will have low visual impact due to their location in an area where other structures have been built.

3.9.7 Mitigation measures

- Appropriate signage as required under legislation and adherence with best practice management
- to ensure neighbouring properties and general usage of the area will not be affected throughout the proposed works, the neighbouring residents will be continually consulted.

3.10 Transport

3.10.1 Existing environment

The proposed upgrade site is located between the Darling and Murray Rivers. Access to the works site is directly via an existing access road from Ski Reserve Road.

3.10.2 Impact assessment

The proposed project will utilise existing tracks to access the site; no new tracks will be created.

This project will be undertaken with adherence to relevant legislation and best practice management.

It is expected that a contractor will travel to the site each day (up to two light vehicles and one truck and dog) between 6.30am and 7.30am. There may be up to four truck movements per day and the contractor staff will leave the site between 4pm and 6pm each evening. The project is expected to last up to six months.

The trucks would travel from the site along existing tracks to the sealed roads.

These additional short-term vehicle movements will not impact on the existing traffic mix, consisting of local landholders or travellers.

3.10.3 Mitigation measures

- Staff shall be trained in firefighting techniques in the event of a bushfire, or fire on plant or equipment
- Minimising the movement of machinery along the bank, particularly after rainfall
- Communication with landholders.

3.11 Noise and vibration

3.11.1 Existing environment

The acoustic environment of the proposed site is considered typical for a water frontage residential location, and adjacent to a Highway bridge crossing nearby. Noise sources that exist within the proposed site are vehicle movements along local roads, motorised river traffic and highway vehicles.

3.11.2 Impact assessment

The main source of noise may arise from the use of light machinery to move gravel and install screw piles. Considering the distance of the project area from the nearest residence (receptor) is over 300m away; and the hours of operation (7am to 6pm Monday to Friday and 8am to 12noon Saturday), any noise created will not cause a significant detrimental impact on the surrounding land users.

Table 8 is adapted from Bassett Acoustics (2007) in the Northern Expressway Noise and Vibration Technical Paper, which predicts noise levels without mitigation in urban environments. In rural environments, 50dB is acceptable. Noise decreases with distance, so with the nearest receptor 300m away, the predicted dB will be above acceptable limits, but due the noise created by the Silver City Highway (to the north), no additional noise impacts are expected. Consultation with affected landholders is advised.

Table 8: Predicted dB(A) noise levels at various distances

Plant type	7m	25m	50m	100m	200m
Front end loader	88	77	71	65	59
Road truck	83	72	66	60	54

Major sources of ground vibration include excavators, loaders and truck movements during work. Vibrations generated from construction and earthmoving activities are expected to be similar in magnitude as those generated from the operation of similar equipment to be used.

Ground vibration impacts at specific levels of magnitude may either:

- disturb occupants of buildings
- disturb contents of buildings by rattling, shaking or movements
- affect structural integrity of a building.

Table 9 indicates the approximate vibration levels that may be expected for various vibration sources (Bassett Acoustics, 2007). Due to the nearest receptor being over 300m away, no vibration is expected due to the large distance between activity and receptor.

Table 9: Approximate generated ground vibration levels (mm/s) for various sources

Activity	Typical levels of ground vibration
Hydraulic rock breakers/Excavators	4.5mm/s @5m 1.30mm/s @10m 0.4mm/s @20m 0.10mm/s @50m
Truck traffic (irregular surfaces)	0.1-2.0mm/s at footings of buildings 10-20m from a roadway

3.11.3 Mitigation measures

- Consultation with nearby residential landholders
- Works would be undertaken during standard working hours only.
    - Monday to Friday 7 am to 6 pm
    - Saturday 8 am to 1 pm
    - No work on Sundays or public holidays
- Operate plant and equipment in a quiet and efficient manner, including:
    - off plant and equipment that is not being used
    - Ensure plant is regularly maintained and any equipment that becomes noisy is repaired or replaced.

3.12 Bushfire hazards

3.12.1 Existing environment

The works area is in a rural township environment, with the Murray and Darling Rivers adjacent to the works area.

3.12.2 Imapct assessment

It is highly unlikely that the project will cause a bushfire, if the following mitigation measures are followed.

3.12.3 Mitigation measures

- No burning of timber or other combustible materials will occur on site
- All plant and equipment will be equipped with fire extinguishers
- Staff shall be trained in firefighting techniques in the event of a bushfire, or fire on plant or equipment
- All vehicles and plant will be regularly serviced, be in good working order and emissions to be kept within manufacturers standards.

3.13 Chemical and hazardous substance management

3.13.1 Existing environment

The existing site is not known to be contaminated and does not appear in the Wentworth LEP or EPA register of contaminated sites.

3.13.2 Impact assessment

No hazardous substances will be stored on site. Limited hazardous substances will be brought on site, in particular fuels and lubricants, e.g oil, grease and distillate, as the fuel for heavy equipment will be transported as required on utility, trailer or fuel truck. Best management practices will be followed when these substances are transferred and in use as stipulated by the contactor's work practices. Empty containers will be taken off the site and suitably disposed of to landfill or for recycling.

3.13.3 Mitigation measures

- Staff trained in best practice in chemical and hazardous substance management

- All vehicles and machinery to be regularly serviced, be in good working order and emissions to be kept within manufacturers standards
- Staff shall be trained in firefighting techniques in the event of a bushfire, or fire on plant or equipment
- All vehicles serviced off-site
- Staff inducted on refuelling procedures, which will be stored with refuelling equipment
- No fuels or lubricants to be stored on site
- In the event of unexpected breakdown of heavy machinery on the site, the spill kit will be used to prevent leakage of petroleum products to the soil - should soil contamination occur, soil will be removed to a licensed facility as per EPA guidelines
- Any discarded oils, worn machinery parts, damaged tyres, broken hoses or empty containers will be removed to a waste storage area on the day they are generated.
- Copy of all safe work method statements/JSA to be stored on site and easily accessible.

3.14 Waste minimisation and management

3.14.1 Existing environment

Waste management shall be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act (2001)*. The objectives of this Act are:

(a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development

(b) to ensure that resource management options are considered against a hierarchy of the following order:

(i) avoidance of unnecessary resource consumption

(ii) resource recovery (including reuse, reprocessing, recycling and energy recovery)

(iii) disposal

(c) to provide for the continual reduction in waste generation

(d) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste

(e) to ensure that industry shares with the community the responsibility for reducing and dealing with waste

(f) to ensure the efficient funding of waste and resource management planning, programs and service delivery

(g) to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis

(h) to assist in the achievement of the objectives of the *Protection of the Environment Operations Act 1997.*

3.14.2 Impact assessment

The work site will operate in a tidy, rubbish-free state. Small quantities of waste (packaging, consumables etc) will be generated from the works, including general construction waste and materials. No servicing of vehicles and machinery will occur on site other than minor repairs following breakdown. It is not likely that there will be any problems associated with the disposal of these wastes. Where materials cannot be recycled, wastes should be legally disposed of at an appropriate landfill.

3.14.3 Mitigation measures

- All waste generated by the proposal would be classified in accordance with the NSW Waste Classification Guidelines Part 1: Classifying Wastes (EPA 2014)
- All waste generated on site is to be transported off site and disposed of at landfill site approved to accept General Solid Waste (non-putrescible)
- Resource management hierarchy principles are to be followed:
    - Avoid unnecessary resource consumption as a priority
    - Avoidance is followed by resource recovery (including reuse of materials, reprocessing, and recycling and energy recovery)
    - Disposal is undertaken as a last resort.
- Waste material is not to be left on site once the works have been completed, with the exception of the excavated material
- All excess materials are to be removed more than 20m from a watercourse
- Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.

3.15 Cumulative environmental impacts

The cumulative environmental impacts of the proposal will be minimal. As stated throughout Section 3, each identified impact has been assessed for its potential threat to the environment. Mitigation measures will help minimise the impact on the proposed project area, as well as off-site impacts (as summarised in Table 10).

Table 10: Mitigation measures

Issue	Mitigation measure
Land Use	• use existing tracks to access the site • maintain a rubbish free and tidy work area • consent to access the site from DPE - Crown Lands
Hydrology and geomorphology	• No new riverbank accesses to be created • Site remediation to ensure loose soils are compacted to match surrounding soils • All works to be carried out in accordance with the controlled activities guidelines.
Water quality, erosion and sedimentation	• refuelling of small plant would only take place on level ground and in bunded areas which is at a distance no less than 40m from drainage lines and waterways • spill containment measures (such as drip trays and bunds) to

Issue	Mitigation measure
	be used when refuelling within 40m of a waterway • compaction of disturbed soils will be similar to the surrounding soils • all excess soil will be removed from the site and a similar topography to the surrounding site will be achieved following construction
Soil	• minimising the movement of machinery along the alignment, particularly after rainfall • ceasing works during heavy rainfall • Appropriate erosion and sediment controls would be installed prior to the commencement of works in accordance with the technical document, Landcom (2006) Edition 4 'Managing Urban Stormwater: Soils and Construction' (the Blue Book), where the disturbed catchment exceeds 250m² and when soil is likely to be left exposed for more than two weeks • Spill kits would be available with each refuelling area and all staff would be trained in their use • Spill containment measures (such as drip trays) to be used when refuelling within 40 metres of a waterway, and where possible, refuelling should occur greater than 40 meters from a waterway • Inspection and maintenance of sediment and erosion controls until site has been stabilised post construction • Spoil to be removed from the site and legally disposed of as per the NSW waste classification guidelines.
Flora	• no new access tracks to be created • trimming and lopping of the minimum extent of trees below 20cm DBH and no trees larger that 20cm DBH to be removed • trenching not to disturb tree roots greater than 15cm diameter, to be hand trenched around to reduce impact • the tree retention zone (12x Diameter at Breast Height) shall be cordoned off and no parking or stockpiling will occur within this zone
Fauna	• ensure sediment fences are in place (as required) until the trench is stable, during and following construction • Any open trenches left open overnight to have fauna access ramps at one end • No trenches to be left open longer than 24hrs.
Weeds and pests	• Machinery will be washed down off-site prior to entering the proposed work areas to ensure it is weed free.
Heritage	• 1.The proposed upgrade works can proceed with caution. • 2.Identified culturally modified tree should be protected by putting in temporary fencing/boundaries denoting restriction of construction activities in the vicinity of the scarred tree to avoid any harm during the proposed works. • 3.All Aboriginal objects and Places are protected under the National Parks and Wildlife Act (1974). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include

Issue	Mitigation measure
	notifying Heritage NSW and Aboriginal stakeholders. • 4.Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must: o immediately cease all work at that location and not further move or disturb the remains o notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location o not recommence work at that location unless authorised in writing by Heritage NSW.
Air quality	• No burning of timber or other combustible materials will occur on-site • Adherence to appropriate Australian Standards • Minimise works during windy periods to minimise dust creation to ensure no dust impacts are occurring along public roads or at sensitive receivers • Ensure all plant and equipment complies with part 4 of the Protection of the Environment Operations (Clean Air) Regulation 2002 • Tip trucks and dog loads should be covered during transportation e.g tarpaulins • Utilise dust suppression techniques such as watering dusty work areas in response to visual cues.
Socio and economic	• appropriate signage as required under legislation and adherence with best practice management • to ensure neighbouring properties and general usage of the area will not be affected throughout the proposed upgrade, the neighbouring residents will be continually consulted.
Transport	• staff shall be trained in firefighting techniques in the event of a bushfire, or fire on plant or equipment • minimising the movement of machinery along the bank, particularly after rainfall • communication with landholders.
Noise and vibration	• Consultation with nearby residential landholders • works would be undertaken during standard working hours only. o Monday to Friday 7 am to 6 pm o Saturday 8 am to 1 pm o No work on Sundays or public holidays • Operate plant and equipment in a quiet and efficient manner, including: o Turn off plant and equipment that is not being used o Ensure plant is regularly maintained and any equipment that becomes noisy is repaired or replaced.
Bushfire hazards	• no burning of timber or other combustible materials will occur on site • all plant and equipment will be equipped with fire extinguishers • staff shall be trained in firefighting techniques in the event of a bushfire, or fire on plant or equipment

Issue	Mitigation measure
	• all vehicles and plant will be regularly serviced, be in good working order and emissions to be kept within manufacturers standards.
Chemical and hazardous substances	• staff trained in best practice in chemical and hazardous substance management • all vehicles and machinery to be regularly serviced, be in good working order and emissions to be kept within manufacturers standards • staff shall be trained in fire-fighting techniques in the event of a bushfire, or fire on plant or equipment • all vehicles serviced off-site • staff inducted on refuelling procedures, which will be stored with refuelling equipment • no fuels or lubricants to be stored on site • in the event of unexpected breakdown of heavy machinery on the site, the spill kit will be used to prevent leakage of petroleum products to the soil - should soil contamination occur, soil will be removed to a licensed facility as per EPA guidelines • any discarded oils, worn machinery parts, damaged tyres, broken hoses or empty containers will be removed to a waste storage area on the day they are generated • Copy of all safe work method statements/JSA to be stored onsite and easily accessible.
Waste minimisation and management	• all waste generated by the proposal would be classified in accordance with the NSW Waste Classification Guidelines Part 1: Classifying Wastes (DECCW 2008). • all waste generated on site is to be transported off site and disposed of at landfill site approved to accept General Solid Waste (non-putrescible). • resource management hierarchy principles are to be followed: • avoid unnecessary resource consumption as a priority • avoidance is followed by resource recovery (including reuse of materials, reprocessing, and recycling and energy recovery) • disposal is undertaken as a last resort • waste material is not to be left on site once the works have been completed, with the exception of the excavated material • all excess materials are to be removed more than 20m from a watercourse • working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.

3.16 Summary of mitigation measures

A range of mitigation measures have been devised to ensure the proposal has minimal impact on the environment, both on site and off site.

Table 11 provides an overview of the risks associated with the proposed project. The table should be read down the left-hand side column to identify the issues at the site and then the activities, processes or facilities are listed across the top of the table.

The table has been completed using a risk assessment of low (L), medium (M) and high (H) and not applicable (n/a).

Table 11: Environmental risk identification matrix

	Activity / process										
Issue	Land preparation, vegetation & topsoil stripping	Earth moving	Use/maintenance of roads, tracks and vehicles	water management including storm event contingencies	Hazardous materials & fuel, handling/spills management	Sewerage	Other infrastructure use and operation	Rubbish disposal	Rehabilitation activities	Rehabilitation maintenance, pending self-sustainability	Rehabilitated land and remaining features
Land use	L	L	L	L	L	n/a	L	L	L	L	L
Hydrology and geomorphology	L	L	L	L	L	n/a	L	L	L	L	L
Water quality, erosion and sedimentation	L	L	L	L	L	n/a	L	L	L	L	L
Soils	L	L	L	L	L	n/a	L	L	L	L	L
Flora	L	L	L	L	L	n/a	L	L	L	L	L
Fauna	L	L	L	L	L	n/a	L	L	L	L	L
Weeds and pests	L	L	L	L	L	n/a	L	L	L	L	L
Heritage	L	L	L	L	L	n/a	L	L	L	L	L
Air quality	L	L	L	L	L	n/a	L	L	L	L	L
Socio and economic	L	L	L	L	L	n/a	L	L	L	L	L
Transport	L	L	L	L	L	n/a	L	L	L	L	L
Noise and vibration	L	L	L	L	L	n/a	L	L	L	L	L
Bushfire hazards	L	L	L	L	L	n/a	L	L	L	L	L
Chemical and haz substance management	L	L	L	L	L	n/a	L	L	L	L	L
Waste minimisation and mgt	L	L	L	L	L	n/a	L	L	L	L	L

Legend – L=Low, M=medium, n/a not applicable

4.0 Conclusion

4.1 Justification for the proposed project

The project has been proposed to improve the usability and functionality of the existing Junction Island recreation area.

This REF aims to assess the proposed works against applicable legislation in the areas of environmental, cultural and historic requirements.

The proposed works are justified and where additional permits and concurrences are required there are processes that need to be followed to allow the works to proceed.

4.2 Principles of ESD

4.2.1 The precautionary principle

This REF has been prepared using the Ecologically Sustainable Development (ESD) precautionary principle. If threats are perceived that could lead to serious or irreversible environmental damage, then actions such as not proceeding or modifying the project will occur to ensure that such threats do not exist. This approach has been used in relation to mitigation measures outlined above in Section 3.

4.2.2 Inter-generational equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The proposed works would not impact on natural or cultural features to a level that would compromise the health, diversity or productivity of the environment for future generations.

4.2.3 Conservation of biological diversity and ecological integrity

The proposed works would not impact on threatened species or their habitats. The assessment has identified that the works would not impact significantly on the biological diversity and ecological integrity of the locality.

Furthermore, mitigation measures have been developed that would assist in protecting the environment and ecological integrity.

4.2.4 Appropriate valuation of environmental factors

This principle relates to giving monetary values to environmental resources. The proposed works would assist in improving the usability and functionally of the area. These factors ensure that the development would conform to the principles of "ecologically sustainable development".

4.3 Summary of assessment

This REF has been prepared in accordance with the provisions of Section 5.5 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The proposal would provide the following benefits:

- Safer user access
- Improved user access
- Minimal environmental impact

This REF has considered and assessed these impacts in accordance with clause 171 of the EP&A Regulation 2021 and the requirements of the EPBC Act (refer Appendix C and Appendix D). Based on the assessment contained in this REF, it is considered that the proposal is not likely to have a significant impact upon the environment or Matters of National Environmental Significance, with the application of recommended mitigation measures in Table 10.

5.0 Certification, review and decision

5.1 Certification

This review of environmental factors provides a true and fair review of the proposals in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Prepared by:

Chris Alderton

Director/Principal Environmental Consultant, Green Edge Environmental Pty Ltd

Date: July 2022

REF reviewed by:

Lucy Alderton

Director Green Edge Environmental Pty Ltd

Date: July 2022

5.2 Environmental Staff review

This REF has been reviewed and considered against the requirements of Sections 5.5 and 5.7 of the *Environmental Planning and Assessment Act 1979*.

In considering the proposal, this assessment has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity as addressed in the REF and associated information. This assessment is considered to be in accordance with the factors required to be considered under clause 171 of the Environmental Planning and Assessment Regulation 2021.

The proposal described in the REF will have some environmental impacts which can be ameliorated satisfactorily. Having regard to the safeguard and management measures proposed, this assessment has considered that these impacts are unlikely to be significant and therefore an approval for the proposal does not need to be sought under Division 5.2 of the *Environmental Planning and Assessment Act 1979*.

The assessment has considered the potential impacts of the activity on areas of outstanding value and on threatened species, ecological communities or their habitats for both terrestrial and aquatic species as defined by the *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 1994*.

The proposal described in the REF will not affect areas of outstanding value. The activity described in the REF will not significantly affect threatened species ecological communities or their habitats. Therefore, a species impact statement is not required.

The assessment has also addressed the potential impacts of the activity on matters of national environmental significance and Commonwealth land and concluded that there will be no significant impacts. Therefore, there is no requirement for a referral to be made to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment and Energy on whether assessment and approval is required under the *Environment Protection and Biodiversity Conservation Act 1999*.

The REF is considered to meet all relevant requirements.

5.3 Environmental Staff recommendation

It is recommended that the proposal to carry out an upgrade Junction Island as described in this REF proceed, subject to the implementation of all mitigation measures

identified in the REF and compliance with all other relevant statutory approvals, licences, permits and authorisations.

The REF has examined and taken into account to the fullest extent possible all matters likely to affect the environment by reason of the activity, and established that the activity is not likely to significantly affect the environment or threatened species, ecological communities or their habitats.

The REF has concluded that there will be no significant impacts on matters of national environmental significance or any impacts on the environment of Commonwealth land. The REF determination will remain current for five years from July 2022 at which time it shall lapse if works have not been physically commenced. The pre-construction checklist must be completed prior to the commencement of any works.

Recommended by:

Michael Hilliard

Project Engineer
Date: July 2022

Noted by:

Geoff Gunn

Director Roads and Engineering

Date: July 2022

5.4 Determination

In accordance with the above recommendation and sections 5.5 and 5.7 of the *Environmental Planning and Assessment Act 1979*, I determine Wentworth Shire may proceed with the activity.

Additional comments: Nil

Matthew Carlin

Director Health and Planning

Date: 4 August 2022

6.0 References

Benson, J.S., Allen, C., Togher, C. & Lemmon, J, (2006). *New South Wales Vegetation Classification and Assessment: Part 1 Plant communities of the NSW Western Plains*. *Cunninghamia* 9(3): 383-451.

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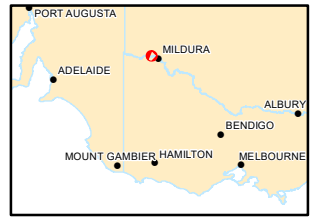
Appendix A: Map series



LEGEND

- Bore
- Proposed Works
- Site Extent

N

0 100 200 300 400 m

Scale 1:15,000 @ A4

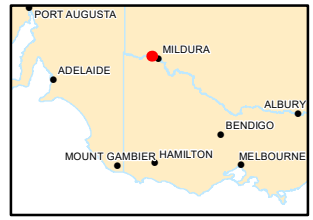
Coordinate System: GDA 1994 MGA Zone 54

greenedge environmental

Figure **1**

Junction Island Location Map

Document Path: C:\Temp\Path\CAL\Junction\Junction_Island_Site Map.mxd



LEGEND

Proposed Works

N

0 5 10 15 20 m

Scale 1:750 @ A4

Coordinate System: GDA 1994 MGA Zone 54

greenedge environmental

Figure **2**

Junction Island
Site Map


SCREW PILES TO WALKWAY
RAMPS OMITTED FOR CLARITY.
APPROX 1.75
RL 31.470
31.300 APPROX
ATV with Trailer
Custom
9000
969
969
STAND OF
TREES
Block Reference
Color ByLayer
Layer Layer2
Linetype ByLayer
2200
118.0000
9000
1576
4152
AND OF
TREES

Appendix B: Threatened species searches

NSW Threatened Fauna

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Animals in selected area [North: -34.06 West: 141.86 East: 141.96 South: -34.16] returned a total of 687 records of 190 species.

Report generated on 7/06/2022 2:19 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Acanthizidae	0497	*Pyrrholaemus brunneus*		Redthroat	V,P		2	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		1	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		2	
Animalia	Aves	Anatidae	0214	*Stictonetta naevosa*		Freckled Duck	V,P		1	
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	1	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		1	
Animalia	Aves	Cacatuidae	0270	*^Lophochroa leadbeateri*		Major Mitchell's Cockatoo	V,P,2		1	
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*		Brown Treecreeper (eastern subspecies)	V,P		5	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*		White-fronted Chat	V,P		1	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		1	
Animalia	Aves	Petroicidae	8367	*Melanodryas cucullata cucullata*		Hooded Robin (south-eastern form)	V,P		2	
Animalia	Aves	Psittacidae	0259	*^^Glossopsitta porphyrocephala*		Purple-crowned Lorikeet	V,P,3		1	
Animalia	Aves	Rostratulidae	0170	*Rostratula australis*		Australian Painted Snipe	E1,P	E	1	
Animalia	Mammalia	Dasyuridae	1043	*Antechinomys laniger*		Kultarr	E1,P		1	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	E1,P	E	1	
Animalia	Mammalia	Thylacomyidae	1106	*Macrotis lagotis*		Bilby	E4,P	V	1	
Animalia	Mammalia	Muridae	1429	*Leporillus conditor*		Greater Stick-nest Rat	E4,P	V	1	

NSW Threatened Flora

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Search criteria : Public Report of all Valid Records of Plants in selected area [North: -34.06 West: 141.86 East: 141.96 South: -34.16] returned a total of 447 records of 220 species.

Report generated on 7/06/2022 2:19 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info

NSW Threatened Communities

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Communities in selected area [North: -34.06 West: 141.86 East: 141.96 South: -34.16] returned 0 records for 3 entities.

Report generated on 7/06/2022 2:20 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				*Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions*		Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	E3		K	
Community				*Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions*		Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		E	K	
Community				*Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions*		Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	E3		K	

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Jun-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	26
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	3
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	8
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	100 - 150km upstream from Ramsar site	In feature area
Riverland	50 - 100km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	200 - 300km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In buffer area only
Mallee Bird Community of the Murray Darling Depression Bioregion	Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Manorina melanotis Black-eared Miner [449]	Endangered	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
Polytelis anthopeplus monarchoides Regent Parrot (eastern) [59612]	Vulnerable	Breeding likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Craterocephalus fluviatilis](#) Murray Hardyhead [56791]	Endangered	Species or species habitat known to occur within area	In feature area
[Galaxias rostratus](#) Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Maccullochella macquariensis](#) Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In feature area
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
[Litoria raniformis](#) Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
PLANT			
[Brachyscome papillosa](#) Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Lepidium monoplocoides](#) Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pterostylis xerophila			
Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In feature area
Solanum karsense			
Menindee Nightshade [7776]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona murrayana			
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Swainsona pyrophila			
Yellow Swainson-pea [56344]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [15187]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Murray - Sunset	National Park	VIC	In buffer area only
River Murray Reserve	Natural Features Reserve	VIC	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Wargan-Mallee B.R.	Natural Features Reserve	VIC	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Wallpolla Island	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Great Darling Anabranch - pipeline construction and environmental water flow ma	2004/1319	Controlled Action	Post-Approval	In feature area
Wallpolla Island Floodplain Restoration Project	2020/8750	Controlled Action	Assessment Approach	In buffer area only
Not controlled action				
Conversion of the North Western Victoria rail system from broad gauge to standar	2002/657	Not Controlled Action	Completed	In buffer area only
Improving environmental flows at Horseshoe Lagoon	2006/2548	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Modifications to Lock and Weir 10 Wentworth	2004/1367	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix C: Test of significance

Test of significance for Junction Island works

Introduction

This test of significance is part of the review of environmental factors for proposed woks at Junction Island, Wentworth.

The following threatened species has potential to occupy the site and has triggered a test of significance for:

- Winged Peppercress (*Lepidium monoplocoides*) (Endangered – Commonwealth)
- Menindee Nightshade (Solanum karsense) (Vulnerable - Commonwealth)
- Australasian Bittern (*Botaurus poiciloptilus*) (Endangered – State and Commonwealth)
- Painted Honeyeater (*Grantiella picta*) (Vulnerable – State and Commonwealth)
- Silver Perch (*Bidyanus bidyanus*) (Vulnerable – State, CE – Commonwealth)
- Murray Hardhead (*Craterocephalus fluviatilis*) (CE- State, Endangered – Commonwealth)
- Murray Cod (*Maccullochella peelii*) (Vulnerable – State)
- Growling Grass frog (*Litoria raniformis*) (Endangered- State, Vulnerable – Commonwealth)
- Koala (*Phascolarctos cinereus*) (Endangered – State and Commonwealth)
- Corben's Long-eared Bat (*Nyctophilus corbeni*) (Vulnerable – State and Commonwealth)

Winged Peppercress

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**

Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

N/A – Winged Peppercress is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

N/A – Winged Peppercress is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential habitat and no existing known populations existing within the works zone.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from potential habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Menindee Nightshade

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
The Menindee Nightshade is largely confined to floodplain lakes, depressions and Black Box (*Eucalyptus largiflorens*) swamps (Auld & Denham 2001). This species is found in heavy grey clays with a highly self-mulching surface and also on sandy floodplains and ridges and in calcareous soils, red sands, red-brown earths and loamy soils. The vegetation associated with this species includes Saltbush and Bluebush plains and Mallee associations.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Menindee Nightshade is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Menindee Nightshade is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential habitat and no existing known populations existing within the works zone.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from potential habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Australasian Bittern

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the large area of potential habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Australasian Bittern is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Australasian Bittern is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat and no existing nesting sites will be impacted.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Painted Honeyeater

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Painted Honeyeater is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Painted Honeyeater is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat and no existing nesting sites will be impacted.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Silver Perch

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Silver Perch have been found in a wide range of habitats and climates across the Murray-Darling Basin. They are generally found in faster-flowing water including rapids and races and more open sections of river. Individuals sometimes form large shoals in open water.
They are omnivorous, feeding on a variety of small prey including aquatic insects, molluscs, worms, crustaceans, zooplankton and algae.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – The Silver Perch is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – The Silver Perch is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat could occur, no long-term impacts are expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action does not constitute part of a key threatening processes as listed in the BC Act 2016 Schedule 4.

Murray Hardyhead

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Murray Hardyhead is a species of small freshwater fish, native to inland parts of south-eastern Australia. They were once widespread and abundant in the Murray and Murrumbidgee River systems in southern NSW and northern Victoria; however, they have suffered a serious population decline, and now seem to be limited to a few sites, mainly in northern Victoria. There are very few recent records of Murray Hardyhead in NSW.

Murray Hardyhead prefer brackish water but can survive in saline environments. They tend to form schools, and can be found along the sheltered edges of lakes, billabongs, backwaters and wetlands, often in areas with abundant submerged vegetation.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Murray Hardyhead is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Murray Hardyhead is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat would occur, no long-term impacts are expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action does not constitute part of the following key threatening processes as listed in the BC Act 2016 Schedule 4.

Murray Cod

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Murray Cod are a member of the family Percichthyidae and have a relatively large, elongate and deep body. They have small eyes and a short snout, which has a distinct concave profile. The mouth is large with a protruding lower jaw. Murray Cod possess a cream to olive green colour with dark grey to greenish blotches over the head and body. The ventral surface (belly) is generally white in

colour. These cod are voracious feeders and predators. Their diet consists of fish, crustaceans, water birds, frogs, turtles and terrestrial animals such as mice and snakes.

Murray Cod, also referred to as cod or codfish, were once abundant throughout the Murray-Darling River system, but overfishing and environmental changes have drastically reduced its numbers. Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Murray Cod is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Murray Cod is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat, no long-term impacts are expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action does not constitute part of the following key threatening processes as listed in the BC Act 2016 Schedule 4.

Growling Grass frog
The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Growling Grass Frogs need still or slow-moving water with emergent vegetation around the edges and mats of floating and submerged plants. They can live in artificial waterbodies, such as farm dams, irrigation channels and disused quarries. Favourable habitat features include abundant aquatic vegetation, minimal tree canopy cover, waterbodies with salinity less than 7.0 mS/cm or (7000 EC) which hold water for at least six months of the year. A cluster of waterbodies (within 700 m) allows frogs to move between sites as conditions change. They usually move on rainy nights.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Growling Grass frog is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Growling Grass frog is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat, no long-term impacts are expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action does not constitute part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Koala

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Koala is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Koala is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat, with no long-term impacts expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Corben's Long-eared Bat

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(**a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**
Overall, the distribution of the southeastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species.

Inhabits a variety of vegetation types, including mallee, Bulloke (*Allocasuarina leuhmanni)* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the specie are expected. No local viable populations of the species are known from this area that could be placed at risk of extinction due to the wide variety of habitat available.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Corben's Long-eared Bat is not considered an endangered ecological community, but a single species, therefore no ecological communities are placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
N/A – Corben's Long-eared Bat is not considered an endangered ecological community, but a single species, the development is not likely to substantially and adversely modify the composition of an endangered community, therefore placing it at risk.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
Due to the small nature of the proposal, only minor modification to potential foraging habitat, with no long-term impacts expected.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity
The proposal will not cause fragmentation or isolations from other potential foraging habitats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality
The habitat proposed to be modified is not critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)
The works will not have an adverse effect on any declared area or outstanding biodiversity values, the project aims to reduce impacts.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The action constitutes part of the following key threatening processes as listed in the BC Act 2016 Schedule 4:

- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee)

Conclusions

The assessment of significance for:

- Winged Peppercress
- Menindee Nightshade
- Australasian Bittern
- Painted Honeyeater
- Silver Perch
- Murray Hardhead
- Murray Cod
- Growling Grass frog
- Koala
- Corben's Long-eared Bat

revealed that the potential impacts of the proposal on the threatened species or communities are extremely unlikely and where there could be potential impacts, they will be very low. Potential

minor impacts resulting from the proposed works are not expected to increase the likelihood of a threatened or endangered species becoming extinct.
The test of significance for these threatened species does not trigger the requirement for a species impact statement (SIS). The proposal is deemed to be non-significant for the assessed species. In determining the significance of the proposed works on threatened species, the following matters were taken into consideration:

- implementation of the proposed works, including pre construction, construction, operation and maintenance phases
- activities to be undertaken in the area following the proposed works
- all direct and indirect impacts, on and off site impacts through all phases
- the frequency and duration of each known or likely impact/action
- the total impact which can be attributed to that action over the entire geographic area affected initially and over time
- the sensitivity of the receiving environment
- the degree of confidence with which the impacts of the action are known and understood.

Appendix D: Aboriginal heritage due diligence assessment

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JUNCTION ISLAND WENTWORTH NEW SOUTH WALES

ABORIGINAL CULTURAL HERITAGE DUE DILIGENCE ASSESSMENT

FINAL REPORT

GREEN EDGE ENVIRONMENTAL PTY LTD

10 June 2022

DOCUMENT INFORMATION

Project:	JUNCTION ISLAND WENTWORTH
Services required:	ACHDDA
Client:	Green Edge Environmental Pty Ltd
Prepared by:	Sejal Pandya
Project number:	22053

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EXECUTIVE SUMMARY

This report has been prepared for Green Edge Environmental Pty Ltd and details the Aboriginal Cultural Heritage Due Diligence Assessment (ACHDDA) of the proposed walking track upgrade and walking bridge upgrade at Junction Island, Wentworth, New South Wales (NSW) [the study area], within the Wentworth Local Government Area (LGA).

This ACHDDA was undertaken to assess the archaeological potential for Aboriginal material to be impacted as part of a business case being prepared by Wentworth Shire Council to determine the feasibility of the projects. The ACHDDA has been undertaken in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (Department of Environment Climate Change and Water NSW 2010) [the Code].

The Murray and Darling Rivers and the associated floodplains are extremely rich in Aboriginal heritage objects and sites. The riverine plains are considered culturally sensitive for the Aboriginal people of the region. A search of previously registered sites resulted in 103 known sites within a 10 km radius of the study area. These sites mainly consist of burials and earth mounds, with artifact sites and modified trees also being present. Whilst the Murray and Darling Rivers have been subject to many archaeological assessments, few have been done in close proximity to the study area. The registered Aboriginal heritage site types such as burials, middens surrounding the study area along the lagoons and lakes associated with these rivers, are considered to have high to moderate significance but the construction of an existing structure such as footbridge and walking trails have impacted the original surface features within the study area and altered it to a certain extent, therefore, it can be said that the proposed works would have no impact on the Aboriginal heritage present within the study area.

It is recommended that:

1. The proposed upgrade works can proceed with caution.
2. Identified culturally modified tree should be protected by putting in temporary fencing/boundaries denoting restriction of construction activities in the vicinity of the scarred tree to avoid any harm during the proposed works.
3. All Aboriginal objects and Places are protected under the National Parks and Wildlife Act (1974). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.
4. Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:
    - immediately cease all work at that location and not further move or disturb the remains
    - notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location
    - not recommence work at that location unless authorised in writing by Heritage NSW.

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1 INTRODUCTION

Austral Archaeology Pty Ltd (Austral) has been engaged by Green Edge Environmental Pty Ltd to provide Aboriginal Cultural Heritage Due Diligence Advice (ACHDDA) for the proposed Junction Island bridge and path upgrade near Wentworth, New South Wales (NSW) [the study area]. This advice is intended to assist Wentworth Shire Council in determining their obligations with regard to the *National Parks and Wildlife Act 1974* (NPW Act) and to determine whether the project will involve activities that may harm Aboriginal objects or places. Austral understands that this report will be used to support a Review of Environmental Factors (REF) being prepared under Part 5 of the *Environmental Planning and Assessment Act 1979.*

The study area is shown in Figure 1.1 and comprises an existing footbridge between Murray River and Darling River and walkways from the eastern end of the island to the tip within Lot 2 DP817571. The proposed works would result in the sealing of the timber walkways and surrounding areas of timber walkways where water pooling occurs.

1.1 ASSESSMENT OBJECTIVES

Section 87 of the NPW Act makes it a strict liability offence to knowingly or unknowingly harm Aboriginal objects or declared Aboriginal places without an Aboriginal Heritage Impact Permit (AHIP). Harm is defined under the NPW Act as "*any act or omission that destroys, defaces or damages the object or place or in relation to an object, moves the object from the land on which it had been situated*". The NPW Act allows for a person or organisation to exercise due diligence in determining whether their actions will or are likely to impact Aboriginal objects or places. Any person or organisation who can demonstrate that they have exercised due diligence has a defence against prosecution under the strict liability provisions of the NPW Act. Where an activity is likely to harm Aboriginal objects or places, consent in the form of an AHIP is required

The *National Parks and Wildlife Regulation 2009* adopted the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) [the Code] as guidance on reasonable and practicable steps which individuals and organisations need to take to:

- Identify whether Aboriginal objects are, or are likely to be, present within the study area.
- If Aboriginal objects are, or are likely to be present, determine whether their activities are likely to cause harm.
- Determine whether further assessment or an AHIP application is required for the activity to proceed.

This advice has been formulated to provide a robust assessment that will identify whether Aboriginal objects or places are present or are likely to be present within the study area. This has been achieved through the completion of a desktop review of the study area. The Code provides a series of questions that clarify whether it is applicable to a proposed project. These questions are addressed in Section 2.

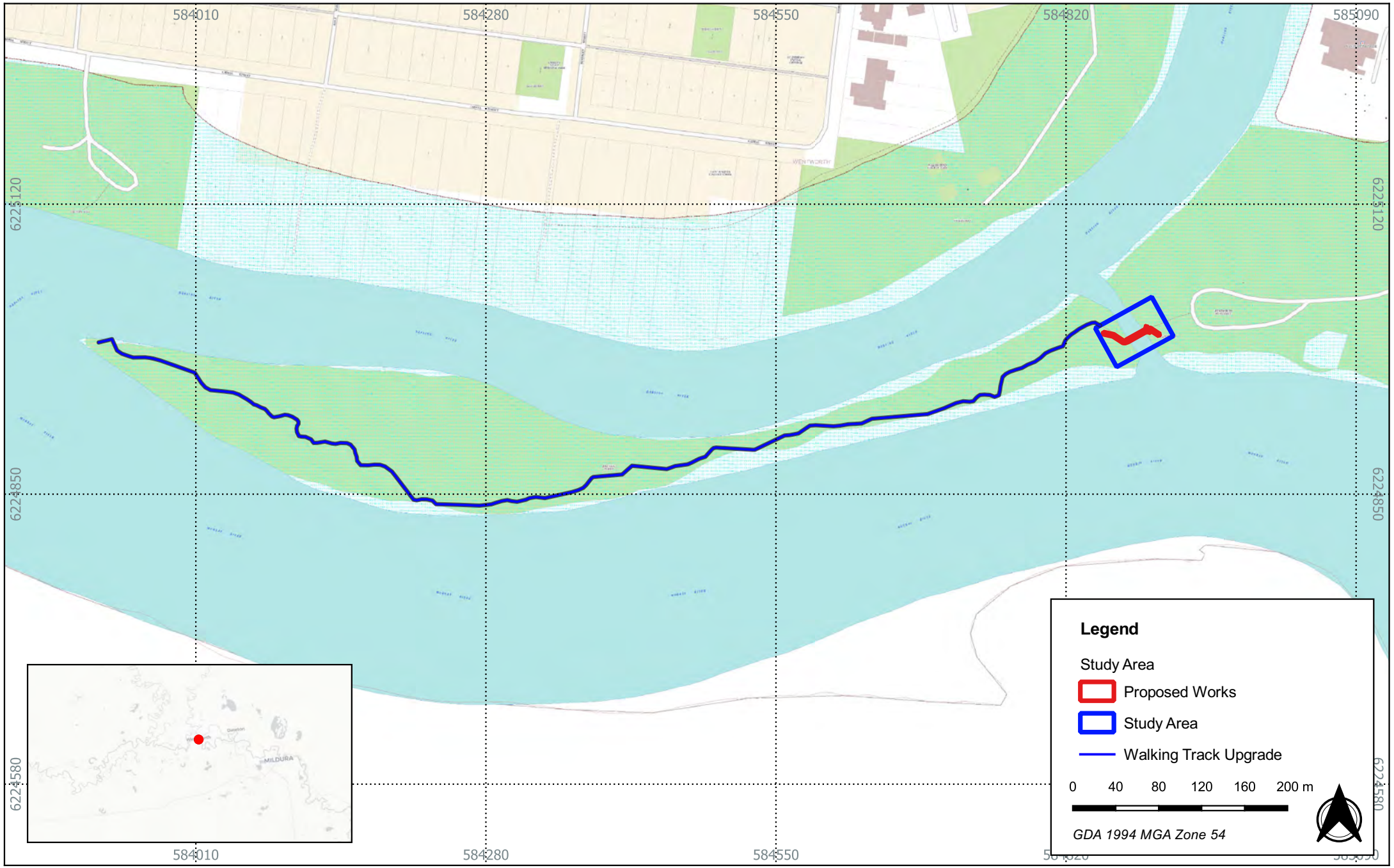

Figure 1.1 - Location of the study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Basemap

Drawn by: ARH Date: 2022-05-27

AUSTRAL ARCHAEOLOGY

Figure 1.2 - Detailed aerial of the study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial

Drawn by: ARH Date: 2022-05-27

AUSTRAL ARCHAEOLOGY

1.2 PROJECT TEAM AND QUALIFICATIONS

The following personnel have been involved in the preparation of this ACHDDA.

AMANDA HANSFORD (BA (ARCH/PALEO), GRAD DIP. ARCH)

Amanda brings unrivalled experience in the practical issues of heritage management, archaeological survey, and excavation, especially in the lower Murray regions. Amanda is a Director of Austral and specialises in Aboriginal heritage. Amanda has worked on many of the major lacustrine projects in the region including Lake Victoria and Willandra Lakes. Amanda began her career in 2007 and has developed a strong understanding of the technical aspects of Australian archaeology as well as legislative processes and consultation with Aboriginal communities.

SEJAL PANDYA (MA. ARCH, GRAD DIP ARCHAEOLOGY)

Sejal Pandya is an Archaeologist at Austral having 10 years of experience in the completion of Aboriginal projects and other archaeological projects in India and Australia. Sejal has contributed to reports completed in accordance with the NPW Act and the Victorian Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018. Through the completion of these projects, Sejal has developed relationships with Aboriginal Stakeholders, Heritage NSW and First Nations-State Relations (Aboriginal Victoria). She has worked on some of the major projects by Vic Roads, GWM water pipeline developments, Western port survey and Archaeological assessment of Lake Menindee and Lake Victoria in NSW.

Amanda Hansford has reviewed this report for quality assurance and technical adequacy and had input into the management recommendations.

1.3 ABBREVIATIONS

The following are common abbreviations that are used within this report:

Burra Charter	*Burra Charter: Australia ICOMOS Charter for Places of Cultural Significance 2013*
ACHA	Aboriginal Cultural Heritage Assessment
ACHDDA	Aboriginal Cultural Heritage Due Diligence Assessment
A**HIP**	Aboriginal Heritage Impact Permit
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act 1974*
The Proponent	Wentworth Shire Council
Study Area	Junction Island Bridge, Wentworth, NSW

2 DUE DILIGENCE ASSESSMENT

The Code consists of a series of 5 steps outlined below

STEP 1. WILL THE ACTIVITY DISTURB THE GROUND SURFACE OR ANY CULTURALLY MODIFIED TREES?

The proposed works for the study will require the upgrades of the existing footbridge and sealing of the bare soil walkway on Junction Island. The works will include importing fill/gravel and will not involve grading. There is no excavation needed to perform the proposed track upgrade works. Some ground disturbance will be required to replace the bridge

The activity will disturb the ground surface which is already significantly disturbed from a previously developed graded walkway and existing bridge, therefore the proposed works will not disturb any undisturbed land or culturally modified trees within the Junction Island Reserve.

As the activity will disturb the ground surface and/or any Aboriginal heritage objects that may be present within the study area and therefore consideration of steps 2a and 2b of the Code is required.

STEP 2A. SEARCH THE ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM (AHIMS) DATABASE AND USE ANY OTHER SOURCES OF INFORMATION OF WHICH YOU ARE ALREADY AWARE

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 26 May 2022 (Client service ID: 685878). The search identified 103 Aboriginal archaeological sites within a 10 kilometre search area centred on the proposed study area. None of these registered sites are located within the study area.

Spatial information for this report is displayed using the GDA94 Datum. Where AHIMS site records were provided on a different datum, they were converted using standard functions in QGIS software.

Table 1 AHIMS sites identified within 20 kilometres of the study area.

Site type	Occurrence	Percentage (%)
Modified Tree	51	49.6
Artefact	12	11.6
Shell	14	13.6
Hearth	14	13.6
Burial	12	11.6
Total	**103**	**100**

The highest type of Aboriginal site type registered surrounding the study area includes culturally modified scarred trees which appear at 49.6% (n=51) of the aboriginal sites. Modified trees are followed by shell midden and hearth sites in a similar percentage (13.6%, n=14). The study area also has a considerable number of burials and artefact sites within the nearby area (11.6%, n=12).

The variety of Aboriginal cultural sites within a small radius of only 10-kilometres confirms the significance of the Murray-Darling Riverine region to the traditional communities and is direct evidence of the Aboriginal past lifeways of the region.

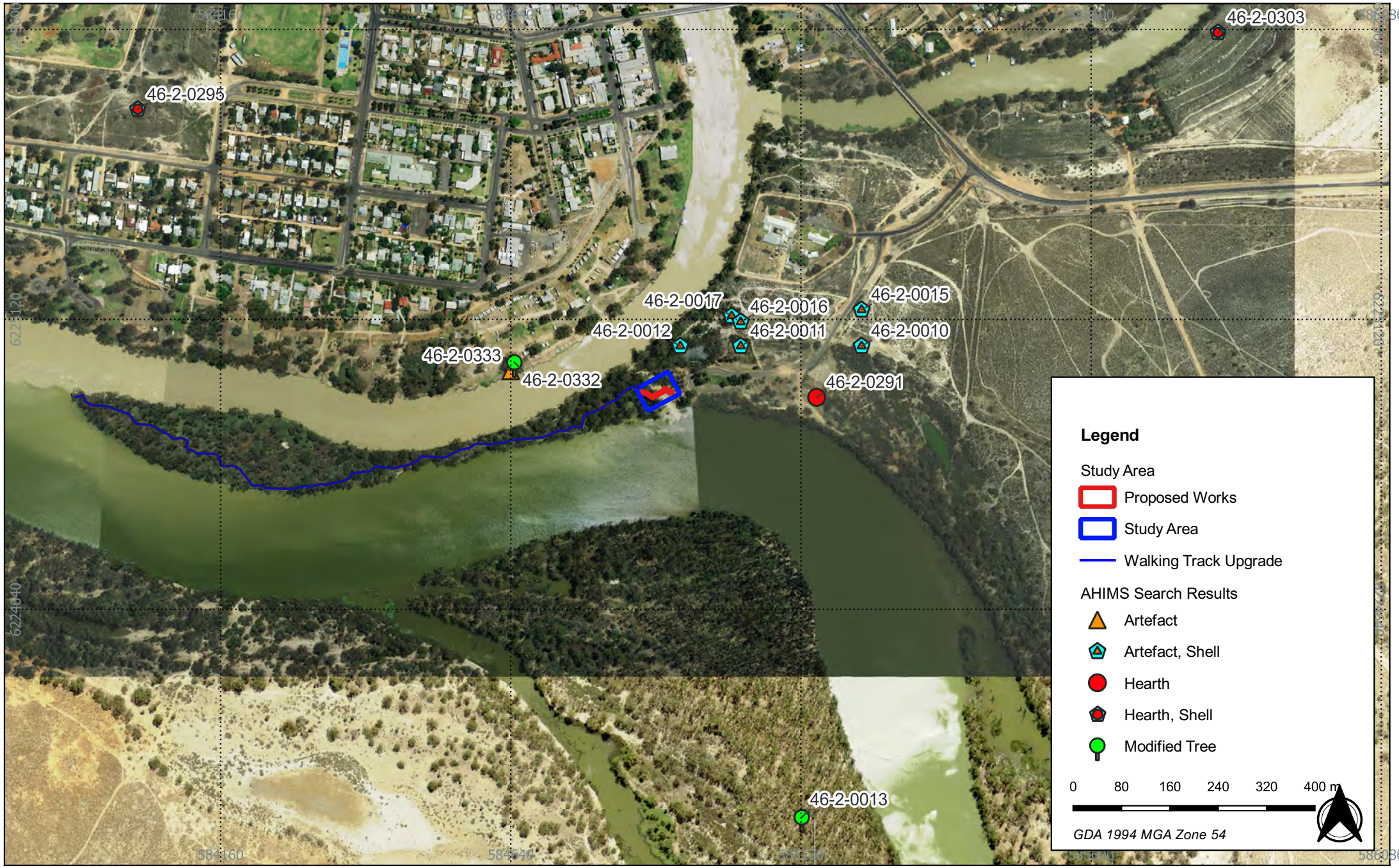

Figure 2.1 - AHIMS Search Results within close proximity 22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial *Drawn by: ARH Date: 2022-05-27*

AUSTRAL ARCHAEOLOGY

2.1 LOCAL ARCHAEOLOGICAL CONTEXT

Archaeological investigations of the Murray- Darling riverine region, particularly around the town of Wentworth are generally conducted as a part of development assessments or in response to impacted cultural heritage or the proposition of the regional infrastructure development or residential development as well as within the framework of academic enquiries.

The major studies which have contributed to our understanding of the Murray-Darling Riverine region and those with direct relevance to the study area, are outlined in Table 2. Reference is made to the main trends garnered from these investigations which serve to provide a broad framework in which to base the current study.

Table 2 Summary of past reports within the vicinity of the study area.

Author	Details
Clark 1983	This study was conducted on the Snaggy Bend burial ground, approximately 4.2 km west of the study area. Five different modes of Aboriginal burial techniques were represented at the site which suggests that the burial ground was used for a long time. Three shell middens were also discovered, as well as twelve Aboriginal hearths. The occurrence of burials near campsites could imply that the site was occupied when the Murray River flooded, and people were forced to migrate to higher ground. Recommendations included regular inspection and maintenance of the exclusion fence to keep the burial ground free of any harm from rabbits and other livestock. The site of the burial ground to have a monitor to check the effectiveness of the erosion control measures employed surrounding the area. (Clark 1983).
Bonhomme 1990	This study focused on Aboriginal burials and sand mining in the Riverine Plain, NSW. It was conducted across a large region including areas such as Darling /Anabranch Lakes, Murray River and lakes, Wakool River area etc., extending from Condobolin and Albury in the east to Mildura in the west. Three different types of burials were identified: 'Isolated, individual burials', 'Locations which contain a great many individual burials' and 'Burial grounds or 'cemeteries' in which the burials are associated in time and space' (Bonhomme 1990, p.9). It was concluded that sand bodies, such as dunes, that are positioned near water sources, have a higher probability of containing Aboriginal burials and there is a strong correlation between the presence of Aboriginal burial sites and water resources. Burial sites and burial sites contain increase as moving east to west. Riverbanks were not as populated as lakes, swamps and lagoons(Bonhomme 1990). As the study area is also a part of the western riverine plain, it can be considered sensitive to the presence of Aboriginal burial sites.
Bonhomme 1993	The archaeological assessments included the survey of two localities around Lake Victoria state forest and the Koondrook State Forest around the Murray Valley area. As a result of the survey, 53 sites were recorded from an area of 46h of Lake Victoria State Forest while 80 sites were recorded from 97ha of the Koondrook State Forest. The registered site types included scarred trees, shell scatters (small and large midden sites), burials and isolated artefacts. It was observed that around the Lake Victoria state forest region, lakes associated with the Murray River were more preferred areas of Aboriginal occupation than the Murray River and floodplains due to the stable availability of lake resources whereas around the central Murray region, lagoons back from the river were occupied and supported high Aboriginal populations within small areas(Bonhomme 1993). The report also predicts the presence of site types within these two different regions.

Author	Details
Edmonds 2002	The assessments included an archaeological survey for a transmission line between Buronga and NSW/SA border. The survey recorded 13 sites (8 middens, 2 campsites with hearths and 3 scarred trees (20 scarred trees were observed but only a few were recorded during the survey) comprising five site types on the Darling River near Avoca station such as a scarred tree, campsite and midden. Campsite along with the hearths and stone artefacts were situated along a high terrace overlooking the floodplain while midden was located along the riverbank. The scarred tree was observed within a floodplain. The report concluded that landforms in association with permanent and ephemeral water sources were strongly associated with Aboriginal settlement patterns. Campsites and middens could be present along the Darling River representing the long-term occupation of the region during the dry months while during winter seasons, areas associated with billabongs, depressions, claypans, and sinks were occupied for Aboriginal settlement within the region. Transitional groups for hunting-gathering activities would have been best practised around these ephemeral sources of water(Edmonds 2002).
Archaeological Consulting Services 1999	An archaeological survey was conducted for the bridge and access road upgrades work on the existing bridge across the Great Darling Anabranch, approximately 13 km north-west of the study area. Six Aboriginal sites were discovered through the field survey: one campsite and five shell middens. In addition, five historic artefacts were also discovered through the study. It was concluded that the site contained moderate scientific and research significance, and high Aboriginal cultural significance. The report recommended having monitors from the Barkindji group to see the works over the remnant sand dunes during the initial construction/excavation period. The recommendation also included protecting the tree with historical significance, identified south of the study area to be protected by setting up a temporary construction barrier to avoid any harm(Archaeological Consulting Services 1999). The geographical region of the assessments and the works are similar to the proposed works within the study area. It indicates that shell midden sites, burials and scarred trees are the most dominant site types to be found within the geographical region of the study area.

2.2 ETHNOHISTORY

The traditional owners associated with the geographical region of the study area, according to Tindale are known as Paakantyi speaking group known as the Maraura people (Tindale 1974, p.130). They were located along the Murray River from Wentworth to Paringa and along the western side of the Darling River. The other groups who spoke the sub-dialects and share boundaries include Bakandji, Wiljakali, Dangali and Kureinji (Tindale 1974). These groups were divided into two matrilineal moieties known as Mukwara (Wedge-tailed eagle) and Kilpara (raven)(c.f. Dibden 2007).

Aboriginal people along the Murray River lived a semi-sedentary hunter-gatherer lifestyle and would often utilise the environment to their advantage (Beveridge 1889, p.32, Mulvaney & Kamminga 1999, p.303). They occupied the riverine plains during the warmest months of the year and occupied the Dunefields for food collecting after winter rains. Kangaroos, wallabies, echidnas, bandicoots, native cats, rodents and emu were hunted. Emus were speared or netted in heavy nets, which were 80 to 100 yards long (70-90metres) with a 6" (150milimetre) mesh. They were fixed in a V shape, which could capture 12 emus on one occasion (Beveridge 188).

European settler named Edward Curr stated that the Aboriginal men "*were muscular active men, two of three being about 5"9. They wore possum skin cloaks and had necklaces of small reeds hung on twine made from flax", they used "kangaroo skin bags" to "carry shields, waddies and utensils", and they "carried their spears and throwing sticks in their hands"* (Curr 1883, p. 85). Stone tools were made from quartz or shells, which were used for activities like cutting the skin of animals, cutting hair and sharpening materials such as wood for boomerangs and spears (Kirby 1896, p.46, Coutts 1977, p.10).

Apart from hunting, fishing and food gathering were also observed as one of the main subsistence traditional practices within the Aboriginal cultural history of the region. Fish were caught either by using spears or by fishing nets. Weirs and dams were also constructed on the rivers at times to

catch fish. The hunting of fish and shellfish collection and processing around the river areas is one of the main reasons for the presence of midden sites around the water sources.

Another ethnographic detail about the Aboriginal subsistence practices of the Murray River area comes from the works of Krefft. Apart from hunting activities, Aboriginal groups also survived for a very long period on the 'Typha roots. He noted that around January or February, women entered the swamps to collect the roots of the reeds and carried them in large bundles to the campsite areas. The roots collected were roasted in an underground hallow oven and were consumed as hot or taken along to a hunting expedition (Kreft 1886, Bonhomme 1993). Roots and tubers were available in abundance, reeds of these roots were made into spears and used for trade in exchange for greenstone axes. Food collecting activities were carried out using wooden digging sticks, stone grinders and pounders and other shell implements. Shells were employed to cut the roots and stems to obtain the fibre for baskets used in gathering and cooking. Plant food sources also included pigface (*Carpobrotus modestus*) and nardoo *(Marsilea drummondii).* The nardoo plants were grounded and mixed into a dough, later baked in an oven built on heat retainers.

Thus, based on the above ethnographic details, we can say the Aboriginal groups around the Murray and Darling riverine region utilised the wide variety of resources available in the region for the subsistence activities. It can be concluded that lagoons, swamps and lakes associated with the permanent water bodies were mainly occupied for long term settlement while river margins were used only for short-term occupation or cultural gatherings. Past evidence has suggested that burials are observed along sand-dunes and lunettes, while scarred trees, midden sites, large scatters of artefact sites, and hearths are found near lagoons or lakes. As the study area is situated at the confluence of two mighty rivers of Australia and has swamps nearby, it would have occupied a very significant place in the Aboriginal cultural geography and therefore has a high potential of finding Aboriginal heritage sites in the area and surrounds.

2.3 TOPOGRAPHY AND HYDROLOGY

As the study area is situated within the Murray-Darling Channels and floodplains, it is formed by geological processes such as alluvial deposition and other erosional processes. Elevation in the region varies from 34 metres to 40 metres.

The study area is located at a junction of the Murray and Darling Rivers, two major watercourses in the area that would have provided abundant resources to support large Aboriginal groups. These permanent freshwater water sources have tributaries including other rivers, streams, paleo-channels, creeks, billabongs, swamps, and levees that feed into the main river.

The hydrological systems identified within and in the locality of the study area are identified in Figure 2.2.

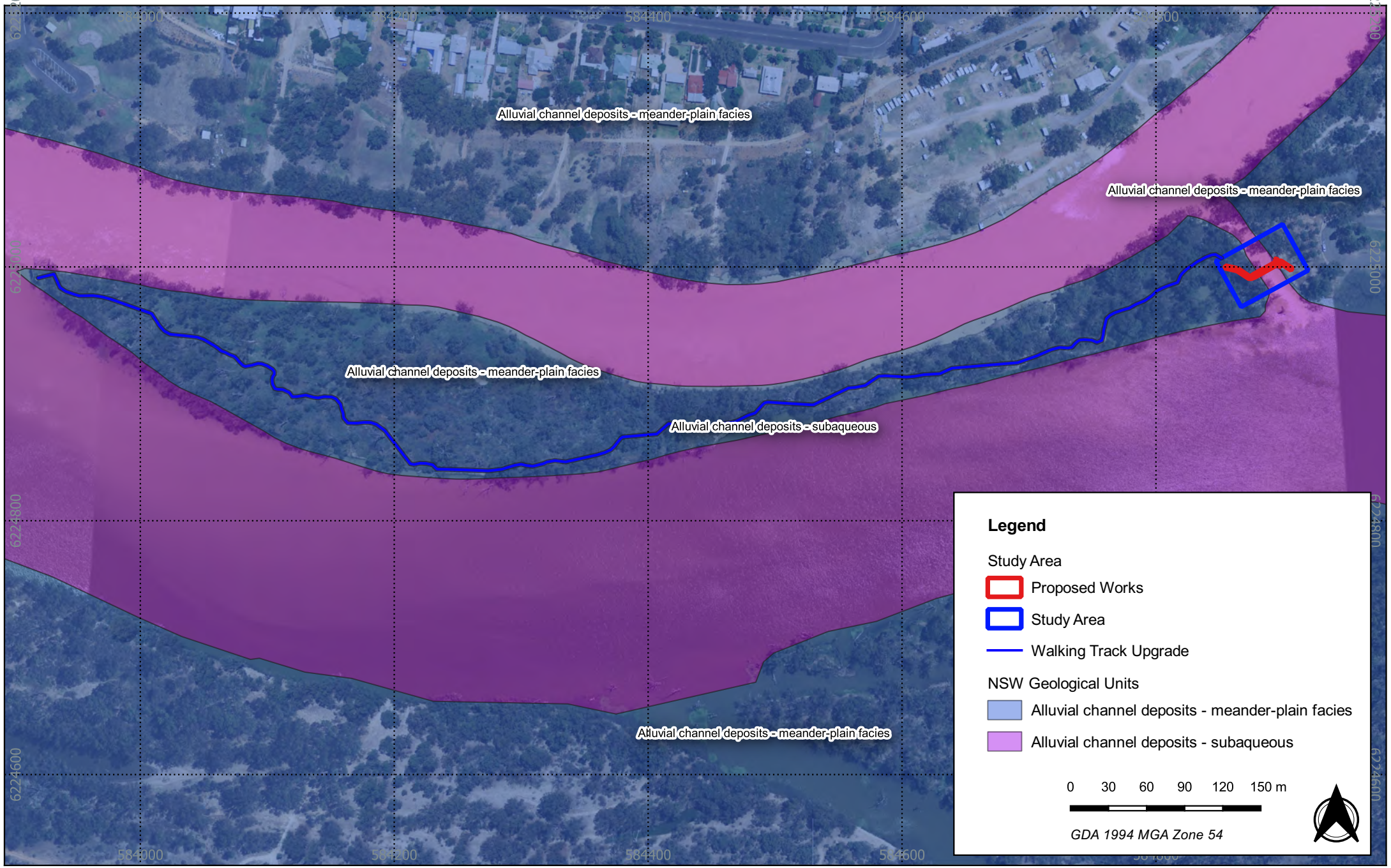

Figure 2.2 - Geological units of the surrounding study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial, NSW Geological units *Drawn by: ARH Date: 2022-05-27*

AUSTRAL ARCHAEOLOGY

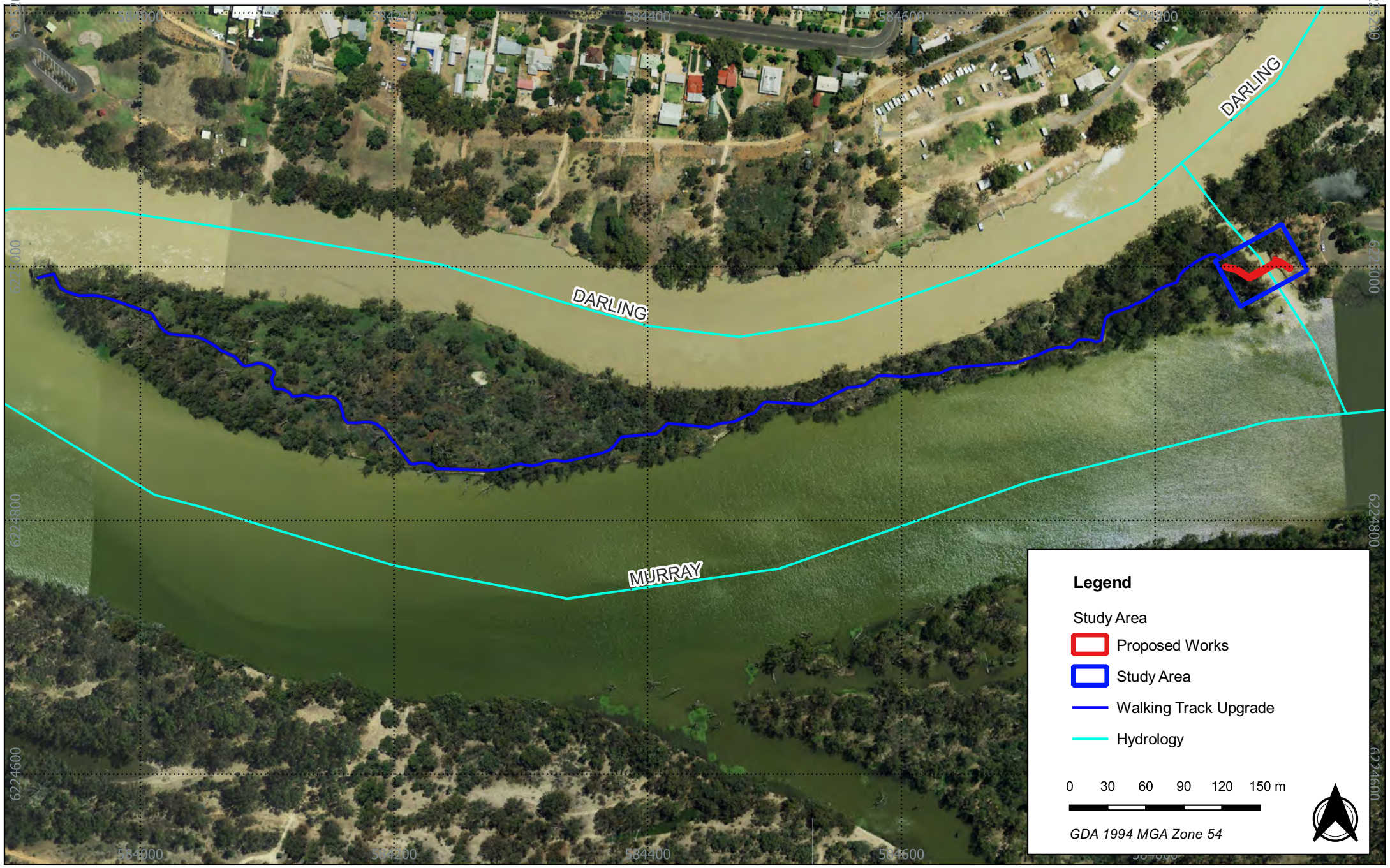

Figure 2.3 - Hydrology of the study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial

Drawn by: ARH Date: 2022-05-27

AUSTRAL ARCHAEOLOGY

2.4 GEOLOGY AND SOILS

The surface geology of the study area is formed from Clastic sediments from alluvial channel deposits of the Murray and Lower Darling Rivers. These sediments consist of light brown clayey silt with the topsoil being from grey humic, clayey sand that is very fine-grained (Colquhoun et al. 2019). The soils within the study area are mostly classified as Vertosols, which are soils made up of cracking and non-cracking grey soils.

The surface geological units identified within the study area are identified in Figure 2.2.

The Mitchell Landscape identified across the study area is Lower Darling Channels and Floodplains and surrounded by Murray Channels and Floodplains. The landscapes are characterised by sinuous anabranches, narrow plains, channel loops, billabongs, and swamps. Lower Darling Channels and Floodplains consist of heavy grey cracking clays with some sandy earth and sands within channels while plains consist of grey clays with areas of scalded red and brown texture-contrast soils (Mitchell 2002).

Mitchell's landscape units identified within the study area are seen in Figure 2.5.

2.5 LANDFORMS

The landscape of the Darling and Murray channel and floodplains consist of grey cracking and non-cracking clays. The associated landforms seen with these landscapes include flood plains, Billabongs, swamps, channels, levees and source bordering dunes (Mitchell 2002). The landform of the study area is a junction island surrounded by Murray and Darling Rivers. It is situated within active channels and floodplain landform having a maximum elevation of approximately 42metres.

The landscape greatly affected how the indigenous communities used the area. The regular flooding of the Murray and Darling meant the higher grounds were favoured for occupation and enabled communities to travel further from the river at certain times of the year.

2.6 LANDSCAPE RESOURCES

In the past, the study area would be able to support indigenous populations for eight to nine months of the year, due to its vicinity to the Murray River and Darling River. It would have been a culturally significant area due to its proximity to the permanent water sources. Previous studies in the region have indicated that a wide variety of aquatic resources such as fish, and aquatic birds depending on the seasons were utilised by the traditional Aboriginal communities through different technologies. Other terrestrial animals that were exploited were marsupials, and reptiles which would have been found along the river and their skins will also be used for constructing clothes and items that aided in transporting goods.

Redgum has traditionally been a resource used by the aboriginal community for several activities, including using it as material for making cannons (Atkinson & Berryman 1983, p.23). Other plants that were exploited along the river, but are no longer in abundance in the study area were Sow Thistle, Midge Orchid, River Mint, and reeds, which contributed to the diet or were used as materials(Atkinson & Berryman 1983, Craib 1991). Typha, for example, were collected and used to create nets which would then be used to catch fish or birds (Beveridge 1889, pp.70–71).

2.7 PAST LAND USE PRACTICES

The study area being a junction of the two important rivers, located at Wentworth has been an important location for the existence of different communities occupying the region. Past archaeological studies have shown the intensive occupation of the area by the traditional communities. The location was also the first site of European settlement within the Wentworth shire. The availability of permanent water sources in the otherwise dry region attracted early settlers and pastoralists to occupy the region and expand their runs in the district of Wentworth. Large pastoral areas were developed. The area was later developed as a big port and occupied a central role in river transport. Around the 1890s, 92 paddle steamers were recorded working the Darling River as a result, Wentworth became the largest and busiest river port in Australia resulting in changed land-use practices over time(Hassell Planning Consultants Pty Ltd 1989).

The geographical region has been historically cleared of the native vegetation since European settlement of the area for agriculture, infrastructure developments and residential growth. The study area has also been subject to disturbance in the form of the construction of the footbridge

and walking trails. The current bridge is narrow and has poor access roads. In the past, the study area has been used as a police paddock. The land was originally used as a paddock for grazing the mounted police horses (Hassel Planning Consultants 1989).

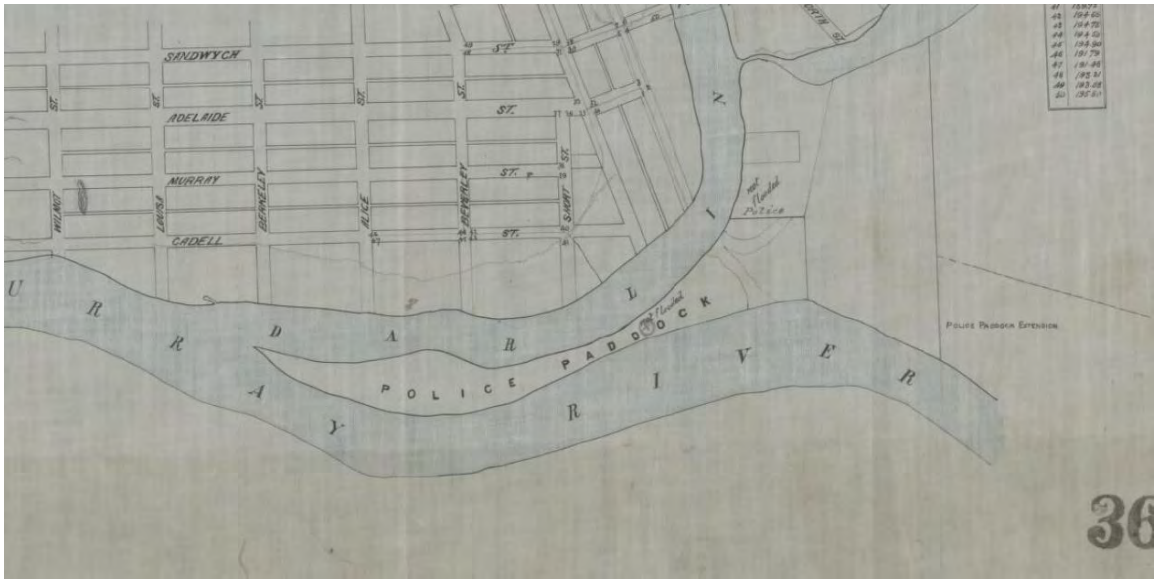

Figure 2.4 Wentworth, 1880-1890s, Study area as Police Paddock (NLA)

Thus, we can say that the study area is a part of the region that has a long history of various past land-use practices such as grazing, infrastructure development and river transport networks. With time, these practices have modified the original landscape of the study area and impacted the Aboriginal cultural heritage-tangible and intangible to a certain extent.

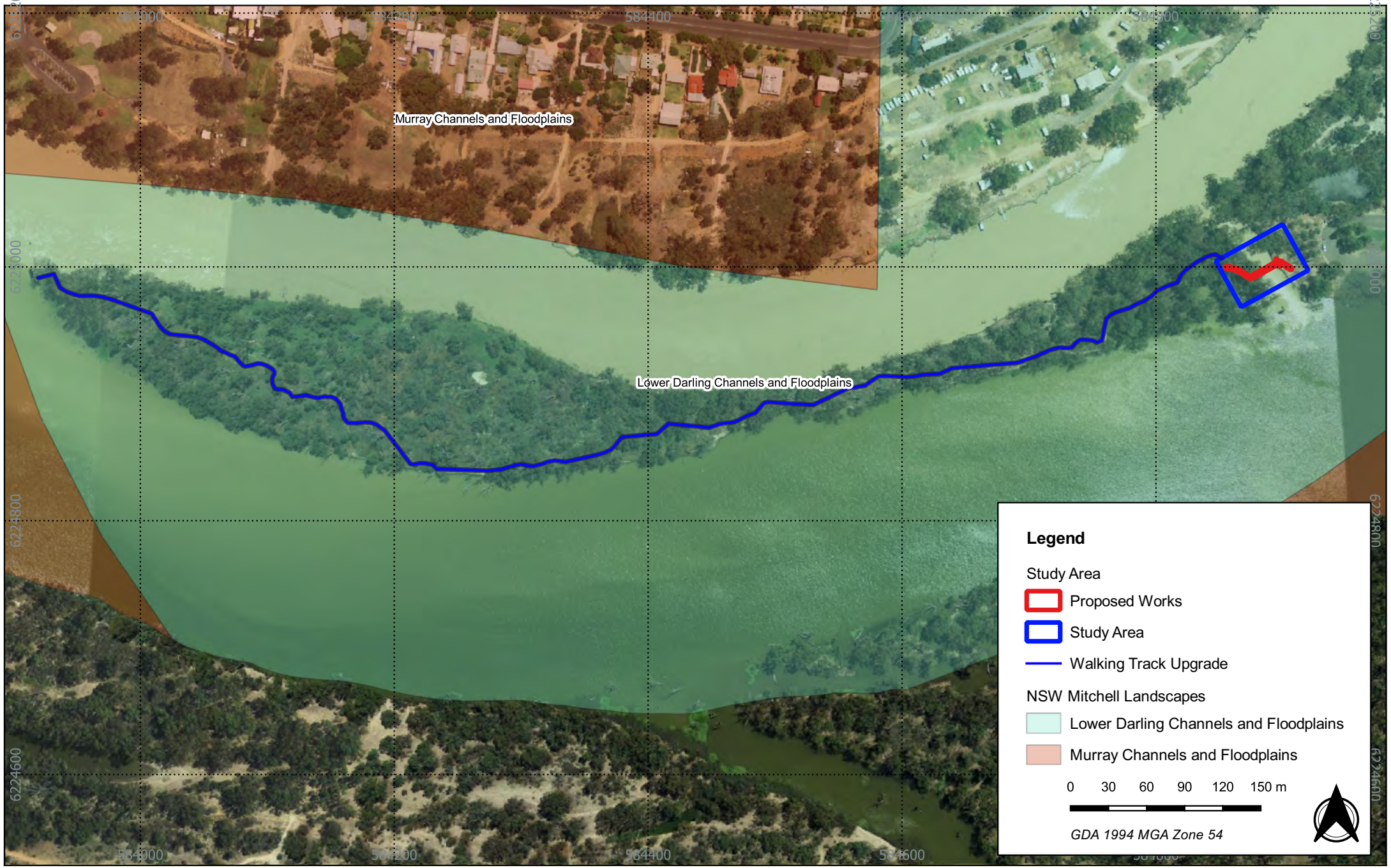

Figure 2.5 - Mitchell Landscape of the study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial, NSW Mitchells Landscape *Drawn by: ARH Date: 2022-05-27*

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2.8 PREDICTIVE STATEMENTS

In general, an archaeological predictive statement for any study area draws on surrounding environmental data, previous archaeological research, and predictive models for Aboriginal occupation. Another essential aspect to predicting the archaeological integrity of a site and something that must be considered is previous land uses of the study area and the degree of disturbance.

The main trends broadly seen within south-western NSW are that:

- Archaeological sites occur on most landforms.
- Site frequency and density are dependent on their location in the landscape.
- There is a dominance of modified trees, artefact scatters and shell features at sites.
- Artefact scatters are commonly located in close proximity to permanent water sources along creek banks, alluvial flats and low slopes. More complex sites are usually located close to major water sources. Due to the antiquity of Aboriginal heritage in western NSW, paleo-channels and past waterways should be also considered as having archaeological potential.
- The dominant raw material used in artefact manufacture is silcrete and fine-grained siliceous material with smaller quantities of chert, quartz and volcanic stone seen.
- Artefact assemblages usually comprise a proportion of formal tool types with the majority of assemblages dominated by flakes and debitage.
- While surface artefact scatters may indicate the presence of subsurface archaeological deposits, surface artefact distribution and density may not accurately reflect those of subsurface archaeological deposits.
- Aboriginal scarred trees may be present in areas where remnant old growth vegetation exists.

While these statements provide an adaptable framework for applying a predictive model to the study area, the Murray and Darling Rivers and their floodplains are rich in archaeological material and all Aboriginal heritage site types can be located within the region. The general studies associated with the geographical region, the specific investigations surrounding the study area and the search of the AHIMS database have helped to predict what certain site types can be expected within the study area. Based upon the results of these background studies Austral has been able to develop a series of predictive statements relating to the type and character of Aboriginal cultural heritage sites that are likely to exist in the study area and where they are more likely to be located. These predictive statements indicate that:

- Aboriginal heritage sites are likely to occur within 200 metres of past or current water sources.
- Burials, hearths and Modified trees are the most common site types registered surrounding the study area.
- Archaeological material such as high-density artefact scatters are found in association with lakes and lagoons associated with permanent water sources, beyond the immediate river surroundings.
- Low lying wetland areas subject to constant inundation will be unlikely to contain Aboriginal occupation.

STEP 2B. ACTIVITIES IN AREAS WHERE LANDSCAPE FEATURES INDICATE THE PRESENCE OF ABORIGINAL OBJECTS

Table 3 Landscape features in the Code that indicate the likely existence of Aboriginal objects.

Question	Response
Is the activity within 200 metres of 'waters'?	Yes
Is the activity within a sand dune system?	No
Is the activity located on a ridge top, ridgeline, or headland?	No
Is the activity located within 200 metres below or above a cliff face?	No
Is the activity within 20 metres of or in a cave, rock shelter or cave mouth?	No
Is the activity (or any part of it) on land that is disturbed?	Yes
Do the predictive statements of 2A indicate Aboriginal Objects or places are likely to occur on any of the topographic elements of the study area?	yes

The study area is located on a floodplain associated with the Murray and Darling Rivers, which is within 200 meters of the study area. The study area is a part of the floodplains of these rivers. It has an existing footbridge and timber walking trail that forms a major part of the study area, the continuous use of footbridge and walking trail has disturbed the study area.

STEP 3. CAN YOU AVOID HARM TO THE OBJECT OR DISTURBANCE OF THE LANDSCAPE FEATURE?

The main landform that is located in the study area is the River channel and flood plain. The proposed works will be subjected to an area that has been historically used as a bridge to view the two rivers and has a bare soil walking trail. It has been modified and is disturbed. The proposed works will be taking place in an area that has no Aboriginal heritage objects, modified trees or other landforms that may contain potential archaeological deposits. Therefore, the disturbance will not harm any known objects, modified trees, or landforms.

STEP 4. DESKTOP ASSESSMENT AND VISUAL INSPECTION

In order to ground truth, the desktop assessment, a visual inspection of the study area was undertaken on 26 May 2022 by Amanda Hansford (Director, Austral). The visual inspection consisted of a systematic survey of the study area to identify and record any Aboriginal archaeological sites visible on the surface or areas of Aboriginal archaeological potential and cultural sensitivity. The archaeological survey was conducted on foot. The methods used during the visual inspection conformed to requirements 5 to 8 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b).

The survey consisted of pedestrian transects walking along the trail from the bridge towards the western end of the reserve. This was to ensure that the study area was thoroughly surveyed and that no cultural material or site was overlooked. The ground surface visibility was 80% along the entire walking trail and surrounding the bridge. It dropped to 50% near the western end of the study area near the Swamp (Figure 2.6, Figure 2.7 and Figure 2.8). The visibility within the study was very good mainly due to the sparse grass growth and wind erosion that exposed the patches of soil.

The landform that the study area is located on is a gently undulating floodplain consisting of greyish brown silty clay topsoil with leaf litter obstructing the visibility within the study area. The average exposure across the study area was 70% caused by soil erosion and walking. Several trees were inspected for cultural scarring. As a part of the archaeological survey, one scarred tree (Figure 2.9) was recorded which was located outside the impact zone of the study area. The location of the scarred tree is indicated in Figure 2.10.

No cultural material or sites were identified in this survey within the area of the proposed works. There is a moderate level of disturbance along the walking track and surrounding the bridge area. It is determined that the study area is of low archaeological potential since the disturbance would disrupt the primary context of any archaeological material that may have existed, and considerably

modified surface landform features present within the study area. The only landform identified within the study area includes a flood plain within an active river channel area, considered as having a low potential for the presence of Aboriginal heritage sites.

	Figure 2.6: View east along the walking track within the study area showing trail and Signage
	Figure 2.7 Facing west within the study area shows walking tracks and young trees along the tracks
	Figure 2.8: Swamp near the western end of the study area

	Figure 2.9 Scarred tree, outside the study area. Dead Eucalyptus tree (River redgum), oval scar. Located at a height of two metre above the ground level. Dimensions of the scarred tree could not be measured due to its high location on the tree.

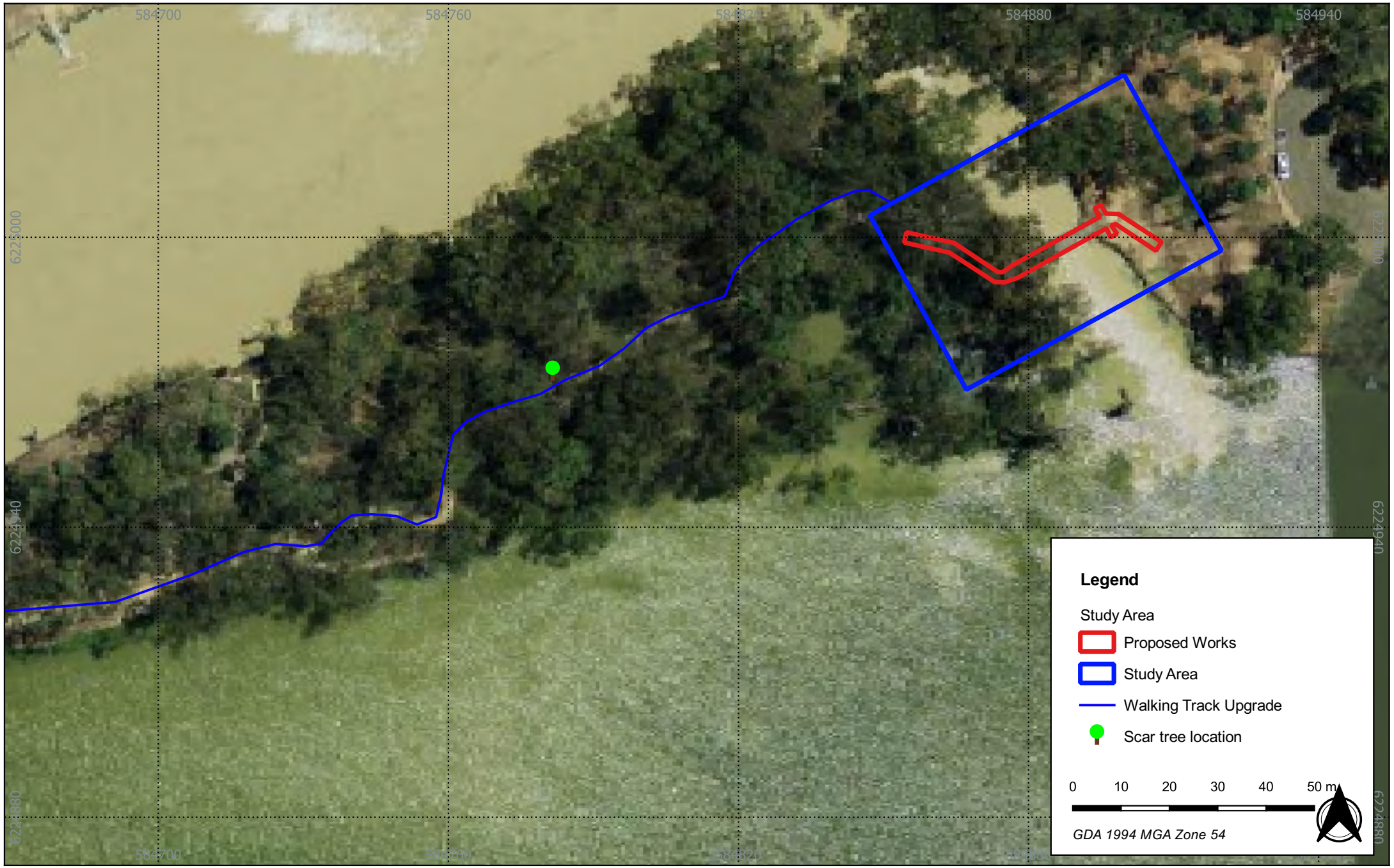

Figure 2.10 - Registered scar tree in relation to the study area

22053 - Junction Island Bridge and Pathway, Wentworth - ACHDDA

Source: NSW LPI Aerial *Drawn by: ARH Date: 2022-05-31*

AUSTRAL ARCHAEOLOGY

STEP 5. FURTHER INVESTIGATIONS AND IMPACT ASSESSMENT

Based upon the outcome of Steps 1 to 4 of the code, further assessment is not warranted based. As such the project may proceed with caution. The following recommendations apply:

1. The proposed upgrade works can proceed with caution.
2. Identified culturally modified tree should be protected by putting in temporary fencing/boundaries denoting restriction of construction activities in the vicinity of the scarred tree to avoid any harm during the proposed works.
3. All Aboriginal objects and Places are protected under the National Parks and Wildlife Act (1974). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.
4. Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:
    - immediately cease all work at that location and not further move or disturb the remains
    - notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location
    - not recommence work at that location unless authorised in writing by Heritage NSW.

If you have any questions regarding the advice within this letter, please do not hesitate to contact me on the details below.

Yours sincerely,

Sejal Pandya

Senior Archaeologist

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Appendix E: Site Photos

Photo 1 –Existing bridge proposed to be replaced

Photo 2 – Existing bridge, the replacement bridge is proposed to have rock rip rap to protect from scour

Photo 3 – Island side of bridge and existing walking trail

Photo 4 – Typical existing walking trail

Photo 5 – Existing interpretative signage and walking trail

Photo 6 – Existing walking trail at the northern end of the Island

Appendix F: Clause 171 Checklist

APPENDIX F – CLAUSE 171 CHECKLIST

A checklist of factors that should be considered in the assessment of impacts prior to its determination is included within Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. This clause identifies 18 issues that need to be addressed. The following text provides summary details of each of the issues, the majority of which have been addressed within the body of this document.

Factor
a. Any environmental impact on a community?
The proposed projects will not have impacts on any community; the local communities are a beneficiary of the project.
b. Any transformation of a locality?
The proposed projects are minor in nature (landscape scale) and would not transform any locality, other than visual impacts during operations and for a period following while regeneration is occurring.
c. Any environmental impact on the ecosystems of the locality?
There would be some minor impacts on terrestrial ecosystems in the locality. These impacts are minor and would be mostly minimised through the small scale of the project, management of clearing works and management during operations.
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?
There would be a slight reduction in the aesthetic and scientific or other environmental quality or value of the locality, due to the removal of topsoil and vegetation in the landscape. No recreational activities will be impacted and scientific values are considered low.
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?
There would be no negative effects on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)?
There would be some minor loss of habitat for native protected fauna. The ecological investigations conducted for in this study conclude that the impacts are likely to be minor and are not expected to result in a decline in any native fauna species or population.
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?
The proposed projects are minor and would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.
h. Any long-term effects on the environment?

There would be no long term negative effects on the environment.
i. Any degradation of the quality of the environment?
The proposed projects would not degrade the quality of the environment any further than it is now, through active management of the topsoil seed store.
j. Any risk to the safety of the environment?
There are no risks to the environment during quarrying that have not already had mitigation measures in place through the risk assessment within the REF.
k. Any reduction in the range of beneficial uses of the environment?
There would be some minor reduction in the range of beneficial uses of the environment, such vegetation and foraging area for terrestrial, including avian fauna with preference for semi-arid environments. This reduction is considered to be minor and short term, during the regeneration phase.
l. Any pollution of the environment?
Pollution from the proposed projects would be limited to dust and exhaust fumes, and some temporary noise pollution, during quarrying phases.
m. Any environmental problems associated with the disposal of waste?
Any waste generated is typical of quarrying activities and would not pose any issues with regards to disposal (disposal to a likened facility will occur).
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?
The resources required to complete the project are not unique or in short supply, other that the gravel resource itself. There would be no risk of resources becoming in short supply.
o. Any cumulative environmental effect with other existing or likely future activities?
There are no other known projects within the study area that could affect in a cumulative sense the environment, as all other council quarries are small in nature.
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?
The proposal areas are not located on the coast.
q. Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1
The proposals are not at odds with any local planning statement, regional strategic plans or district strategic plans made under the Act, Division 3.1.
r. other relevant environmental factors
No other relevant environmental factor not considered in the REF will be impacted.

Appendix G: EPBC Checklist

APPENDIX G – Consideration of Matters of National Environmental Significance

The table below demonstrates the Wentworth Shire Council's consideration of the Matters of National Environmental Significance (MNES) under the EPBC Act to be considered in order to determine whether the proposal should be referred to Commonwealth Department of Agriculture, Water and the Environment. A Protected Matters Search Tool (PMST) Report was generated on 7 June 2022 and revealed the following.

Matters of NES	Impact
Any impact on a Work Heritage property?	
There are no World Heritage properties within the PMST search area (site and a 10km buffer). No impacts will occur	Nil
Any impact on a National Heritage Place?	
There are no National Heritage Places within the PMST search area. No impacts will occur.	Nil
Any impact on a wetland of international importance?	
The PMST search identified the site is within the catchment of three wetlands of international importance. • Banrock station wetland complex 200 - 300km downstream • Riverland 200 - 300km downstream • The Coorong, and Lakes Alexandrina and Albert Wetland 400 - 500km downstream Due to the minor nature of the works and long distance between work site to the wetlands on International importance, no impacts negative impacts are expected.	Nil, all located 100's of kilometers downstream
Any impact on a listed threatened species or community?	
The PMST identified within the search area 19 threatened species that could occur, including • 11 bird species • 6 fish species • 2 mammal species • 6 plant species The following threatened ecological communities (TEC) were identified as potentially occurring within the PMST search area: • Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions • Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions • Mallee Bird Community of the Murray Darling Depression Bioregion The works will not result in any negative impacts on vegetation or habitat for threatened species, therefore the proposal is not likely to have a significant impact on the Commonwealth listed threatened species or communities.	No impact to either, as these TEC's not recorded within the works area.

Any impact on listed migratory species?	
It is unlikely that the development of the proposal would significantly affect any listed migratory species and these species habitat requirements are not within the works area.	Eleven species retuned in the search area
Does the Proposal include a nuclear action (including uranium mining?)	
The proposal does not involve a nuclear action.	Nil
Any impact on a Commonwealth marine area?	
The proposal will not impact on a Commonwealth marine area.	Nil
Does the proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources?	
The proposal does not involve the development of coal seam gas and/or large coal mine.	Nil
Additionally, and impact (direct or indirect on Commonwealth Land?	
The proposal will not impact directly or indirectly on Commonwealth Land.	Nil

GENERAL NOTES:

G1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS. ALL DISCREPANCIES SHALL BE REFERRED TO THE QUALITY MANAGER FOR DECISION BEFORE PROCEEDING WITH THE WORK.

G2. ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION AND FABRICATION ARE COMMENCED. THE ENGINEER'S DRAWINGS SHALL NOT BE SCALED.

G3. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE IN A STABLE CONDITION AND ENSURING NO PART IS OVERSTRESSED UNDER CONSTRUCTION ACTIVITIES.

G4. WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS INCLUDING ALL AMENDMENTS AND THE LOCAL STATUTORY AUTHORITIES, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

G5. THE STRUCTURAL WORK SHOWN ON THESE DRAWINGS HAS BEEN DESIGNED FOR THE FOLLOWING LIVE LOADS:

ROOF	0.25 KPa or $(\frac{1.8}{A} + 0.12)$ KPa or 1.4 KN
FLOOR	2.0 KPa or 2.7 KN

G6. THE DESIGN WIND CRITERIA TO AS 1170.2- 2011 IS AS FOLLOW:

REGION	A0
BASIC WIND SPEED	VU = 45 m/s
TERRAIN CATEGORY	2.5

G7. DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METRES UNLESS SHOWN OTHERWISE.

G8. SITE SURVEYING AND SETTING OUT SHALL BE CARRIED OUT BY A REGISTERED SURVEYOR.

G9. EXISTING SERVICES ARE SHOWN ON THE DRAWINGS IN APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING EXISTING SERVICES.

G10. BUILDING MATERIALS SHALL NOT BE STORED ON STRUCTURAL ELEMENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE QUALITY MANAGER.

G11. THESE DRAWINGS DO NOT DETAIL TEMPORARY WORKS. TEMPORARY WORKS ARE TO BE DESIGNED BY THE CONTRACTOR.

G12. ALL TESTING SHALL BE PERFORMED BY INDEPENDENT NATA ACCREDITED AUTHORITY. TEST REPORTS SHALL BE FORWARDED TO THE QUALITY MANAGER.

G13. INCOMPATIBLE METALS SHALL BE SEPARATED BY CONCEALED LAYERS OF SUITABLE INERT MATERIALS AND THICKNESSES.

G14. THESE NOTES SHALL BE SUPPLIED TO ALL SUB-CONTRACTORS.

SITE PREPARATION AND EARTHWORKS NOTES:

SP1. PRIOR TO THE STRIPPING OF TOPSOIL, THE CONTRACTOR IS TO REMOVE EXISTING SURFACE VEGETATION AND DISPOSE OFF SITE.

SP2. TOPSOIL SHALL BE STRIPPED FROM ALL AREAS OF CONSTRUCTION TO A NOMINAL DEPTH OF 100mm AND SHALL BE STOCKPILED ON SITE FOR LATER RE-USE IN FILLING TO BATTER SLOPES, LANDSCAPING, GRASSED AREAS ETC. STOCKPILES SHALL HAVE ADEQUATE DRAINAGE AND EROSION PROTECTION AND BE PROTECTED FROM CONTAMINATION BY OTHER EXCAVATED MATERIAL, WEEDS AND BUILDING DEBRIS. EXCESS TOPSOIL IS TO BE REMOVED FROM SITE.

SP3. ALL FILL MATERIALS ARE SUBJECT TO SUPERINTENDENT APPROVAL PRIOR TO USE AND SHALL NOMINALLY BE A CLEAN GRANULAR SOIL OR A SOIL-AGGREGATE MIXTURE CAPABLE OF BEING COMPACTED TO FORM A HOMOGENEOUS MASS. SELECT FILL SHALL HAVE A SOAKED CBR OF AT LEAST 15%. LARGE PARTICLES MUST BE BROKEN DOWN TO A MAXIMUM PARTICLE SIZE OF 75mm.

SP4. ALL SOFT/DISTURBED SOILS TO BE REMOVED TO FIRM NATURAL GROUND. BACKFILL AND BUILDUP SITE IN MAX 200mm THICK LIFTS WITH SELECT FILL MATERIALS, EACH LIFT SHALL BE COMPACTED TO MIN 95% SDD AND EACH LAYER TESTED TO AS3798. ENTIRE BUILDING SITE TO BE PROOF ROLLED TO AS3798 PRIOR TO APPLICATION OF BLINDING LAYER BELOW SLAB.

SP5. PROVIDE 100mm THICK BLINDING LAYER OF SCREENED QUARRY RUBBLE OR BASALT CRUSHER DUST (PM2/20 QR) COMPACTED TO 95% SDD BELOW ALL BUILDING SLABS.

SP6. ALL SERVICE TRENCHES & SITE EXCAVATIONS TO BE BACK FILLED & TESTED SIMILAR TO NOTE SP4.

CONCRETE NOTES:

C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 - 2018.

C2. CLEAR CONCRETE COVER TO REINFORCEMENT FOR IN-SITU CONCRETE ELEMENTS SHALL BE AS PER AS3600 - 2018.

C3. REQUIRED SURFACE FINISH AND CLASS OF FORMWORK FOR IN-SITU CONCRETE SHALL CONFORM WITH AS3600 - 2018.

C4. SCHEDULE OF CONCRETE PROPERTIES TO BE USED FOR THE PARTICULAR SECTION OF WORK SHALL BE AS SHOWN ON THE TABLE ON THIS SHEET UNLESS OTHERWISE INSTRUCTED.

C5. CONCRETE MIX DESIGN SHALL BE PROVIDED TO THE QUALITY MANAGER FOR APPROVAL.

C6. NO CONCRETE ADMIXTURE OR ADDITIVES SHALL BE USED WITHOUT WRITTEN APPROVAL FROM THE QUALITY MANAGER. AIR ENTRAINMENT IS NOT PERMITTED.

C7. WATER WITH MORE THAN 0.03% CHLORIDE OR CHLORINE CONTENT SHALL NOT BE USED.

C8. ALL CONCRETE TO BE READY MIXED SUPPLIED IN ACCORDANCE WITH AS 1379 BY THE BATCH PRODUCTION PROCESS. READY MIXED CONCRETE SHALL BE DELIVERED IN AGITATING TRUCKS.

C9. FORMWORK AND FALSEWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH AS 3610.

C10. FORMS SHALL NOT BE STRIPPED OR ANY FORMWORK SUPPORTS REMOVED UNTIL THE CONCRETE HAS ACQUIRED SUFFICIENT STRENGTH TO SUPPORT ITS OWN WEIGHT AND ANY SUPERIMPOSED LOADS WITHOUT DETRIMENT TO ITS INTENDED USE.

C11. ALL EXPOSED EDGES AND RE-ENTRANT CORNERS SHALL BE CHAMFERED.

C12. THE CONTRACTOR SHALL EMPLOY CONCRETE PLACEMENT METHOD SO AS TO:
- PREVENT SEGREGATION OR LOSS OF MATERIALS;
- PREVENT PREMATURE STIFFENING;
- PREVENT NONCONFORMING DISPLACEMENT OF REINFORCEMENT, LIGATURES OR EMBEDMENTS;
- PRODUCE A DENSE HOMOGENEOUS PRODUCT WHICH IS MONOLITHIC BETWEEN PLANNED JOINT AND/OR THE EXTREMITIES OF MEMBERS OR BOTH;
- COMPLETELY FILL THE FORMWORK TO THE INTENDED LEVEL, EXPEL ENTRAPPED AIR, AND SURROUNDING REINFORCEMENT AND EMBEDMENTS;
- PROVIDE THE SPECIFIED FINISH;
- CONTROL CRACKING, INCLUDING THAT CAUSED BY PLASTIC DRYING SHRINKAGE, CONCRETE SLUMPING AND PLASTIC SETTLEMENT;
- THE USE OF POKED AND FORM VIBRATORS ARE CONSIDERED ESSENTIAL.

C13. UNDER NO CIRCUMSTANCES SHALL FORMWORK OR PROJECTING REINFORCEMENT BE SHAKEN, DISPLACED OR DISTURBED MORE THAN TWENTY MINUTES AFTER PLACING THE CONCRETE.

C14. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE PLANNED AND APPROVED IN ADVANCE BY THE QUALITY MANAGER.

C15. CONCRETE SHALL BE CONTINUOUSLY CURED FOR AT LEAST 7 DAYS.

C16. THE CONCRETE SURFACE SHALL BE MAINTAINED AT A TEMPERATURE NOT LESS THAN 5° THROUGHOUT THE CURING PERIOD.

C17. ALL FOOTINGS AND SLABS ON GROUND SHALL HAVE A DAMP PROOF MEMBRANE TO AS2870 UNLESS NOTED OTHERWISE.

FOOTING:

F1 THE MINIMUM ALLOWABLE BEARING CAPACITY OF THE FOUNDATION MATERIAL IS TO BE:
1. 140 kPa FOR PAD FOOTINGS
2. 140 kPa FOR STRIP FOOTINGS
3. 140 kPa FOR BORED PIERS/PILES
4. 80 kPa FOR RAFT SLABS (BEAMS)
5. 80 kPa FOR RAFT SLABS (SLAB) & SLABS ON GROUND
6. REFER TO GEOTECHNICAL REPORT No 3180103 BY CIVIL TEST PTY LTD FOR GUIDANCE.

F2 THE ASSUMED FOUNDING LEVELS OF THE FOOTINGS ARE TO BE AS INDICATED ON THE DRAWINGS. BEFORE ANY REINFORCEMENT OR CONCRETE IS PLACED, THE ALLOWABLE BEARING CAPACITY OF THE GROUND IS TO BE VERIFIED BY THE GEOTECHNICAL ENGINEER. EXCAVATION SHALL CONTINUE UNTIL THE REQUIRED BEARING CAPACITY IS FOUND. THE OVER-EXCAVATION SHALL BE BACK-FILLED WITH BLINDING CONCRETE TO THE ASSUMED FOUNDING LEVEL.

F3 THE CONTRACTOR IS TO ALLOW FOR THE ENGAGEMENT OF A GEOTECHNICAL ENGINEER TO VERIFY THE FOUNDING MATERIAL.

F4 OVER-EXCAVATION WITHIN THE INFLUENCE ZONE (45 DEGREE LINE DOWN FROM BASE OF WALL) OF ANY RETAINING WALL IS NOT ALLOWED WITHOUT THE PRIOR APPROVAL OF THE EXCAVATION SEQUENCE BY THE SUPERINTENDENT.

F5 FOOTINGS TO BE FOUNDED A MINIMUM OF 200mm INTO NATURAL SOIL WITH MINIMUM ALLOWABLE BEARING CAPACITY AS LISTED ABOVE.

REINFORCEMENT NOTES:

R1. REINFORCEMENT SYMBOLS ARE AS FOLLOW:
N: DEFORMED BARS TO AS/NZS 4671 GRADE D500N;
R: STRUCTURAL GRADE PLAIN BARS TO AS 1302;
SL: SQUARE MESH TO AS/NZS 4671 GRADE D500L;
RL: RECTANGULAR MESH TO AS/NZS 4671 GRADE D500L;
W: HARD DRAWN STEEL WIRES TO AS 1303.

R2. THE LOCATION OF THE REINFORCEMENT IS ABBREVIATED AS FOLLOW:
EW: EACH WAY EF: EACH FACE NF: NEAR FACE
FF: FAR FACE B: BOTTOM T: TOP
BB: BOTTOM BOTTOM (LAID FIRST) TT: TOP TOP (LAID LAST)

R3. REINFORCEMENT IS PRESENTED DIAGRAMMATICALLY AND IS NOT NECESSARILY IN TRUE PROJECTION.

R4. ALL REINFORCEMENT SHALL BE SUPPORTED AND HELD IN POSITIONS TO MAINTAIN THE NOMINATED COVER BY APPROVED CHAIRS, SPACERS OR TIES.

R5. THE REINFORCEMENT SHALL NOT BE CUT, BENT OR HEATED ON SITE WITHOUT PRIOR APPROVAL FROM THE QUALITY MANAGER.

R6. THE REINFORCEMENT SHALL NOT BE WELDED WITHOUT PRIOR APPROVAL FROM THE QUALITY MANAGER.

R7. THE REINFORCEMENT SHALL BE FREE FROM LOOSE MILL SCALE, LOOSE RUST, OIL, GREASE AND OTHER NON-METALLIC COATINGS WHICH WOULD REDUCE THE BOND TO THE CONCRETE.

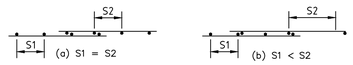
R8. REINFORCEMENT SHALL BE SECURED IN POSITION BY TIE WIRE OF ANNEALED STEEL HAVING A DIAMETER OF NOT LESS THAN 1.2mm. BARS MUST BE TIED AT ALL INTERSECTIONS. THE ENDS OF BARS FORMING A LAPPED SPLICE SHALL BE WIRED TOGETHER IN AT LEAST TWO PLACES.

R9. SPLICE LENGTHS IN BARS SHALL BE AS FOLLOW:

N12: 500mm N16: 700mm N20: 900mm

R10. HORIZONTAL REINFORCING BARS IN CONCRETE FOOTINGS AND MASONRY WALLS SHALL BE BENT AND LAPPED AT ALL CORNERS.

R11. A LAPPED SPLICE FOR WELDED WIRE FABRIC SHALL BE MADE SO THAT THE TWO OUTERMOST TRANSVERSE WIRES OF ONE SHEET OF FABRIC OVERLAP THE OUTERMOST TRANSVERSE WIRE OF THE SHEET BEING LAPPED.



LAPPED SPLICED FOR MESH

LOCATION	GRADE (MPa)	MAX AGGREGATE (mm)	SLUMP
FOOTINGS, INTERNAL SLABS ON GROUND	N25	20	80±15
EXTERNAL SLABS	N25	20	80±15
STRIP FOOTING	N25	20	80±15

	COVER (mm)			
	TOP	BOTTOM	SIDES EXTERNAL	SIDES INTERNAL
SLAB INTERNAL	30	40	-	-
SLAB EXTERNAL	40	40	40	40
FOOTINGS WITHOUT DAMP PROOF MEMBRANE	40	40	40	-
FOOTINGS WITH DAMP PROOF MEMBRANE	-	40	40	-

STAINLESS STEEL & GALV GREASE DETAIL

SS1. WHEN USING STAINLESS STEEL BOLTS OR OTHER FITTINGS WITH GALVANISED PLATES / STEEL MEMBERS, THE BOLTS MUST BE GREASED WITH A LITHIUM, MOLYBDENUM OR LANOLIN GREASE(NON GRAPHITE GREASE) AND A NEOPRENE SEPARATION WASHER USED

CONTAMINATED SOIL NOTES

CS1. EXCAVATED MATERIAL MUST BE ASSESSED FOR CONTAMINATION AND MANAGED ACCORDING TO THE INDUSTRIAL WASTE RESOURCE GUIDELINES IWRG621 FROM THE EPA.

CS2. CONTAMINATED SOIL LOW LEVEL AS DESCRIBED BY THE EPA PUBLICATION 448 CAN BE DISPOSED OF AT THE MILDURA LANDFILL LOCATED ON ONTARIO AVENUE, FOLLOWING THE EPA WASTE DISCHARGE LICENCE NO HS1302. HIGHER CONTAMINATED SOILS MUST BE TREATED OR STABILISED AS REQUIRED BY THE EPA.

CS3. CONTAMINATED SOIL CONTAINING ASBESTOS CAN ALSO BE DISPOSED OF AT THE MILDURA LANDFILL FOLLOWING EPA WASTE DISCHARGE LICENCE NO HS1302 AND THE CORRESPONDING HEALTH AND SAFETY CONSIDERATIONS.

CS4. VEHICLES SHALL USE A WHEEL CLEANING FACILITY TO PREVENT CONTAMINATED MATERIALS LEAVING THE SITE.

CS5. CONTAMINATED MATERIALS SHOULD BE COVERED BY APPROVED MATERIAL AFTER DEPOSITION.

CS6. CONTRACTOR TO FOLLOW BEST PRACTICE ENVIRONMENTAL MANAGEMENT SITING, DESIGN, OPERATION AND REHABILITATION OF LANDFILLS, EPA PUBLICATION 788.1, SEPTEMBER 2010 WHEN DISPOSING MATERIALS IN THE LANDFILL.

ASBESTOS

A1. ALL ASBESTOS WHICH REQUIRES REMOVAL OR DISTURBANCE AS PART OF THE CONSTRUCTION WORKS SHALL BE REMOVED BY AN ACCREDITED ASBESTOS REMOVALIST REGISTERED WITH THE OCCUPATIONAL HEALTH AND SAFETY AUTHORITIES.

A2. EXISTING CONSTRUCTION MAY CONTAIN ASBESTOS CONTAMINATED PRODUCTS. MATERIALS THOUGHT TO CONTAIN ASBESTOS MUST BE INSPECTED BY A CERTIFIED INSPECTOR CAPABLE OF SAMPLING FOR THE EXISTENCE OF ASBESTOS. WORKS SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT WORKSAFE REGULATIONS AND DISPOSED OF IN ACCORDANCE WITH CURRENT REGULATIONS.

PROTECTION OF TREES

TR1 ALL EXISTING TREES ARE TO BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. REFER TO LANDSCAPE ARCHITECT SPECIFICATION.

OH&S NOTES

OH1. THE CONTRACTOR SHALL CHECK FOR CONTAMINANTS PRIOR TO ENTERING DRAINAGE SYSTEM.

OH2. THE CONTRACTOR SHALL INTRODUCE MANUAL HANDLING PROCEDURES PRIOR TO CONSTRUCTION AND MAINTENANCE WORKS.

OH3. THE CONTRACTOR SHALL INTRODUCE SAFE MAINTENANCE PROCEDURES PRIOR TO UNDERTAKING MAINTENANCE WORKS ON THE ASSETS.

OH4. THE CONTRACTOR SHALL UNDERTAKE WORKS IN ACCORDANCE WITH THE RELEVANT CONFINED SPACE STANDARDS AND REGULATIONS WHERE APPROPRIATE.

OH5. CONTRACTOR SHOULD EXERCISE EXTREME CARE WHEN WORKING IN THE VICINITY OF UNDERGROUND AND OVERHEAD POWER INFRASTRUCTURE IN ACCORDANCE WITH RELEVANT LEGISLATIVE REQUIREMENTS.

OH6. PRIOR TO COMMENCEMENT OF WORKS ON SITE THE CONTRACTOR SHALL ENSURE THAT ALL MATTERS RELATING TO THE OCCUPATIONAL HEALTH AND SAFETY HAVE BEEN COMPLIED WITH.

OH7. AT THE COMPLETION OF THE WORKS, ALL RUBBISH, DEBRIS AND SURPLUS MATERIALS SHALL BE REMOVED AND THE SITE SHALL BE CLEARED TO THE SATISFACTION OF THE SUPERINTENDENT.

OH8. CONTRACTOR SHALL PROVIDE FENCING TO ALL OPEN EXCAVATION.

OH9. ALL EXCAVATIONS DEEPER THAN 1.5m SHALL BE SHORED IN ACCORDANCE WITH OHS REQUIREMENTS AND LEGISLATION.

OH10. IT IS NOT GUARANTEED THAT ALL SERVICES HAVE BEEN SHOWN ON THE DRAWINGS, CONTRACTOR TO UNDERTAKE A DBYD BEFORE THE COMMENCEMENT OF WORKS

OH11. MAKE ALL NECESSARY REPAIRS TO EXISTING SERVICES AND INFRASTRUCTURE TO AN 'AS GOOD AS NEW

OH12. THESE DRAWINGS ARE A SCHEMATIC REPRESENTATION OF SERVICES INFORMATION CONTAINED IN DRAWINGS ISSUED BY THE RELEVANT AUTHORITIES.
THE INFORMATION CONTAINED IN THESE DRAWINGS IS INDICATIVE ONLY, AND REFERENCE SHOULD BE MADE TO THE RELEVANT AUTHORITIES DOCUMENTATION TO CONFIRM ACCURACY AND COMPLETENESS.
WHERE INFORMATION IS AVAILABLE, THE SUB-SURFACE SERVICES INSTALLED BY CONTRACTORS OTHER THAN THE AUTHORITIES HAVE BEEN SHOWN, BUT ADDITIONAL UNDOCUMENTED SERVICES MAY BE PRESENT. SHOULD THE CONTRACTOR BELIEVE THAT SUB-SURFACE SERVICES ARE AT RISK OF DAMAGE DURING CONSTRUCTION, THE CONTRACTOR SHOULD NOTIFY THE RELEVANT AUTHORITIES AND ESTABLISH THE EXACT LOCATION OF THE SERVICES.

STRUCTURAL STEELWORK NOTES:

S1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 4100.

S2. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, STEEL MATERIALS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 2 OF AS 4100 AND CLAUSE 1.5 OF AS 4600 AS FOLLOW:

GRADE 300 FOR HOT-ROLLED STEEL MEMBERS (UB, UC, TFB, PFC, EA, UA) TO AS 3679.1
GRADE C350 FOR HOLLOW SECTIONS TO AS 1163

GRADE 250 FOR ALL CONNECTING PLATES TO AS 3678

S3. BOLTS NOT DESIGNATED SHALL BE GRADE 8.8/S BOLTS TO AS 1252 TIGHTENED TO A SNUG TIGHT FIT. BOLTS DESIGNATED 4.6/S SHALL BE COMMERCIAL GRADE STEEL BOLTS TO AS 1111 AND AS 1112 TIGHTENED TO A SNUG FIT. WASHERS SHALL BE INSTALLED UNDER BOLT HEADS AND NUTS.

S4. ALL BOLTS, WASHERS AND NUTS SHALL BE SUPPLIED HOT-DIPPED GALVANISED TO AS 1214. INTERNAL THREADS SHALL BE TAPPED AFTER GALVANIZING AND OILED FOR CORROSION PROTECTION. GALVANISED BOLTS SHALL NOT BE RECUT.

S5. HOLDING DOWN BOLTS SHALL BE RIGIDLY TIED TOGETHER PRIOR TO INSTALLATION TO ENSURE CORRECT BOLT LOCATIONS AND SET OUT USING A 3mm STEEL TEMPLATE SUPPLIED BY THE FABRICATOR.

S6. BOLT HOLE SIZE SHALL BE AS FOLLOW:
BOLT DIAMETER PLUS 2mm FOR STEEL TO STEEL CONNECTIONS.
BOLT DIAMETER PLUS 4mm FOR STEEL TO CONCRETE CONNECTIONS.
BOLT DIAMETER PLUS 6mm FOR HOLDING DOWN BOLTS.

S7. WELDING SHALL BE PERFORMED BY AN EXPERIENCED OPERATOR IN ACCORDANCE WITH AS 1554.

S8. EXCEPT WHERE OTHERWISE SHOWN WELDS TO BE 6 mm CONTINUOUS FILLET AND SHALL BE STRUCTURAL PURPOSE (SP) WELDS. WELD ELECTRODES SHALL BE CLASS B-E49XX UNLESS SHOWN OTHERWISE. BUTT WELD SHALL BE FULL STRENGTH COMPLETE PENETRATION BUTT WELD, DENOTED F.S.B.W ON DRAWINGS. EXTENT OF WELD INSPECTION TO BE AS PER THE PROJECT SPECIFICATION.

S9. UNLESS SHOWN OTHERWISE MINIMUM BOLTED STRUCTURAL CONNECTION SHALL BE 10mm PLATE WITH 2M16 8.8/S BOLTS.

S10. UNLESS SHOWN OTHERWISE STRUCTURAL MEMBERS SHALL BE CONCENTRIC AT CONNECTIONS (GRAVITY OR GAUGE LINES TO INTERSECT).

S11. THE ENDS OF ALL TUBULAR MEMBERS ARE TO BE SEALED WITH NOMINAL THICKNESS PLATES AND CONTINUOUS FILLET WELD UNLESS OTHERWISE SHOWN.

S12. BASE PLATES SHALL BE GROUTED USING APPROVED HIGH STRENGTH NON SHRINK GROUTS BEFORE COLUMNS ARE LOADED.

S13. THE STRUCTURAL STEELWORK SHALL BE MADE SAFE DURING ERECTION AGAINST WIND AND ALL ERECTION STRESSES AND LOADING CONDITIONS INCLUDING THOSE DUE TO ERECTION EQUIPMENT.

S14. BEFORE FABRICATION IS COMMENCED THE CONTRACTOR SHALL SUBMIT COPIES OF THE SHOP DRAWINGS TO THE QUALITY MANAGER FOR REVIEW. REVIEW DOES NOT INCLUDE CHECKING OF DIMENSIONS. FABRICATION SHALL NOT BE COMMENCED UNTIL THE SHOP DRAWINGS ARE REVIEWED AND APPROVED.

S15. UNLESS OTHERWISE SPECIFIED STEELWORK SHALL BE PROTECTED AGAINST CORROSION AS FOLLOWS:
- INTERNAL STEELWORK (NOT EXPOSED TO WEATHER): SAND BLAST CLEAN CLASS 2.5 AND SHOP PAINTED WITH APPROVED ZINC RICH PRIMER, 75 MICRONS DFT.

ALL OTHER STEEL TO BE HOT DIPPED GALVANISED TO AS4680, TO THE FOLLOWING COATING THICKNESS:
- EXTERNAL STEELWORK Z300
- BELOW SURFACE, GALVANISE & DENSO TAPE WRAP
- LINTELS IN MASONRY WALLS, GALVANISE Z300

S16. DAMAGE TO GALVANISED COATING SHALL BE CARRIED OUT BY POWER TOOL CLEANING TO AS 1627.2, OR IF INACCESSIBLE, BY HAND TOOL CLEANING TO AS 1627.7, FOLLOWED BY SOLVENT CLEANING/DEGREASING TO AS 1627.1 AND THE APPLICATION OF TWO COATS OF AN ORGANIC ZINC-RICH PRIMER EACH 50 MICRONS DRY FILM THICKNESS OVERLAPPING SOUND METALLIC ZINC.

S17. ON-SITE WELDING SHALL BE CLEANED OF ALL SLAG AND SCALE, GIVEN ONE COAT OF AN APPROVED INORGANIC ZINC SILICATE PRIMER AND THEN TWO COATS OF "GALVAFROID" PAINT OR APPROVED EQUIVALENT.

S18. ALL ROOF AND WALL ROD 'X' BRACES TO BE TENSIONED.

S19. WHEN DISTANCE BETWEEN UNDERSIDE OF PURLINS AND TOP OF BEAM/TRUSS EXCEEDS 100mm, USE 75x8 EA, AS CLEAT.

TEMPORARY BRACING:

TE1 THE DOCUMENTED DESIGN IS FOR THE PERMANENT CONDITION ONLY AND DOES NOT SPECIFICALLY CATER FOR THE INTERIM ARRANGEMENTS DURING CONSTRUCTION AND ERECTION UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE AND ANY ADJACENT STRUCTURES IN A SAFE AND STABLE CONDITION AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR IS TO ENGAGE A QUALIFIED AND SUITABLY EXPERIENCED ERECTION ENGINEER TO REVIEW AND APPROVE THE CONTRACTORS CONSTRUCTION METHODOLOGY AND TO PROVIDE THE DESIGN OF ANY TEMPORARY WORKS (SUCH AS PROPPING AND TEMPORARY BRACING) TO SUIT THE CONTRACTORS CONSTRUCTION SEQUENCE AND METHODOLOGY. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS AND DRAWINGS TO THE SUPERINTENDENT UPON REQUEST AS EVIDENCE THAT A SAFE ERECTING METHODOLOGY HAS BEEN PUT FORWARD.

SHEET SIZE A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.
-	-	-	-	-

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
SURVEYED:
SURVEY DATE:
APPROVED / PROJECT LEADER
-

PUBLIC UTILITIES:
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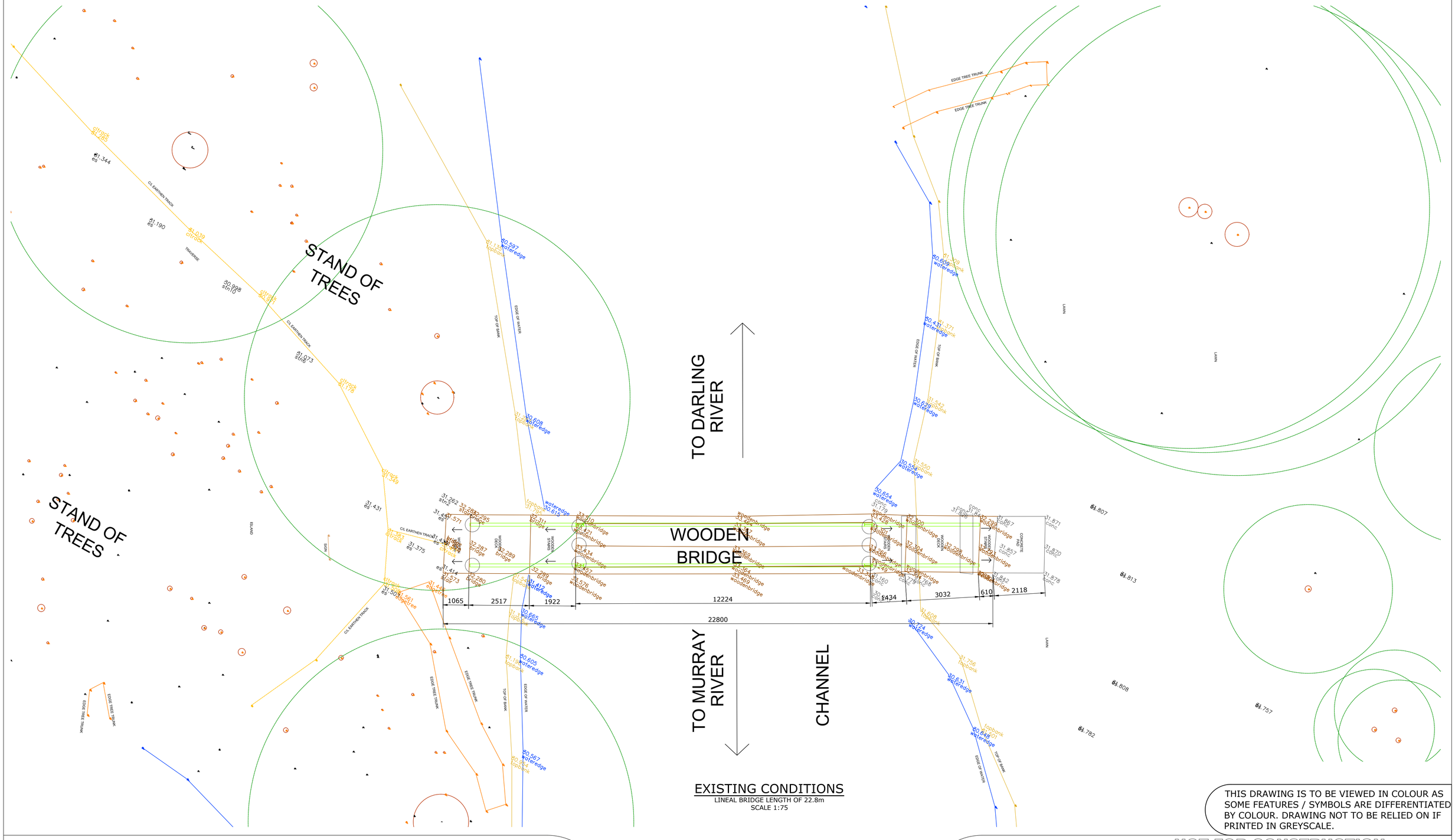
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
GENERAL NOTES

FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	01	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A1.DWG -01- (06-05-22 4:54:47PM)



EXISTING CONDITIONS

LINEAL BRIDGE LENGTH OF 22.8m
SCALE 1:75

THIS DRAWING IS TO BE VIEWED IN COLOUR AS SOME FEATURES / SYMBOLS ARE DIFFERENTIATED BY COLOUR. DRAWING NOT TO BE RELIED ON IF PRINTED IN GREYSCALE.

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
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A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
SURVEYED:
SURVEY DATE:
APPROVED / PROJECT LEADER
-

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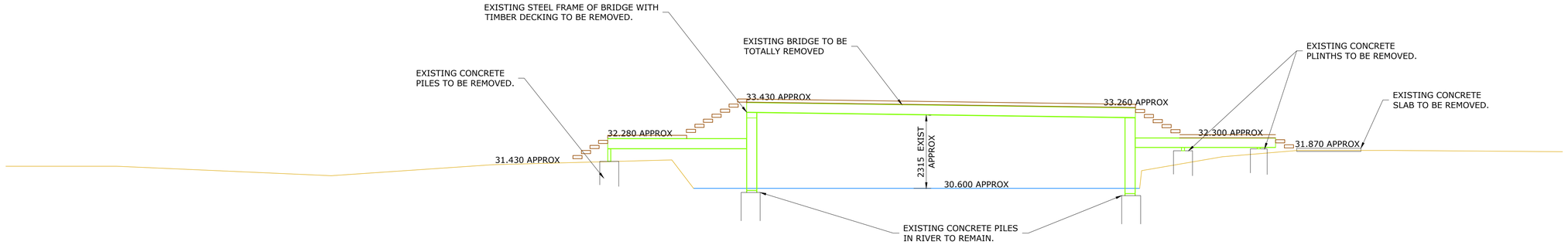
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
FOOTING PLAN

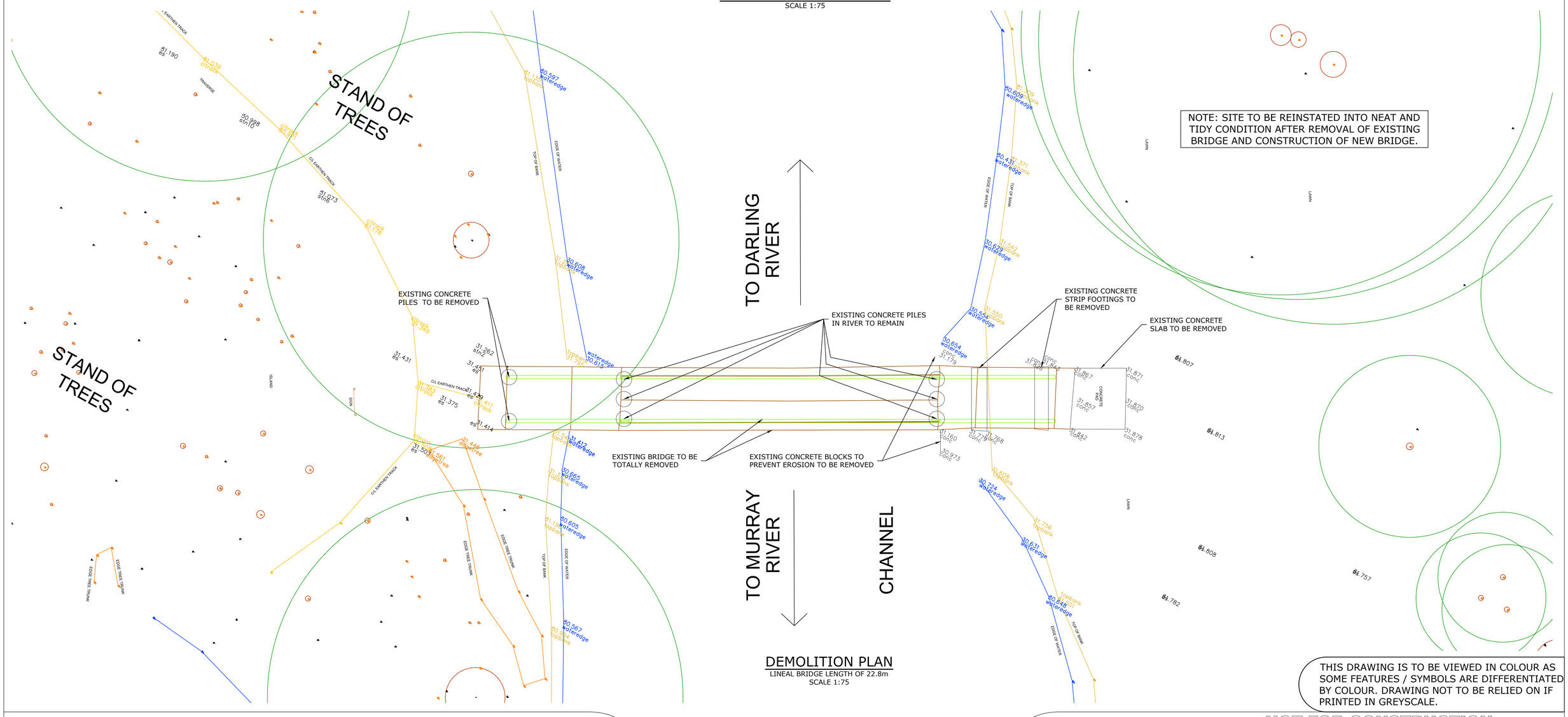
FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	02	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -02- (06-05-22 4:54:50PM)



DEMOLITION ELEVATION
SCALE 1:75



DEMOLITION PLAN
LINEAL BRIDGE LENGTH OF 22.8m
SCALE 1:75

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SHEET SIZE A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

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COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
SURVEYED:
SURVEY DATE:
APPROVED / PROJECT LEADER: -

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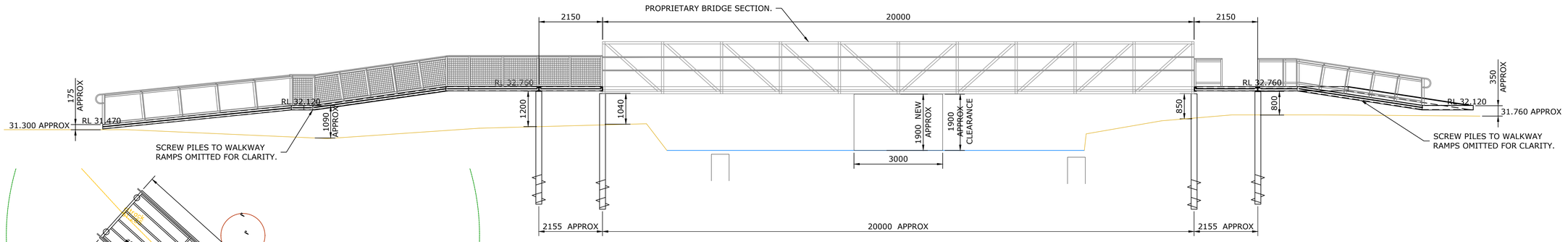
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
DEMOLITION PLAN

FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	03	A

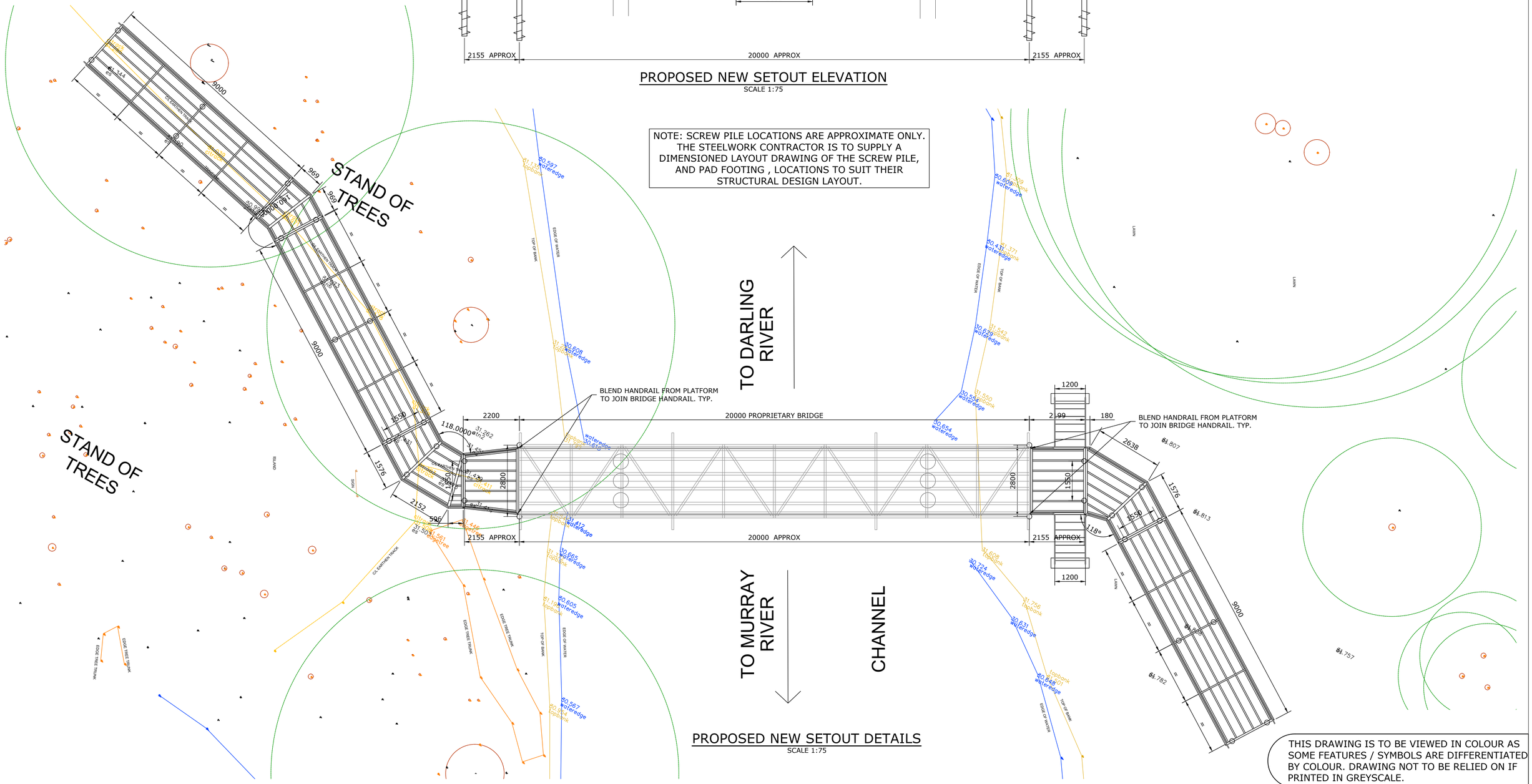
T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -03- (06-05-22 4:54:53PM)



PROPOSED NEW SETOUT ELEVATION

SCALE 1:75

NOTE: SCREW PILE LOCATIONS ARE APPROXIMATE ONLY. THE STEELWORK CONTRACTOR IS TO SUPPLY A DIMENSIONED LAYOUT DRAWING OF THE SCREW PILE, AND PAD FOOTING , LOCATIONS TO SUIT THEIR STRUCTURAL DESIGN LAYOUT.



PROPOSED NEW SETOUT DETAILS

SCALE 1:75

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SHEET SIZE A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
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A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.

COORDS: MGA94 ZONE 53
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SCALE:
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APPROVED / PROJECT LEADER
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WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
SETOUT DETAILS

FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	04	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -04- (06-05-22 4:54:56PM)

FOOTING SCHEDULE

MARK	SIZE	LOADS VERTICAL	LOADS LATERAL	REMARKS
SP1	BY CONTRACTOR	70kN	15kN	SCREW PILE
SP2	BY CONTRACTOR	172kN	60kN	SCREW PILE
SP3	BY CONTRACTOR	65kN OR 60kN UPLIFT	30kN	SCREW PILE
PF1	400W x 600D x 1500L 4-N12 BARS TOP & BOTTOM N10 LIGS @ 500 CTS.	N/A	N/A	PAD FOOTING

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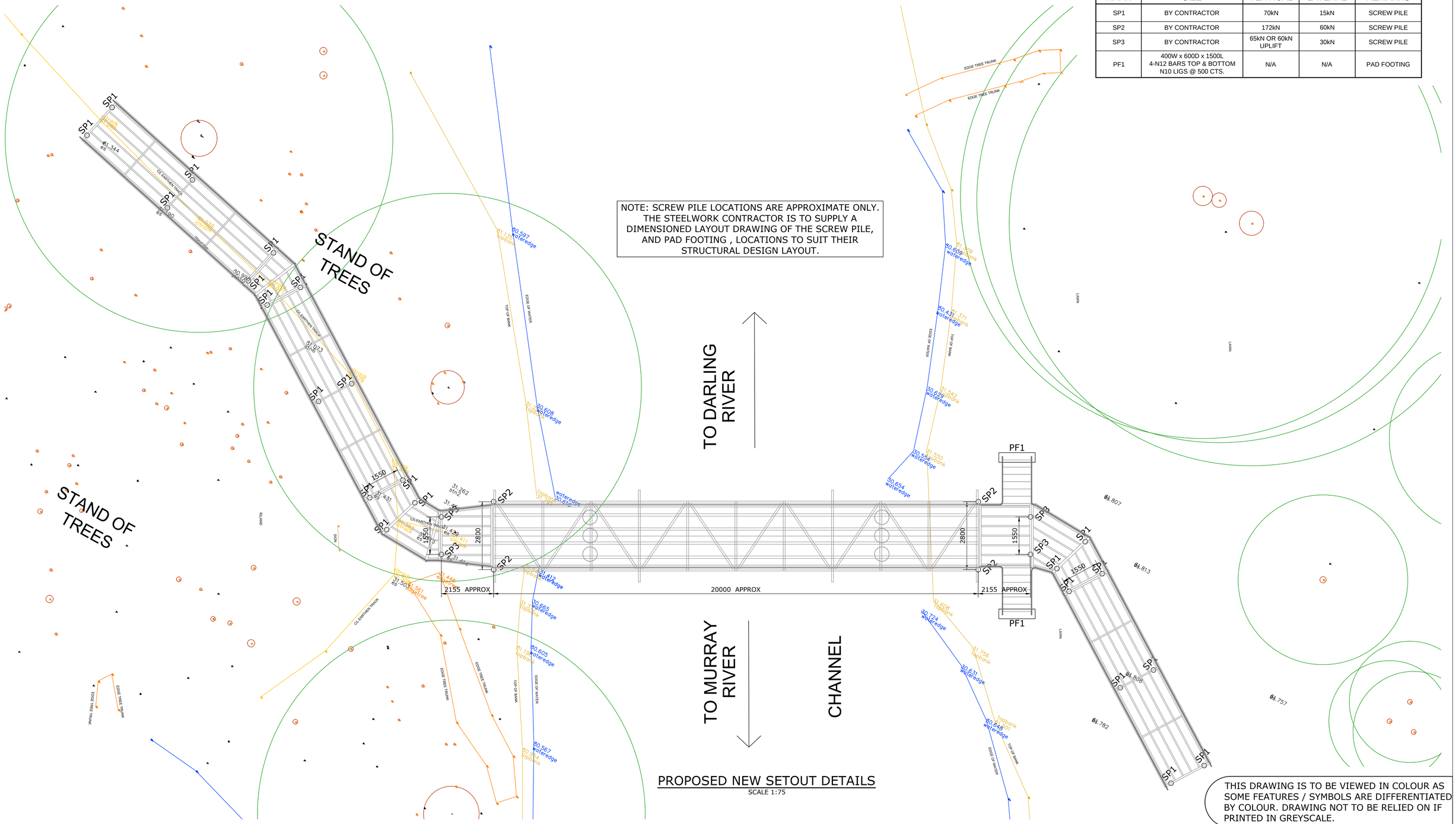

PROPOSED NEW SETOUT DETAILS

SCALE 1:75

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SHEET SIZE A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

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A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.

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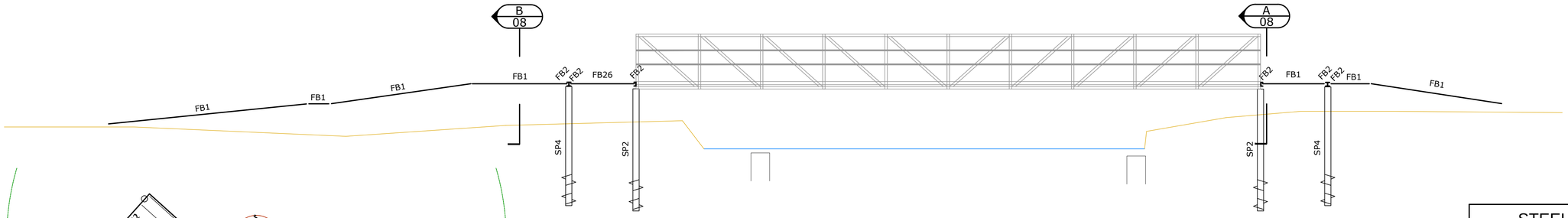
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE JUNCTION ISLAND, WENTWORTH. NSW FOOTING PLAN LAYOUT

FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	05	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A1.DWG -05- (06-05-22 4:54:59PM)



PROPOSED NEW SETOUT ELEVATION

SCALE 1:75

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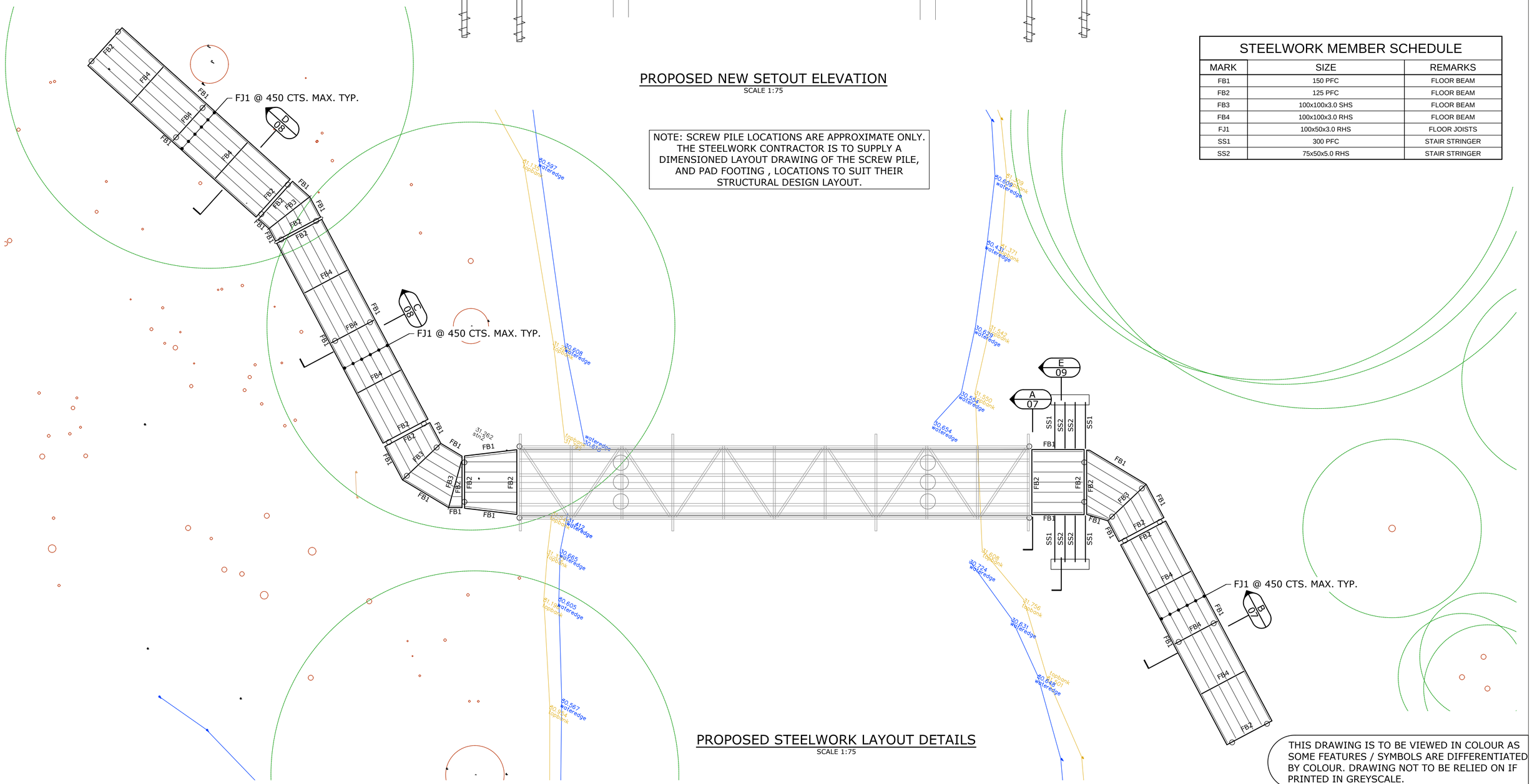
STEELWORK MEMBER SCHEDULE

MARK	SIZE	REMARKS
FB1	150 PFC	FLOOR BEAM
FB2	125 PFC	FLOOR BEAM
FB3	100x100x3.0 SHS	FLOOR BEAM
FB4	100x100x3.0 RHS	FLOOR BEAM
FJ1	100x50x3.0 RHS	FLOOR JOISTS
SS1	300 PFC	STAIR STRINGER
SS2	75x50x5.0 RHS	STAIR STRINGER



PROPOSED STEELWORK LAYOUT DETAILS

SCALE 1:75

THIS DRAWING IS TO BE VIEWED IN COLOUR AS SOME FEATURES / SYMBOLS ARE DIFFERENTIATED BY COLOUR. DRAWING NOT TO BE RELIED ON IF PRINTED IN GREYSCALE.

SHEET SIZE A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
-	-	-	-	-
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
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SURVEY DATE:
APPROVED / PROJECT LEADER
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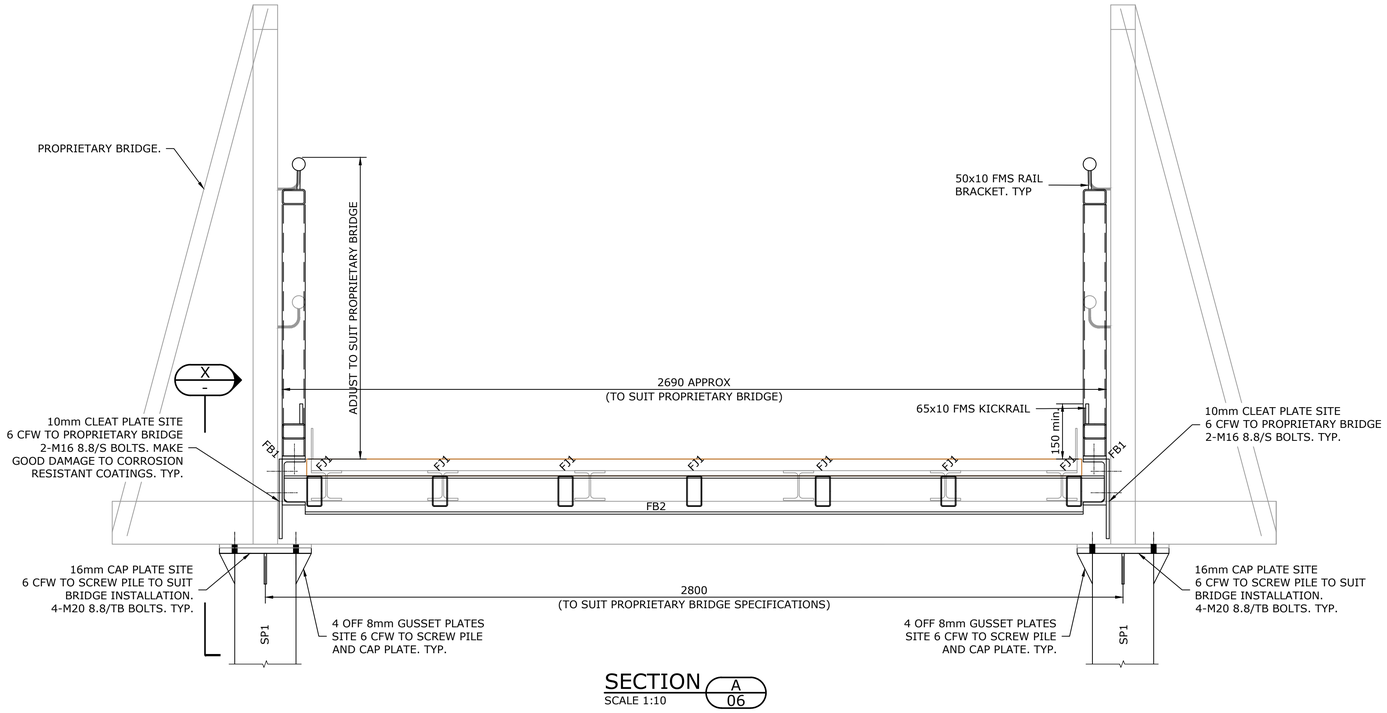
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
STEELWORK LAYOUT PLAN

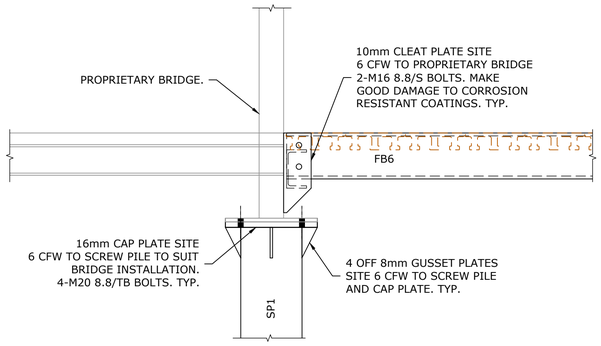
FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	06	A

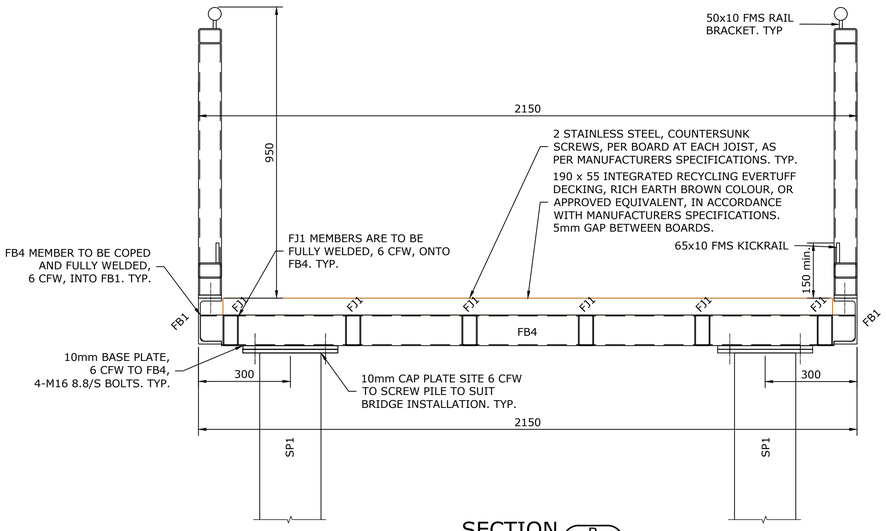
T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -06- (06-05-22 4:55:01PM)



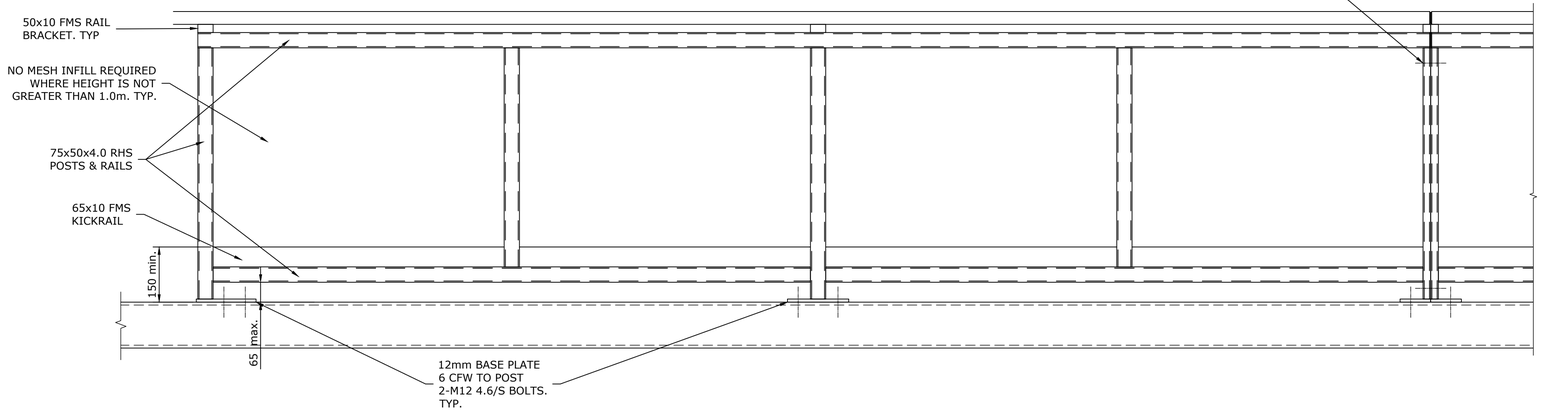
SECTION A / 06
SCALE 1:10



SECTION X / -
SCALE 1:10



SECTION B / 06
SCALE 1:10



TYPICAL HANDRAIL CONSTRUCTION ON RAMPS LEADING UP TO BRIDGE
SCALE 1:10

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.
-	-	-	-	-

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
SURVEYED:
SURVEY DATE:
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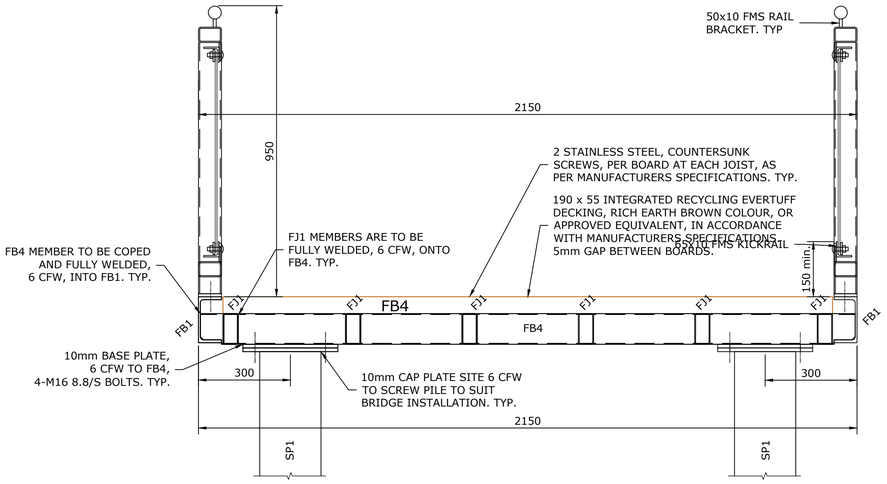
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
RAMP SECTIONS AND HANDRAIL DETAILS

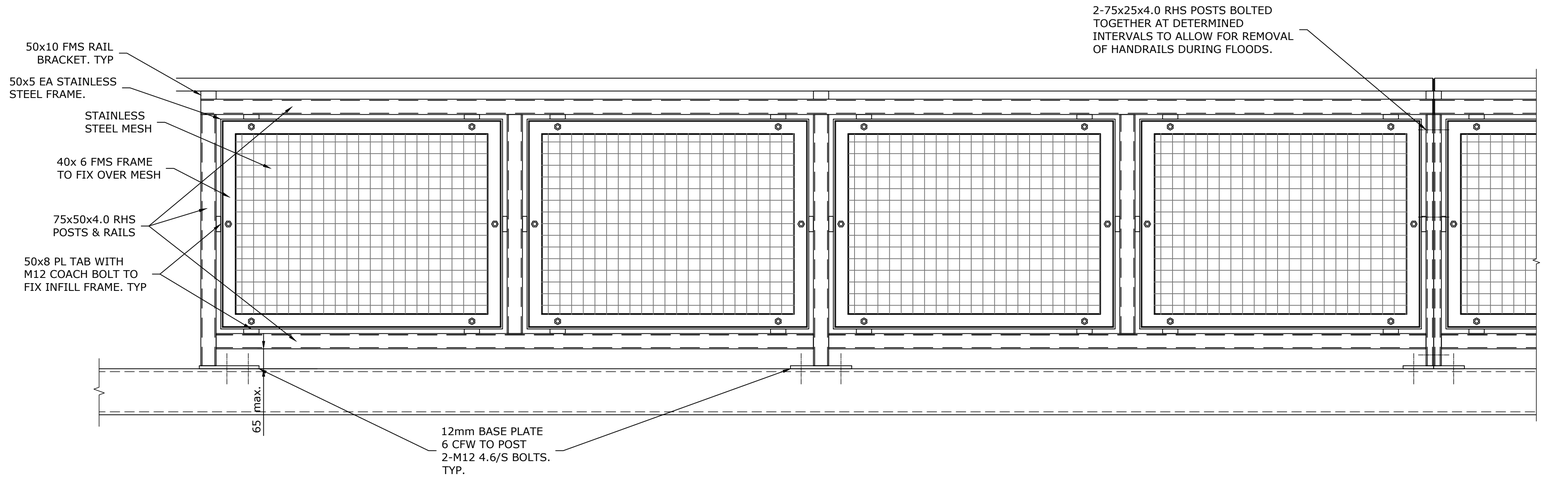
FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	07	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -07- (06-05-22 4:55:05PM)

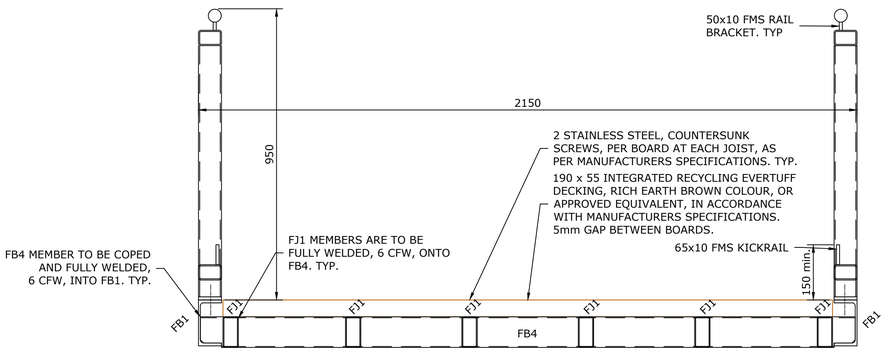


SECTION C
SCALE 1:10

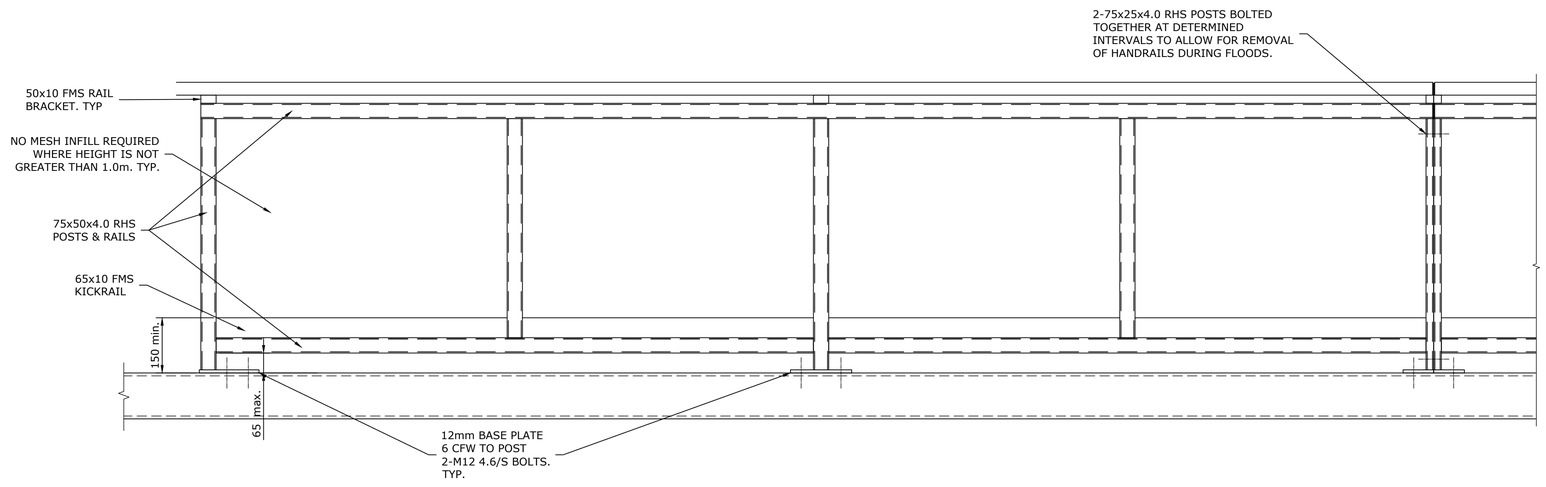


HANDRAIL CONSTRUCTION ON WESTERN RAMPS LEADING UP TO BRIDGE AT HEIGHT GREATER THAN 1.0m

SCALE 1:10



SECTION D
SCALE 1:10



TYPICAL HANDRAIL CONSTRUCTION ON RAMPS LEADING UP TO BRIDGE

SCALE 1:10

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.
-	-	-	-	-

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
SURVEYED:
SURVEY DATE:
APPROVED / PROJECT LEADER
-

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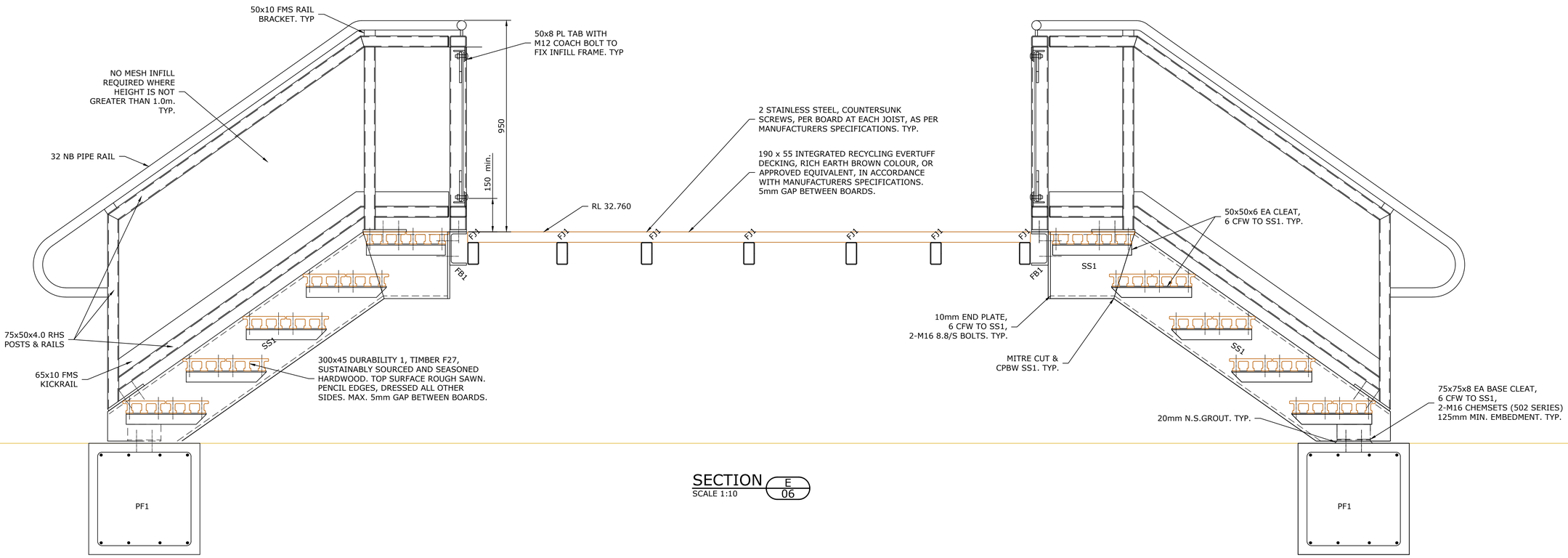
WENTWORTH SHIRE COUNCIL

PROPOSED NEW BRIDGE
JUNCTION ISLAND, WENTWORTH. NSW
RAMP SECTIONS AND HANDRAIL DETAILS

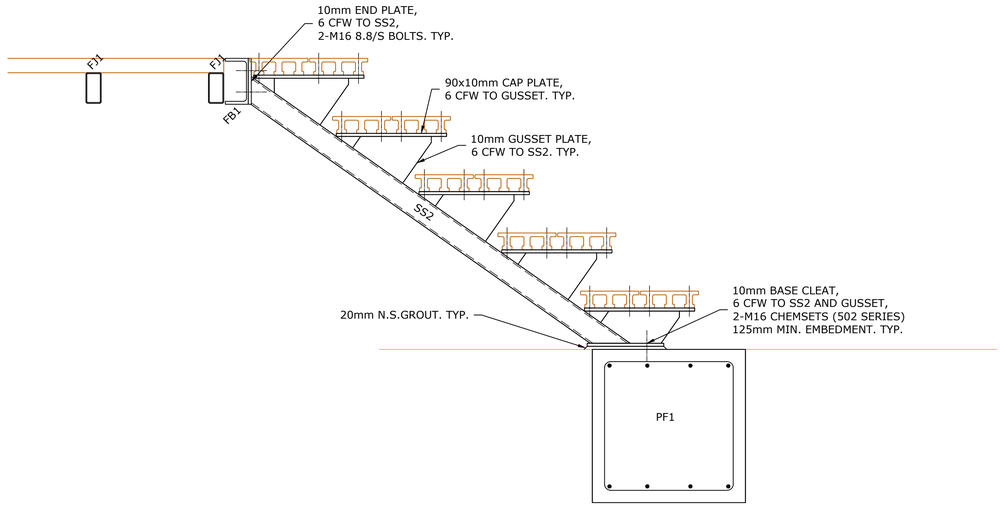
FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	08	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -08- (06-05-22 4:55:09PM)



SECTION E
SCALE 1:10
06



SECTION THROUGH INTERMEDIATE STAIR STRINGER SS2
SCALE 1:10

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.
-	-	-	-	-

COORDS: MGA94 ZONE 53
DATUM: ALL LEVELS TO A.H.D.
SCALE:
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SURVEY DATE:
APPROVED / PROJECT LEADER
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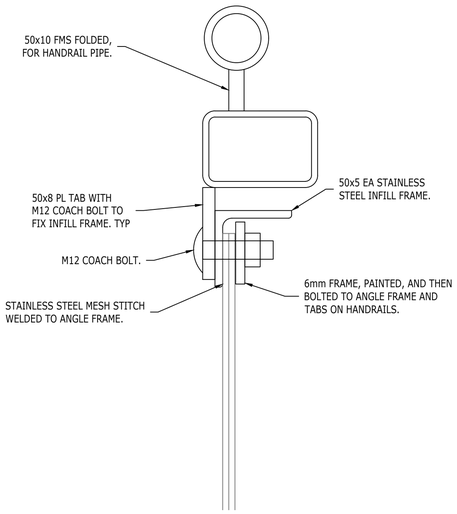
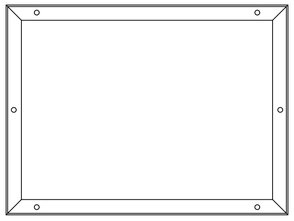
FILENAME: 212579 [A].DWG
PROJECT NUMBER: 212579
DRAWING NUMBER: 08
REVISION: A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -09- (06-05-22 4:55:11PM)



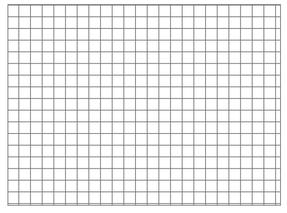
CONSTRUCTION OF INFILL FRAME AND FIXING TO HANDRAILS

SCALE 1:10



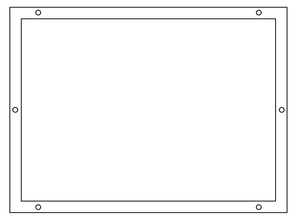
50x5 EA STAINLESS STEEL INFILL FRAME

SCALE 1:10



STAINLESS STEEL MESH TO BE STITCH WELDED TO ANGLE INFILL FRAME

SCALE 1:10



6mm MILD STEEL FRAME, PAINTED, AND THEN TO BE BOLTED TO ANGLE INFILL FRAME AND TABS ON HANDRAIL

SCALE 1:10

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.	
					COORDS: MGA94 ZONE 53
					DATUM: ALL LEVELS TO A.H.D.
					SCALE:
					SURVEYED:
					SURVEY DATE:
-	-	-	-	-	APPROVED / PROJECT LEADER
A	PRELIMINARY ISSUE	05.05.22	A.S.	N.G.A.	-

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HANDRAIL CONSTRUCTIONS DETAILS

FILENAME: 212579 [A].DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
212579	08	A

T:\2021\212579 JUNCTION ISLAND BRIDGE ABUT AND ACCESS R - WENTWORTH SHIRE COUNCIL\4 WORKING\1 CAD\212579 [A].DWG -10- (06-05-22 4:55:14PM)