Statement of Environmental Effects: Bridge over Talywalka Creek

greenedge environmental

Teryawynia Station, via Ivanhoe, NSW

Business name	Green Edge Environmental P/L
ABN	18 654 533 712
Postal address	c/o Springton Post Office, Springton SA 5235
Principle Point of contact	Chris Alderton
Email and Mobile	chris@geenvironmental.com.au 0438 345 109

Rev	Purpose of document	Author	Reviewer	Issue date
A	Internal review	C. Alderton	L. Alderton	8 February 2022
B	For client comment	C. Alderton	C. Alderton	9 February 2022
0	For lodgement	C. Alderton	C. Alderton	13 February 2022

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 The proposal

1.1 Locality

This Statement of Environmental Effects (SEE) has been prepared to support a development application for a bridge over the Talywalka Creek on Teryawynia Station, Ivanhoe NSW 2836. The application is accompanied by design plans.

The proposed is located on Teryawynia Station, via Ivanhoe, approximately 83km north-east of Menindee. Access to the proposed site is via Menindee-Wilcannia Road an existing gravel farm track; approximately 22km from the Menindee-Wilcannia Road (refer to Appendix A).

The subject allotment is known as Teryawynia Station and is legally described as 3995 in DP 766468. The lot is located within the Central Darling Shire Council (CDSC) Local Government Area, the site is zoned RU1 – Primary Production zone under the Central Darling Local Environmental Plan 2012.

The land is held under Western Lands Lease (WLL) 7829 by Semi-Arid Ag Pty Ltd, managed by the company director Jack Palmer, and is predominately used for grazing by domestic livestock.

1.2 Objective of the proposal

The objective of this proposal is to install a small pre-constructed bridge over the Talywalka Creek, which splits the station in two (refer Appendix G). The project is required so the landholders can continue to manage livestock at time of high flow in the Darling River, which causes the Talywalka Creek to become inundated and impassable, stranding livestock on an island.

The proposed development has the following characteristics (refer Table 1).

Table 1: Site details

Name	Address	Lot and DP	Zoning	Minimum lot size	Waterway
Teryawynia Station	Teryawynia Road Ivanhoe 2878	Lot 3995 DP 766468	RU1- Primary Production:	2,000ha	Talywalka Creek, Darling River Catchment

1.3 Description of the development

The proposed location is at an existing low-level earthen crossing of the Talywalka Creek. Excavation of the bed of the creek will occur to facilitate the installation of the concretion foundation. Bridge approaches will be constructed, and the pre-constructed bridge deck will be craned into place.

The development is small in scale in an existing cross of the Talywalka Creek.

1.4 Site lay out plans

The site layout is presented in Appendix A, all mapping coordinates are GDA 1994, MGA Zone 54.

1.5 Site preparation

Site preparation for the proposed development will consist of:

- formally marking the proposed development areas (including 'no go' zones) using flagging or bunting. No vehicles or machinery will traverse up or down the creek
- levelling the existing low-level track
- excavation and concreting of footings and bridge approaches.

1.6 Infrastructure considerations

The bridge will be permanent infrastructure. No temporary infrastructure will be required to facilitate the development. No other facilities, car parking, storage etc are required on site.

1.7 Rehabilitation

Rehabilitation will ensure excavations within the creek are stable and resistant to erosion. The small scale of the works in an existing modified area ensures a small rehabilitation footprint.

1.8 Previous and existing operations

The site is a current low-level earthen creek crossing.

1.9 Timeline

The proposed life of the bridge is 50 years. The proposed timeline for installation is with 2022 and will take approximately four (4) weeks to construct.

1.10 Consideration of the alternatives and justification

All viable alternatives have been considered, including:

- Building a low-level concrete forward crossing
- Building a new bridge from scratch on site
- Continuing to drive around the existing low-level crossing at times of inundation, or a 190km round trip.

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

- will utilise existing tracks
- utilise existing disturbed area in the creek
- the bridge deck is existing and just needs to be installed
- a concrete forward crossing would be more expensive due the large amount of concrete required, and still does not provide access during high flows
- is small scale and provides the best environmental outcome.

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 SEE has been prepared by Green Edge Environmental on behalf of Semi-arid Ag who are the proponents. A Development Application (DA) will be lodged with the consent authority, CDSC under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Environmental Planning and Assessment Act

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 proposal requires approval under Part 4 of the EP&A Act and is permissible with the consent of council under the Central Darling Local Environmental Plan 2012.

Table 2: Section 79C of EP&A Act- matters for consideration

Matters for Consideration	Section where addressed
(a) The provisions of: i. Any environmental planning instrument, and ii. Any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority, and iii. Any development control plan, and iv. Any planning agreement that has been entered into under Section 93F, or any draft planning agreement that a developer has offered to enter into under Section 93F, and v. The regulations (to the extent that they prescribe matters for the purposes of this paragraph, That apply to the land	Section 2
(b) The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality	Section 4
(c) The suitability of the site for development	Section 4
(d) Any submissions made in accordance with this Act or the regulations	Noted
(e) The public interest	Noted

2.2 Legal permissibility

The CDSC is the consent authority to which this SEE will be lodged. The proposed location is in western New South Wales.

2.2.1 Crown Land Management Act 2016

New South Wales Department of Planning, Industry and Environment (DPIE) – Crown Lands are the licensing authority western lands leases. Under Division 5.6 of the *Crown Land Management Act 2016,* an existing WLL is in place covering the works areas, therefore no licence application is required, but landowners' consent is required from the Department prior to lodging a DA.

2.2.2 Local Lands Services Act 2013

The objects of this Act are as follows:

(a) to establish a statutory corporation with responsibility for management and delivery of local land services in the social, economic and environmental interests of the State in accordance with any State priorities for local land services

(b) to establish a governance framework to provide for the proper and efficient management and delivery of local land services

(c) to establish local boards for the purpose of devolving management and planning functions to regional levels to facilitate targeted local delivery of programs and services to meet community, client and customer needs

(d) to require decisions taken at a regional level to take account of State priorities for local land services

(e) to ensure the proper management of natural resources in the social, economic and environmental interests of the State, consistently with the principles of ecologically sustainable development (described in section 6 (2) of the Protection of the Environment Administration Act 1991)

(f) to apply sound scientific knowledge to achieve a fully functioning and productive landscape,

(g) to encourage collaboration and shared responsibility by involving communities, industries and non-government organisations in making the best use of local knowledge and expertise in relation to the provision of local land services

(h) to establish mechanisms for the charging of rates, levies and contributions on landholders and fees for services

(i) to provide a framework for financial assistance and incentives to landholders, including, but not limited to, incentives that promote land and biodiversity conservation.

Part 5A deals with Land Management (Native Vegetation), which is not relevant to the project as no native vegetation is proposed to be removed. The project does not impact on a Travelling Stock Route (TSR), so no formal concurrence is required of the LLS is required.

2.2.2 Biodiversity Conservation Act 2016

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 Assessment 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. An Assessment of Significance was conducted to characterise the significance of any potential impacts within Appendix D 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 (BOS). In this case the BOS is **not** triggered as:

- No native vegetation will be cleared, therefore does not exceed the area threshold
- the area is mapped on the Biodiversity Values (BV) Map published by the Environment Agency Head, but the development within areas on the BV Map does not involve clearing native vegetation (including groundcover, trees and understorey plants) or a prescribed impact (as set out in clause 6.1 of the Biodiversity Conservation Regulation 2017) within the mapped area, the Biodiversity Offsets Scheme (BOS) i**s not applied** based on the BV Map.

- However, the proponent must also consider other criteria for the BOS:
    - whether the area of native vegetation clearing in areas not on the BV Map exceeds the clearing area thresholds as specified in clause 7.2 of the Biodiversity Conservation Regulation 2017
    - whether the proposed development or activity is likely to significantly affect threatened species, or ecological communities or their habitats based on the test of significance in section 7.3 of the BC Act (Appendix D).

2.2.3 Fisheries Management Act 1994

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

- Any work that involves excavating water land; or
- 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; or

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

The proposal is likely to involve minor excavation of bank and bed of the Talywalka Creek and thus 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.

Section 4 of the SEE includes an assessment of the impacts of the proposed development.

2.2.4 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (NPW Act), administered by the DPIE - 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 4.11).

2.2.5 Heritage Act 1977

The *Heritage Act 1977* identifies and protects heritage items, administered by the NSW Office of Environment and Heritage. 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 listed on the State Heritage Register are located within the immediate vicinity of the proposal.

2.2.6 Water Management Act 2000

The objectives of the *Water Management Act (2000)* 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 Act 2000 (WM Act) is administered by the Department of Primary Industries (DPI). Under Part 3, Chapter 3, an application for a controlled activity approval for works on waterfront land will be applied for in conjunction with the DA process.

2.2.7 Protection of the Environment Operations Act 1997

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.

2.2.8 Environmental Protection and Biodiversity Conservation Act 1999

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 (NES) require approval from the Commonwealth Minister for Environment and Heritage. Matters of NES 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 Local environmental plans

Central Darling Local Environmental Plan (LEP) 2012

The site is located within the Central Darling local government area and as such the Central Darling LEP 2012 applies. Applicable sections of the LEP include:

Cultural Heritage Conservation

Clause 5.10 of the LEP specifies the requirements of the consent authority in relation to impacts on areas of cultural and heritage significance. The proposed works will not impact upon any known cultural heritage sites (refer to Section 4.7).

Biodiversity Conservation

Clause 1.2 of the LEP, aims of the plan:

(2) The particular aims of this plan are as follows:

(a) to encourage the proper management of the natural and human-made resources of Central Darling by protecting, enhancing or conserving:

(i) productive agricultural land, and

(ii) timber, minerals, soil, water and other natural resources, and

(iii) areas of significance for nature conservation, and

(iv) areas of high scenic or recreational value, and

(v) places and buildings of archaeological or heritage significance,

(b) to promote ecologically sustainable urban and rural development,

(c) to provide a secure future for agriculture by expanding Central Darling's economic base and minimising the loss or fragmentation of productive agricultural land.

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 flood function and behaviour on the land, taking into account projected changes as a result of climate change,

(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,

(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.

(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—

(a) is compatible with the flood function and behaviour on the land, and

(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and

(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and

(d) incorporates appropriate measures to manage risk to life in the event of a flood, and

(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—

(a) the impact of the development on projected changes to flood behaviour as a result of climate change,

(b) the intended design and scale of buildings resulting from the development,

(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,

(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.

(4) A word or expression used in this clause has the same meaning as it has in the Considering Flooding in Land Use Planning Guideline unless it is otherwise defined in this clause.

The proposed development has been designed to not impact flood flows or cause flooding impacts in other areas. The design plans in Appendix B show the finished height above maximum flood flows.

Earthworks

(1) The objective of this clause is 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.

(2) Development consent is required for earthworks unless—

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

(b) the earthworks are ancillary to development that is permitted without consent under this Plan or to development for which development consent has been given.

(3) Before granting development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters—

(a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,

(b) the effect of the development on the likely future use or redevelopment of the land,

(c) the quality of the fill or the soil to be excavated, or both,

(d) the effect of the development on the existing and likely amenity of adjoining properties,

(e) the source of any fill material and the destination of any excavated material,

(f) the likelihood of disturbing relics,

(g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area,

(h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

An assessment of the likely impacts of the proposal is located in Section 4.

2.4 Relevant guidelines

A number of guidelines were consulted during the preparation of this SEE including:

- DPI Fisheries (2013), Policy and guidelines for fish habitat conservation and management. State of New South Wales through Department of Trade and Investment, Regional Infrastructure and Services.
- DPI Water (2013). Controlled Activities on Waterfront Land - Retaining walls on inland waterways. State of New South Wales through the Department of Trade and Investment, Regional Infrastructure and Services.
- DPI Water (2012). Controlled Activities on Waterfront Land - Guidelines for instream works on waterfront land. Department of Primary Industries, a division of NSW Department of Trade and Investment, Regional Infrastructure and Services.

2.5 Zoning

Under the Central Darling LEP, the proposed site is zoned ‘primary production zone (RU1).’

The objectives of zone are to:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- To encourage diversity in primary industry enterprises and systems appropriate for the area
- To minimise the fragmentation and alienation of resource lands
- To minimise conflict between land uses within this zone and land uses within adjoining zones

Under this zone, roads are permitted without consent.

Definitions under the *Road Transport Act 2013:*

> "road" means an area that is open to or used by the public and is developed for, or has as one of its main uses, the driving or riding of motor vehicles.
>
> "road infrastructure" includes--
>
> (a) a road, including its surface or pavement, and
>
> (b) anything under or supporting a road or its surface or pavement and maintained by a roads authority, and
>
> (c) any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of a road system or supporting a road, and
>
> (d) any bridge or other work or structure located above, in or on a road and maintained by a roads authority, and
>
> (e) any traffic control devices, railway or tramway equipment, electricity equipment, emergency telephone systems or any other facilities (whether of the same or a different kind) in, on, over, under or connected with anything referred to in paragraphs (a)-(d), and
>
> (f) anything declared by the statutory rules to be included in this definition,

2.6 Designated development

Under Part 4 of the EP&A Act, an Environmental Impact Statement (EIS) is required if the development is 'designated development', a Statement of Environmental Effect (SEE) is required for all other developments. Schedule 3 of the Environmental Planning and Assessment Regulation 2000 lists all development which falls under 'designated development'. As this proposal does not describe works listed in Schedule 3, a SEE is required to be submitted with the development application.

2.7 Integrated development

Under Section 91 of the EP&A Act, development that requires both development consent and one or more listed approvals or licences is 'integrated development'. The proposal is classified as integrated development and the approvals outlined in Table 3.

The EP&A Act provides that, on receipt of the development application (DA) for integrated development, copies of the application must be forwarded by the consent authority to each 'approval body'. These approval bodies will review the DA and SEE and advise the consent authority whether they will grant the relevant approval or licence and the conditions attached.

Table 3: Approvals required for the project

Act	Provision	Approval / concurrence
Environmental Planning and Assessment Act 1979	Part 4- Development Consent	Central Darling Shire
Crown Lands Management Act 2016	Division 5.6	Crown consent required from landowner
Water Management Act 2000	Part 3, Chapter 3	Controlled activity approval
Fisheries Management Act 1999	Section 201	Not required as a CAA will be gained, concurrence from fisheries required.

2.8 Determining authority

The determining authority is the Central Darling Shire Council.

3.0 Location

3.1 Site description

The proposed project area is located within the Talywalka Creek, the waterway itself. The area has been heavily impacted due to a long history of disturbance from recreational activities, grazing and use as a vehicle crossing.

One plant community type (PCT) occurs on site which meet the floristic criteria of the community type, which is:

- Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (PCT13)

3.2 Land systems and geology

The proposed project is located within the Murray Basin Geological province. Quaternary material covers almost all of the area. Quaternary alluvial deposits comprise the riverine plain. Scattered aeolian (windblown) deposits also occur throughout (Cunningham et al 1992).

The Murray Basin is a shallow depression filled with marine and terrestrial sediments to a maximum depth of 600m over the last 50-60 million years. Shallow seas have moved back and forth across the plains several times, leaving traces of parallel beach ridges and limestone sediments under the dunefields. At one stage, the coast reached as far inland as Balranald (OEH, 2011).

The works will occur within the Talywalka Creek, part of the Murray Darling Basin.

3.3 Hydrology and geomorphology

The proposed activity is located within a relatively straight section of the Talywalka Creek. The water within this section is controlled by high flows entering down the Darling River located upstream. The creek only flows a few times each decade and is dry the majority of the time. As the works are minor in nature, they are not expected to impact adversely on the hydrology and geomorphology of the site.

3.4 Soil

Soils in the depositional basin are deep red sands with variable sandy profiles under dunes, and gradational profiles in the sandplains. Most soils have a moderate to high level of calcium carbonate in the profile (ANRA, 2009).

Lowland areas of the Darling River Catchment contain a deep river channel and flat alluvial flood plain. The soils within the Darling River are a mix of vertosols and chromosols (eSpade, 2016).

Vegetation communities on site are linked to soil type. The grey cracking clays of the banks of the Talywalka Creed support River Cooba and Black Box (*Eucalyptus largiflorens*) trees while the wetter bed of the river supports lignum (*Muehlenbeckia florulenta*) and chenopods.

3.5 Climate

The annual average mean temperature recorded from the Menindee Post Office (IDN60801) is 11.4ºC, monthly values varying from 4.1ºC during July to 18.7ºC during January. The annual average maximum temperature is 26 deg C - monthly values vary from 17.1ºC in July to 34.5ºC in January (Bureau of Meteorology, 2019).

The annual rainfall total of 244.3mm is fairly evenly distributed throughout the year, but is more concentrated in the summer and autumn months. The month of October is on average the wettest, receiving 26.3mm (see Table 4). By contrast, the year's driest month, February, receiving only 15mm (Bureau of Meteorology, 2019).

Table 4: Menindee Post Office rainfall data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean monthly rainfall (mm)	26	15	18.3	20.3	20.7	15.4	18.4	18.3	21.8	26.3	20	21.8
Highest monthly rainfall (mm)	165	89.0	233.6	216.3	84.2	77.2	61.6	74.5	136	109.1	129.0	106.1
Lowest monthly rainfall (mm)	0	0	0	0	0	0	0	0	0	0	0	0
Highest daily rain (mm)	75.2	69	129	85.6	53.6	58.4	29	44.5	78.4	48	57	49.8

4.0 Environmental impacts and management

This section outlines the environmental impacts of the proposed works and any mitigation measures that reduce potential impacts.

4.1 Land use

4.1.1 Existing environment

The Darling River Basin has been highly modified through adjacent historical camping and recreation since European settlement. The Talywalka Creek at this location has been used for a long period of time as a track to access the shearing shed and eastern side of the property.

4.1.2 Impact assessment

The proposed bridge construction will cause minor impacts to the banks and bed of the Talywalka Creek and will require minor work on the access track to allow access to the site. As the bridge is prebuilt, once foundations and bridge approaches are formed, the bridge deck will be craned on. All impacts are considered low in nature and can be mitigated by the following measures.

4.1.3 Mitigation measures

- use existing tracks to access the site
- maintain a rubbish free and tidy work area

4.2 Hydrology and geomorphology

The Darling River travels as a deep channel in the flat, dry floodplains of western New South Wales (MDBA, 2019).

The general topography of the catchment is flat, with elevation less than 100m across most of the floodplain area. The low gradient of the land to the north of Menindee means that flood peaks may take a long time to reach the lower Darling. At its confluence with the River Murray, the elevation of the Darling is less than 50m (MDBA, 2019).

River flows in the lower Darling River result from seasonal rainfall and storms in the catchment and upper catchments. Floods generally occur as a result of high rainfall in the northern and eastern catchments of the northern Basin (MDBA, 2019). During floods in the Darling River the Talkywalka Creek flows.

In 1968, the naturally occurring chain of lakes near Menindee on the Darling River were modified by the NSW Government to improve its storage capacity for farming, recreation, mining, urban water supply and to manage Darling River floods. Consequently, the flows through the lower Darling River and the Great Darling Anabranch are highly regulated (MDBA, 2019).

4.2.1 Impact assessment

The following works are proposed:

- Leveling the existing track across the Talywalka Creek
- Excavation of footings
- Construction bridge approaches

The proposed development has been designed to not impact flood flows or cause flooding impacts in other areas. The design plans in Appendix B show the finished height above maximum flood flows.

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

4.2.2 Mitigation measures

- No new creek 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.

4.3 Water quality, erosion and sedimentation

4.3.1 Existing environment

Groundwater in the catchment is contained in the Darling Alluvium (associated with the Darling River) and fractured rock aquifers beneath the Murray and Darling geological basins.

Water quality is variable, depending on the origin of the water. Groundwater quality generally ranges from 25-50,000 (µS/cm) and surface water quality is highly variable and can range into the 1,000's (µS/cm). Under current low to no flow conditions in the Talywalka Creek, minimal sedimentation and erosion is occurring.

4.3.2 Impact assessment

The works will occur when the Creek is dry or on flood recession, water quality will not be impacted. Erosion and sediment will be managed by ensuring excavations are compacted and match in with the existing creek bed and banks.

4.3.3 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 is required

4.4 Soils

4.4.1 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 upstream and downstream banks of the Talywalka Creek.

The project areas contain generally heavy clay soil and the topography of the land system is generally flat.

A search of the NSW EPA Contaminated Land Register (9 February 2022) did not identify any contaminated lands on or adjacent to the project area.

A search of the Australian Soil Resource Information System (ASRIS) was conducted on 9 February 2022, the area of the proposed works is mapped as *Extremely Low Probability of Occurrence* (CSIRO, 2019).

4.4.2 Impact assessment

The proposed works would not pose any major impact to landform or geology. Some soil disturbances would occur during excavation of the foundations and bridge approaches, vehicle and plant access tracks to access the site. 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.

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.

4.4.3 Mitigation measures

- minimising the movement of machinery along the bank, 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 refueling area and all staff would be trained in their use
- Spill containment measures (such as drip trays) to be used when refueling within 40 metres of a waterway is required, 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
- Soil/silt to be removed from the site and legally disposed of as per the NSW waste classification guidelines.

4.5 Flora

4.5.1 Existing environment

The proposed project area is located in the Murray Darling Depression Bioregion and the Darling Riverine Plains - Menindee 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 occur within the works area:

- Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (PCT 13).

Details of this PCT are shown in Table 5.

Table 5: PCT characteristics

PCT	PCT name	Description
13	Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Woodland, open forest or open woodland averaging about 15m tall dominated by a sparse to dense stands of Lignum (*Muehlenbeckia florulenta*), Nitre Goosefoot (*Chenopodium nitrariaceum*) and River Cooba (*Acacia stenophylla*). The ground cover includes low shrubs such as *Sclerolaena muricata var. muricata, Enchylaena tomentosa, Einadia nutans subsp. nutans* and various saltbush species (*Atriplex* spp.). Forb species include *Solanum esuriale, Cotula australis, Oxalis perennans, Alternanthera denticulata* and *Pratia concolor*. Grass species include Warrego Summer Grass (*Paspalidium jubiflorum*), Curly Windmill Grass (*Enteropogon acicularis)* and *Walwhalleya proluta* and wallaby grasses (*Austrodanthonia spp*.). Occurs on clay or clay-loam, often gilgaied, soils on inner floodplains and on alluvial plains mostly in depressions that are frequently flooded. A widespread community along rivers in south-western NSW including the Murray, Wakool, lower Darling, Lachlan, Murrumbidgee Rivers and Willandra Creek. Mainly located in the semi-arid (warm) climate zone in the Riverina and Murray Darling Depression and southern Cobar Peneplain Bioregions.

The project area is mapped as 'Category 2 Vulnerable Regulated Land (as per the Native Vegetation Regulatory Map, refer Appendix A) – rural land where clearing of native vegetation is more restricted than on other Category 2 land. This includes steep and highly erodible lands, riparian land and special category land.

4.5.2 Threatened species

A database search was undertaken on 23 November 2021 of the NSW Department of Planning, Industry and Environment – Environment, Energy and Science (EES) (BioNet Atlas of NSW Wildlife) and the Department of Agriculture, Water and the Environment (AWE) websites to identify threatened species that may be found within the proposed project site as listed under the *Biodiversity Conservation Act 2016* and the *Environmental Protection and Biodiversity Act 1999* (EPBC Act).

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

- NSW EES BioNet Atlas of NSW Wildlife (refer to Appendix C)
- DWE Protected Matters Report (refer to Appendix C).

Seven threatened flora species were identified in an IBRA subregion by habitat search and the Protected Matters Search Tool. Table 6 identifies these species, their threat level, predicted occurrence and a comment on their potential to occur on site. While

some species have the potential to occur at the site, they were not observed on site, and are unlikely to occur under future management scenarios. Only Winged Pepper-cress was subject to the 'assessment of significance', as set out in Section 7.3 of the BC Act (Appendix D).

Table 6: Threatened flora with potential habitat

Scientific name	Common name	Level of threat		Suitable habitat
		State	Federal	
Acacia carneorum	Purple-wood Wattle	V	V	No potential habitat. Grows in grassland and woodland in red, sandy soil; also found in Mulga communities on sand dunes, level sandy sites and alluvial accumulations along watercourses. Not observed on site.
Atriplex infrequens	A saltbush	V	V	*Atriplex infrequens* is associated with broad drainage tracts, clay flats and possibly occasionally inundated habitats. Not observed on site.
Austrostipa metatoris			V	No potential habitat. Grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. Not observed on site.
Calotis moorei	A burr-daisy	E1	E	No potential habitat. The species grows in sandy soil and appears to be associated with Acacia woodlands and chenopod shrublands. Not observed on site.
Lepidium monoplocoides	Winged Pepper-cress		E	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). Not observed on site.
Solanum karsense	Menindee Nightshade	V	V	Potential habitat. 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. Not observed on site.
Santalum murrayanum	Bitter Qunodong	E		Unlikely habitat. Usually grows in mallee communities. Generally grows in gravely and sandy loam soils on dunes, in open woodland and tall shrubland. Also recorded in sand in spinifex-shrub steppe. Not observed on site.

Note V=vulnerable, E/E1=endangered

4.5.3 Threatened communities

The above-mentioned databases were also searched for threatened ecological communities (TEC). Five TEC's were listed:

- Acacia loderi shrublands
- Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions
- Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions

These communities did not occur at the proposed project site or will not be impacted upon by the proposal.

Under the *Fisheries Management Act 1994* (Part 3 of Schedule 4) the following endangered ecological community is listed:

- Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River

Priority actions to improve the habitat of the endangered ecological community include:

- improve fish passage at major regulating structures through existing programs (High priority)
- identify and prioritise the most significant barriers to fish passage within the geographic area of the EEC having regard to relevant existing programs (Medium priority).

Under Schedule 6 of the Act, the installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams is listed as a key threatening process. The proposed project will not alter the natural flow regime or rivers or steams in this area.

4.5.4 Impact assessment

A general flora assessment was conducted across the proposed project site and the surrounding area on 2 December 2021 by Chris Alderton (B App Sci). The two-hour 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, maximum temperature of 30ºC and slight breeze.

One vegetation stratification units occur within the assessment (works footprint) area (Appendix A). Eleven native flora species were observed within the assessment footprint.

The assessment area does form part of a vegetation corridor along the Talywalka Creek, which will not be impacted by the proposed development. Hollow and nest bearing trees were observed within the study area but will not be impacted.

The flora assessment revealed no vegetation species; populations or communities, that are of local, regional or state conservation significance (refer to Table 7).

Table 7: Flora Species recorded on-site

Scientific name	Common name	Threatened / Status
Acacia stenophylla	River Coooba	No
Atriplex holocarpa	Pop saltbush	No
Chenopodium nitrariaceum	Nitre Goosefoot	No
Duma florulenta	Lignum	No
Einadia nutans	Climbing saltbush	No
Enchylaena tomentosa	Ruby saltbush	No
Eucalyptus largiflorens	Black Box	No
Myoporum platycarpum	Sugarwood	No
Sclerolaena dicantha	Poverty bush	No
Sclerolaena divaricata	Pale Poverty Bush	No
Osteocarpum dipterpcarpa	Water weed	No

4.5.5 Mitigation measures

- no new creek bank accesses to be created
- the tree retention zone (12x Diameter at Breast Height) shall be cordoned off and no parking or stockpiling will occur within this zone

4.6 Fauna

4.6.1 Threatened species

A database search was undertaken on 23 November 2021 of the NSW Department of Planning, Industry and Environment – Environment, Energy and Science (EES) (BioNet Atlas of NSW Wildlife) and the Department of Agriculture, Water and the Environment (AWE) websites to identify threatened species that may be found within the proposed project site as listed under the *Biodiversity Conservation Act 2016* and the *Environmental Protection and Biodiversity Act 1999* (EPBC Act).

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

- NSW EES BioNet Atlas of NSW Wildlife (refer to Appendix C)
- DWE Protected Matters Report (refer to Appendix C).

None of these species were recorded during site assessments on 2 December 2021.

Table 8 lists the fauna species with state and national conservation significance that have potential to occur within the study area. The column in Table 8 headed 'comment', identifies if critical habitat will be impacted. Although some habitat preference is available at the proposed works site, none of these will be impacted upon. Two of the

identified species, Chestnut Quail-thrush and Varied Sittella , have been assessed under the ‘test of significance’, as set out in Section 7.3 of the BC Act (refer Appendix D).

Table 8: Listed fauna species

Class	Species name	Common name	State	National	Comment
Reptile	*Strophurus elderi*	Jewelled Gecko	V,P		No potential habitat. Restricted to habitats containing spinifex on red sandy plains or dunes and to a lesser extent stony hills. Spinifex may occur as a dominant groundcover with little to no overstorey vegetation or in association with mallee, cypress pine or acacia woodlands.
Reptile	Lerista xanthura	Yellow-tailed Plain Slider	V,P		No potential habitat. Known only from two locations in NSW. Occurs on grassed alluvial sands and sand dunes, including dry open woodlands and spinifex-dominated red sand plains. The species is fossorial and usually found in loose soil or sand beneath stones, logs and other surface debris.
Reptile	*Cyclodomorphus melanops elongatus*	Mallee Slender Blue-tongue Lizard	E1		No potential habitat. In NSW, animals inhabit mallee/spinifex communities on a sandy or mixed sand/gravel substrate (plains, ridges or hillslopes). It is assumed that the species seeks refuge in vegetation clumps such as spinifex and in fallen timber and leaf litter.
Reptile	*Tiliqua occipitalis*	Western, Blue-tongued Lizard	V,P		No potential habitat. Inhabits plains, swales, ranges and sometimes dunes of loamy or clayey/sandy soils vegetated by woodlands, especially mallee, shrublands (including chenopods), heaths or hummock grasslands. Preferred vegetation type appears to be mixed mallee/Triodia communities
Aves	*Cinclosoma castanotum*	Chestnut Quail-thrush	V,P		Potential habitat. Throughout its distribution it occurs in a wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine. However, in NSW it seems to occur almost exclusively in mallee habitats, with understorey dominated by spinifex, chenopods or other shrubs including Acacia species.
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		Potential habitat. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Not observed on site.

Class	Species name	Common name	State	National	Comment
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		Unlikely habitat, prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.
Aves	*Falco hypoleucos*	Grey Falcon	E1,P,2		Potential habitat. 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. But as these habitats will not be impacted and the short duration of the project, no impacts are expected.
Aves	*Falco subniger*	Black Falcon	V,P		Unlikely habitat, distributed but sparsely across NSW.
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	Unlikely habitat, inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans.
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE, Mig	No habitat. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts.
Aves	*Calyptorhynchus banksii samueli*	Red-tailed Black-Cockatoo (inland subspecies)	V,P,2		Unlikely habitat, prefers large hollow bearing River Red Gum habitat, in close proximity to water.
Aves	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		Unlikely habitat. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		No habitat. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground.
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		Unlikely habitat. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very

Class	Species name	Common name	State	National	Comment
					occasionally in moist forest or rainforest
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		Unlikely habitat. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.
Mammal	*Ningaui yvonneae*	Southern Ningaui	V,P		No habitat. Shelters in spinifex clumps, beneath logs, and in dense vegetation, but may also dig its own burrows.
Mammal	*Chalinolobus picatus*	Little Pied Bat	V,P		Potential habitat. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. But as these habitats will not be impacted and the short duration of the project, no impacts are expected.
Mammal	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	Unlikely habitat. 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
Mammal	*Vespadelus baverstocki*	Inland Forest Bat	V,P		Potential habitat. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited by the Little Forest Bat. But as these habitats will not be impacted and the short duration of the project, no impacts are expected.
Gastropoda	*Notopala sublineata*	Darling River Snail	CE*		Potential habitat when water flows. Dry at time of assessment.
Fish	*Bidyanus bidyanus*	Silver Perch	V*	CE	Potential habitat when water flows. Dry at time of assessment.
Fish	*Maccullochella peelii*	Murray Cod		V	Potential habitat when water flows. Dry at time of assessment.
Fish	*Maccullochella macquariensis*	Trout Cod		E	Unlikely habitat found further east.

Class	Species name	Common name	State	National	Comment
Fish	*Ambassis agassizii*	Olive Perchlet	E population*		Potential habitat when water flows. Dry at time of assessment.

Note V=vulnerable, P=protected, E/E1=endangered and E4/CE= critically endangered; Mig= Migratory under EPBC Act/International convention; *listed under the *Fisheries Act 1994*

4.6.2 Impact assessment

A general fauna assessment was conducted across the proposed works area, including nearby areas of intact vegetation and instream habitat, by Chris Alderton (B App Sci). The assessment also focused on the access to the site and surrounding habitats. It was noted that no nests and hollows exist within the area proposed for the activity (only outside of the work footprint).

The fauna assessment revealed no species; population or communities, which are of local, regional or state conservation significance. Three species were assessed for significance (Appendix D), which concluded no further species impact statement (SIS) was required.

The native fauna species that were recorded moving across the site include, Western Grey Kangaroo (*Macropus fuliginosus*) and Galah (*Eolophus roseicapilla*).

4.6.3 Mitigation measures

- ensure sediment fences are in place until the bank is stable, during and following construction
- profiles of threatened species that have potential to inhabit the site will be kept on site

4.7 Heritage

4.7.1 Existing environment

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

A search of Native TitleVision, the National Native Title Tribunal's online mapping database (NNTT, 2019), indicated the following:

- The lot and DP has been extinguished from the Barkandji Traditional Owners #8 (Part A) Native Title Claim NCD2015/001

4.7.2 Impact assessment

A site inspection was conducted on 2 December 2021 by Mark Sloan of the Menindee Local Aboriginal Land Council (Menindee LALC).

The site inspection involved a pedestrian survey which progressed east to west of the proposed site. During the physical survey providing a detailed survey of approximately 100% of the works area. Visibility during the survey was approximately 90% with the poorer areas of visibility being those around the existing groundcover vegetation.

There are mature trees throughout the project area but none of these trees showed any signs of Aboriginal cultural scarring.

No cultural heritage sites were discovered during the onsite inspection.

The assessment did not reveal any areas where conservation activities to protect cultural heritage material are required.

The site is located within the Talywalka Creek, which provides no permanent water supply. The proposed work area did not contain features that the Aboriginal monitor believed warranted further investigation.

An Aboriginal Heritage Information Management System (AHIMS) database search was undertaken of the Lot and DP, with a 1km buffer (refer Appendix E). Thirteen Aboriginal sites were recorded within the search area, which are mapped in Appendix A and will not be impacted.

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. Section 8 of this document provides a flow chart of the due diligence process.

This project has assessed those impacts to any unknown cultural heritage sites of significance is **unlikely**.

As outlined in the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW, a number of assessments and tests have been undertaken to ensure no harm is caused to places of Aboriginal significance.

This code sets out the reasonable and practicable steps that individuals and organisations need to take in order to:

1. identify whether or not Aboriginal objects are, or are likely to be, present in an area
2. determine whether or not their activities are likely to harm Aboriginal objects (if present)
3. determine whether an AHIP application is required.

In following the generic due diligence process, the following processes have occurred (refer to Table 9).

Table 9: Due diligence process

Step	Guide	Response
1a. Will the proposed activity disturb the ground surface or any recorded culturally modified trees?	Review project footprint in relation to the AHIMS search to determine whether the proposed activity will disturb the ground surface or involve vegetation clearance, including lopping.	Yes - **move to step 2a(i)**
2a(i). Search the AHIMS database and determine whether any Aboriginal sites have been recorded in or within 1000 metres of the project area.	If not already undertaken, undertake 'basic' AHIMS search of the project area with a 1,000-metre buffer of the project area Lot and DP. Append AHIMS basic search results ☒	13 sites - **go to step 2a(ii)**
2a(ii). Obtain copies of AHIMS records	If not already undertaken from step 2, undertake 'extensive' AHIMS search of the project area with a 1,000-metre buffer of the project area Lot and DP. Append AHIMS extensive search results ☒ Map project area and all AHIMS results using GDA94 latitude and longitude data.	**Number of Aboriginal objects in the searched area:** 13 Aboriginal sites **In all instances, go to step 2a(iii)**

	If not already undertaken at step 2 above, map AHIMS results and append ☒ Request and review copies of all site cards within the searched area. Append all site cards ☐	
2a(iii). Review other sources of information to determine whether Aboriginal objects are likely to be present in the project area?	If you are aware of other sources of information, you need to use these to identify whether or not Aboriginal objects are likely to be present in the project area. Previous studies ☒ Previous reports☒ Previous archaeological surveys☒ Review relevant Local Environmental Plan, notably Schedule 5 and maps ☒ Other ☐ Append results ☐	**As a result of step 2a(iii), are there likely to be additional Aboriginal objects or areas of Aboriginal cultural heritage sensitivity present in the project area?** **No - go to step 2b** **Describe the expected nature, extent and significance of the Aboriginal objects and/or areas of Aboriginal cultural heritage sensitivity.** Due to the close proximity of the proposed works to the intermittent creek a moderate percentage of expected finds is likely. However due to the high previous disturbance in the area and the minor nature of the works, no additional finds are expected.
2b. Having regard to landscape features, are Aboriginal objects likely to be present in the project area?	Is any part of the proposed activity on land that is not disturbed land and: Within 200 metres of waters? ☒ Within a sand dune system? ☐ On a ridge top, ridge line or headland? ☐ Within 200 metres below or above a cliff face? ☐ Within 20 metres of, or in a cave, rock shelter, or a cave mouth? ☐ Append mapped results ☐	**One box checked and reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the project area - no further due diligence required. Proceed with caution** There are no other features (within 200m of water) present within the project area which are likely to contain Aboriginal Cultural heritage.
3. Can you avoid harm to the object or disturbance of the landscape feature?	Where, as a result of step 2a(i, ii, iii) you think it is likely that there are Aboriginal objects present in the project area, describe whether you can avoid harm to those objects. Where you have checked any boxes in step 2b above, describe whether you can redesign the project area to avoid the landscape feature(s). Append results ☐	The site assessment by the Menindee Local Aboriginal Lands Council did not reveal that any unknown Aboriginal objects would be located due the minor nature or the works and the existing high disturbance.
Step 5. Further investigations and impact assessment	Step 5 must be undertaken by a person with expertise in Aboriginal	No further assessment required.

	cultural heritage management.	

4.7.3 Other cultural heritage

The State Heritage Register (NSW Environment and Heritage) database was used to determine if any areas of historic value were located on or nearby the proposed project site. There are no other known heritage sites within the proposed project area. A search of the Central Darling Local Environment Plan, Schedule 5, for local heritage revealed (Appendix G):

- no listed local heritage items
- no listed state heritage items

Additionally, there are no World Heritage or National Heritage items and/or places within 10 kilometres of proposed work site.

4.7.4 Mitigation measures

- If any Aboriginal object is discovered and/or harmed in, or under the land, while undertaking earthwork activities, the proponent must:
  1. Not further harm the object
  2. Immediately cease all work at the particular location
  3. Secure the area so as to avoid further harm to the Aboriginal object
  4. Notify Heritage NSW as soon as practical on 131555, providing any details of the Aboriginal object and its location
  5. Not recommence any work at the particular location unless authorised in writing by Heritage NSW.
  6. In the event that skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and Heritage NSW contacted.

4.8 Air quality

4.8.1 Existing Environment

The nearest permanent residence and receptor is located approximately 5km of the proposed works site. The nearest public road is approximately 11km east.

4.8.2 Impact assessment

Due to the remoteness of the areas, 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.

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.

4.8.3 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

4.9 Socio and economic

4.9.1 Existing environment

The existing low level earthen crossing is unsuitable during times of flow in the creek. The eastern side of the proposed bridge is cut off from the rest of the property, requiring a 190km return trip to access this area via local roads.

4.9.2 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 proposal will provide benefits to the landholder, through reduced travel times in accessing this area during time of flow in the Talywalka Creek.

4.9.3 Economic assessment

The expected capital expenditure of the upgrade is approximately $100,000, completed by local contractors where possible. This will have important flow on effects to other service providers within the township of Menindee.

4.9.4 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.

4.9.5 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.

4.9.6 Visual impact

The proposed removal will have low visual impact due to it being in a remote area and only minor work being undertaken.

4.9.7 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.

4.10 Transport

4.10.1 Existing environment

The proposed site in within the Talywalka Creek with access via property tracks and the Menindee-Wilcannia Road.

4.10.2 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) between 6.30am and 7.30am. There may be up to three truck movements for the length of the project and the contractor staff will leave the site between 4pm and 6pm each evening. The project is expected to last up to four weeks.

These additional short-term vehicle movements will not impact the existing traffic mix.

4.10.3 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.

4.11 Noise and vibration

4.11.1 Existing environment

The acoustic environment of the proposed site is considered typical for a creek frontage remote farming area. Noise sources that exist within the proposed site are vehicle movements along the track and general farming practices.

4.11.2 Impact assessment

The main source of noise may arise from the use of heavy machinery during construction. Considering the distance of the project area from the nearest residence (receptor) is over 5km 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 10 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 50km away the predicted dB will be below acceptable limits.

Table 10: 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 front end 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 11 indicates the approximate vibration levels that may be expected for various vibration sources (Bassett Acoustics, 2007). Due to the nearest receptor being over 5km away, no vibration is expected due to the large distance between activity and receptor.

Table 11: 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 road way

4.11.3 Mitigation measures

- 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.

4.12 Bushfire hazards

4.12.1 Existing environment

The works area is in a rural environment where existing bushfire hazards exist.

4.12.2 Imapct assessment

Due to the nature of the proposal and the composition of vegetation species at the site, it is highly unlikely that the vegetation would carry a fire. The wide spacing of individual trees and the limited amount of dry matter or grass species present (due to the arid climate, recreation and native and non-native grazing) would not be conducive to the spread of fire.

4.12.3 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.

4.13 Chemical and hazardous substance management

4.13.1 Existing environment

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

4.13.2 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 contactors work practices. Empty containers will be taken off the site and suitably disposed of to landfill or for recycling.

4.13.3 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
- refuelling of small plant would only take place on level ground and in bunded areas which are at a distance no less than 40m from drainage lines and waterways
- spill containment measures (such as drip trays and bunds) to be used where refuelling within 40m of a waterway
- 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.

4.14 Waste minimisation and management

4.14.1 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.*

4.14.2 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.

4.14.3 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
- Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.

4.15 Cumulative environmental impacts

The cumulative environmental impacts of the proposal will be minimal. As stated throughout Section 4, 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 12).

Table 12: Mitigation measures

Issue	Mitigation measure
Land Use	• use existing tracks to access the site • maintain a rubbish free and tidy work area

Issue	Mitigation measure
Hydrology and geomorphology	• no new creek bank accesses to be created • site remediation to ensure loose soils are compacted to match surrounding soils • ensure sediment fences are in place until the bank is stable, during and following construction • a Flood Response Plan is to be developed, which details triggers and measures to be implemented to remove potentially dangerous materials from the worksite area in the event of flooding • 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 are at a distance no less than 40m from drainage lines and waterways • spill containment measures (such as drip trays and bunds) to be used where refuelling within 40m of a waterway
Soil and silt	• minimising the movement of machinery along the bank, 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 where refuelling within 40 metres of a waterway is required. 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
Flora	• no new creek bank accesses to be created • 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 until the bank is stable, during and following construction. • profiles of threatened species that have potential to inhabit the site will be kept on site • Site Environmental Officer to be onsite during instream works to translocate any fauna to a safe location.
Weeds and pests	• The Mesquite trees on the eastern side to be removed carefully and disposed of appropriately to minimise potential for seed to spread • Machinery will be washed down off-site prior to entering the proposed work areas to ensure it is weed free.
Heritage	• if any Aboriginal object is discovered and/or harmed in, or under the land, while undertaking earthwork activities, the proponent must: • 1. Not further harm the object

Issue	Mitigation measure
	• 2. Immediately cease all work at the particular location • 3. Secure the area so as to avoid further harm to the Aboriginal object • 4. Notify OEH as soon as practical on 131555, providing any details of the Aboriginal object and its location • 5. Not recommence any work at the particular location unless authorised in writing by OEH. • 6. In the event that skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and OEH contacted. • Recommendations by the Menindee LALC o the remaining imported rock on either side of the structure to be moved closer to the bank and levelled, to allow access for cultural reasons, under instruction from a Menindee LALC representative o the juvenile River Cooba tree on the town side to be excluded from impact o Cultural heritage monitors to be on site during works
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
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	• 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

Issue	Mitigation measure
	• 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.
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 • refuelling of small plant would only take place on level ground and in bunded areas which are at a distance no less than 40m from drainage lines and waterways • spill containment measures (such as drip trays and bunds) to be used where refuelling within 40m of a waterway • 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 • working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.

5.0 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 13 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 13: 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 hazardous 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

6.0 Conclusion

6.1 Justification for the proposed project

The project has been proposed to ensure the landholder has access to the property during times of flow in the Tallywalka Creek.

This report 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 are required there are processes that need to be followed to allow the works to proceed.

6.2 Principles of ESD

6.2.1 The precautionary principle

This SEE 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 action 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 4.

6.2.2 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.

6.2.3 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 aquatic habitats.

6.2.4 Appropriate valuation of environmental factors

This principle relates to giving monetary values to environmental resources. The proposed works would assist in improving fish passage with other benefits such as recreation and education benefits. These factors ensure that the development would conform to the principles of “ecologically sustainable development”.

6.3 Summary of assessment

This SEE has been prepared in accordance with the provisions of Section 4 of the EP&A Act, taking into account the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

This SEE has considered and assessed these impacts in accordance with the EP&A Regulation and the requirements of the EPBC Act. Based on the assessment contained in this SEE, 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 12.

7.0 References

AHIMS Database, Environment and Heritage (2022)
[Online, accessed 23 November 2021]
http://www.environment.nsw.gov.au/awssapp/login.aspx

ANRA Webster (2009)
[Online, accessed 20 October 2012]
URL: http://www.anra.gov.au/topics/rangelands/overview/nsw/ibra-mdd.html#vegetation

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.

Brodie, R. S. (1994) Menindee Hydrogeological Map (1:250,000 scale). Murray Basin Hydrogeological Map Series. Canberra, Australian Geological Survey Organisation.

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.

Bureau of Meteorology (2019)
[Online, accessed 18 November 2019]
http://www.bom.gov.au/climate/averages/tables/cw_047019.shtml

Cunningham, G.M., W.E. Mulham, P.L. Milthorpe, & J.H. Leigh, (1992). *Plants of Western New South Wales.* Inkata Press, Melbourne.

Cogger, Harold G, (1992). *Reptiles and Amphibians of Australia.* Reed International Books, Sydney.

Costermans, Leon, (1983). *Native Trees and Shrubs of South Eastern Australia*. New Holland Ltd., Sydney.

Cogger, Harold G, (1992). *Reptiles and Amphibians of Australia.* Reed International Books, Sydney.

DECC (2007). Threatened Species Assessment Guidelines
(Online, accessed 19 October 2012]
URL:http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf

Office of Environment and Heritage, (2012). *Threatened Species Assessment Guidelines: The Assessment of Significance*, Department of Environment and Heritage, Sydney.
http://www.environment.nsw.gov.au/threatenedspecies/

DPIE - EES (2020) [Online, accessed 9 May 2020]
http://www.environment.gov.au/biodiversity/threatened/

DPIE - EES (NSW) (2021) BioNet Atlas of NSW Wildlife, [Online, accessed 23 November 2021] http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

eSpadeV2, (DPIE). [Online, accessed 9 February 2022] https://www.environment.nsw.gov.au/eSpade2Webapp#

NSW EPA Contaminated Lands website [Online, accessed 9 February 2022] http://www.epa.nsw.gov.au/prclmapp/searchresults.aspx?&LGA=5550&Suburb=&Notice=&Name=&Text=&DateFrom=&DateTo=

MDBA (2019). [Online, accessed 18 November 2019] https://www.mdba.gov.au/discover-basin/catchments/lower-darling

NNTT, 2022. Native TitleVision, [Online, accessed 9 February 2022] http://nntt.maps.arcgis.com/apps/webappviewer/index.html?id=b221c006ae5d4cabaa1e18099bc11bb9, National Native Title Tribunal, Commonwealth Government of Australia.

NSW State Heritage website [Online, accessed 9 February 2022] http://www.heritage.nsw.gov.au

NSW Department of Environment and Heritage http://www.environment.nsw.gov.au/awssapp/MySearches.aspx

Roads and Maritime Service (2016). Construction Noise and Vibration Guideline. Roads and Maritime Service

Appendix A: Map series

Legend

- Site

N

0 5 10 15 20 25

Kilometers

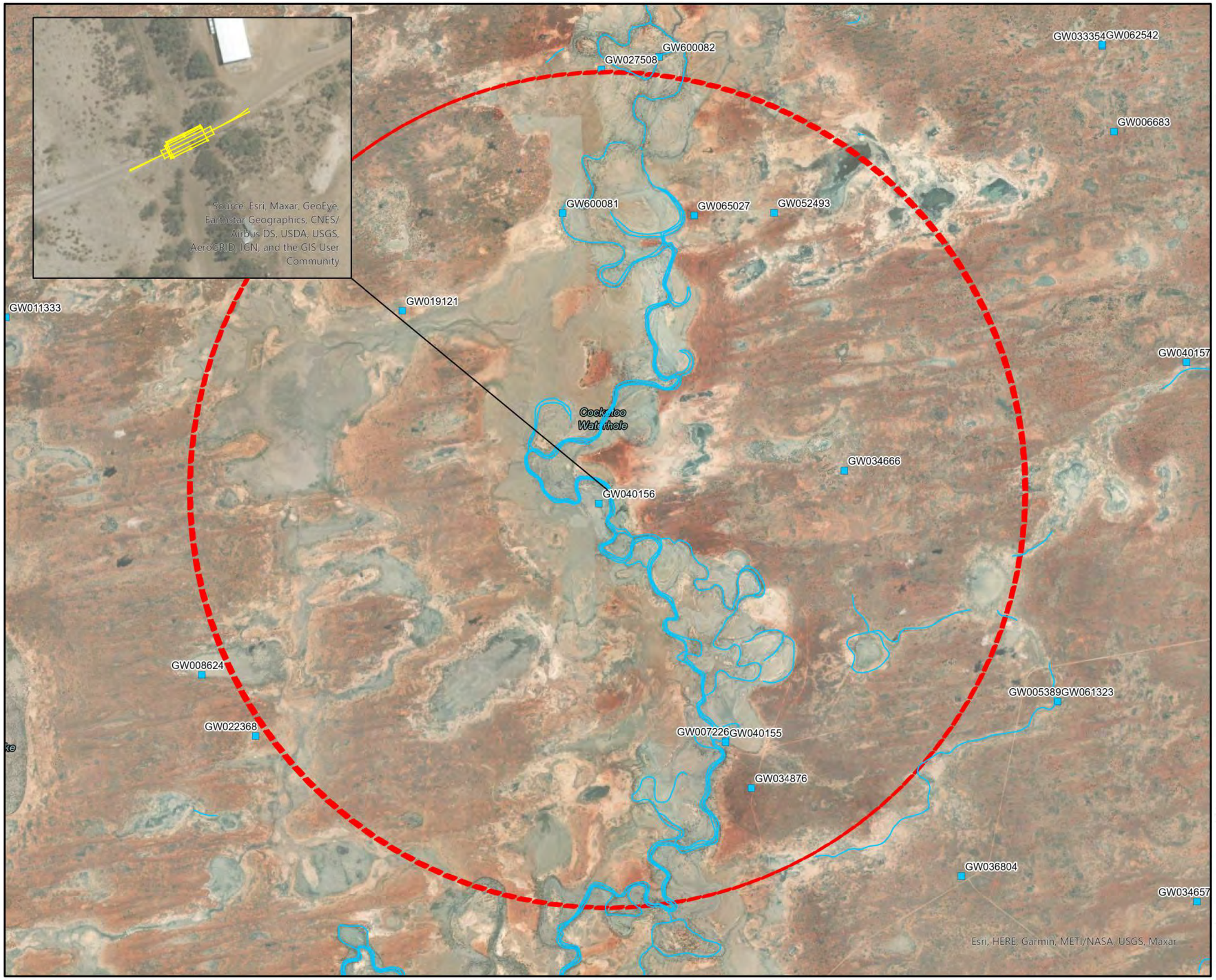
@ A3

GDA 1994 MGA Zone 54

greenedge environmental

Bridge over Talawalka Creek at Tintinollogy Station

Location Map



Legend

- GW Bore
- Bridge Design
- Site Buffer (10km)
- Watercourse

N

0 1 2 3 4

Kilometers

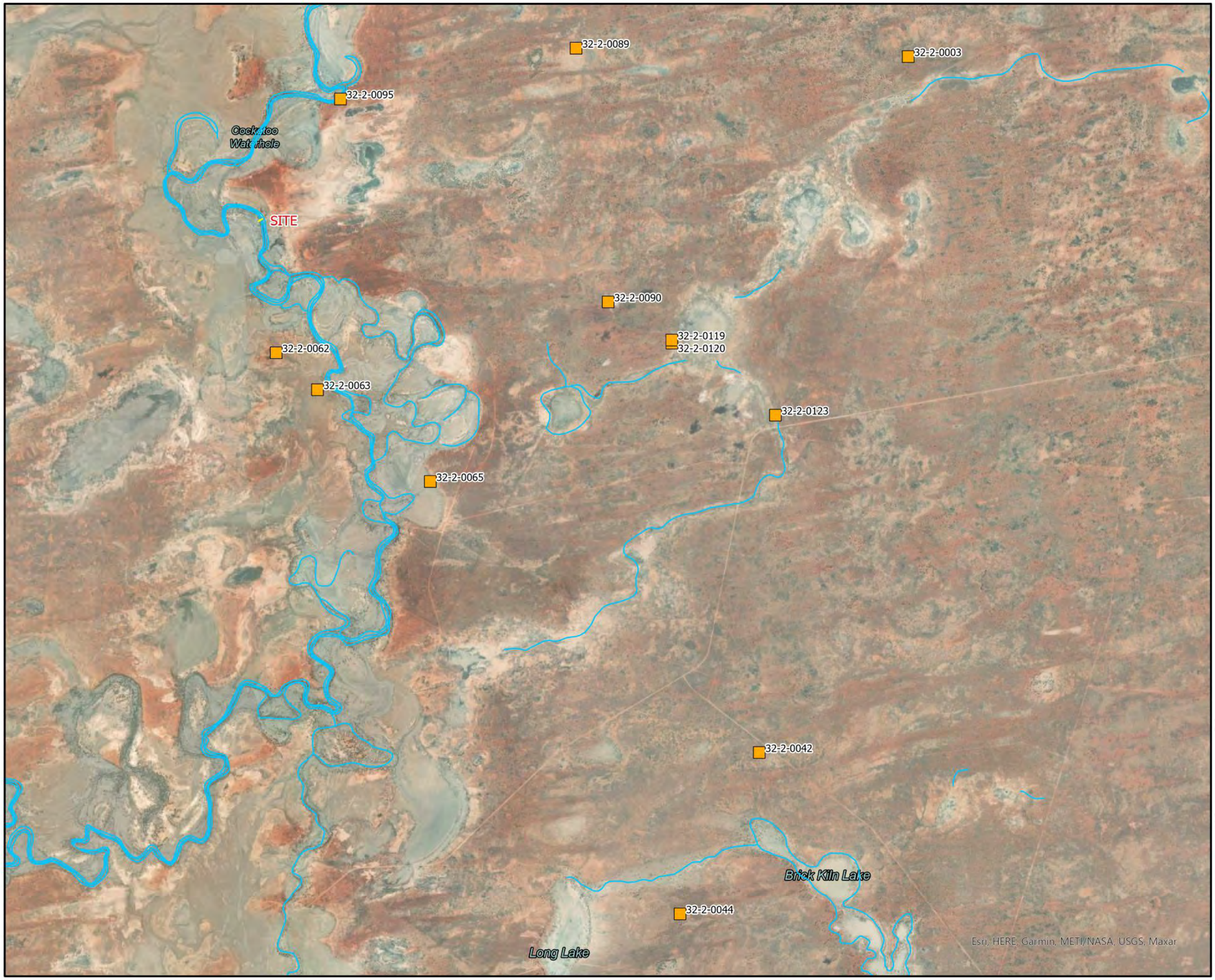
@ A3

GDA 1994 MGA Zone 54

greenedge environmental

Bridge over Talawalka Creek at Tintinollogy Station

Site Map



Legend

- AHIMS Site
- Bridge Design
- Watercourse

N

0 1,000 2,000 3,000 4,000

Meters

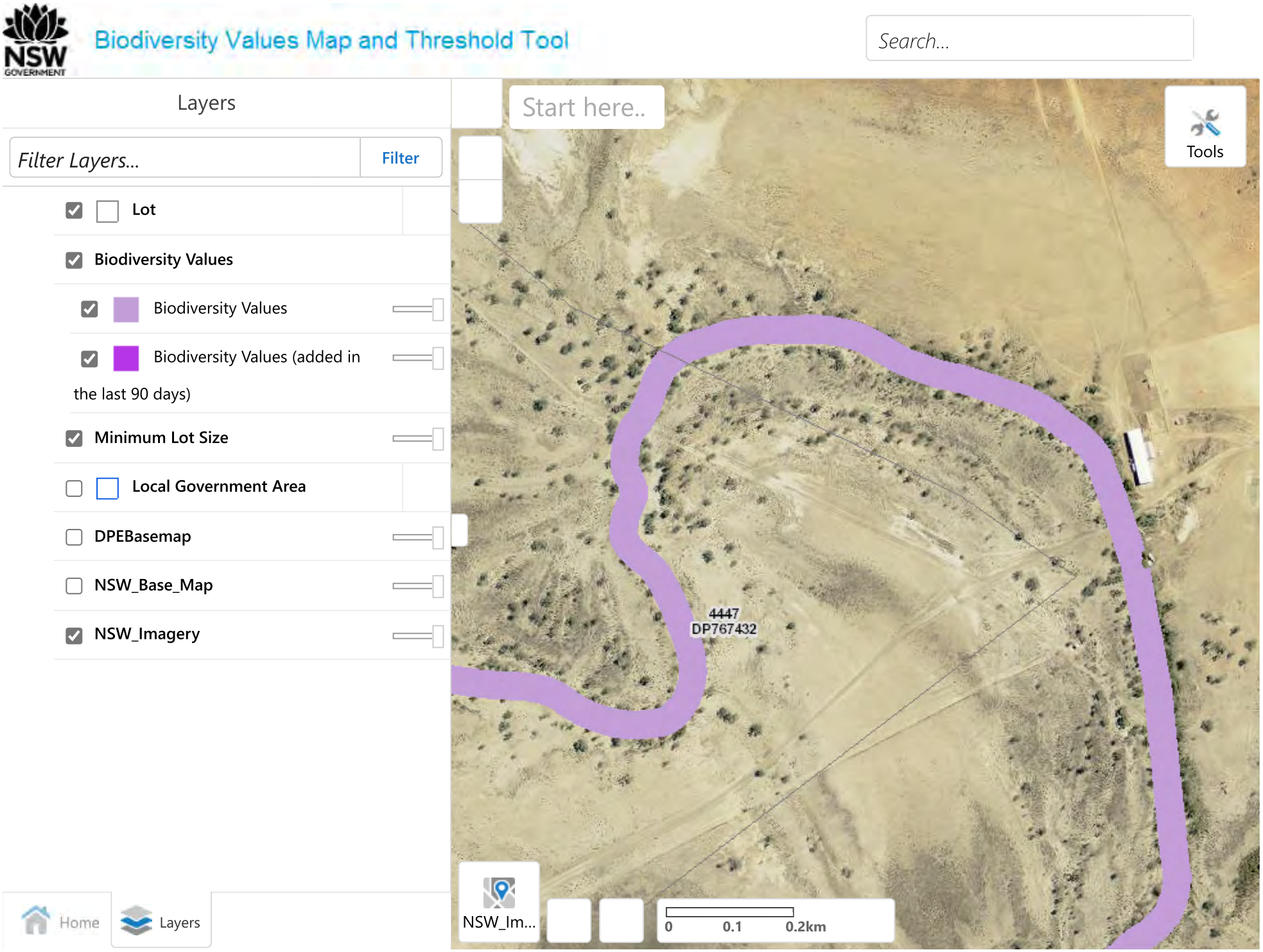
@ A3

GDA 1994 MGA Zone 54

greenedge environmental

Bridge over Talawalka Creek at Tintinollogy Station

AHIMS Map


Biodiversity Values Map and Threshold Tool
Search...
Layers
Filter Layers...
Filter
Lot
Biodiversity Values
Biodiversity Values
Biodiversity Values (added in the last 90 days)
Minimum Lot Size
Local Government Area
DPEBasemap
NSW_Base_Map
NSW_Imagery
Start here..
Tools
4447
DP767432
NSW_Im...
0
0.1
0.2km
Home
Layers

NSW GOVERNMENT

Transitional Native Vegetation Regulatory Map

Legend

- Cadastre
- Local Land Services Regions
- Local Government Area

Native Vegetation Regulatory Map (in force)

- Category 2 - Vulnerable Regulated Land
- Category 2 - Sensitive Regulated Land
- Category 2 - Sensitive & Vulnerable Regulated Land
- Land Excluded from Local Land Services Act 2013
- Werriwa & Monaro CEEC Advisory Layer

N

0 0.14 0.3 0.56 kilometres

Map extract date: 23-Nov-2021

Appendix B: Engineering plans

UNLESS OTHERWISE SHOWN ON INDIVIDUAL DRAWINGS, THESE NOTES APPLY TO ALL BRIDGE DRAWINGS.

GENERAL

G1. DIMENSIONS ARE IN MILLIMETERS.
G2. STATIONS AND REDUCED LEVELS ARE IN METRES.
G3. REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM.
G4. ABBREVIATIONS -

E	DENOTES EXPANSION BEARING.
F	DENOTES FIXED BEARING.
R	DENOTES RESTRAINED BEARING.
SOP	DENOTES SETTING OUT POINT.
LV	DENOTES LENGTH VARIES.
EJ	DENOTES EXPANSION JOINT.
CJ	DENOTES CONSTRUCTION JOINT.
BJ	DENOTES BARRIER JOINT.
ABR	ALTERNATE BARS REVERSED.
ABS	ALTERNATIVE BARS STAGGERED.
SL	STAGGERED LAPS.
NSOP	NOTSHOWN ON PLAN.
NCF	NO CHAMFER OR FILLET.
UNO	UNLESS NOTED OTHERWISE.
HFL	HIGH FLOOD LEVEL.
NWL	NORMAL WATER LEVEL.

G5. INFORMATION OF EXISTING SERVICES AND UTILITIES SHOWN ARE BASED ON SURVEY DATA AVAILABLE AT TIME OF DESIGN AS SUCH THE ACCURACY AND EXISTENCE OF OTHER MISSING INFORMATION SHOULD BE VERIFIED BEFORE WORK COMMENCES ON SITE.
G6. OPTIONAL CONSTRUCTION JOINTS OTHER THAN THOSE SHOWN ON THE DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL DESIGN REPRESENTATIVE FOR APPROVAL.

REINFORCEMENT - ABUTMENTS, PIERS, FOOTINGS & SUPERSTRUCTURES

R1. NOMINAL COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SURFACE SHALL BE IN ACCORDANCE WITH TABLE 2 UNO.
R2. UNLESS NOTED OTHERWISE ON THE DRAWINGS, LAPS ON ADJACENT BARS ON ANY FACE SHALL BE STAGGERED BY NO LESS THAN THE LAP LENGTH.
R3. UNLESS OTHERWISE SPECIFIED, THE MINIMUM DEVELOPMENT LENGTHS AND LENGHTS OF LAPS SHALL BE AS GIVEN IN TABLE 1 BELOW.

TABLE 1

BAR SIZE	N12	N16	N20	N24	N28	N32	N36
HORIZONTAL BARS WITH >300mm OF CONCRETE CAST BELOW THE BAR	400	650	750	900	1150	1500	1750
OTHER BARS	300	500	600	700	900	1200	1400

R4. WHERE MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION ON ANY FACE, THE LAPS SHOWN IN THE TABLE ABOVE SHALL BE INCREASE BY A FACTOR OF 1.3.
R5. REINFORCEMENT MAY BE DISPLACED SLIGHTLY WHERE NECESSARY TO CLEAR STEEL DOWELS, ANCHOR BOLTS, DRAINAGE PIPES, FORMED HOLES AND RECESSES.
R6. MECHANICAL COUPLERS SHALL BE CAPABLE OF DEVELOPING A STRESS IN TENSION OR COMPRESSION OF NO LESS THAN 1.1fsy, AS APPROPRIATE TO THE WEAKER BAR AT THE SPLICE. THE COUPLER SHALL BE SUBMITTED TO THE SITE SUPERINTENDENT FOR APPROVAL.
R7. WHERE HELICAL REINFORCEMENT IS SHOWN: THE HELIX SHALL BE ANCHORED AT ITS ENDS BY ONE AND ONE HALF EXTRA TURNS OF THE HELIX AT 50mm PITCH. IT MAY BE SPLICED WITHIN ITS LENGTH EITHER BY WELDING OR BY MECHANICAL MEANS.
R8. WHERE PRACTICABLE BARS ARE NUMBERED STARTING WITH '1' AS THE FIRST BAR PLACED AT THE BOTTOM OF EACH STRUCTURAL ELEMENT.
R10. FOR REINFORCEMENT BAR SHAPES REFER TO STANDARD BAR SHAPES DRAWINGS.

CONCRETE - ABUTMENTS, PIERS, FOOTINGS & SUPERSTRUCTURES

C1. ALL CONCRETE SHALL BE CONSTRUCTED IN ACCORDANCE WITH RTA SPECIFICATION B80.
C2. EDGES SHALL BE CHAMFERED 20x20 AND REENTRANT ANGLES FILLETED 20x20 UNLESS SPECIFIED OTHERWISE.
C3. GAP BETWEEN PLANK/GIRDER TOP FLANGES SHALL BE FILLED WITH SEALANT COMPRESSIVE BACKING ROD OR PROPRIETARY SEAL.
C4. BLINDING AND MASS CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH EQUAL TO THE STRUCTURAL MEMBER.
C5. MINIMUM THICKNESS OF BLINDING SHALL BE 50mm UNLESS NOTED OTHERWISE.
C6. MINIMUM COMPRESSIVE STRENGTH OF MORTAR AT 28 DAYS TO BE 40MPa UNO.

TABLE 2 - CONSTRUCTION REQUIREMENTS

CONCRETE ELEMENT	LOCATION	CONCRETE SPECIFICATION		NOMINAL COVER TO NEAREST REINFORCEMENT |mm|
		EXPOSURE CATEGORY	CONCRETE f*c |MPa|	
SUPERSTRUCTURE	DECK SLAB	A	40	30 – BOTTOM
	PRECAST PLANKS	A	50	35 – TYPICAL UND
SUBSTRUCTURE	ABUTMENT	B1	40	40 – TYPICAL UND
	PIER HEADSTOCK	B1	40	40 – TYPICAL UND
	PSC PILES	B1	40	70 – TYPICAL UND
MISCELLANEOUS	TRAFFIC BARRIER	A	50	55 – STITCH BEAM
	APPROACH SLABS	B1	40	40-TYPICAL UND
	WING WALL	B1	40	40 – TYPICAL UND

PRECAST CONCRETE FOR STRUCTURES OTHER THAN PSC GIRDERS & PLANKS

PC1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS5100 AND THE RTA SPECIFICATION B115
PC2. DIMENSIONS SHOWN ARE FINAL STRUCTURAL SIZES AND ADDITIONAL CONCRETE MUST BE PROVIDED TO ALLOW FOR LOSS OF STRUCTURAL THICKNESS DUE TO THE USE OF RETARDING AGENTS AND SURFACE TREATMENT.
PC3. PANEL STRUCTURAL THICKNESS SHALL BE AS NOTED.
PC4. ALL METAL WORK AND CAST-IN FIXING SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS1650 UND. TOP SURFACE LIFTING FERRULES LEFT FINALLY EXPOSED SHALL BE STAINLESS STEEL.
PC5. ALL CAST-IN FERRULES SHOWN ON THE DRAWINGS ARE TO REMAIN SEALED UNTIL THE ERECTION OF THE UNIT. THEY ARE NOT TO BE USED FOR LIFTING PURPOSES.
PC6. NO INSERTS SHALL BE 'SHOT' |FIRED| OR DRILLED INTO THE UNITS WITHOUT APPROVAL BE TH ENGINEER.
PC7. FABRIC IN PANELS SHALL BE OF ONE SHEET - NO LAPPING IS PERMITTED UNLESS SHOWN ON STRUCTURAL DRAWINGS.
PC8. PENETRATIONS FOR SERVICES SHALL BE NEAT FORMED HOLES. HOLE BORING THROUGH PANELS WILL NOT BE PERMETTED.
PC9. TEMPORARY STEEL PACKERS TO BE USED FOR LEVELLING MAY BE LEFT PERMANENTLY PROVIDED THEY HAVE A MINIMUM OF 50mm GROUT COVER AND ENSURE BEARING PRESSURE LESS THAN 7MPa.
PC10. ALL SHOP DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL DESIGN REPRESENTATIVE FOR APPROVAL BEFORE FABRICATION COMMENCES. SHOP DRAWINGS SHALL SHOW ALL CAST-IN INSERTS.
PC11. EXTRA REINFORCEMENT TO THE PRECAST UNITS, SHALL BE ADDED WHERE REQUIRED BY THE LIFTING METHODS.
PC12. LIFTING DEVICES/HOOKS SHALL BE DESIGNED BY THE PRECAST MANUFACTURER.
PC13. ALL LIFTING DEVICES/HOOKS SHALL BE CUT BACK TO PROVIDE NOMINAL COVER TO THE CONCRETE SURFACE AND PATCHED WITH A CEMENTIYIOUS MORTAR TO NATCH THE PRECAST UNIT SURFACE.
PC14. HANDLING PROCEDURES INCLUDING STRIPPING, LIFTING, STACKING, TRANSPORTATION AND ERECTION OF PRECAST UNITS SHALL BE SUPPLIED TO THE ENGINEER FOR APPROVAL. STRESSES THROUGHOUT HANDLING SHALL NOT CAUSE CRACKING.

GEOTECHNICAL

G1. PILES SHALL BE CONSTRUCTED IN ACCORDANCE TO RTA SPECIFICATION B59.
G2. THE DESIGN FOR PILES AND FOOTINGS HAS BEEN UNDERTAKEN BASED ON A SITE EVALUATION FROM DISCRETE TEST BORE HOLE DATA RECORDED. GENERALISED OR IDEALISED SUBSURFACE CONDITIONS INCLUDING THE INDICATED SOIL STRATUM LEVELS SHOWN OMN THE DRAWINGS HAVE BEEN ASSUMED OR PREPARED BY INTERPOLATION/EXTRAPOLATION OF THIS DATA. LOCAL VARIATIONS OR ANOMALIES IN THE GENERALISED GROUND CONDITIONS CAN OCCUR AS SUCH, THESE CONDITIONS ARE AN INTERPRETATION AND MUST BE CONSIDERED AS A GUIDE ONLY.
G3. WHERE REFERRED TO IN THE DRAWINGS, THE ESTIMATED DEPTH OF ANY FOOTING |PILES, ETC| IS AN ENGINEERING ESTIMATE OF THE DEPTH TO WHICH THEY SHOULD BE CONSTRUCTED. THE DEPTH REMAINS, HOWEVER, AN ESTIMATE AND THEREFORE LIABLE TO VARIATION. VERIFICATION INSPECTION AND MAPPING DURING CONSTRUCTION IS REQUIRED.
G4. ANY CHANGE IN DESIGN, CONSTRUCTION METHOD OR IN GROUND CONDITION AS NOTED DURING CONSTRUCTION, FROM THOSE ASSUMED IN THIS REPORT SHOULD BE REFERRED TO THE GEOTECHNICAL DESIGN REPRESENTATIVE.
G5. BACKFILL MATERIAL TO STRUCTURAL ELEMENTS SHALL BE IN ACCORDANCE WITH RTA SPECIFICATION B30. BACKFILL MATERIAL SHALL BE NON-AGGRESSIVE SUCH THAT THE LOCAL ENVIRONMENT DOES NOT EXCEED AN EXPOSURE CLASSIFICATION OF B1 IN ACCORDANCE WITH AS5100.4.

STEELWORK - MINOR STEEL ITEMS

SS1. STEEL PLATES SHALL BE GRADE 250 TO AS/NZS 3678 U.N.D
SS2. STEEL SECTIONS SHALL BE GRADE 300 TO AS/NZS 3679.1 U.N.D.
SS3. STEEL DOWELS SHALL BE GRADE 250R TO AS4671 U.N.D.
SS4. RECTANGULAR AND SQUARE HOLLOW SECTIONS SHALL BE GRADE C350L0 TO AS 1163 U.N.D.
SS5. BOLTING CATEGOR FOR HIGH-STRENGTH STEEL BOLTS SHALL BE 8.8/S IN ACCORDANCE WITH AS5100.6.
SS6. ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF AS/NZS1554.1 WITH ADDITIONAL REQUIREMENTS AS GIVEN IN ALLIANCE SPECIFICATION B204. THE WELD CATEGORY SHALL BE SP IN ACCORDANCE WITH AS/NZS 1554.1.
SS7. WELDING SYMBOLS COMPLY WITH AS 1101 PART 3.
SS8. EDGES TO BE PROTECTIVE TREATED SHALL BE ROUNDED TO A RAIDUS OF 1.5mm UNLESS SPECIFIED OTHERWISE.
SS9. ALL COMPONENTS EXCEPTS STAINLESS STEEL ITEMS SHALL BE HOT-DIP GALVANISED AFTER FABRICATION.
SS10. DAMAGED GALVANISED SURFACES SHALL BE RENOVATED WITH A TWO PACK ORGANIC ZINC-RICH PRIMER IN ACCORDANCE WITH RTA SPECIFICATION B220.
SS11. BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH RTA SPECIFICATION B240.
SS12. EXPOSED BUTT WELDS SHALL BE GROUND FLUSH.
SS13. THE LONGITUDINAL SEAM IN RHS SECTIONS SHALL BE ON THE UNDERSIDE OF HORIZONTAL SECTIONS AND INSIDE OF VERTICAL SECTIONS.

SEALANT JOINTS

SJ1. SEALANT SHALL CONFORM TO RTA SPECIFICATION B312.
SJ2. SEALANT IN CONTACT WITH ASPHALT SHALL BE COMPATIBLE WITH ASPHALT.
SJ3. COLOUR CODED, SELF ADHESIVE PRESSURE SENSITIVE TAPE MADE FROM NON-STICK MATERIAL SUCH AS TEFLON OR POLYETHYLENE SHALL BE USED AS BOND BREAKERS.
SJ4. BACKER ROD SHALL BE NON-ABSORBENT CLOSED CELL POLYTHEN OR NEOPRENE |PARBURY'S EXPANDAFOAM BACKER ROD OR APPROVED EQUIVALENT| INSTALLED WITH 25% COMPRESSION.
SJ5. SEALANTS SHALL BE APPLIED BETWEEN 7.00AM AND 11.00AM AT TEMPERATURES NOT LESS THAN 10°C OR NOT MORE THAN 35°C.
SJ6. JOINT WIDTH AT INSTALLATION SHALL NOT EXCEED THE SPECIFIED WIDTH ± MOVEMENT RANGE SPECIFIED.

BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

NEW BRIDGE:

PROJECT NUMBER: 6283
DESIGN SPEED 10km/h
DESIGN STANDARDS: AS 5100, 1-5 BRIDGE DESIGN
DESIGN LOADING: SM1600
BARRIER PERFORMANCE LEVEL: LOW - FALL FROM HEIGHT PROTECTION ONLY
PEDESTRIAN LOADING: 5KPa

REFERENCE DESIGN REPORTS:

GEOTECHNICAL/SOIL INVESTIGATION & DESIGN REPORT BY METALINE ENGINEERING GROUP, PROJECT NUMBER 6283.
SURVEY STUDY: GRAHAM HOWE SURVEYING.

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

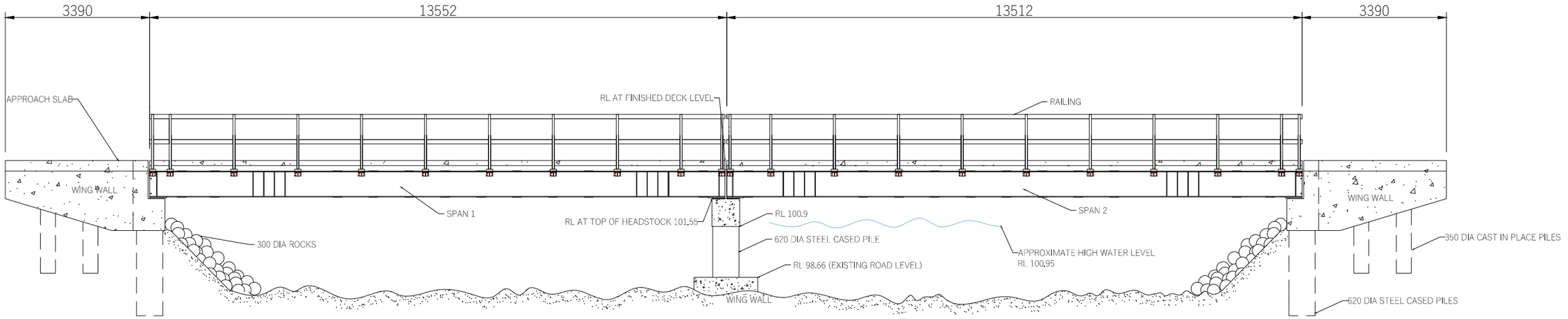
MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

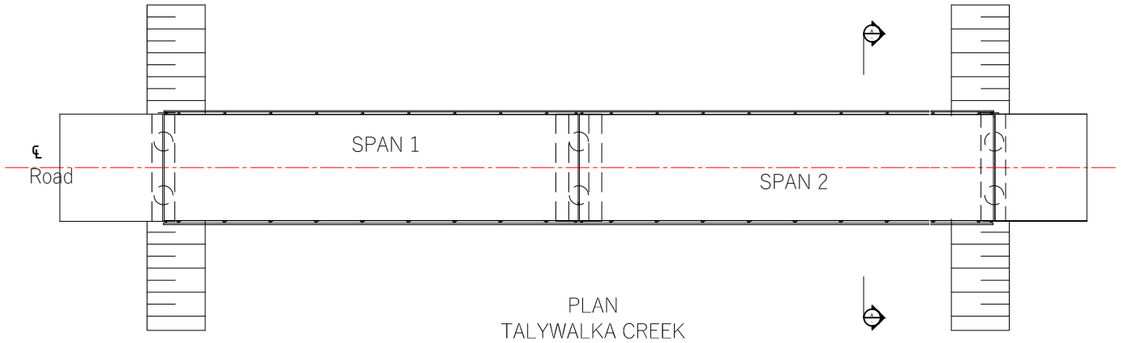
Client: Jack & Hollie PALMER
Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION
Drawing: General Notes:

ISSUE FOR CONSTRUCTION

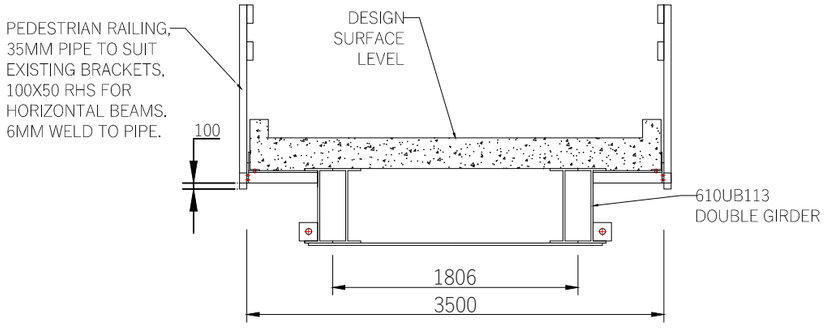
Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283		Drawing No. S1	Rev. F



ELEVATION



PLAN
TALYWALKA CREEK



A-A

VIEW TO MENINDEE

Notes

1. FOR GENERAL NOTES AND CONSTRUCTION REQUIREMENTS REFER SHEET 003.
2. DIMENSIONS ARE IN MILLIMETRES.
3. CHAINAGES AND REDUCED LEVELS ARE IN METRES.
4. ALL REDUCED LEVELS ARE BASED ON AHD.
5. DESIGN VEHICLE LOADING SM1600 HLP 420 IN ACCORDANCE WITH A5 5100 PART 2.
6. FOR EXISTING BRIDGE DETAILS CONSULT APPROPRIATE AUTHORITIES.
7. TRAFFIC BARRIER TO LOW PERFORMANCE BARRIER DESIGN.
8. IF REQUIRED - ASPHALTIC CONCRETE INCLUDING SPRAYED POLYMER MODIFIED BITUMINOUS.

   MEMBRANE TO BE A TOTAL OF 75mm THICK ON BRIDGE DECK SURFACE AND IN ACCORDANCE WITH THE RMA SPECIFICATION DCM B344.
9. UTILITIES ARE SHOWN INDICATIVELY AND MAY NOT BE LOCATED EXACTLY AS SHOWN ON PLAN. CONTRACTOR TO LOCATE EXISTING UTILITIES PRIOR TO CONSTRUCTION.
10. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT.
11. ANY DISCREPANCY SHALL BE REFERRED TO THE RELEVANT PARTIES BEFORE PROCEEDING WITH THE WORK CONSTRUCTION FROM THESE DRAWINGS AND THEIR ASSOCIATED CONSULTANTS DRAWINGS, IS NOT TO COMMENCE UNTIL APPROVED BY THE RELEVANT AUTHORITIES.
12. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH RELEVANT DESIGN REPORT.
13. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND REQUIREMENTS OF THE RELEVANT AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
14. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE CONTRACTOR ON SITE. DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
15. ANY VARIATION FROM WHAT IS SHOWN ON DRAWINGS SHALL BE NOT BE MADE WITHOUT PRIOR WRITTEN APPROVAL FROM THE RELEVANT PARTIES.

Rev.	Remark/Comment	Date	Apv.
G	ISSUE FOR CONSTRUCTION Rev1	28.02.22	A.M
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

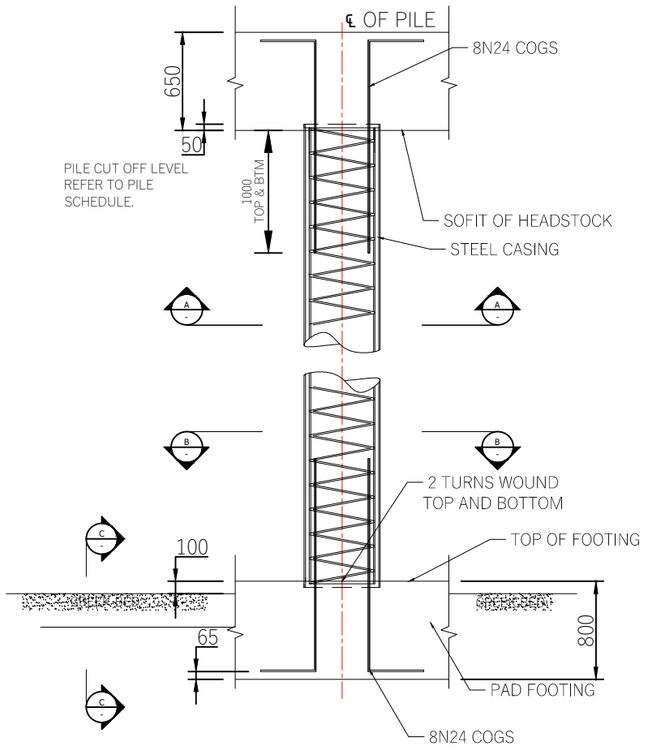
Client: Jack & Hollie PALMER

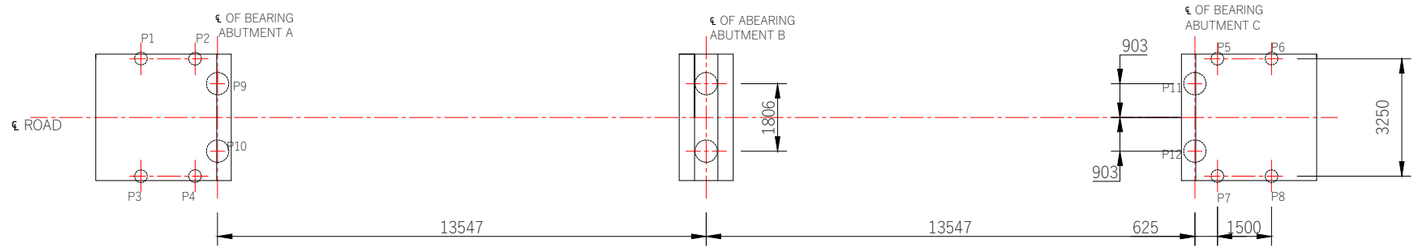
Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

Drawing: General Arrangement

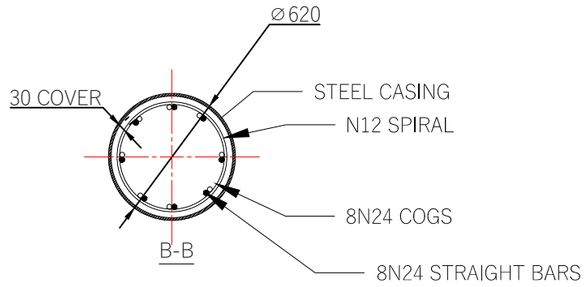
ISSUE FOR CONSTRUCTION

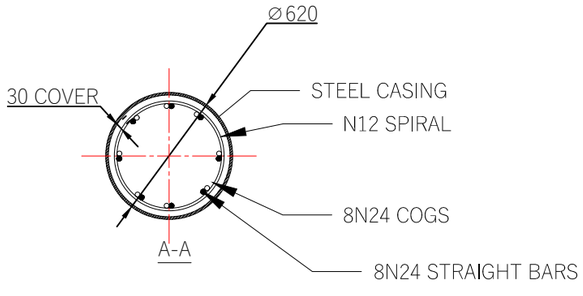
Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: FEB 2022	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283	Drawing No. S2		Rev. G





PILES SET OUT PLAN





NOTES

1. MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa.
2. CONCRETE EXPOSURE CLASSIFICATION A.
3. CLEAR COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SHALL BE 75mm.
4. LONGITUDINAL BARS AND SPIRALS SHALL BE DEFORMED BARS TO AS/NZ4671 GRADE D500N.
5. SPLICING OF SPIRAL SHALL BE WELDED.
6. THE WELD CATEGORY FOR ALL OTHER WELDS SHALL BE GP IN ACCORDANCE WITH 1554 PART1.
7. CALCULATED ULTIMATE PILE 1000 kN COMPRESSION
   DESIGN AXIAL LOAD 0 kN TENSION

   CALCULATED ULTIMATE PILE
   DESIGN MOMENT 580 kNm

8. MINIMUM ALLOWABLE END BEARING CAPACITY SHALL BE 1 MPa.
9. MINIMUM ULTIMATE END BEARING CAPACITY SHALL BE 4 MPa.
10. THE END BEARING CAPACITY OF THE ROCK AT FOUNDING LEVEL SHALL BE VERIFIED BY AN EXPERIENCED GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF CONCRETE.
11. LAPS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION.
12. PILE FOUNDING LEVELS SHALL NOT BE LIFTED WITOUT WRITTEN APPROVAL OF THE DESIGN ENGINEER.
13. UNLESS NOTED OTHER WISE, THE MINIMUM DEVELOPMENT LENGTHS AND LENGTHS OF LAPS SHALL BE AS FOLLOWS:

BAR SIZE	N12	N16	N20	N24	N28	N32
a| HORIZONTAL BARS WITH 300mm OF CONCRETE CAST BELOW THE BAR	375	500	750	950	1250	1575
b| OTHER	300	400	600	750	1000	1250

14. PILE CONSTRUCTION TOLERANCE IS 75mm
15. BASE OF DRILLED SHATS SHALL BE CLEANED TO REMOVE DEBRIS PRIOR TO PLACEMENT OF CONCRETE.
16. PILES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RTA SPECIFICATIONS B59

PILE SCHEDULE

PILE No.	LENGTH OF PILE FROM BASE OF ABUTMENT/WING WALL	EASTING	NORTHING	CUT OFF LEVEL |RL|	CONTRACT LEVEL |RL|
P1	1500	-	-	-	-
P2	1500	-	-	-	-
P3	1500	-	-	-	-
P4	1500	-	-	-	-
P5	1500	-	-	-	-
P6	1500	-	-	-	-
P7	1500	-	-	-	-
P8	1500	-	-	-	-
P9	2200	-	-	-	-
P10	2200	-	-	-	-
P11	2200	-	-	-	-
P12	2200				

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

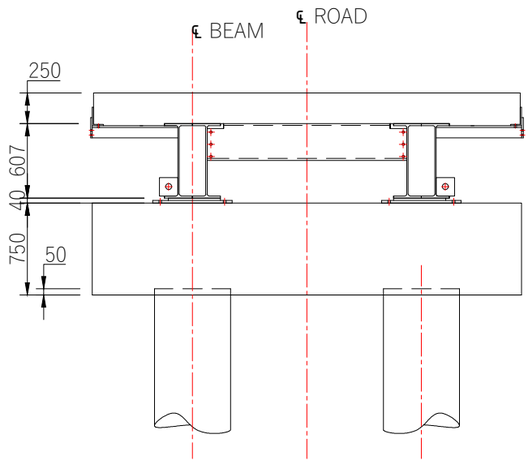
Client: Jack & Hollie PALMER

Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

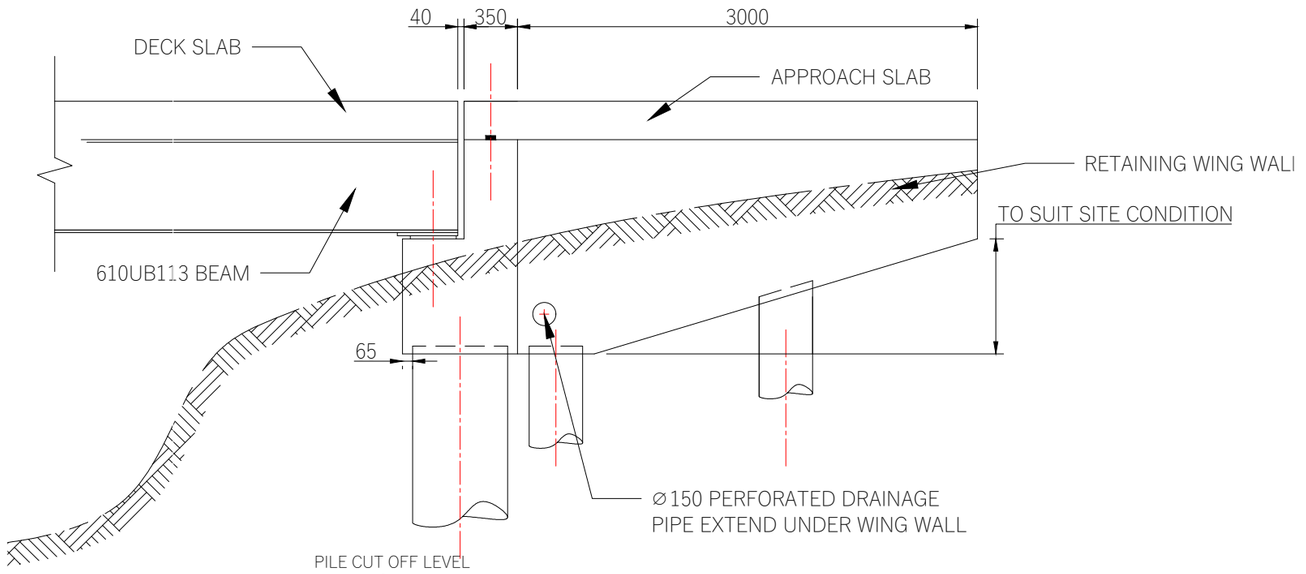
Drawing: Piling Layout and Detail:

ISSUE FOR CONSTRUCTION

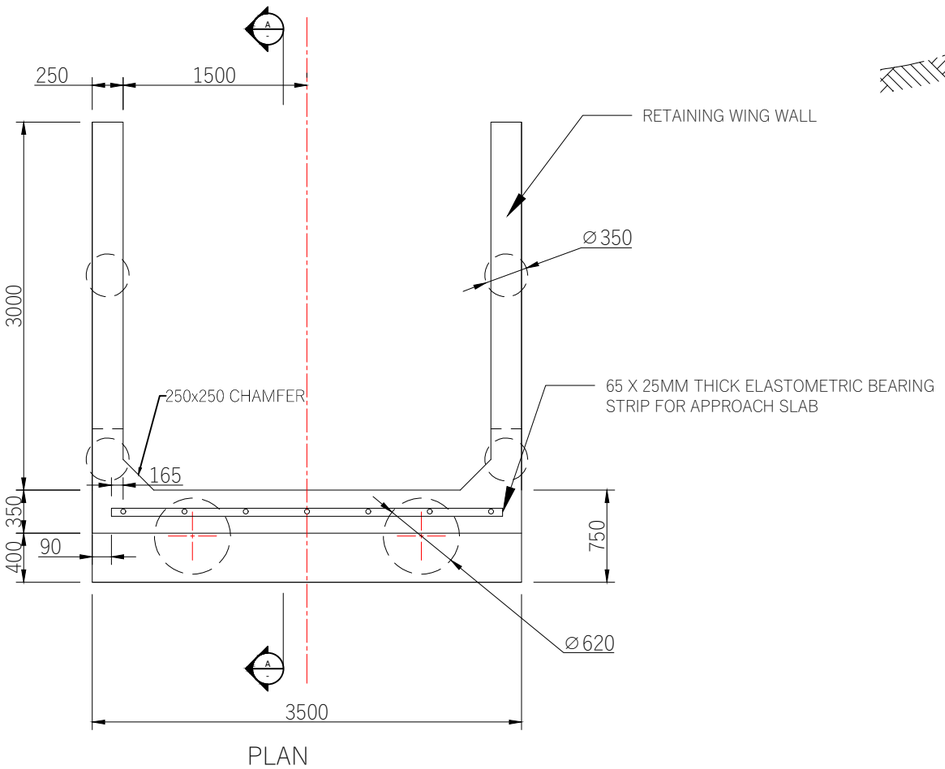
Designed: A.M.	Scale (A3):		
Drawn: W.B.	Date: OCT 2021		
Checked: A.M.	No. of Sheets: 8		
Project No. 6283	Drawing No. S3	Rev. F	



ELEVATION



A-A



PLAN

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

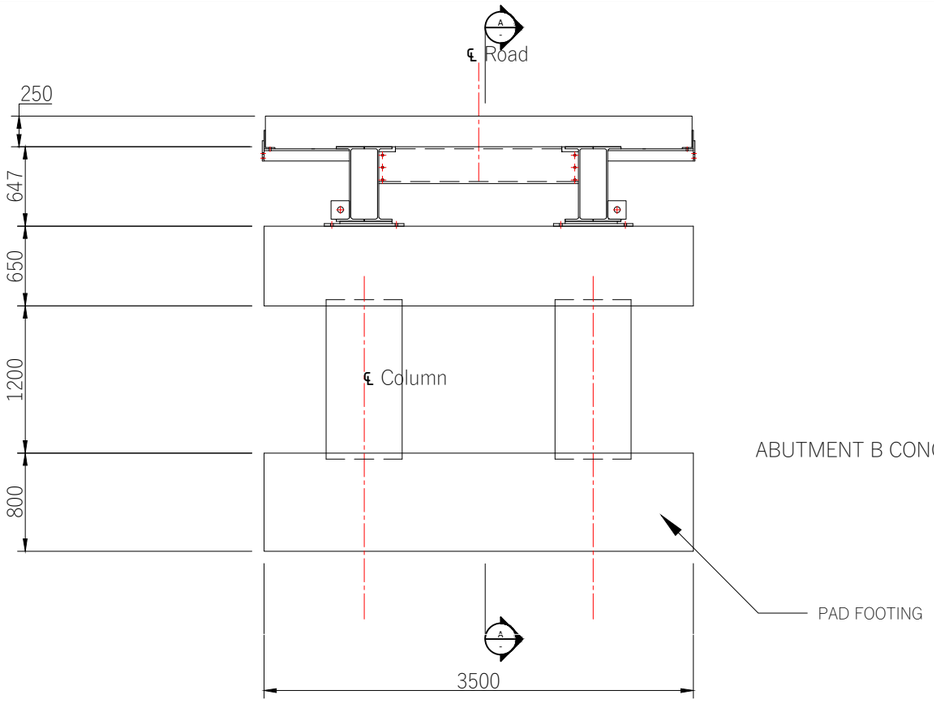
Client: Jack & Hollie PALMER

Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

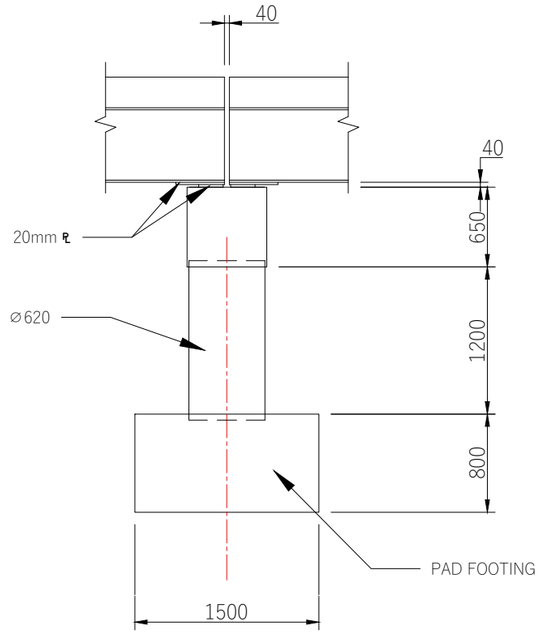
Drawing: Abutment A & C detail:

ISSUE FOR CONSTRUCTION

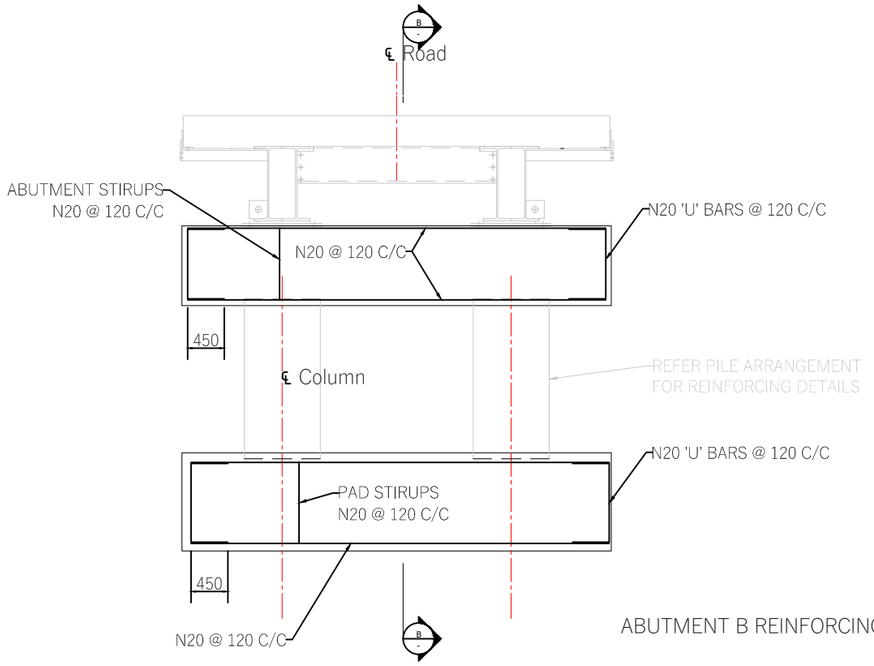
Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283		Drawing No. S4	Rev. F



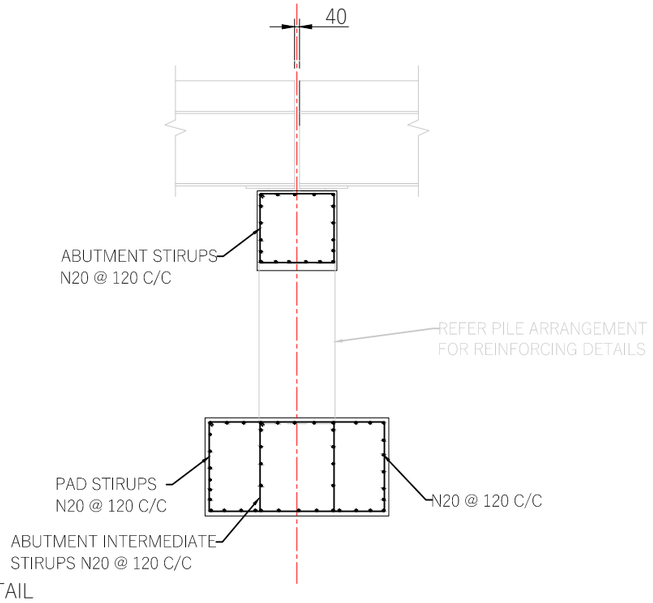
ABUTMENT B CONCRETE DETAIL



A-A



ABUTMENT B REINFORCING DETAIL



B-B

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP

331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945

A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

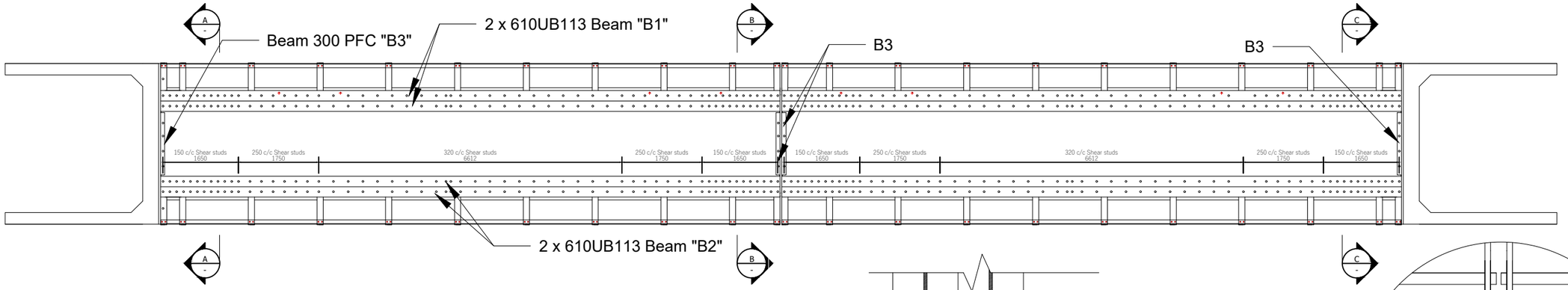
Client: Jack & Hollie PALMER

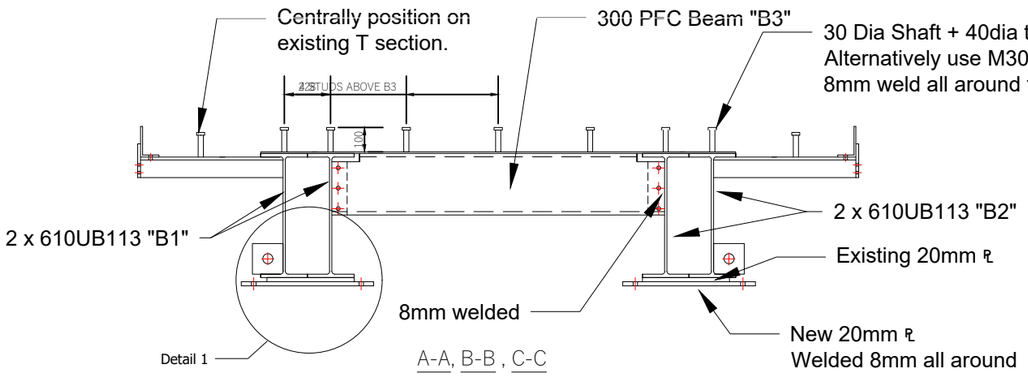
Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

Drawing: Abutment B detail:

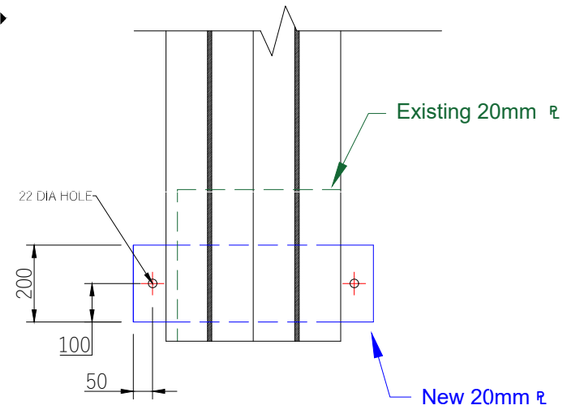
ISSUE FOR CONSTRUCTION

Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283	Drawing No. S5		Rev. F

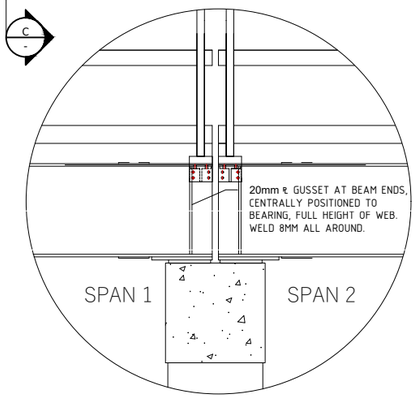


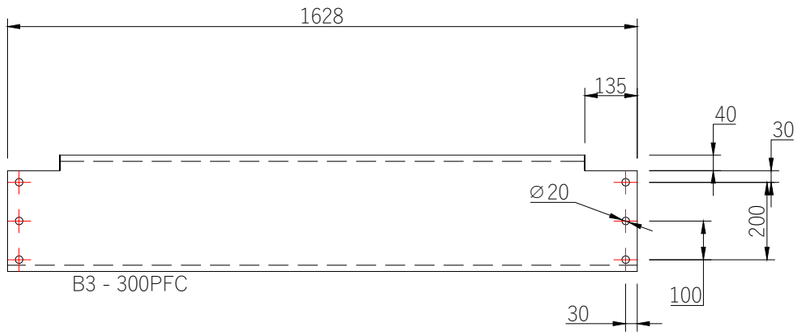


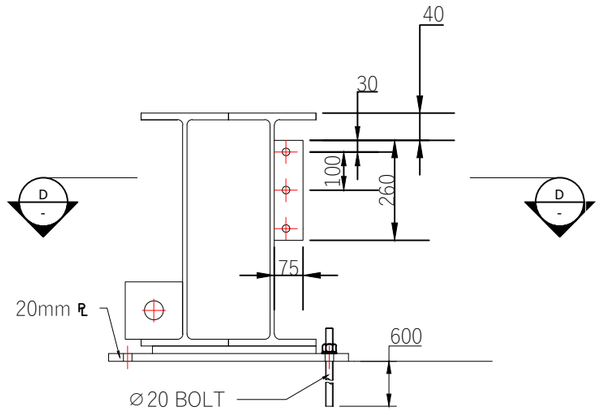
A-A, B-B , C-C



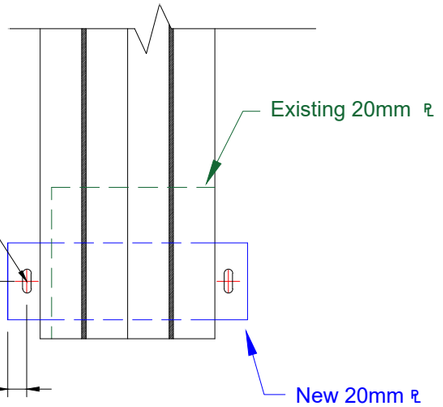
D-D
ABUTMENT A AND C ONLY







Detail 1



D-D
ABUTMENT B ONLY

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

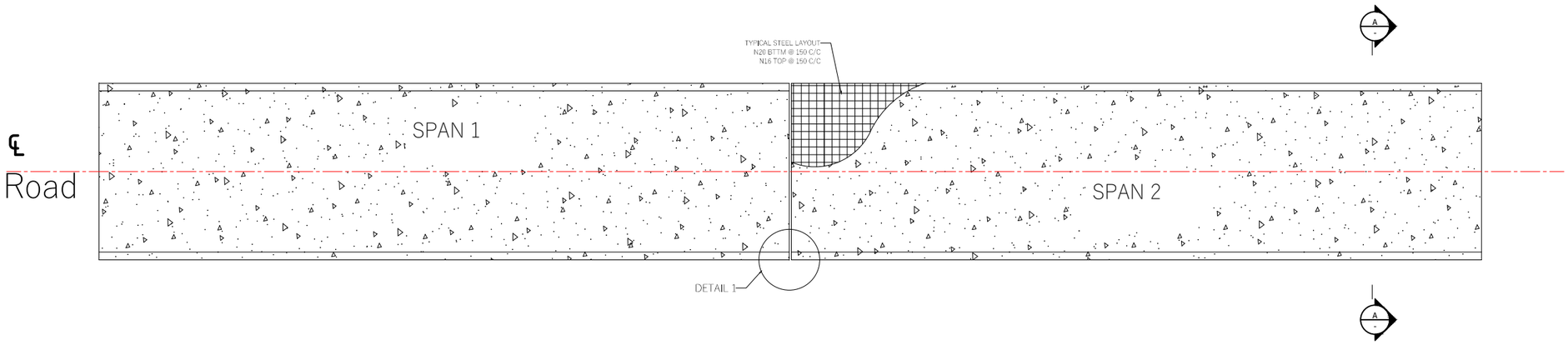
Client: Jack & Hollie PALMER

Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

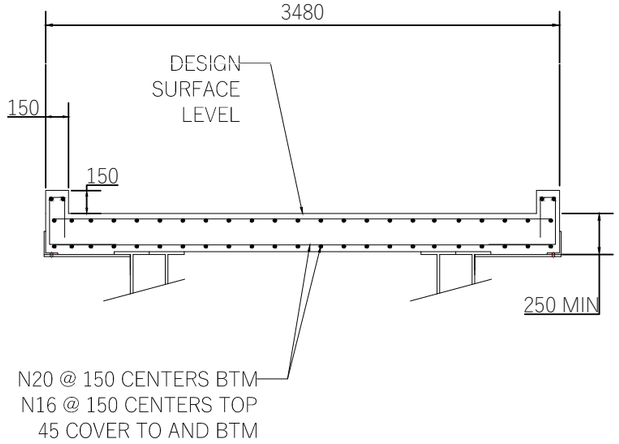
Drawing: Beam layout and modification:

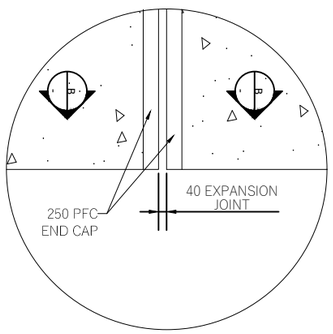
ISSUE FOR CONSTRUCTION

Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283	Drawing No. S6	Rev. F	

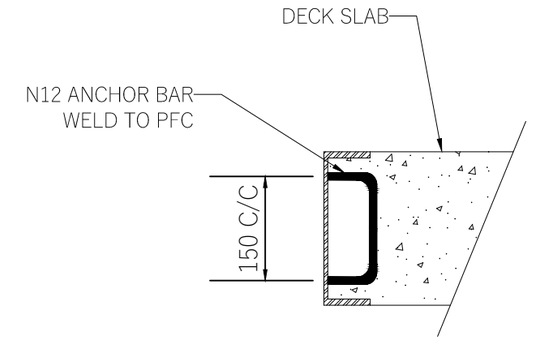


PLAN





DETAIL 1
DECK SLAB TYPICAL END DETAIL



SECTION B-B

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP
331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945
A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

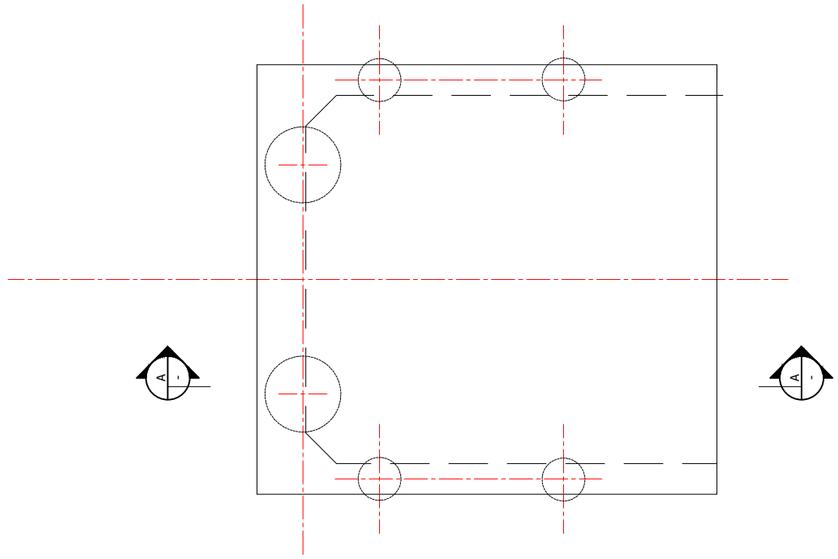
Client: Jack & Hollie PALMER

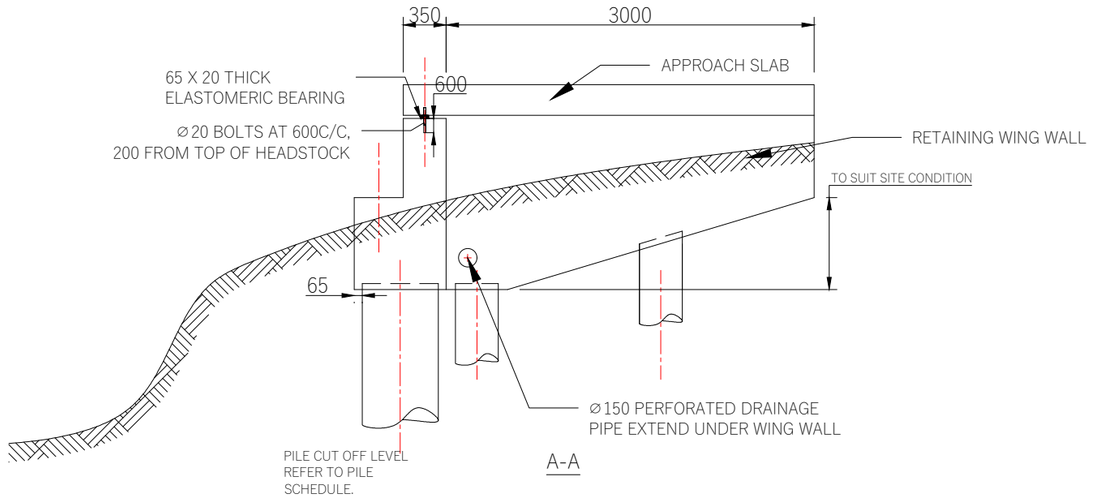
Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

Drawing: Concrete Deck detail:

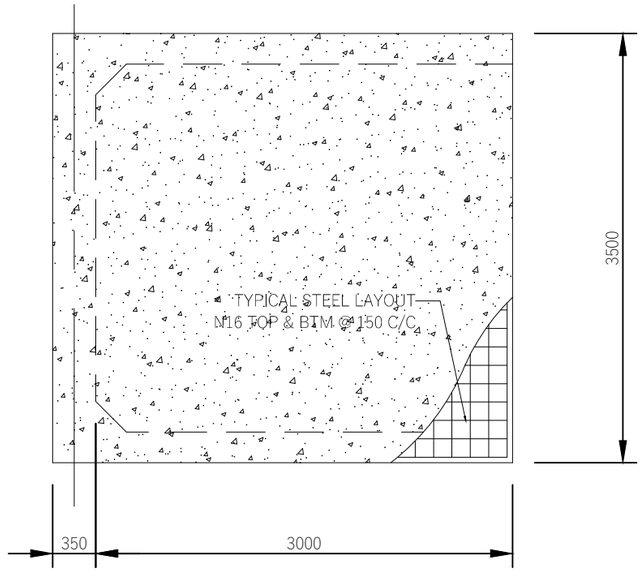
ISSUE FOR CONSTRUCTION

Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283	Drawing No. S7		Rev. F





A-A



PLAN

Rev.	Remark/Comment	Date	Apv.
F	ISSUE FOR CONSTRUCTION	26.10.21	A.M
E	FOR REVIEW	25.10.21	A.M
D	FOR REVIEW	24.10.21	A.M
C	FOR REVIEW	22.10.21	A.M
B	FOR REVIEW	21.10.21	A.M
A	FOR REVIEW	21.10.21	A.M

MEG METALINE ENGINEERING GROUP

331 Cummins Street, BROKEN HILL, NSW, 2880
MOB: 0484 770 945

A.C.N. 63 7312951
www.metaline-engineering.com

CIVIL
STRUCTURAL
COMMERCIAL
RESIDENTIAL
GEOTECHNICAL
BUILDING SERVICES
PROJECT MANAGEMENT
RAIL/ROLLINGSTOCK
AUTOMOTIVE

Client: Jack & Hollie PALMER

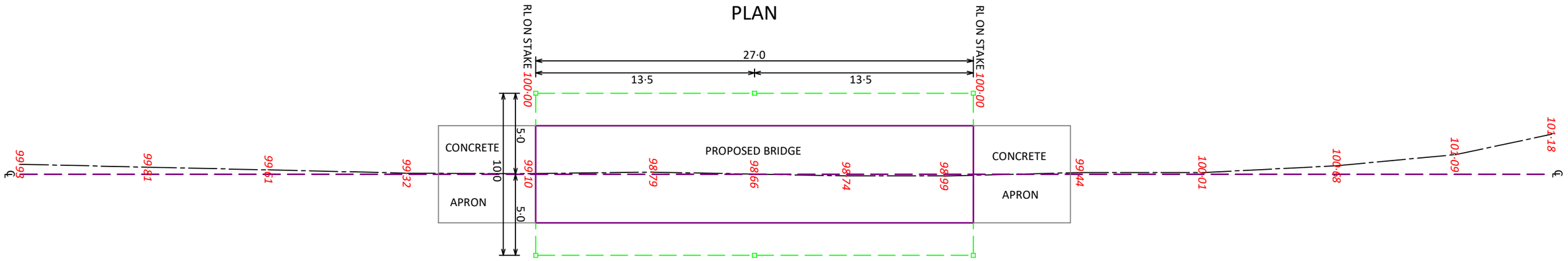
Project: BRIDGE OVER TALYAWALKA CREEK AT TINTINALLOGY STATION

Drawing: Approach slab detail:

ISSUE FOR CONSTRUCTION

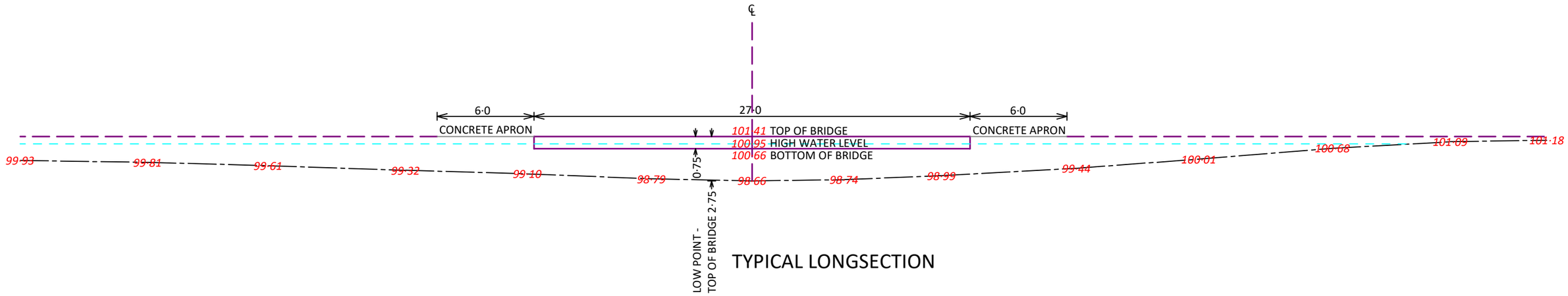
Designed: A.M.		Scale (A3):	
Drawn: W.B.		Date: OCT 2021	
Checked: A.M.		No. of Sheets: 8	
Project No. 6283		Drawing No. S8	Rev. F

PLAN



- STAKE
- OFFSET LINE
- CENTRELINE OF ROAD
- CENTRELINE OF BRIDGE
- HIGH WATER LEVEL (APPROXIMATE)

NOTES:
1. ASSUMED SPOT HEIGHTS SHOWN THUS *100·00*
2. HIGH WATER LEVEL *100·95* (APPROXIMATE)



TYPICAL LONGSECTION

0 10 20 30 40 50 m

SCALE 1:250 (A3)

SURVEY FOR PROPOSED BRIDGE OVER TALYAWALKA CREEK, TINTINALLOGY

LENGTHS ARE IN METRES	GRAHAM F. HOWE REGISTERED SURVEYOR PH/FAX 08 8087 3660 515 WYMAN LANE, BROKEN HILL P.O. BOX 317 N.S.W. 2880	SIGNED:	
SCALE 1:250 (A3)		27-9-2021	C203-6

Appendix C: Threatened species searches

Australian Government

Department of Agriculture, Water and the Environment

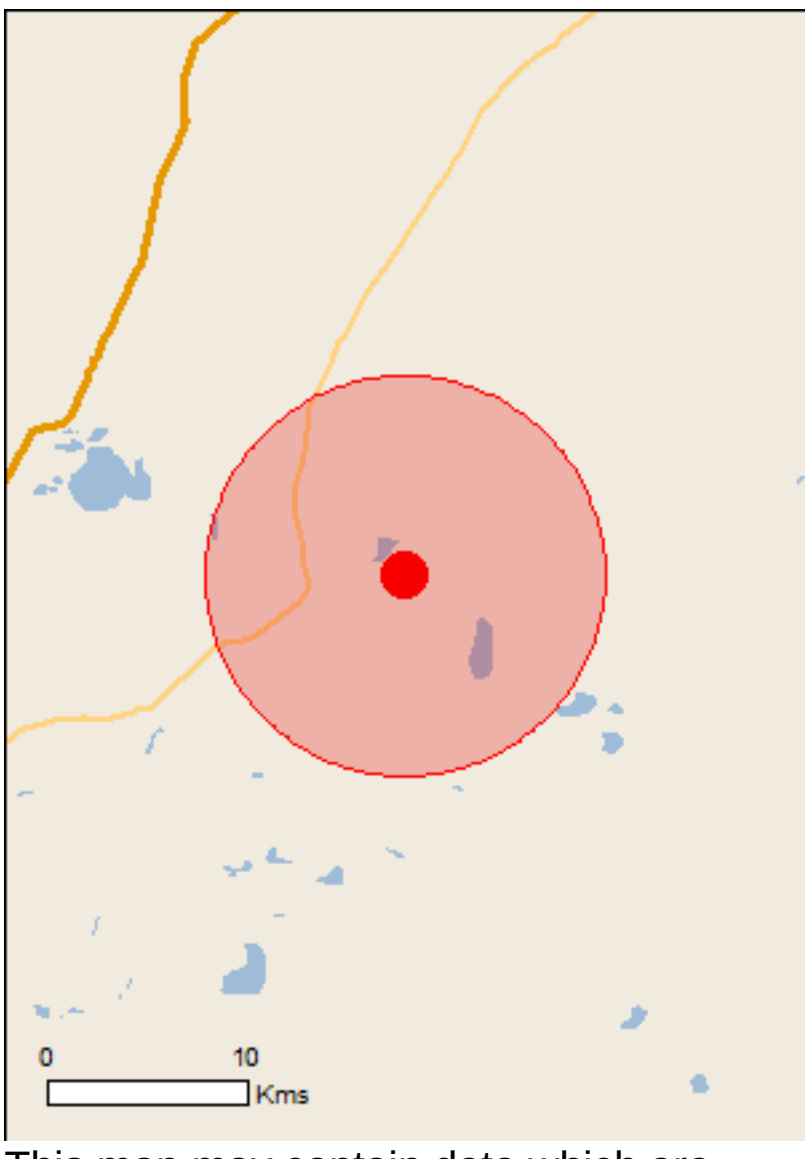
EPBC Act Protected Matters Report

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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

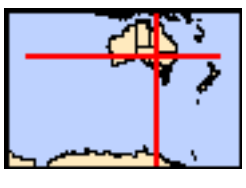
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 23/11/21 13:57:04



Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental 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:	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	15
Listed Migratory Species:	7

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 environment anywhere.

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 Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	14
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	300 - 400km upstream
Riverland	200 - 300km upstream
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream

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.

Name	Status	Type of Presence
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Amytornis modestus Thick-billed Grasswren [84121]	Vulnerable	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Plants		

Name	Status	Type of Presence
Acacia carneorum Needle Wattle, Dead Finish, Purple-wood Wattle [66685]	Vulnerable	Species or species habitat may occur within area
Atriplex infrequens [4143]	Vulnerable	Species or species habitat may occur within area
Austrostipa metatoris [66704]	Vulnerable	Species or species habitat may occur within area
Calotis moorei Moore's Burr-daisy [55381]	Endangered	Species or species habitat likely to occur within area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area
Solanum karsense Menindee Nightshade [7776]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-32.0899 143.03705

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.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

NSW Threatned 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: -31.79 West: 143.20 East: 143.51 South: -32.18] returned 0 records for 5 entities.

Report generated on 23/11/2021 7:09 PM

Kingdom	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Community	*Acacia loderi shrublands*	Acacia loderi shrublands	E3		K	
Community	*Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions*	Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	E3		K	
Community	*Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions*	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	E3	E	K	
Community	*Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3	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		P	

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. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Plants in selected area [North: -32.07 West: 142.76 East: 143.72 South: -33.23] returned a total of 1,544 records of 375 species.

Report generated on 23/11/2021 4:23 PM

Kingdom	Class	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	*Santalum murrayanum*	Bitter Quandong	E1		3	
Plantae	Flora	*Solanum karsense*	Menindee Nightshade	V	V	4	

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 Entities in selected area [North: -32.07 West: 142.76 East: 143.72 South: -33.23] returned a total of 4,894 records of 604 species.

Report generated on 23/11/2021 4:13 PM

Kingdom	Class	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Animalia	Reptilia	*Strophurus elderi*	Jewelled Gecko	V,P		10	
Animalia	Reptilia	*Cyclodomorphus melanops elongatus*	Mallee Slender Blue-tongue Lizard	E1,P		1	
Animalia	Reptilia	*Lerista xanthura*	Yellow-tailed Plain Slider	V,P		1	
Animalia	Reptilia	*Tiliqua occipitalis*	Western Blue-tongued Lizard	V,P		1	
Animalia	Aves	*Stictonetta naevosa*	Freckled Duck	V,P		24	
Animalia	Aves	*Falco subniger*	Black Falcon	V,P		2	
Animalia	Aves	*^Calyptorhynchus banksii samueli*	Red-tailed Black-Cockatoo (inland subspecies)	V,P,2		1	
Animalia	Aves	*^Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		35	
Animalia	Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		14	
Animalia	Aves	*Epthianura albifrons*	White-fronted Chat	V,P		5	
Animalia	Aves	*Cinclosoma castanotum*	Chestnut Quail-thrush	V,P		4	
Animalia	Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		1	
Animalia	Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		1	
Animalia	Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		12	
Animalia	Mammalia	*Ningaui yvonneae*	Southern Ningaui	V,P		14	
Animalia	Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		18	
Animalia	Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	1	
Animalia	Mammalia	*Vespadelus baverstocki*	Inland Forest Bat	V,P		9	

Appendix D: Test of significance

Test of significance for proposed Talywalka Bridge

Introduction

This test of significance is part of the environmental impact assessment for a proposed bridge crossing the Talywalka Creek on Tintinollogy Station.

The objective of this proposal is to install a small pre-constructed bridge over the Talywalka Creek, which splits the station in two. The project is required so the landholders can continue to manage livestock at time of high flow in the Darling River, which causes the Talywalka Creek to become inundated and impassable, stranding livestock on an island.

In respect to terrestrial biodiversity values, the areas have been modified (grazing) and contains the species commonly found in such environments, including native grasses and rangeland groundcover species.

The proposed works occur within the CDSC municipal area and within the Western Local Lands Service region.

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

- NSW EES BioNet Atlas of NSW Wildlife
- DWE Protected Matters Report

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

- Winged Pepper-cress (*Lepidium monoplocoides*) (Endangered – NSW and Commonwealth)
- Chestnut Quail-thrush (*Cinclosoma castanotum*) (Vulnerable – NSW)
- Varied Sittella (*Daphoenositta chrysoptera*) (Vulnerable – NSW)

Winged Pepper-cress

(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**

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 proposed project and no observations on site, no impacts to the specie are expected. No local viable populations of the species are known from these areas 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, or

N/A – Winged Pepper-cress 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 Pepper-cress 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, and
Due to the small nature of the proposal, only minor modification to potential habitat, no existing observations of the species and continued land management (grazing).

(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, and
The proposal will not cause fragmentation or isolations from other 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 area proposed for the quarries are not mapped as an area of outstanding biodiversity value (OBV).

(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.

Chestnut Quail-thrush

(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**
This species is endemic to arid and semi-arid southern Australia, reaching its northern extent in the south of the Northern Territory. Three subspecies have been described with the nominate (castanotum) the only one occurring in NSW. It is probably the most widely recorded of the 'mallee specialists' in NSW where it occurs in two main populations. The first is in the central mallee centred on Round Hill and Nombinnie Nature Reserves, with a number of sightings also made on leasehold land to the north and west of these reserves. This population probably occurred in mallee as far south as Griffith and Temora, though extensive clearing has meant that recent records have only been made in Loughnan Nature Reserve and in mallee near Taleeban, and more rarely in Cocoparra National Park.
The last record from Pulletop Nature Reserve was in 1999 and prior to this it had not been seen since 1985 despite some survey effort. The other population is in the south west corner of the state where it is widespread in both the Scotia mallee and in areas east of the Darling River as far east as Balranald and north to near Menindee. There are few records between the Darling River and the Great Darling Anabranch, though this may reflect lack of survey effort in suitable habitat.

Due to the small nature of the proposal, and the availability of surrounding habitat, no impacts to the species 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, or
N/A – Chestnut Quail-thrush 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 – Chestnut Quail-thrush 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, and
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, and
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 area proposed for the quarries in not mapped as an area of outstanding biodiversity value (OBV).

(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.

Varied Sittella

(**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 Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.

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, or
N/A – Varied Sittella 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 – Varied Sittella 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, and
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, and
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 area proposed for the quarries in not mapped as an area of outstanding biodiversity value (OBV).

(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.

Conclusions

The assessment of significance for:

- Winged Pepper-cress
- Chestnut Quail-thrush
- Varied Sittella

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 project 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 E: AHIMS Database Search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Talywalka Bridge

Client Service ID : 640973

Green Edge Environmental

178 Jutland Road
Springton South Australia 5235

Attention: Chris Alderton

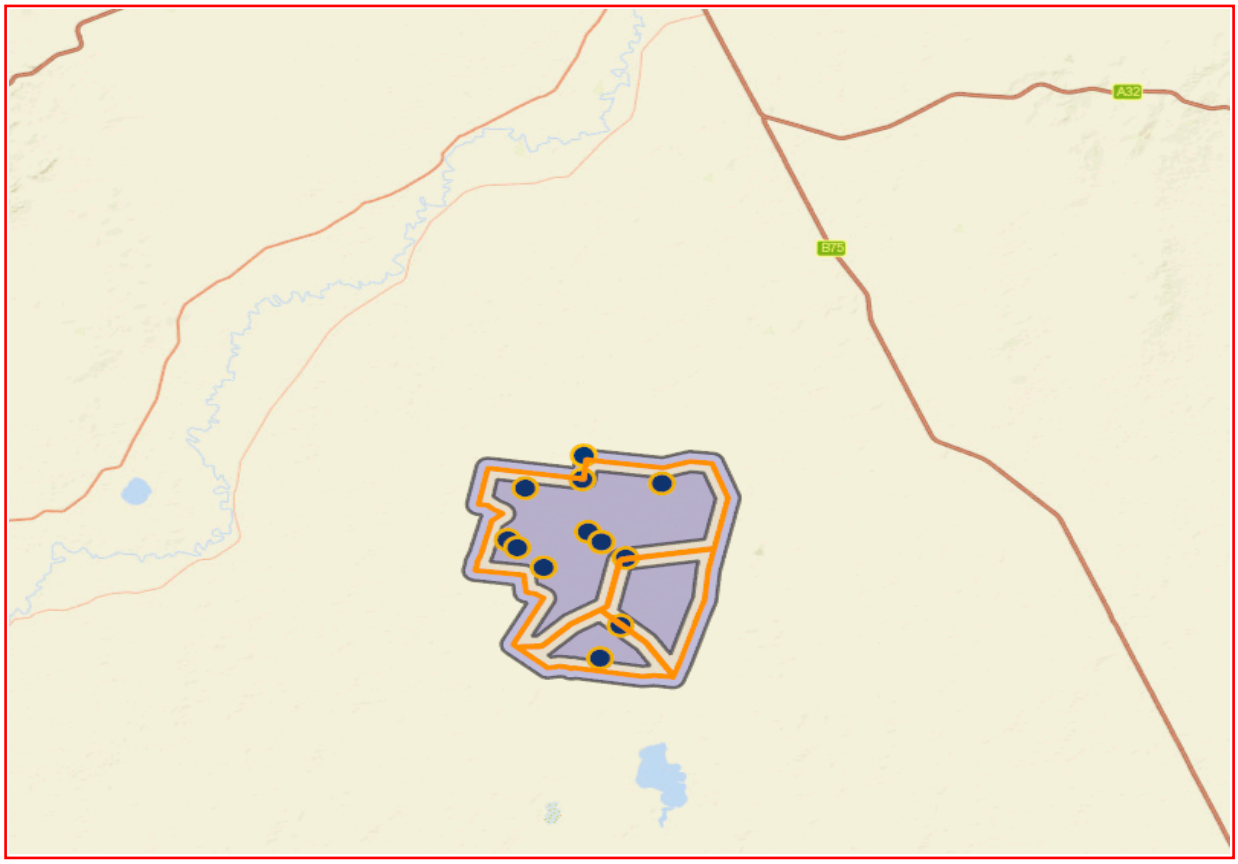
Email: chris@geenvironmental.com.au

Date: 23 November 2021

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 3995, DP:DP766468, Section : - with a Buffer of 1000 meters, conducted by Chris Alderton on 23 November 2021.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

13	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Talywalka Bridge

Client Service ID : 640974

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
32-2-0065	HD-204-1;Teryawynia;	AGD	54	713700	6443600	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Gerald Quayle,P. Thompson					**Permits**		
32-2-0123	BR-OS1	GDA	54	720813	6444559	Open site	Valid	Artefact : -		
	Contact	**Recorders**	OzArk Environmental and Heritage Management - Dubbo,Miss.Philippa Sokol					**Permits**		
32-2-0062	HD-204-3;Terawynia;	AGD	54	710700	6446400	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Gerald Quayle,P. Thompson					**Permits**		
32-2-0063	HD-204-2;Terawynia;	AGD	54	711500	6445600	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Gerald Quayle,P. Thompson					**Permits**		
32-2-0090	HD-111-3;Teryawynia;	AGD	54	717531	6447058	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	P. Thompson,S Burke					**Permits**		
32-2-0042	HD-125-5;Teryawynia;Wilcannia;	AGD	54	720100	6437700	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	207
	Contact	**Recorders**	P. Thompson,S Burke					**Permits**		
32-2-0089	HD-111-4;Teryawynia;	AGD	54	717165	6452268	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	P. Thompson,S Burke					**Permits**		
32-2-0095	COW 1;	AGD	54	712300	6451500	Open site	Valid	Shell : -, Artefact : -, Burial : -	Burial/s,Midden	1352
	Contact	**Recorders**	Jane Balme,Klim Gollan					**Permits**		
32-2-0120	BR-IF1A	GDA	54	718783	6446146	Open site	Valid	Artefact : -		
	Contact	**Recorders**	OzArk Environmental and Heritage Management - Dubbo,Miss.Philippa Sokol					**Permits**		
32-2-0119	BR-IF2B	GDA	54	718785	6446209	Open site	Valid	Artefact : -		
	Contact	**Recorders**	OzArk Environmental and Heritage Management - Dubbo,Miss.Philippa Sokol					**Permits**		
32-2-0044	HD-111-2;Teryawynia;Wilcannia;	AGD	54	718300	6434500	Open site	Valid	Artefact : -	Open Camp Site	207
	Contact	**Recorders**	P. Thompson,S Burke					**Permits**		
32-2-0003	Surveyors Well Rocks;Surveyors Bore;	AGD	54	723929	6451720	Open site	Valid	Aboriginal Ceremony and Dreaming : -	Natural Mythological (Ritual)	4431
	Contact	**Recorders**	Harry Creamer,Mr.Richard Kelly					**Permits**		
32-2-0088	HD-111-5;Bakara;	AGD	54	717348	6454645	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	P. Thompson,S Burke					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 23/11/2021 for Chris Alderton for the following area at Lot : 3995, DP:DP766468, Section : null with a Buffer of 1000 meters.. Number of Aboriginal sites and Aboriginal objects found is 13

Appendix F: Cultural Heritage Contingency Plan

Contingency plan in the event of Aboriginal material being found

If any Aboriginal object is discovered and/or harmed in, or under the land, while undertaking gravel pit development activities, the proponent must:

1. Not further harm the object;
2. Immediately cease all work at the particular location;
3. Secure the area so as to avoid further harm to the Aboriginal object;
4. Notify Heritage NSW as soon as practical on 131555, providing any details of the Aboriginal object and its location; and
5. Not recommence any work at the particular location unless authorised in writing by Heritage NSW.

Appendix G: Site photos

	
Photo 1 – View to the east across the existing track with the bridge is proposed.	Photo 2 – Existing track to the west of the proposed bridge.
	
Photo 3 – View to the west from the existing track.	Photo 4 – View to the west looking across the proposed bridge level
	
Photo 5 – View upstream in the Talywalka Creek.	Photo 6 – View downstream in the Talywalka Creek.

	
Photo 7 – February 2022 flooding at the bridge area	Photo 8 – February 2022 flooding at the bridge area