Standard Pastoral Land Clearing Application - Section 91F Pastoral Land Act 1992

CONTEXT: This form should be used for pastoral land clearing (PLC) applications that do not qualify for the simplified assessment process outlined in Schedule 1 of the PLC Guidelines, as published by the Pastoral Land Board in accordance with the *Pastoral Land Act 1992*. The questions in this application form seek to address the 'Matters to be taken into account' by the Pastoral Land Board as specified in the PLC Guidelines. For further information contact the Vegetation Assessment Unit, Department of Environment, Parks and Water Security (DEPWS) on (08) 8999 4454 or refer to the following website https://nt.gov.au/property/land-clearing/pastoral-land/clearing-native-vegetation-on-pastoral-land.

PRE-LODGEMENT: Applications will be screened by the Vegetation Assessment Unit before being accepted for assessment to ensure applications contain all the information required to enable assessment. Incomplete applications will not be accepted. Applicants are encouraged to contact the Vegetation Assessment Unit to discuss their application prior to submission.

LODGEMENT: Submit the completed form with all required attachments and associated spatial data (e.g. proposed clearing shapefile/kml, land types shapefile/kml.) through Development Applications Online.

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1. Application details

Station Name:	Hayfield Perpetual Pastoral Lease
NT Portion/s:	7513 and 1077
Pastoral District:	Sturt Plateau
Pastoral Lease No:	1135
Proposed Clearing Area (ha)	54.31
Document Version Number:	2.0
Date:	7/01/2025

2. Applicant details

For an application to be correctly made under section 91F of the *Pastoral Land Act 1992*, it must be lodged by the pastoral lessee or a person authorised by written consent from the pastoral lessee. Once the application has been accepted, payment of the application fee should be made to the Receiver of Territory Monies and the receipt forwarded to PastoralAssessment.DEPWS@nt.gov.au.

Form completed by:	Natalie Calder
Name of consultant:	SLR Consulting
Name of lessee:	A.P.N. Pty Ltd
Applicant* name:	Warren Twist, APA SPP Pty Ltd
Applicant* telephone:	0410 541 391
Applicant* email:	warren.twist@apa.com.au
Applicant* postal address:	Level 12, 80 Ann Street, Brisbane QLD 4000

*All correspondence regarding the application will be directed to the applicant.

☒ Attach Lessee/s Authorisation form.

Attachment No: 1 – Lessee Authorisation form

3. Description of proposal

Provide an overview summarising the proposed development. Include any relevant information or details you wish to be considered that is not captured in the following sections, including design rationale.

APA SPP Pty Ltd proposes to construct and operate the Sturt Plateau Pipeline (the Project). The Project will receive gas from Tamboran B2 Pty Ltd's approved gas exploration and appraisal project in the Beetaloo Basin and transport it to the Amadeus Gas Pipeline.

This application seeks a permit to clear approximately 54.31 hectares (ha) of vegetation on Hayfield PPL for the purpose of constructing and operating:

- a buried gas pipeline within a nominally 30 m wide construction right of way (CROW) plus additional work spaces within a 500 m wide pipeline corridor
- temporary and permanent infrastructure.

The exact alignment of the pipeline is subject to additional investigations. Whilst this application seeks a permit for a 500 m wide linear corridor footprint and additional areas for surface facilities, clearing of native vegetation will be restricted to (and only take place within) a nominally 30 m wide linear portion of this corridor and those areas indicated for temporary and permanent infrastructure associated with the Sturt Plateau Pipeline.

As the Project spans Hayfield and Shenandoah PPL a pastoral land clearing application for proposed clearing within Shenandoah PPL has been lodged concurrently with this application. A detailed project description is provided in **Attachment 2: Supporting Information Report**.

The Project requires a Pipeline Licence and Pipeline Management Plan under the *Energy Pipelines Act 1981*.

4. Existing clearing

4.1 Provide details of the extent of existing clearing within the lease.

Note: All PLC permits are published online at https://nt.gov.au/property/land-clearing/pastoral-land/pastoral-land-clearing-applications-and-permits

Site	Area (ha)	Year cleared	Permit No.	Area within proposed clearing extent (ha)	Description
NT Portion 7513	8.87	Unknown	NA	8.87	Gravel pit
Total:	8.87			8.87	

☒ Attach a map showing areas of existing clearing within the property

Attachment No: Attachment 3 – Proposed Clearing Plan

5. Proposed clearing

5.1 Provide details of the proposed clearing extent.

Site Id	Proposed Use	Area (ha)
Hayfield (NT Portion 7513)	Pipeline and construction camp	25.18
Hayfield (NT Portion 1077)	Pipeline and Sturt Plateau Facility	29.13

Total:	54.31

5.2 Provide a proposed Clearing Plan

The proposed Clearing Plan is a map showing the geo-referenced location of the proposed clearing areas as identified in Section 5.1. The maps should include:

- The map datum (e.g. GDA94)
- The map projection or zone
- A north arrow
- A grid or scale bar
- A suitable background (e.g. cadastre and aerial/satellite imagery)

☒ Attach proposed Clearing Plan.

Attachment No: Attachment 3 – Proposed Clearing Plan

6. Water Resources

6.1 Does the proposed use require irrigation?

☐ Yes ☒ No

6.2 Provide details regarding the proposed water requirements for each proposed crop/use.

Note: If the proposal requires irrigation and a Water Extraction Licence (WEL) has not been issued, refer to https://nt.gov.au/environment/water or contact the Water Resources Division, DEPWS by email waterresources@nt.gov.au or telephone: (08) 8999 4455.

Crop/Use & Polygon	Area (ha)	Water required (ML/yr)	Water source	Licence required (yes/no)	Licence No. or application status
Construction camp, construction water and dust control	N/A	40	New bore	Yes	Application required
Construction water, dust control and hydrostatic testing of the pipeline	N/A	30	Existing bores	Yes	GRF10285*
TOTAL:	N/A	70			

☒ Attach a copy of any relevant licences or bore reports.

Attachment No: Attachment 4 – Water Extraction Licence GRF10285

*Water will either be sourced from Tamboran B2 Pty Ltd or a related company under an existing WEL.

7. Land Resources

Note: Most published land resource mapping and soil site data is available on NR Maps at: https://nrmaps.nt.gov.au/nrmaps.html. This broad scale mapping can provide useful information and guidance with respect to planning a more detailed site-specific resource assessment to prepare a Land Type map*. For further information view: https://depws.nt.gov.au/rangelands/information-and-requests/land-soil-vegetation-information

*Applicants may be asked to provide site inspection data (e.g. inspection track, sites and data) to aid assessment.

7.1 Provide a Land Type map for the proposed clearing extent.

Note: Consideration of an application cannot proceed without the collection and orderly presentation of field-verified site-specific data and mapping. In accordance with the Northern Territory Planning Scheme (NTPS) Land Clearing Guidelines (LCG) (refer to Land and Vegetation Resource Assessment - sections 4.2.3 to 4.2.6) all clearing applications need to be accompanied by an appropriate soil, vegetation and land resource assessment in the form of a Land Type map at a scale of 1:5,000 to 1:20,000.

☒ Attach a Land Type map for proposed clearing extent.

Attachment No: Attachment 5 – Land Type Map

Spatial Data Source: Brocklehurst, P. and Trueman, M. (IN PREP). 1:250,000."Land Types of the Southern Part of the Northern Territory". July 29, 2015. Rangelands Division, Department of Environment and Natural Resources.

☒ Attach one Land Type description for each Land Type unit (use proforma at **Appendix A** – Land Type description proforma).

Attachment No: Attachment 6 – Land Type Descriptions

Source: Burley, P., Carnarvas, M. & Hempel, J. (2019). Soil and Land Suitability Assessment for Irrigated Agriculture in the Dunmarra Area. Available at: https://hdl.handle.net/10070/780402 [accessed 21 September 2024]

7.2 Determine whether a Land Capability Assessment (LCA) or a Land Suitability Assessment (LSA) is required.

Note: In accordance with Land capability and land suitability classifications (section 4.2.2) of the NTPS LCG; land capability evaluates a common set of broad land-based development constraints and determines the appropriateness of the land in general for a broad range of land uses, whereas land suitability assesses the potential of a soil or land resource for a specific irrigated agricultural land use. To determine the type of assessment required, contact the Land Assessment Branch, DEPWS (08) 8999 4443.

☐ LCA required (complete Question 7.3); **OR**

☐ LSA required (complete Question 7.4)

A review of the Project in terms of land capability and land suitability has been undertaken. The Project does not include any elements of irrigated agricultural land, therefore a Land Suitability Assessment is not considered necessary. A Land Capability Assessment is not relevant for the Project because:

- The linear nature of the proposed development and associated footprint is considered negligible when compared with the scale of the pastoral land use in which it is located.

- The main potential changes to soil will be temporary during the construction phase, and other than the above ground plant and equipment facilities, the disturbed soil and land within the defined corridor will be rehabilitated and revegetated in accordance with management plans.
- The potential impacts during construction will be mitigated through the implementation of soil and erosion control measures, implemented in accordance with construction and operational phase management plans.
- As part of the clearing, topsoil will be stripped and stockpiled within the corridor and reinstated, hence the soil condition in the upper horizon will be similar to prior to construction.
- It is considered that there will be minimal degradation to the land resource and receiving environment in the short, medium and long-term, beyond the construction period.
- Clearing works will be managed to mitigate potential land degradation or erosion caused by construction works and operational activities.

It is therefore considered that the soil and land resource being considered is appropriate for the intended use with the mitigation.

7.3 Provide a LCA for Land Types within the proposed clearing extent.

Note: In accordance with the LCG, LCA (section 4.2.7) evaluates the key soil and land resource attributes recorded within a Land Type map against a defined set of criteria to determine an overall Land Capability Class.

☐ Attach a LCA table for Land Types within the proposed clearing extent (use proforma at **Appendix B** – Land Capability Assessment table).

Attachment No: Not applicable

☐ Attach a map of the proposed clearing extent showing the Land Types' overall Land Capability Classes.

Attachment No: Not applicable

7.4 Provide a LSA report for Land Types within the proposed clearing extent.

Note: In accordance with LCG (section 4.2.8), LSA involves the assessment of the requirements for a particular land use against soil and landscape attributes that influence sustainable production. LSA is crop-specific and uses a defined set of standard land use requirements to evaluate plant growth limitations, machinery use restrictions, land preparation factors, irrigation efficiency and susceptibility to land degradation. DEPWS has published a series of LSA frameworks describing the limitations, attribute values and decision rules required to assess the suitability of soil and land resources within a region for a range of specific irrigated agricultural land uses.

☐ Attach a LSA report for the proposed clearing extent.

Attachment No: Not applicable

☐ Attach a map of the proposed clearing extent showing the Land Types' overall Land Suitability classes.

Attachment No: Not applicable

8. Biodiversity

8.1 Describe any records of threatened flora and fauna species or migratory species listed under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) within 10km of the proposed clearing extent. Also describe any such species for which there are no records but have a reasonable likelihood of occurring within the habitats (i.e. Land Types) comprising the proposed clearing extent.

Note: For further information, refer to the following websites or contact the Flora and Fauna Division, DEPWS via email Biodiversity.Assessments@nt.gov.au or telephone: 08 8995 5000. Add additional rows to the table as needed.

http://nrmaps.nt.gov.au/

www.nt.gov.au/environment/animals/classification-of-wildlife

http://www.environment.gov.au/epbc/protected-matters-search-tool

A likelihood of occurrence assessment for threatened fauna species or migratory species listed under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) within 30 km of the Project Area is provided in Table 21 of **Attachment 7 – Ecological Assessment**. No threatened flora species occur within 10km of the Project Area. The following species were recorded within 10 km of the proposed clearing extent or determined to have a moderate or high likelihood of occurring within the Project Area based on outcomes of desk- and field-based assessments:

Common name	Species	TPWC	EPBC	Location
Northern Blue-tongued Skink	*Tiliqua scincoides intermedia*	Not Listed	Critically Endangered	3 local records. North, within 5 km of the Project Area, along the Stuart highway corridor. (NR Maps). High likelihood of occurrence.
Australian Painted-snipe	*Rostratula australis*	Endangered	Endangered	1 local record. North, within 5 km of the Project Area, along the Stuart highway corridor. (NR Maps). Moderate likelihood of occurrence.
Gouldian Finch	*Erythrura gouldiae*	Vulnerable	Endangered	Observed 9 km North of the Project Area during field surveys of the Project Area. Moderate likelihood of occurrence.
Northern Quoll	*Dasyurus hallucatus*	Threatened	Endangered	North, within 5 km of the Project Area, along the Stuart highway corridor. Data is unconfirmed from an unknown source (NR Maps)
Greater Bilby	*Macrotis lagotis*	Vulnerable	Vulnerable	North, within 5 km of the Project Area, along the Stuart highway corridor. Identified in 1930 (NR Maps)
Grey Falcon	*Falco hypoleucos*	Vulnerable	Vulnerable	1 local records. North, within 5 km of the Project Area, along the Stuart highway corridor. (NR Maps). Moderate likelihood of occurrence.

Common name	Species	TPWC	EPBC	Location
Painted Honeyeater	*Grantiella picta*	Vulnerable	Vulnerable	1 local record. North, within 5 km of the Project Area, along the Stuart highway corridor. (NR Maps). Moderate likelihood of occurrence.
Yellow-Spotted Monitor	*Varanus panoptes*	Vulnerable	Not Listed	2 local records. North, within 5 km of the Project Area, along the Stuart highway corridor. Approximately 5 km South of the Project Area along the Stuart Highway Corridor. 10 km directly South of the Project Area, within the Stuart Highway Corridor.
Common Greenshank	*Tringa nebularia*	Least Concern	Migratory	North, within 5km of the Project Area, along the Stuart highway corridor. Approximately 5 km South of the Project Area along the Stuart Highway Corridor. (NR Maps)
Glossy Ibis	*Plegadis falcinellus*	Least Concern	Migratory	11 local records. Observed during field surveys of the Project Area. Moderate likelihood of occurrence.
Marsh Sandpiper	*Tringa stagnatilis*	Least Concern	Migratory	Dunmarra Lake, Stuart Hwy
Oriental Pratincole	*Glareola maldivarum*	Least Concern	Migratory	Moderate likelihood of occurrence.
Sharp-tailed Sandpiper	*Calidris acuminata*	Least Concern	Migratory	North, within 5 km of the Project Area, along the Stuart highway corridor. Approximately 5 km South of the Project Area along the Stuart Highway Corridor. (NR Maps)

8.2 Describe potential impacts to species identified above from the proposed clearing.

Note: To determine the risk to threatened species, information should be considered at the scale of the proposed clearing and at a regional context. Consider any associations that the species may have with landforms, vegetation structure or dominant plant species proposed for clearing.

A significant impact assessment for threatened fauna species or migratory species listed under the *Territory Parks and Wildlife Conservation Act 1976* (TPWC) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) within 30 km of the Project Area is provided in Table 21 of **Attachment 7 – Ecological Assessment**.

Common name	Potential impact	Risk*	Justification
Northern Blue-tongued Skink	Habitat loss	Medium	This species has a high likelihood of occurrence within the Project Area. This species has not been observed in the Project Area but has been observed in the surrounding region. Clearing within Hayfield PPL may impact around 45.02 ha of previously undisturbed habitat for this species. Clearing associated with the whole Project, across both pastoral leases, may impact around 134.70 ha of suitable habitat, which is just 0.05% of the available regional habitat. The remaining habitat will remain unaffected.
Australian Painted-snipe	Habitat loss	Medium	This species has a moderate likelihood of occurrence within the Project Area. This species has not been observed in the Project Area. Clearing within Hayfield PPL may impact around 11.98 ha of previously undisturbed habitat for this species. Clearing associated with the whole Project, across both pastoral leases, may impact about 22.57 ha of suitable habitat, which is only 0.65% of the available regional habitat. The remaining habitat will be unaffected.
Gouldian Finch	Habitat loss	Medium	This species has a moderate likelihood of occurrence within the Project Area. This species has not been observed in the Project Area. Clearing within Hayfield PPL may impact around 33.04 ha of previously undisturbed habitat for this species. Clearing associated with the whole Project, across both pastoral leases, may impact approximately 112.14 ha of its habitat, representing only 0.05% of the available regional habitat. The remaining habitat will be unaffected.
Northern Quoll	Habitat loss	Low	This species is unlikely to occur in the Project Area or the surrounding region. This species or its habitat may occur more than 90 km North of the Project Area and is likely to occur more than 150 km North of the Project Area. There is 1 local record of the Northen Quoll approximately 3 km North of the Project Area. This data is undated and from an unknown source.
Greater Bilby	Habitat degradation	Low	There are no recent local record identifying the Greater Bilby. There was no evidence of this species recorded during the survey. The Project Area overlaps modelled non-core distribution of this species and is outside the Baker and Gynther (2023) modelled extant of distribution of this species. As the Project Area occurs on the fringe of historical occurrence records and the historical distribution of this species. It is therefore unlikely that this species will occur in the Project Area or the surrounding area, so the risk of impacts is low.

Common name	Potential impact	Risk*	Justification
Grey Falcon	Habitat fragmentation	Medium	This species has a moderate likelihood of occurrence within the Project Area. Clearing within Hayfield PPL may impact around 45.02 ha of previously undisturbed habitat for this species. The Project Area does not support an important population of this species. Clearing associated with the whole of the Project, across both pastoral leases, may impact around 134.70 ha of potential habitat, which is just 0.05% of the regional habitat. The remaining habitat will be unaffected.
Painted Honeyeater	Habitat loss	Medium	This species has a moderate likelihood of occurrence within the Project Area. The Project Area does not support an important population of this species. Clearing within Hayfield PPL may impact around 14.25 ha of previously undisturbed habitat for this species. Clearing associated with the whole Project, across both pastoral leases, may impact approximately 83.96 ha of habitat, which is just 0.04% of the available regional habitat. The remaining habitat will be unaffected.
Yellow-Spotted Monitor	Habitat disruption	Medium	This species has a high likelihood of occurrence within the Project Area. The Project Area does not support an important population of this species. Clearing within Hayfield PPL may impact around 45.02 ha of previously undisturbed habitat for this species. Clearing associated with the whole Project, across both pastoral leases, may impact around 134.70 ha of potential habitat, which is just 0.05% of the regional habitat. The remaining habitat will remain unaffected.
Common Greenshank	Disturbance	Low	This species has a low likelihood of occurrence within the Project Area. There are three DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within.
Glossy Ibis	Habitat alteration	Low	This species has a moderate likelihood of occurrence within the Project Area. This species has not been recorded in the Project Area, which also does not provide important habitat or a significant portion of its population. It has been observed in the immediate surrounding are and the surrounding region. The Project will not significantly impact this species.

Common name	Potential impact	Risk*	Justification
Marsh Sandpiper	Disturbance	Low	There are five DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north of the proposed alignment (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
Oriental Pratincole	Habitat modification	Low	This species has a moderate likelihood of occurrence within the Project Area. This species has not been recorded in the Project Area, which also does not support important habitat or a significant portion of its population.
Sharp-tailed Sandpiper	Habitat disruption	Low	This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat. There are 17 DEPWS (2024a) local records of this species within 30 km of the Project Area. The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within.

*Use the following risk matrix (adapted from Table 17 in the LCG):

Risk rating	Characteristics
Low	The proposed clearing extent is characterised by a combination of factors such as: • It is a relatively small area • It does not contain sensitive or significant vegetation • It is unlikely to provide habitat for the identified species • It is unlikely to cause offsite impacts to the identified species.
Medium	The proposed clearing extent has characteristics between the Low and High risk classes. (e.g. it may support the identified species, however the local occurrence of the species may not be considered significant or the extent of clearing as a proportion of habitat available to the species may be sufficiently small enough to not pose a High risk).
High	The proposed clearing extent is important habitat for the identified species. Note: If the clearing has the potential to negatively impact the species identified, even a small clearing extent could be categorised as high risk.

8.3 Identify which of the following types of sensitive features are present within proximity of the proposed clearing extent.

Feature	LCG	Present/Absent
Drainage depressions and streams	Section 4.4.7	Present
Wetlands	Section 4.4.8	Present
Groundwater Dependent Ecosystems	Section 4.4.8	Absent
Sinkholes	Section 4.4.9	Absent
Other sensitive or significant vegetation	Section 4.4.6	Present

8.4 Identify the individual sensitive features within proximity of the proposed clearing extent and the associated Land Type.

Note: Refer to the relevant sections of the LCG (identified above) for information regarding recommended native vegetation buffer widths and value attribution.

<table>
<tr><th>Feature</th><th>Land Type</th><th>Value / Order</th><th>Location in relation to proposed clearing extent</th><th>LCG recommended buffer width (m)</th><th>Proposed buffer width (m)</th></tr>
<tr><td rowspan="4">Riparian Vegetation</td><td rowspan="4">E. microtheca open woodland on floodplains
E. microtheca and Lophostemon grandiflorus open woodland on floodplain fringes.</td><td>First</td><td rowspan="2">Intersects Project Area along mapped watercourses</td><td>25</td><td>0</td></tr>
<tr><td>Second</td><td>50</td><td>0</td></tr>
<tr><td>Third and Fourth</td><td>N/A</td><td>100</td><td>N/A</td></tr>
<tr><td>Fifth and higher</td><td>N/A</td><td>250</td><td>N/A</td></tr>
<tr><td>Floodplain Areas</td><td>Melaleuca low open woodland on floodplains and drainage depressions.
Coolabah low open woodland on clay.
Coolabah, Lophostemon and Gutta Percha swamps</td><td>Moderate</td><td>Located in southern sections, Project Area fringe</td><td>100</td><td>0</td></tr>
<tr><td>Drainage Depressions</td><td>Melaleuca low open woodland on floodplains and drainage depressions.</td><td>N/A</td><td>Present on-site</td><td>25</td><td>0</td></tr>
</table>

8.5 Provide reasons for discretion and describe proposed mitigation measures for any proposed buffers that are not consistent with LCG recommendations.

Note: Additional supporting evidence should be attached.

Feature	Reasons for discretion	Proposed mitigation
Riparian Vegetation	Clearing of riparian vegetation is unavoidable where the project crosses waterways due to the linear nature of the project.	Minimize clearing; install erosion and sediment controls, progressively rehabilitate areas with native flora.
Wetlands	No permanent wetlands within the project area, but seasonal wetlands occur.	Avoid clearing near sensitive areas; use erosion control measures; monitor runoff and dewatering activities to prevent contamination.
Drainage Depressions	Required access through certain drainage lines for pipeline installation.	Install erosion and sediment controls; apply 25 m buffer where possible; restore natural drainage after construction.

☒ Attach relevant supporting evidence.

Attachment No: Attachment 7 – Ecological Assessment, Section 6.1

8.6 Identify the wildlife corridors to be retained within proximity of the proposed clearing extent and reasons for siting and design.

Note: A corridor of 100m is considered the minimum width to be viable in the NT context for general application and as a default, corridor density should be at a rate of one corridor per linear kilometre of clearing or equivalent – refer to LCG section 4.4.10. Question 3 in the Land Management Plan (template available at Appendix E – Land Management Plan) addresses property boundary buffers.

Corridor Id.	Location	Proposed width (m)	Justification
N/A	N/A	N/A	There will be no wildlife corridors developed as part of this Project. The pipeline will be buried and the CROW will be rehabilitated with native grasses and shallow rooted shrubs to reduce barriers to wildlife movement, ensuring that critical ecological functions, such as foraging and dispersal, are preserved despite the development. During construction, the open trench will form a temporary barrier to fauna. Mitigation measures will be implemented in accordance with the Australian Pipelines and Gas Association Ltd (APGA) Code of Environmental Practice – Onshore Pipelines (APGA 2022). Fauna controls may include the use of fauna shelters, earth plugs or access ramps at prescribed distances of open trench as well as daily fauna trench checks of open sections of trench and bell holes at a prescribed number of times and certain time of day. The length of open trench will also be minimised where possible to reduce the number of trapped fauna and the resources required.

8.7 Assess the risk of the proposed clearing to regional biodiversity and provide an overall risk rating.

Note: To determine the risk to regional biodiversity, information is to be considered at the scale of the proposed clearing footprint and evaluated within a regional context. Refer to Section 4.2 and 4.3 of the LCG or contact the Flora and Fauna Division, DEPWS (telephone: 08 8995 5000).

Consideration	Yes/No	Explain
Are there any important biodiversity values within the proposed clearing extent?	Yes	Important biodiversity values within the clearing extent include sensitive and significant vegetation communities (riparian vegetation), introduced flora and fauna species; and threatened and migratory fauna species.
Are there any important biodiversity values within proximity of the proposed clearing extent?	Yes	Important biodiversity values within the immediate area include drainage depressions and non-permanent wetlands.
Does the proposed clearing have the potential to impact any important biodiversity values?	Yes	Clearing may result in habitat fragmentation; however, the design of the infrastructure and revegetation plan aims to reduce barriers to wildlife movement, ensuring that critical ecological functions, such as foraging and dispersal, are preserved despite the development.
Have all reasonable alternatives been considered to avoid impacts to important biodiversity values?	Yes	Compared to alternative locations for the pipeline, the proposed pipeline alignment minimises the impact to high-value habitats where possible.
What is the overall biodiversity risk rating (Low, Medium High)?	Low	The proposed clearing may impact important biodiversity values. The majority of these impacts will either be on low value features or be small in scale. Impacts will be managed through mitigation measures. Implementation of these measures will likely result in impacts to native vegetation, water, and soil being of low risk within otherwise sparse vegetation communities.

9. Infrastructure and Amenity

9.1 Describe any public facilities, utilities or infrastructure within the locality and how any potential impacts from the proposed clearing development will be managed.

Infrastructure	Location	Potential impacts	Proposed mitigation
Stuart Highway	Adjacent to Project Area	Increased traffic during construction, potential dust generation from heavy vehicle movements.	Implement Traffic Management Plan, notify public of construction schedules, use dust suppression.
Buchanan Highway	North of Project Area	Increased traffic during construction, potential dust generation from heavy vehicle movements.	Implement Traffic Management Plan, notify public of construction schedules, use dust suppression.

Dunmarra Roadhouse	3 km north of Project Area	Increased traffic and potential demand on services during peak construction.	Coordinate with Dunmarra for potential overflow accommodation; communication on demand projections.

9.2 Identify any public roads or public facilities within 200m of the proposed clearing extent.

Note: Refer to LCG sections 4.3.5 and 4.3.5.1.

Feature	Distance from proposed clearing extent (m)
Stuart Highway (A1 – Rural National Highway)	110 m
Buchanan Highway (D – Rural State Arterial (unsealed)	Approximately 10 km from project clearing extent.

9.3 Assess the risks posed to the following public values and the proposed mitigation measures.

Note: Risk assessment should describe the likelihood of impacts occurring and the potential consequences.

Value	Risk	Mitigation
Amenity	Noise and dust from construction activities.	Schedule works during daytime; dust suppression methods.
Recreation	Minimal impact anticipated.	Public notices about temporary access changes during construction.
Tourism	Potential disruption to highway access.	Traffic management plan.
Parks / Reserves	No impact to parks or reserves identified.	No national parks or conservation areas nearby.

10. Land Management

10.1 Attach a proposed Establishment Plan (see template at **Appendix C – Establishment Plan**).

☒ Attach the Establishment Plan

Attachment No: Appendix C – Establishment Plan

10.2 Attach a proposed Staging Plan (see template at **Appendix D – Staging Plan**).

☒ Attach the Staging Plan

Attachment No: Not applicable

10.3 Attach a proposed Land Management Plan (see template at **Appendix E – Land Management Plan**).

☒ Attach a proposed Land Management Plan

Attachment No: Attachment 8 – Land Management Plan and Appendix E – Land Management Plan

11. Weed Management

11.1 List all weeds declared under the *Weeds Management Act 2001* present within the property and describe the proximity of species to the proposed clearing extent.

Note: For information refer to: https://nt.gov.au/environment/weeds and NR Maps https://nrmaps.nt.gov.au/nrmaps.html.

Weed species	Class	Location	Density
Khaki Weed *Alternanthera pungens*	B	Identified within a 30km buffer area during a desktop assessment	Low
Rubber Bush *Calotropis procera*	B/-	Identified within a 30km buffer area during a desktop assessment	Low
Noogoora Burr *Xanthium strumarium*	B	Identified within a 30km buffer area during a desktop assessment	Low
Bellyache Bush *Jatropha gossypiifolia*	A/B	Identified within a 30km buffer area during a desktop assessment	Low
Parkinsonia *Parkinsonia aculeata*	B	Identified within a 30km buffer area during a desktop assessment	Low
Coffee Senna *Senna occidentalis*	B	Identified within a 30km buffer area during a desktop assessment	Low
Hyptis *Hyptis capitata*	B	Identified within a 30km buffer area during a desktop assessment	Low
Hyptis *Mesosphaerum suaveolens*	B	Identified on existing access tracks during the ecological survey	Low
Neem *Azadirachta indica*	B	Identified within a 30km buffer area during a desktop assessment	Low
Flannel Weed *Sida Cordifolia*	B	Identified on existing access tracks during the ecological survey	Low

Weed species	Class	Location	Density
Note: species found during survey were found in low abundance and were isolated to disturbed sections of access tracks within the clearing extent. No Weeds of National Significance were identified within the survey area.			

11.2 Provide details of weed management on the property.

Note: Consider whether the weed has a statutory Weed Management Plan https://nt.gov.au/environment/weeds/how-to-comply-with-the-law/statutory-weed-management-plans

Weed species	Management Aim	Method	Current / Proposed
Hyptis (Hyptis capitata)	Containment and suppression	Hand-pulling; spot spraying with herbicide where dense	Proposed
Flannel Weed (Sida cordifolia)	Suppression	Herbicide spraying; prevent flowering and seeding	Proposed

12. Cultural Heritage

12.1 Provide details of any heritage or archaeological surveys conducted within the property and any findings relevant to the proposed clearing extent.

<table>
<tr><th>Survey name</th><th>Year conducted</th><th>Completed by</th><th>Findings relevant to the proposed clearing extent</th></tr>
<tr><td>Cultural Heritage Field Assessment Report: APA SPP Pty Ltd, Sturt Plateau Pipeline</td><td>2024</td><td>Remote Heritage Services</td><td>No significant heritage sites were identified during the survey. The wider Project Area presents a low risk for lithic resources and riparian occupation sites. While local vegetation patterns suggest potential for past human activity, there is no strong indication of durable archaeological materials within the proposed construction footprint.</td></tr>
<tr><td>Archaeological Survey of the Beetaloo Basin</td><td>2008</td><td>de Rochefort and Williams</td><td rowspan="2">Attachment 9 – Heritage Desktop Assessment (REDACTED), in part, summarises the four archaeological assessments as suggesting: isolated stone artefacts may be the most frequently encountered site type, with stone artefact scatters and contact artefacts appearing less common. A higher number of sites were recorded in the Birrimbah land system compared to the Beetaloo system. This pattern might suggest more frequent utilisation of the Birrimbah area or potentially</td></tr>
<tr><td>Katherine optical fibre cable route Aboriginal archaeological site investigations and mitigation work, Amadeus Basin to Darwin natural gas pipeline</td><td>1991</td><td>Coates</td></tr>
</table>

Archaeological Survey at Dunmarra Roadhouse	Pre-1997	Macfarlane	better preservation of archaeological sites within this system. Proximity to water resources seemed to be associated with a notable number of features
Aboriginal & Historic Heritage Assessment: 2018 Exploration Lease Areas	2019	AECOM 2019 (Surveys completed 2017)	
Amadeus Basin to Darwin Natural Gas Pipeline – Spread 2 internal report on the archaeological findings	1986	Hermes 1986	Large scale survey for a proposed natural gas pipeline targeting areas of major cultural sensitivity from Daly Waters to Katherine. Thirty-two sites were identified with the majority being artefact scatters associated with watercourses.

☒ Attach relevant information (e.g. maps, site descriptions, etc.) from the survey relevant to the proposed clearing extent.

Attachment No: Attachment 9 – Heritage Desktop Assessment (REDACTED)

This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

Attachment No: Attachment 10 – Heritage Field Assessment (CONFIDENTIAL)

This report is not publicly available because it contains culturally sensitive information and third-party personal information.

12.2 Provide details of any known (i) places, (ii) archaeological places, or (iii) Aboriginal or Macassan archaeological places, within the meaning of the *Heritage Act 2011* located within the property.

Note: Risk assessment should describe the likelihood of impacts occurring and the potential consequences. For more information go to https://nt.gov.au/property/land/heritage-listings/heritage-register-search-for-places-or-objects .

Place / Site	Location in relation to the proposed clearing extent	Risk	Mitigation
N/A – Please refer to attachments. No registered sites within the Project Area		Low	Clearing will be restricted to within limit of Project Area.

☒ Attach a map showing the location of any declared sites/places in proximity to the proposed clearing extent.

Attachment No: Attachment 9 – Heritage Desktop Assessment (REDACTED)

This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

Attachment No: Attachment 10 – Heritage Field Assessment (CONFIDENTIAL)

This report is not publicly available because it contains culturally sensitive information and third-party personal information.

12.3 Contact the Heritage Branch, Department of Territory Families, Housing and Communities for advice regarding the proposed clearing in relation to the *Heritage Act 2011*.

Note: The Heritage Branch can be contacted via email: heritage.branch@nt.gov.au or telephone 08 8999 5039.

☒ Attach a copy of the advice.

Attachment No: Attachment 9 – Heritage Desktop Assessment (REDACTED)

This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

12.4 Provide details of any sacred sites within the meaning of the *Northern Territory Aboriginal Sacred Sites Act 1989* located within proximity of the proposed clearing extent.

Note: Risk assessment should describe the likelihood of impacts occurring and the potential consequences. For more information go to https://www.aapant.org.au/ .

Site	Location in relation to the proposed clearing extent	Risk	Mitigation
N/A – Please refer to attachments. APA will provide an Authority Certificate when it becomes available		Low	Clearing will be restricted to within limit of Project Area and will occur in accordance with conditions of the Authority Certificate.

☒ Attach a map showing the location of any declared sites in proximity to the proposed clearing extent.

Attachment No: Attachment 9 – Heritage Desktop Assessment (REDACTED)

This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

12.5 Aboriginal Areas Protection Authority

Contact the Aboriginal Areas Protection Authority to obtain an Abstract of Records and consent to use the information for the purposes of this application.

☒ Attach the Abstract of Records

Attachment No: Attachment 9 – Heritage Desktop Assessment (REDACTED)

This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

Have you, or do you intend to apply for an Authority Certificate?

☒ Yes Attachment No: Currently not available

If yes, please provide a copy of the Authority Certificate as part of the application or before the Pastoral Land Board determines the application.

☐ No

If an Authority Certificate is not provided and you do not intend to apply for an Authority Certificate, please explain why an Authority Certificate has not been included as part of the application.

APA SPP Pty Ltd's application for an Authority Certificate was accepted by the Aboriginal Areas Protection Authority on 15 July 2024. The subject land for the Authority Certificate includes the Project Area.

13. Greenhouse Gas Emissions

13.1 Estimate the emissions (tonnes CO_{2-e}) from the clearing.

8,187.93 tCO_2-e

Note: Under the NT Government's Greenhouse Gas Emissions Management for New and Expanding Large Emitters' Policy, which came into effect in September 2021, a land use project generating over **500 000 tCO_2-e** from a single clearing event, OR cumulatively from multiple land clearing actions on a property over time is required to develop a Greenhouse Gas Abatement Plan (GGAP) which demonstrates how emissions will be managed and reduced.

Information on how to obtain an estimate of the average emissions (tCO_{2-e}) per hectare for your project can be found here or by accessing the link at https://nt.gov.au/property/land-clearing/pastoral-land/clearing-native-vegetation-on-pastoral-land

14. Environment Protection

14.1 Has the application been referred for assessment under the *Environment Protection Act 2019?*

Note: Refer to the document 'Referring a proposal to the NT EPA' available on the following website https://ntepa.nt.gov.au/your-business/environment-impact-assessment or contact the Environment Division, DEPWS via telephone 08 8924 4218 or email eia.ntepa@nt.gov.au

☐ Not referred;

  ☐ Attach a completed referral checklist located in Appendix 1 of Referring a proposal to the NT EPA

  Attachment No: ___________________

☒ Referred;

  ☐ Attach advice from the NT EPA

  ☒ Advice not available yet

Attachment No: Attachment 11 – Pre-referral Screening Tool

14.2 Assess the risks associated with the following potential pollutants from clearing and development works and describe the proposed mitigation measures. Consideration of risk should include potential sources, the likelihood of impacts occurring and the potential consequences.

Note: Under the *Waste Management and Pollution Control Act 1998* everyone in the NT has a 'general environmental duty' to not carry out any activity that causes or is likely to cause environmental harm, unless measures to prevent or minimise the harm have been taken. For more information refer to the following website https://ntepa.nt.gov.au/your-business/environmental-obligations-and-duties or contact the Environment Division, DEPWS via telephone 08 8924 4218 or email pollution@nt.gov.au.

For information regarding spray drift and the *Agricultural and Veterinary Chemical (Control of Use) Act 2004* contact Chemicals Services, DITT via email chemicals@nt.gov.au or telephone 08 8999 2344.

Potential pollutants	Risk	Mitigation
Dust	The risk of dust pollutants is high during construction, but impacts to sensitive receptors, health and adverse soiling are negligible. Once constructed, air emissions from the Project will be minimal.	Daily visual inspections, water cart spray during dry conditions.
Chemical spray drift	Low	Limit chemical use, apply buffer zones near sensitive areas.
Chemical runoff (to surrounding land or riparian systems)	Medium	Storage of chemicals and fuels in self-bunded containers. Execute erosion and sediment control plan. Install sediment barriers, divert clean water around the site where practicable, monitor water quality near watercourses
Groundwater contamination	Low	Avoid chemical storage near bores; monitor bore levels during construction. Apply buffer zones near sensitive areas.
Noise	Low	Specific noise mitigation measures, such as equipment noise attenuation or silencers, are not warranted.

15. Other relevant information

15.1 Provide any additional relevant information not addressed above and outline in the table below.

Attachment No.	Description
12	Surface Water Assessment
13	References

16. Checklist of Attachments and Required Spatial Data

Complete the following checklist.

Note: Spatial data for the items indicated must be provided before the application will be accepted. ESRI shapefile is the preferred format - kml/kmz also accepted. Contact: PastoralAssessment.DEPWS@nt.gov.au

Attachment No.	Name	Question No.	Item attached	Spatial data
1	Lessee/s Authorisation form	2	Yes	NA
3	Map of existing clearing	4.1	Yes	**Required**
3	Proposed Clearing Plan	5.2	Yes	**Required**
4	Water licence &/or bore reports	6.2	Yes	NA
5	Land Type map	7.1	Yes	**Required**
6	Land Type descriptions	7.1	Yes	NA
	LCA table	7.3	N/A	NA
	LCA map	7.3	N/A	NA
	LSA report	7.4	N/A	NA
	LSA map	7.4	N/A	NA
7	Buffer discretion – supporting evidence	8.5	Yes	NA
Appendix C	Establishment Plan	10.1/Appendix C	Yes	NA
	Staging Plan	10.2/ Appendix D	N/A	NA
8, Appendix E	Land Management Plan	10.3/ Appendix E	Yes	NA
8	Slope & runoff map	10.3/ Appendix E-2	Yes	NA
8	ESC map	10.3/ Appendix E-9	Yes	NA
8	ESC details	10.3/ Appendix E-10	Yes	NA
9, 10	Map of heritage/archaeological places	12.2	Yes	NA
9	Heritage Branch advice	12.3	Yes	NA
9	Map of sacred sites	12.4	Yes	NA
9	Abstract of Records or Authority Certificate	12.5	Yes	NA
11	EPA referral checklist	13.1	Yes	NA
-	EPA advice	13.1	N/A	**Optional**
12, 13	Other additional info	14	Yes	**Optional**

Appendix A – Land Type description proforma

Note: Complete one table per Land Type. Attached as PDF Data generated from Land Type field investigations may be requested – refer to the LCG – Vegetation Data (section 4.2.5).

☐ Attach map showing site inspection track, site locations, photo points and Land Types.

Attachment No:________________

Attribute	Description
Land Type	*E.g. Use a letter or number to distinguish each Land Type.*
Landform	*E.g. Describe the landform, slope range, extent of surface rock. Refer to LCG Section 4.2.4 (Yellow Book).*
Soil	*E.g. Describe the dominant soil in this Land Type highlighting features such as soil texture, depth, colour, occurrence of surface gravel or cracking, Wet season drainage. Refer to LCG Section 4.2.4 (Yellow Book).*
Vegetation	*E.g. Describe the average height and cover of the upper-storey (e.g. individual tree canopies generally overlapping, partially separated, clearly separated or very sparse) and the dominant trees, shrubs, grasses and weeds. Refer to Section 4.2.5 (NVIS level 5).*
Photo No.	*E.g. Insert numbered photo (representative of Land Type) and show location on map.*

Appendix B – Land Capability Assessment table

Note: Refer to the LCG – Land Capability Assessment (section 4.2.7.1).

Land Type	ASS	Flooding	Microrelief	Salinity	Sodicity	Slope	Soil depth	Drainage	Surface Rock	Wind erosion	Initial capability class	Overall capability class

Appendix C – Establishment Plan

Note: Refer to LCG sections 4.3.2.3 and 4.3.2.4.

Activity	E.g.	Timing (month & year)	Method (describe)
Preliminary survey works		July – November 2025	Preliminary survey works will be undertaken to mark the extent of approved work areas. Markers will be placed along the alignment to identify the pipeline centreline, the boundaries of the ROW, any additional work spaces and access roads, if required. Fencing crossing the ROW will be strained and cut and temporary gates and fencing will be installed.
Clearing and grading		July – November 2025	Clearing and grading of the ROW is undertaken to provide a safe and efficient area for construction activities. Clearing of the entire alignment is likely to occur at the commencement of construction works. Clearing will be required to remove trees, shrubs and groundcover vegetation. Graders, bulldozers and excavators are generally used to clear and level the ROW. A ROW width of 30m will generally be cleared and graded. In areas of woody vegetation, trees and shrubs will be mulched or stockpiled as cleared. The method will depend upon the type and density of the vegetation. Rootstock of trees will generally be removed. Cleared vegetation will be stockpiled on one or both sides of the ROW. Breaks will be left in stockpiled vegetation at fence lines, tracks and drainage lines and at locations to allow continued access for stock to water points . Topsoil will be stripped to depths defined by soil surveys, typically over the full width of the ROW. In soil types with topsoil depth of 30cm or greater, the stripping depth may be reduced to ensure stockpiles can be accommodated within the 30m ROW width. Stripped topsoil will be stockpiled on one or both sides of the ROW adjacent to vegetation stockpiles.

Activity	E.g.	Timing (month & year)	Method (describe)
Pipe stringing and bending		July – November 2025	Stringing involves distributing pipe lengths along the ROW in preparation for welding. Pipe lengths will generally be transported to the ROW from laydown areas by extendable semi-trailers. Pipe lengths will be lifted from trucks by excavators fitted with vacuum lifters, side-booms or cranes fitted with lifting hooks or vacuum lifters and laid adjacent to the marked trench location in a defined order. Pipe lengths will be positioned on wooden skids and sandbags to protect the pipe coating from damage. Where required, pipe lengths will be bent using a hydraulic bending machine to match changes in either elevation or direction of the alignment.
Welding		July – November 2025	Specialised construction crews will weld pipe lengths together manually. Pipe lengths will be welded into “strings” of up to approximately 1,200m in length, allowing for stock and landholder access breaks where required. All welds will be subjected to 100% x-ray analysis, ultrasonic testing or other methods to check structural integrity. Non-compliant welds will either be repaired or replaced. Following welding, the weld joints will be cleaned by grit blasting with garnet. An external coating (compatible with the factory applied external coating) will be applied to the weld to prevent corrosion
Trench Excavation	.	July – November 2025	A wheel trencher, rocksaw or excavator will be used to dig the trench to lay the pipeline in. Spoil generated during trench excavation will be stockpiled on the non-working side of the ROW, separate from vegetation and topsoil stockpiled earlier in the construction program. Breaks in the open trench will be included to facilitate stock and wildlife crossings and agricultural vehicle movements. Breaks will also be included at fences and drainage lines as required. Blasting of rock to excavate the trench will only be undertaken if conventional excavation, rock hammering or trenching equipment is found to be ineffective. This is considered unlikely to occur due to favourable geology across most of the alignment.

Activity	E.g.	Timing (month & year)	Method (describe)
Lowering and Backfilling		July – November 2025	Following trench excavation, the welded pipe strings will be lifted off skids and lowered into the trench using side-boom tractors. The pipe coating is inspected and tested for defects as each welded pipe string is lifted. After lowering-in, the strings are welded together (a 'tie-in') in the trench. In some areas, it may be necessary to protect the pipe coating from abrasion damage by placing a layer of padding material in the trench prior to lowering in of the pipeline as well as to cover the pipeline (shading). Padding machines are used to generate padding material by sieving the excavated trench subsoil to remove rocks and coarse materials, and depositing the fine material in the base of the trench. This method minimises, but may not eliminate, the need for importing padding material from other locations. Where required, trench blocks (also known as trench or sack breakers) will be installed prior to backfilling of the trench to control lateral water movement along the trench. Trench breakers are commonly installed in a number of environmental conditions, such as adjacent to watercourses and wetlands, on steep slopes or where drainage patterns change. Trench breakers are constructed typically from sacks of soil or sand, stabilised sand or spray applied polyurethane foam. The trench will then be backfilled with trench spoil and compacted to minimise the risk of settlement.

Activity	E.g.	Timing (month & year)	Method (describe)
Rehabilitation		July – November 2025	with the APGA Code of Environmental Practice and good pipeline construction principles with the aim of: • Returning land to its previous productivity within a reasonable timeframe. • Re-establishing topsoil cover. • Returning all land and waterways to a stable condition. • Ameliorating construction impacts to soil texture, structure and chemical composition, where required. • Reinstating natural drainage patterns. • Spreading of mulch or timber, where appropriate. • Application of seed and fertiliser, where appropriate. • Installing permanent erosion control measures (such as contour banks, filter strips) in erosion prone areas. • Ensuring the pre-construction environment is reinstated and disturbed habitats recreated where they do not affect pipeline operation and integrity (trees and shrubs are discouraged over and near the pipeline to maintain integrity of the pipe coatings) and to enable operational access. Given that the pipeline will be underground, land users will be able to continue regular land use activities.

Activity	E.g.	Timing (month & year)	Method (describe)
Inspections and Maintenance	Regrowth control, weed management, erosion monitoring	2025 Q1	A routine inspection and maintenance program will be implemented during pipeline operation. Inspection of the easement for issues such as erosion, weeds, subsidence, revegetation and unauthorised third party activity will be undertaken on a regular basis by ground and aerial patrols. Aerial patrols will typically be undertaken monthly with ground patrols conducted annually. Frequency of inspections may vary depending upon the particular issue being inspected, or in response to specific conditions such as major rainfall events. Ground patrols of the easement will be generally undertaken by travelling along accessible sections of the easement in light vehicles.

Appendix D – Staging Plan

Note: Standard PLC permits are valid for 10 years. Refer to LCG section 4.3.2.4.

Year	Site Id (e.g. polygon / paddock)
Not applicable.	

Appendix E – Land Management Plan

Note: The following Land Management Plan (LMP) should be developed with reference to the proposed Establishment and Staging Plan. It is not an Erosion and Sediment Control Plan (ESCP). For large or complex clearing areas, preparation and implementation of an Erosion and Sediment Control Plan (ESCP) can be an effective way of managing erosion risk - however it is not an alternative to retaining native vegetation which should otherwise be retained in accordance with the LCG, or used as a "catch-all" means of mitigating other risks the clearing may pose (see LCG section 4.3.2.5). Whether a formal ESCP is required as a condition of a PLC permit will be at the discretion of the PLB/Delegate based on the advice of the Land Management Unit, DEPWS and will depend on the level of detail provided in this LMP and the erosion risk associated with the proposal. For further information, contact the Land Management Unit on 08 8999 4404.

1 Provide a general description of the soil loss factors for the proposed clearing extent:

Note: Refer to Section 4.3.2 of the LCG.

Factor:	E.g.	Description
Rainfall	Consider the climatic zone, seasonal outlook and proposed timing of works.	Clearing will commence in July 2025 and is likely to occur in the wet season. The clearing operation will require monitoring weather conditions to anticipate rainfall events, adjust schedules and delay major clearing activities during heavy rainfall. During the wet season, inspections of erosion and sediment control measures will be increased. Clearing works will be avoided in periods of heavy rainfall to avoid issues with soil compaction/machinery and the risk of soil movement.
Soil	Consider the erodibility of soil types present based on soil type texture and structure. Note whether soils are dispersive or sodic.	The erodibility of the soil types in all of the land types is moderate However as the construction works are being scheduled for the dry season and early wet season months, it is expected that all construction works and rehabilitation of the CROW will be completed before the onset of the 2025/256 wet season. As such, erodibility of soils will not be an issue.
Length of slope	Indicate the average length of slope within the proposed clearing extent and areas that exceed this.	The clearing extent has slopes relatively flat (<1%).
Slope gradient (%)	Indicate the range of slope within the proposed clearing extent (e.g. 0-2%) and areas that exceed 2%.	The areas proposed for clearing within the pipeline extent are flat, with slopes <1%.
Groundcover	Consider the timing, duration and frequency of soil exposure.	To minimise the impact of clearing, large-scale disturbance of the soil surface, which can lead to increased vulnerability to erosion, will be avoided. Timing should align with favourable weather conditions to avoid clearing during the wet season or periods of heavy rainfall. The duration of soil exposure should be kept as short as possible—disturbed areas will be re-vegetated or protected with erosion control measures like mulch or timber, where appropriate. Clearing will be done in phases or sections, with each section quickly followed by the implementation of stabilisation measures to reduce the amount of exposed soil at any given time.

Factor:	E.g.	Description
Management	Consider the level of soil disturbance associated with the proposed method of clearing and land use.	The proposed clearing works will be undertaken in accordance with the construction sequencing, which has yet to be defined. The operations associated with the clearing works will focus on mitigating the impacts of soil disturbance. Measures such effective planning, such as scheduling clearing during dry conditions to reduce soil compaction, using low-impact machinery where possible, and limiting machinery movement to specific areas. Erosion control measures such as sediment traps and mulching will be immediately implemented after clearing.

2 Describe where rainfall runoff flows within the proposed clearing extent.

Polygon	Direction of runoff	Receiving environment

☒ Attach map showing slope % and the direction of runoff within the proposed clearing extent.

Attachment No: Attachment 8 – Land Management Plan, Appendix A

3 Identify whether property boundary buffers will be retained in accordance with the LCG and provide reasons for discretion (if required)

Note: Valid reasons must be provided for instances where no property boundary buffers or buffers less than 210m wide (including 10m wide firebreaks) will be retained. Refer to section 4.3.3 of the LCG.

Property Boundary	Proposed buffer width (m)	Reasons for discretion
NT Portion 7513, NT Portion 1077 and NT Portion 7513 and Stuart Highway	0	This is a linear infrastructure project associated with an easement (gas pipeline). Existing clearing within the temporary campsite does not comply with the recommended buffer.

4 Describe any land management buffers to be retained within proximity of the proposed clearing extent.

Note: A land management buffer is different to a wildlife corridor or property boundary buffer – refer to section 4.3.4 of the LCG.

Buffer Id.	Location	Width (m)	Purpose and design justification

5 Describe any existing erosion within the proposed clearing extent.

Note: Erosion types include: wind, sheet, rill, gully or tunnel erosion.

Erosion Site	Location	Cause	Erosion type & description	Mitigation
Not applicable.				

6 Considering all information provided above; describe the potential risk, likelihood and impact of erosion associated with the proposed development.

Source of risk	Likelihood of occurring	Potential impacts
Erosion linked to rainfall during the wet season	It is unlikely during the clearing and construction phase and low once construction is completed and the site is rehabilitated.	Soil in cleared areas can be vulnerable to sheet or rill erosion and loss/movement of topsoil, however clearing and construction occurring in the dry season will mitigate this risk.

7 Considering all information provided above; describe the proposed erosion and sediment control (ESC) measures to be implemented during the clearing and establishment phase of the development.

ESC measure	Location	Temporary/Permanent	Description
Sediment fence	Downstream side of CROW and cleared areas if required	Temporary	Sediment fences will be utilised to control sheet flow from the disturbance areas during the construction works if required

ESC measure	Location	Temporary/Permanent	Description
Vegetation cover management	Across all proposed clearing areas.	Ongoing	During clearing works, effective vegetation cover management is crucial to minimise soil erosion, protect biodiversity, and ensure that disturbed areas are stabilised quickly. Prior to clearing, a comprehensive plan will be developed to identify sequencing and areas of clearing. To manage the exposed soil, erosion control measures like mulching will be applied to prevent soil loss from rainfall and wind. Additionally, areas that are not immediately required for construction will be left undisturbed or cleared in phases, ensuring that vegetation is removed only when necessary, and protective measures are implemented as soon as possible. After clearing, temporary vegetation or cover crops will be planted to establish a protective cover, prevent soil erosion, and promote quick recovery of the ecosystem.
Roads and tracks	Access roads around the proposed pipeline alignment	Permanent with ongoing maintenance	Installation of whoa boys along tracks and roads.

8 Considering all the information provided above; describe the proposed erosion and sediment control (ESC) measures to be implemented during the operational phase of the development.

ESC measure	Location	Temporary/Permanent	Description
Vegetation cover management	Across all proposed clearing areas	Ongoing	These measures will be continuously monitored and maintained to ensure their effectiveness throughout the operational phase.
Compaction management	Across all proposed clearing areas	Ongoing	Heavy machinery traffic will be controlled, especially in wet conditions.

9 Provide an erosion and sediment control (ESC) map showing the location of the following information.

☒ Attach an ESC map showing the location of the following within the proposed clearing extent:

- Land management buffers (Question 4)
- Existing erosion (Question 5)
- Temporary ESC measures to be installed (Question 7 & 8)
- Permanent ESC measures to be installed (Question 7 & 8)
- Firebreaks, tracks and fences.

Attachment No: Attachment 8 – Land Management Plan, Appendix C

10 Provide any ESC standard drawings or design details.

Note: The level of information required will depend on the complexity of the proposed measures. Information is available on the following website: https://nt.gov.au/environment/soil-land-vegetation

☒ Attach ESC standard drawings / design details

Attachment No: Attachment 8 – Land Management Plan

Attachment 1 – Lessee/s Authorisation Form

Lessee/s Authorisation to lodge an application - Pastoral Land Act 1992

PASTORAL LAND BOARD
NORTHERN TERRITORY

The lessee and/or persons duly authorised as signatory on behalf of the lessee hereby authorise:

Applicant / Consultant:	Warren Twist (APA SPP Pty Ltd), A.P.N Pty Ltd
Telephone:	0410 541 391
Email:	warren.twist@apa.com

To lodge an application under the *Pastoral Land Act 1992* over the property described as:

Station Name:	Hayfield Perpetual Pastoral Lease
NT Portions/s:	NT Portions 7513 and 1077
Pastoral District:	Sturt Plateau
Pastoral Lease No:	1135

For the purpose of:

Application type:	☒ Pastoral Land Clearing (PLC) ☐ PLC Permit Variation	☐ Non-Pastoral Use (NPU) ☐ NPU Permit Variation

Declaration:

I make this application as the pastoral lessee for the pastoral lease indicated above. If the pastoral lease is a company I warrant that I am properly authorised by the pastoral lessee to make this application.

Signatures of lessee / authorised person:	
Name:	JUSTIN DYER
Company position (if required):	DIRECTOR
Company (if required):	APN P/L
Date:	19/12/24
Supporting evidence (if required):	*Applicants should include sufficient evidence in support of their authorisation to make the application on behalf of the body corporate pastoral lessee.*

Attach supporting evidence:

☐ Other: ____________________

Note: Add additional signature blocks as required.

Attachment 2 – Supporting Information Report

Supporting Information Report

Sturt Plateau Pipeline

APA SPP Pty Ltd

Level 12, 80 Ann Street
Brisbane QLD 4000

Prepared by:

SLR Consulting Australia

SLR Project No.: 680.030294.00001

7 January 2025

Revision: 3.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	21 October 2024	Mavisha Nariansamy	Natalie Calder	Craig Smith
2.0	6 December 2024	Natalie Calder	Craig Smith	Craig Smith
3.0	7 January 2025	Natalie Calder	Craig Smith	Craig Smith

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with APA SPP Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Acronyms and Abbreviations

AGP	Amadeaus Gas Pipeline
APA	APA SPP Pty Ltd
APA Group	APA Group Limited
APGA	Australian Pipelines and Gas Association
AS	Australian Standards
CROW	Construction Right of Way
DENR	Department of Environment and Natural Resources
DLI	Department of Logistics and Infrastructure
DN	Diameter nominal
ha	Hectares
km	Kilometres
KP	Kilometres point
L	Litres
LGA	Local Government Area
m	Metres
mg	Milligrams
ML	Megalitres
NT	Northern Territory
NTG	Northern Territory Government
PPL	Perpetual Pastoral Lease
ROW	Right of way
SLR	SLR Consulting Pty Ltd
SPCF	Sturt Plateau Compression Facility
SPP	The Sturt Plateau Pipeline

1.0 Introduction

1.1 Project Overview

APA is a subsidiary of APA Group Limited (APA Group). APA Group owns and operates various gas pipelines in the NT and throughout Australia through its subsidiaries.

APA proposes to construct and operate the Sturt Plateau Pipeline (the Project). The Project will receive gas from Tamboran's approved gas exploration and appraisal project in the Beetaloo Basin and transport it to the Amadeus Gas Pipeline (AGP) that connects to Darwin, Alice Springs, and regional centres.

The Project is located approximately 50 km south of Daly Waters, and 80 km north of Elliott, in the Roper Gulf Region of the Northern Territory (NT).

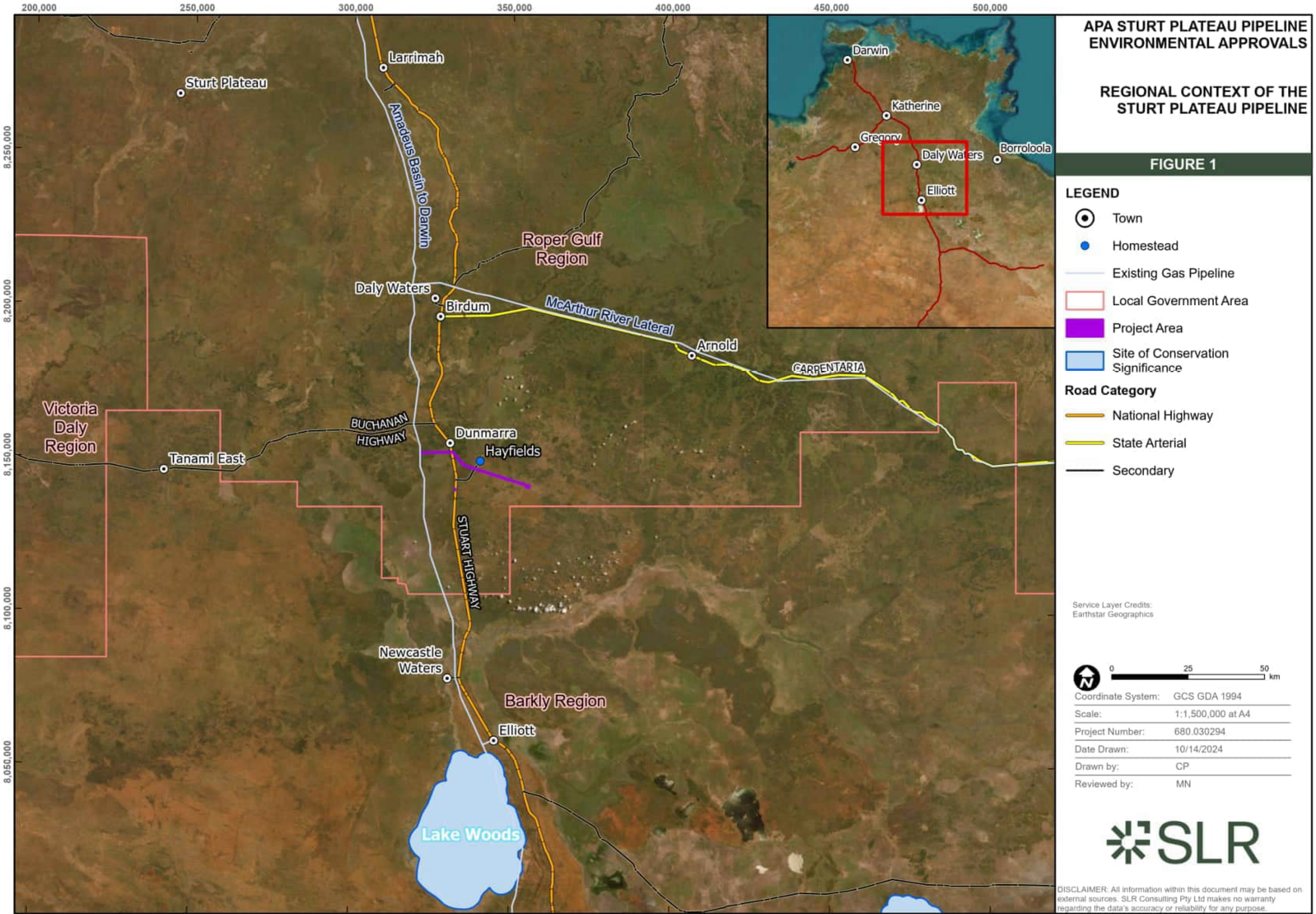
The AGP, APA Group's existing bidirectional gas pipeline, extends from the south of the NT to Darwin (in the north), transporting natural gas to Darwin, Alice Springs, and regional centres, primarily for power generation.

The Disturbance Footprint for the project is defined as the Project's combined construction footprint and is approximately 146 hectares (ha) comprising:

- The construction right of way (CROW) for the Sturt Plateau Pipeline.
- construction footprints for the Shenandoah Facility and Sturt Plateau Facility.
- the temporary construction camp, and
- additional work areas (including truck turnarounds, vegetation storage, horizontal bore entry and exit locations, and line pipe storage areas) required to facilitate construction.

The Disturbance Footprint is located within the larger Project Area comprising a 500 m wide corridor for the proposed pipeline, land for surface facilities at the start and end of the pipeline and the temporary construction camp. Whilst this application seeks a permit for a 500 m wide linear corridor footprint and additional areas for surface facilities, clearing of native vegetation will be restricted to (and only take place within) a nominally 30 m wide linear portion of this corridor and those areas indicated for temporary and permanent infrastructure associated with the Sturt Plateau Pipeline.

The estimated capital investment value for the Project is $57 million. The regional context of the Project is provided in Figure 1.



Path: \\au.slr.local\Corporate\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F01_Regional context of the Sturt Plateau Pipeline

2.0 Project Description

2.1 Location and Regional Context

2.1.1 Location

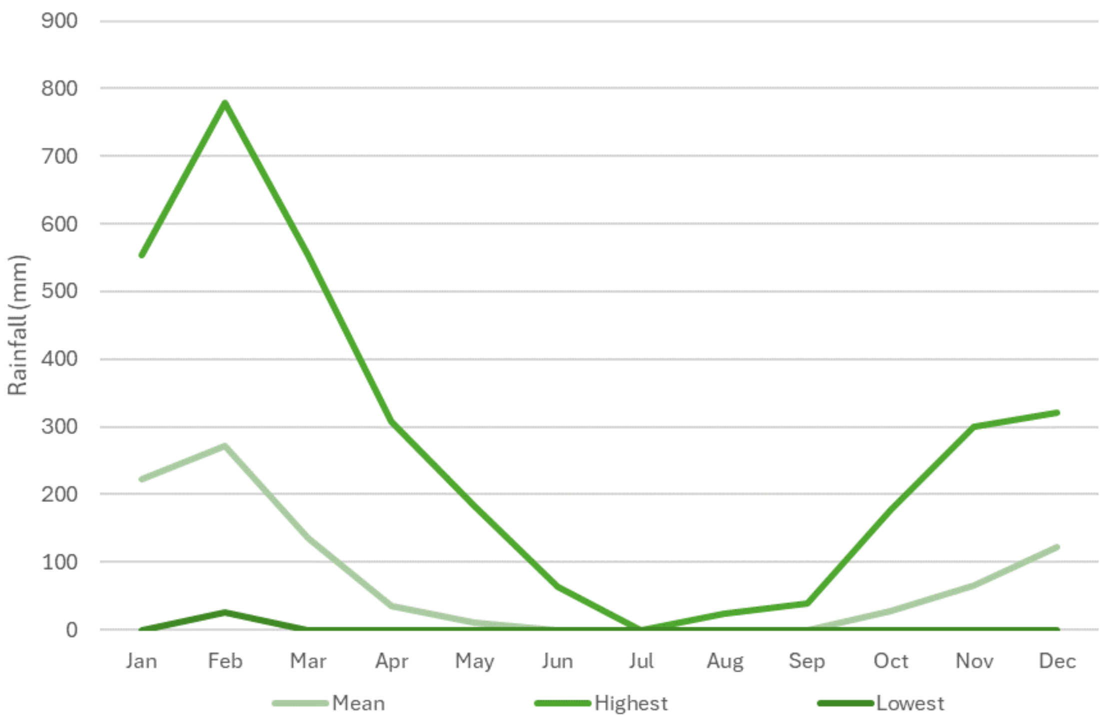
The Project is situated in the Birdum region of the NT within the Roper Gulf Local Government Area (LGA) and bordering the Barkly LGA. The regional context of the Project is shown in Figure 1.

2.1.2 Climate

Climate is described as per Daly Waters Airstrip, BOM Station 14626 (Bureau of Meteorology (BOM), 2024) and Dunmarra Roadhouse NT, BOM Station 14611 (BOM, 2024) depending on information availability. Climate described in this location is as follows:

- As per data recorded from Daly Waters from 1940 to 2024, Daly Waters's mean highest temperature is greater in December (45.6º C) and the lowest in June (36.2º C). Its mean minimum temperature is greater in November (38.1º C) and lowest in June (29º C).
- Figure 2 shows rainfall recorded at Dunmarra Roadhouse from 1963 to 2014, with the mean highest rainfall in February (779.6 mm) and the lowest in July (0 mm). The mean rainfall annually for all years is 922.4 mm.

Figure 2: Dunmarra Roadhouse Annual Rainfall (1963 – 2014) (BOM 2024)



2.1.3 Landscapes

The Project is located within:

- Land system: Beetaloo (BE)
- Geozone: Sturt Plateau
- Class: Lateritic plains and rises. Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils.

There is no occurrence of acid sulfate soils in the region.

2.1.4 Land Units

Based on the information provided by DENR 2019, Shenandoah Area, the Project Area is composed of:

- Elevated plains and pediments
- Sloping pediments
- Lower clay plains

Table 1 shows the land units and landforms at the Survey Area

Table 1: Land Units and Land Forms at Project Area

Land Unit	Landform	Soil	Vegetation
Low Rises			
7a	Gently undulating dissected gravelly low rises and pediment slopes	Very shallow (<0.25 m) to moderately deep (<1 m), massive, brown earthy sands or red earths over ferricrete (Leptic Tenosols and Red/Brown Petroferric Kandosols)	*Corymbia dichromophloia* low open woodland
7b	Scoured gravelly gently undulating low rises and pediment slopes	Generally shallow (<0.5), massive, brown or red earths over indurated ferricrete (Red/Brown Petroferric Kandosols)	*Acacia shirleyi* low woodland
Plains			
8a3	Level sandy wash-slope plains and pediments	Massive, bleached, brown earthy sands or brown earths over ferricrete. Soil depth predominately moderately deep (0.5-1m), though quite variable. (Petroferric Tenosols/Kandosols)	*Corymbia dichromophloia* low open woodland
8a4	Broad, imperfectly drained, mostly endorheic plains	Deep (<1.5 m), massive, bleached, brown earthy sands or grey/yellow earths over ferricrete (Petroferric Kandosols)	*Melaleuca nervosa* low open woodland
8b2	Level colluvial plain margins and valley flats within narrow relict drainage features	Moderately deep (0.5-1.0 m), massive, red earths over ferricrete (Red Kandosols)	*Erythrophleum chlorostachys, Corymbia dichromophloia, Corymbia terminalis* low woodland
Inland Wetlands			
13a	Seasonally inundated level clay plains with gilgai microrelief	Very deep (>1.5 m), cracking, self-mulching, grey medium to heavy clay (Grey Vertosols)	*Eucalyptus microtheca* low open woodland

2.1.5 Land Tenure

The start of the transmission pipeline (KP 0) will connect to the Shenandoah Facility on NT Portion 7026 and the end of the transmission pipeline (KP 37) will connect to the Sturt Plateau Facility which connects to the AGP on NT Portion 1077. The pipeline will cross the Stuart Highway Road corridor and NT Portion 7513. The site layout of the Proposed Action is provided in Figure 3.

Details of land tenure for each respective lot are listed in Table 2.

A map series showing the proposed location of the transmission pipeline corridor, the Shenandoah Facility, Sturt Plateau Facility and cathodic protection anode bed is provided in Figure 4 to Figure 7.

Options to secure land tenure and access include:

- easement (for the pipeline)
- sub-lease – for fenced surface facilities at either end of the alignment, and
- deed of agreement for the Stuart Highway Road reserve.

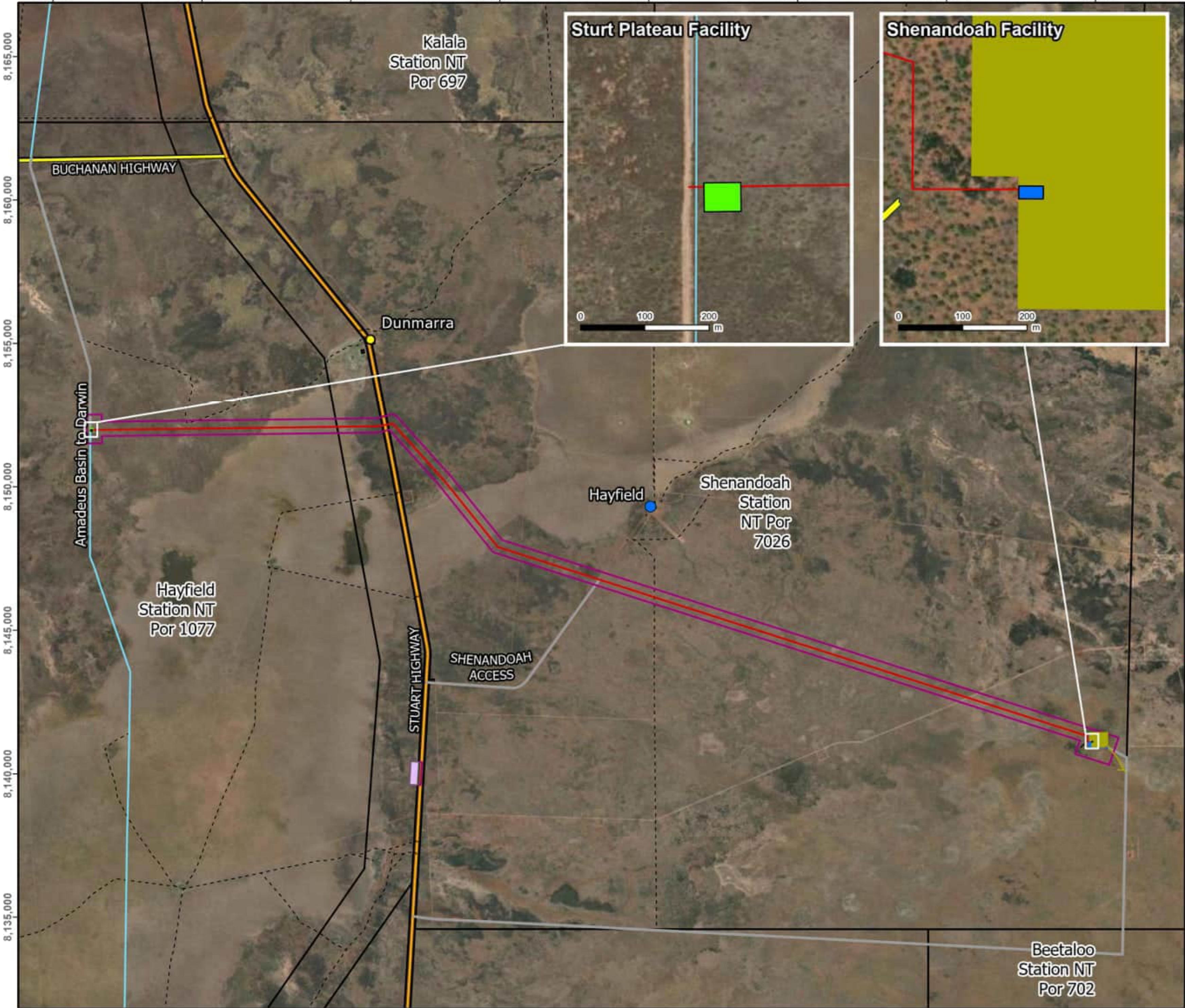
Table 2: Land Tenure Details for the Project

Portion Number	7026	Stuart Highway	7513	1077
Project element	Shenandoah Facility and pipeline	Pipeline	Pipeline and construction camp	Pipeline and Sturt Plateau Facility
Tenure Type	PPL	NTG road corridor	PPL	PPL
Station Name	Shenandoah	-	Hayfield	Hayfield
Title	CUFT 752	-	CUFT 823	CUFT 823
Street Number	14981 Stuart Highway, Birdum	-		1143 Buchanan Highway, Birdum
Survey ID	S2009/182A		CP005573	S811108
Lot Area (ha)	147,273	-	8040	176,702
Owner	A.P.N Pty Ltd	Department of Logistics and Infrastructure (DLI)	A.P.N Pty Ltd	A.P.N Pty Ltd
Construction Disturbance Footprint (ha)	88.76	2.63	25.18	29.13
Operation Footprint (ha)	81.84	0.6	4.55	25.31
Total Area to be Rehabilitated Following Construction (ha)	6.92	1.56	20.99	3.93

APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

STURT PLATEAU PIPELINE SITE LAYOUT

FIGURE 3



LEGEND

Project Elements

- Proposed Pipeline Alignment
- Cathodic protection anode bed
- Temporary Construction Camp and Laydown Area
- Sturt Plateau Facility
- Shenandoah Facility
- Tamboran's Sturt Plateau Compression Facility

Existing Infrastructure

- Roadhouse
- Homestead
- Access Track
- Existing Gas Pipeline

Road Category

- National Highway
- State Arterial
- Local
- Cadastre
- Project Area

Service Layer Credits: Earthstar Geographics, Maxar

0 2.5 5 km

Coordinate System:	GCS GDA 1994
Scale:	1:180,000 at A4
Project Number:	680.030294
Date Drawn:	10/15/2024
Drawn by:	CP
Reviewed by:	MN

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2.1.6 Community

The Project site is situated across two large pastoral leases: Hayfield Station and Shenandoah Station. These areas are characterised by open plains, flood country, scrub, and sand hills. The Stuart Highway, the main road through Central Australia, separates the two stations and runs north-south across the Project site. It stretches from Darwin in the NT through Tennant Creek and Alice Springs to Port Augusta in South Australia.

The closest community infrastructure to the Project is the Dunmarra Roadhouse, a petrol station and rest stop on the highway, about 3 km north of the Project. Other nearby settlements include Daly Waters, approximately 50 km north, which offers roadhouses, pubs, accommodations, a regional airstrip without commercial services, and various services for regional road users and tourists.

Several remote Aboriginal communities and family outstations are located within 30-50 km of the Project, including Jingaloo, Lily Hole, Murranji, and Marlinja, near the historically significant Newcastle Waters pastoral station and historic township. Two Community Living Areas (CLAs) are located in proximity to the pipeline, namely Lily Hole and Jingaloo. CLAs are small Aboriginal living areas excised from pastoral leases.

The nearest community with local-level services like health, education, and police is the town of Elliott, about 70 km to the south. Residents seeking higher-level social infrastructure and services like hospitals, tertiary education, and civic services would need to travel about 280 km north to Katherine or 330 km south to Tennant Creek from the Project site.

The Project is situated in an isolated region across two large pastoral stations separated by the Stuart Highway. The closest human sensitive receptors to the Project are:

- Hayfield homestead, 3 km northeast of the Project
- Dunmarra, 3 km north of the intersection of the Project with the Stuart Highway
- Tamboran’s Camp, 3.3 km south-southeast of the eastern end of the pipeline corridor. This camp is associated with Tamboran’s exploration and appraisal activities which will provide the gas to be transmitted through the SPP.
- APA’s Temporary Construction Camp 9 km southwest of the Project.

The Project crosses two areas with native title determinations: the Shenandoah Pastoral Lease and Hayfield Pastoral Lease. The Native Title holders and claimants under the determinations are:

- Shenandoah:
  - The Kinbininggu Group
  - The Bamarrnganja Group
- Hayfield:
  - The Kinbininggu Group
  - The Marlinja Group
  - The Warranangku Group.

Both areas are administered by the Top End Prescribed Body Corporate (PBC), an agent PBC responsible for many native title determinations in the NT. It functions under the Native Title Act 1993 as an agent for native title holders.

2.2 Key Project Elements

The key elements of the Project are identified in Table 3.

Table 3: Project Key Elements

Project element	Summary
Overview	
The Project	The Project will involve the: • Use of the existing sealed road network for transport of machinery and materials to the Project Area. • Clearing of approximately 134 ha of native vegetation and site preparation. • Ancillary surface facilities including additional work areas, supply of gravel, water, site access and the temporary construction camp. • Construction of surface facilities, including the Shenandoah Facility (receipt station) and Sturt Plateau Facility (delivery station). • Installation of a medium diameter (DN300), gas transmission pipeline (up to 9.6 MPaG) of approximately 37 km in length. • Operation of the pipeline. • Decommissioning of the pipeline.
Project Area	The development envelope of the Project, within which the Project will be sited, is approximately 2002 ha.
Location	The Project is in the locality of Birdum, approximately 50 km south of Daly Waters, and 80 km north of Elliott, in the Northern Territory.
Land tenure	The Project is located across: • NT Portion 1077 – Shenandoah Perpetual Pastoral Lease (PPL). • NT Portion 7026 – Hayfield PPL. • NT Portion 7513 – Hayfield PPL. • The Stuart Highway Road Reserve.
Capital Investment Value	Approximately $57 million
Project life	40 years
Construction	
Disturbance Footprint	The construction footprint covers an area of approximately 146 ha, including approximately 12 ha of previously disturbed land.
Total area that will be rehabilitated	Approximately 33 ha of the Disturbance Footprint will be rehabilitated progressively during construction.
Construction water use and supply	Construction of the Project will require an estimated 70 Mega Litres (ML) of water in total. Approximately 30 ML of non-potable water will be utilised for dust control and hydrostatic testing which will be sourced from Tamboran or associated companies under an existing water extraction licence (WEL). New bores are required to be constructed to source 40 ML for the Project under a new WEL.
Off-site supporting infrastructure	• Existing road network • Waste disposal facility • Pipe laydown area
Construction hours	6 am to 6 pm, seven days a week. Construction will occur in shifts of 21 days on and 7 days off. Limited 24 hours works will be required during hydrostatic testing activities.
Construction workforce	Between 70 to 125 personnel will be required for the majority of the 6-month construction period. The construction workforce will peak at approximately 133 personnel for one or two days, halfway through construction.
Operation	

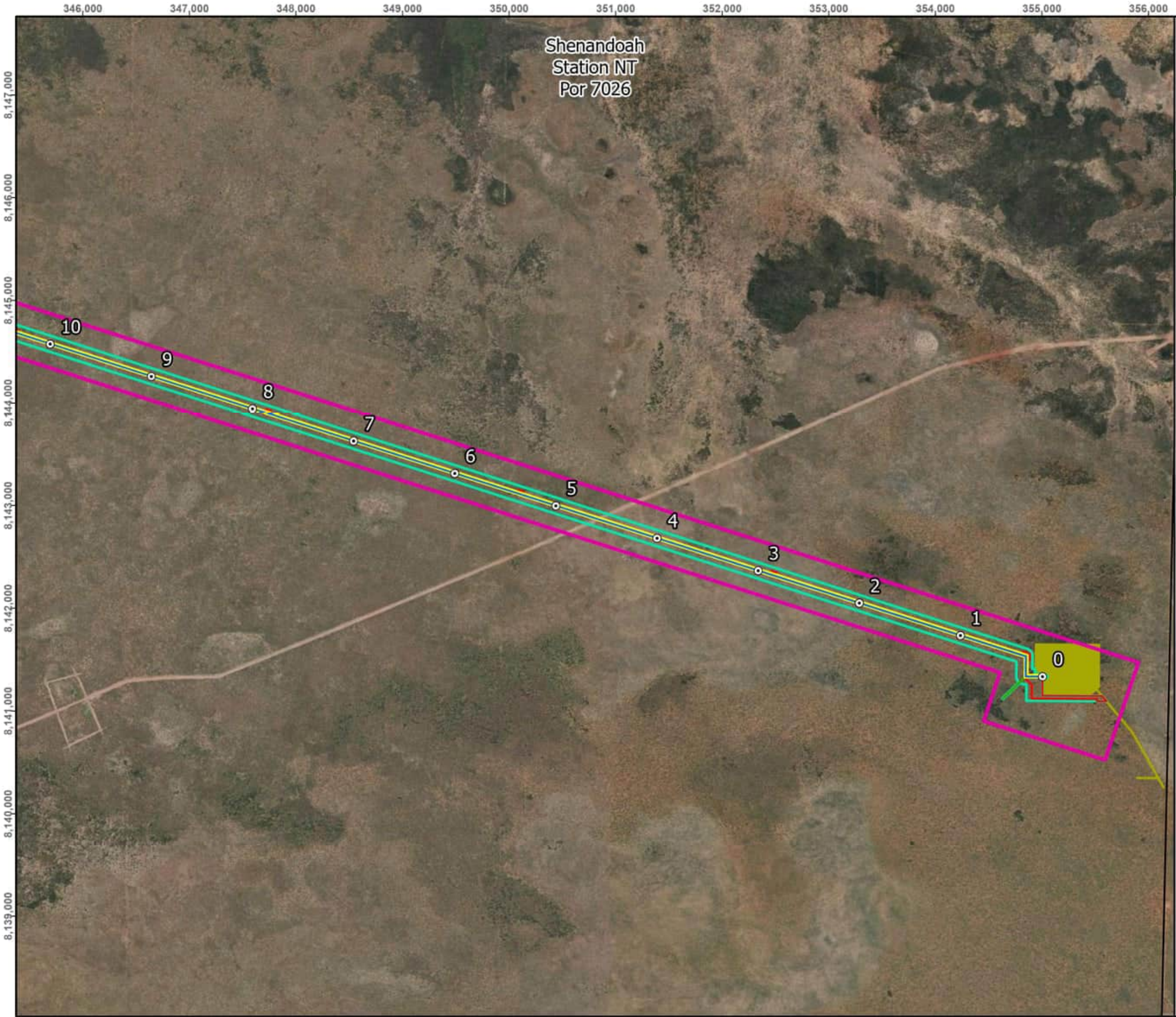
Project element	Summary
Operation footprint	Approximately 112 ha will be utilised for the transmission pipeline easement, Shenandoah Facility, and Sturt Plateau Facility during operations.
Operational workforce	Approximately 2 personnel
Operational hours	Up to 24 hours, seven days a week as required by the Project’s operations and maintenance.
Decommissioning	
Decommissioning	The pipeline’s decommissioning may include suspension or abandonment. Removal of the pipeline as part of abandonment would result in significant disturbance and environmental impacts and is therefore not preferred.

2.2.1 Schedule

The indicative project schedule is provided in Table 4. Environmental approvals are anticipated to be obtained by the end of June 2025. Mobilisation for construction is proposed to commence in July 2025 pending receipt of necessary approvals and agreements. Construction is anticipated to take six months upon which commissioning will be completed. The indicative schedule is subject to review through advance or delay during the approvals and access, design, procurement, construction and commissioning stages.

Table 4: Indicative Project Schedule

Stage	2024			2025			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Approvals and Access							
Front End Engineering Design							
Detailed Engineering Completion							
Long-Lead Item procurement							
Site Mobilisation (late July - Late August)							
Construction (late July - November 25)							
Commissioning (November / December 25)							



STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

STURT PLATEAU PIPELINE KP 0 - KP 10

FIGURE 4

LEGEND

- Kilometre Points
- Proposed Pipeline Alignment
- Additional Work Area
- Cathodic Protection Anode Bed
- Pipeline Construction ROW
- Cadastre
- Project Area
- Survey Area
- Tamboran's Sturt Plateau Compression Facility

Service Layer Credits: Esri, TomTom, FAO, NOAA, USGS, Esri, USGS, Maxar

0 1 2 km

Coordinate System:	GCS GDA 1994
Scale:	1:50,000 at A4
Project Number:	680.030294
Date Drawn:	10/17/2024
Drawn by:	CP
Reviewed by:	NC

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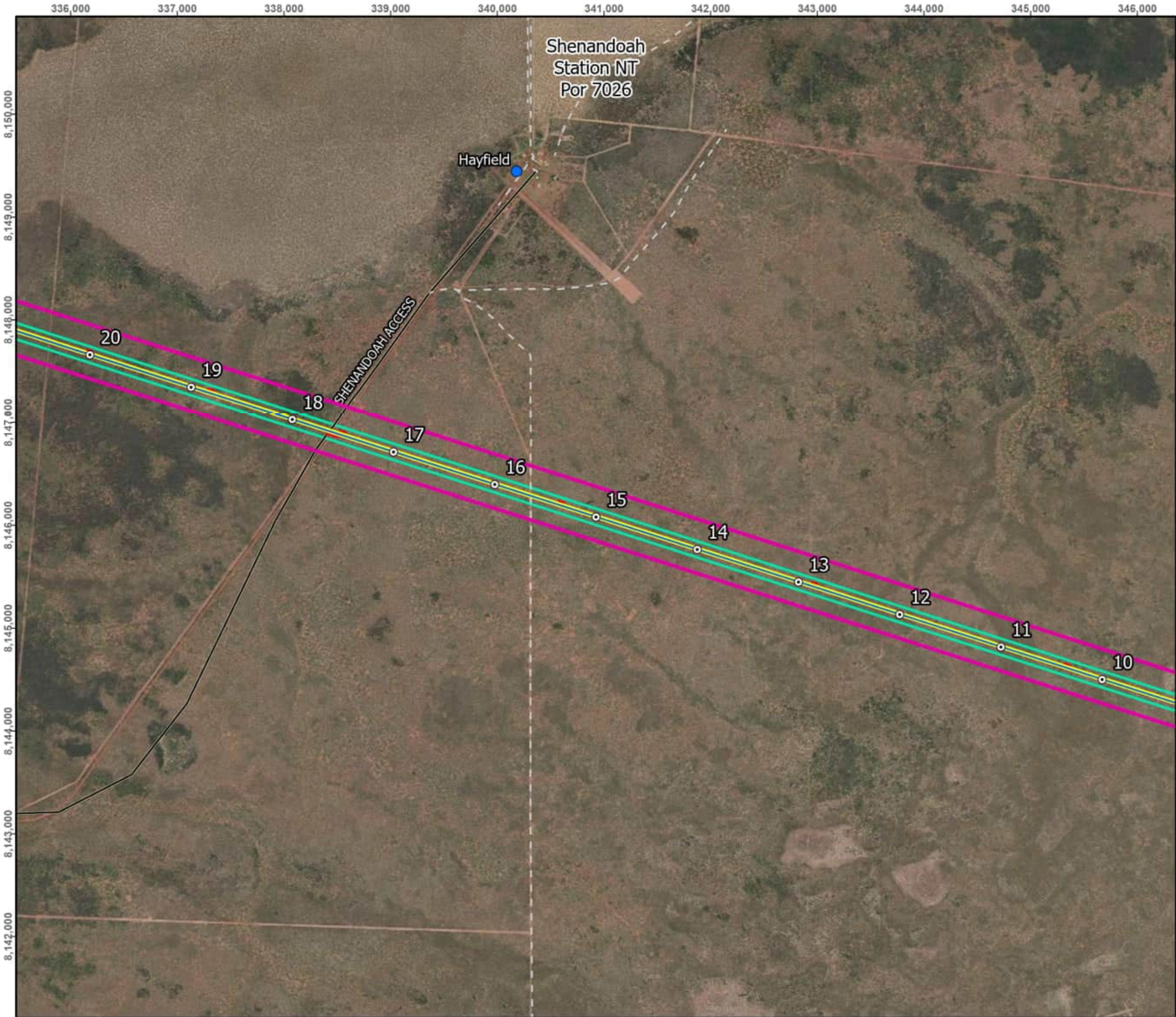
STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

STURT PLATEAU PIPELINE KP 10 - KP 20

FIGURE 5



LEGEND

- Homestead
- Kilometre Points
- Proposed Pipeline Alignment
- Additional Work Area
- Pipeline Construction ROW
- Cadastre
- Project Area
- Survey Area

Road Category

- Secondary
- Local

Service Layer Credits: Esri, TomTom, FAO, NOAA, USGS, Earthstar Geographics, Esri, USGS

0 1 2 km

Coordinate System:	GCS GDA 1994
Scale:	1:50,000 at A4
Project Number:	680.030294
Date Drawn:	10/17/2024
Drawn by:	CP
Reviewed by:	NC

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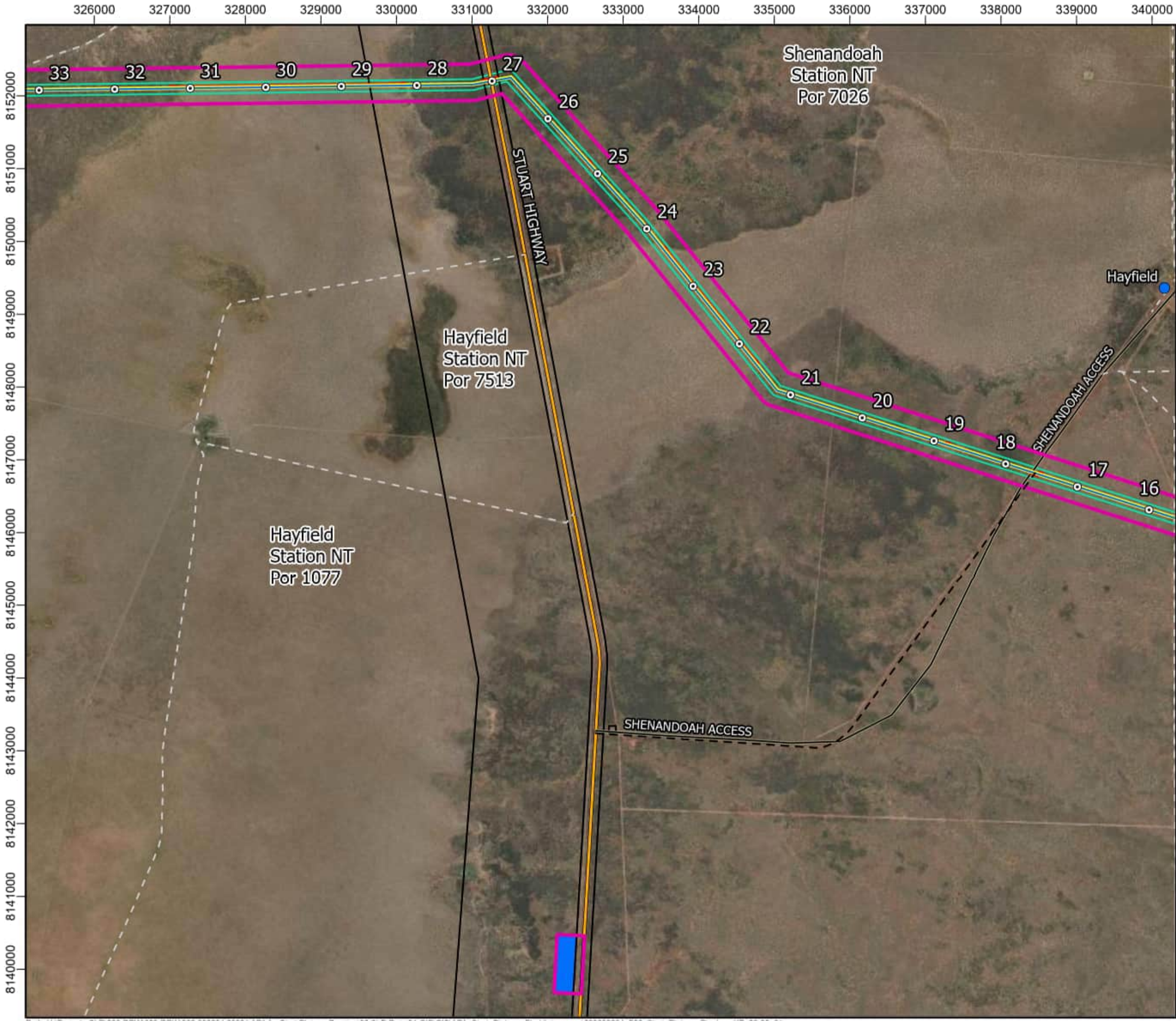

STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

STURT PLATEAU PIPELINE KP 20 - KP 30

FIGURE 6

LEGEND

- Kilometre Points
- Proposed Pipeline Alignment
- Homestead
- Additional Work Area
- Pipeline Construction ROW
- Cadastre
- Project Area
- Survey Area
- Temporary Construction Camp
- Access Track

Road Category

- National Highway
- Secondary
- Local

Service Layer Credits: Earthstar Geographics

0 1 2 km

Coordinate System:	GCS GDA 1994
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Project Number:	680.030294
Date Drawn:	25-Nov-2024
Drawn by:	CP

SLR

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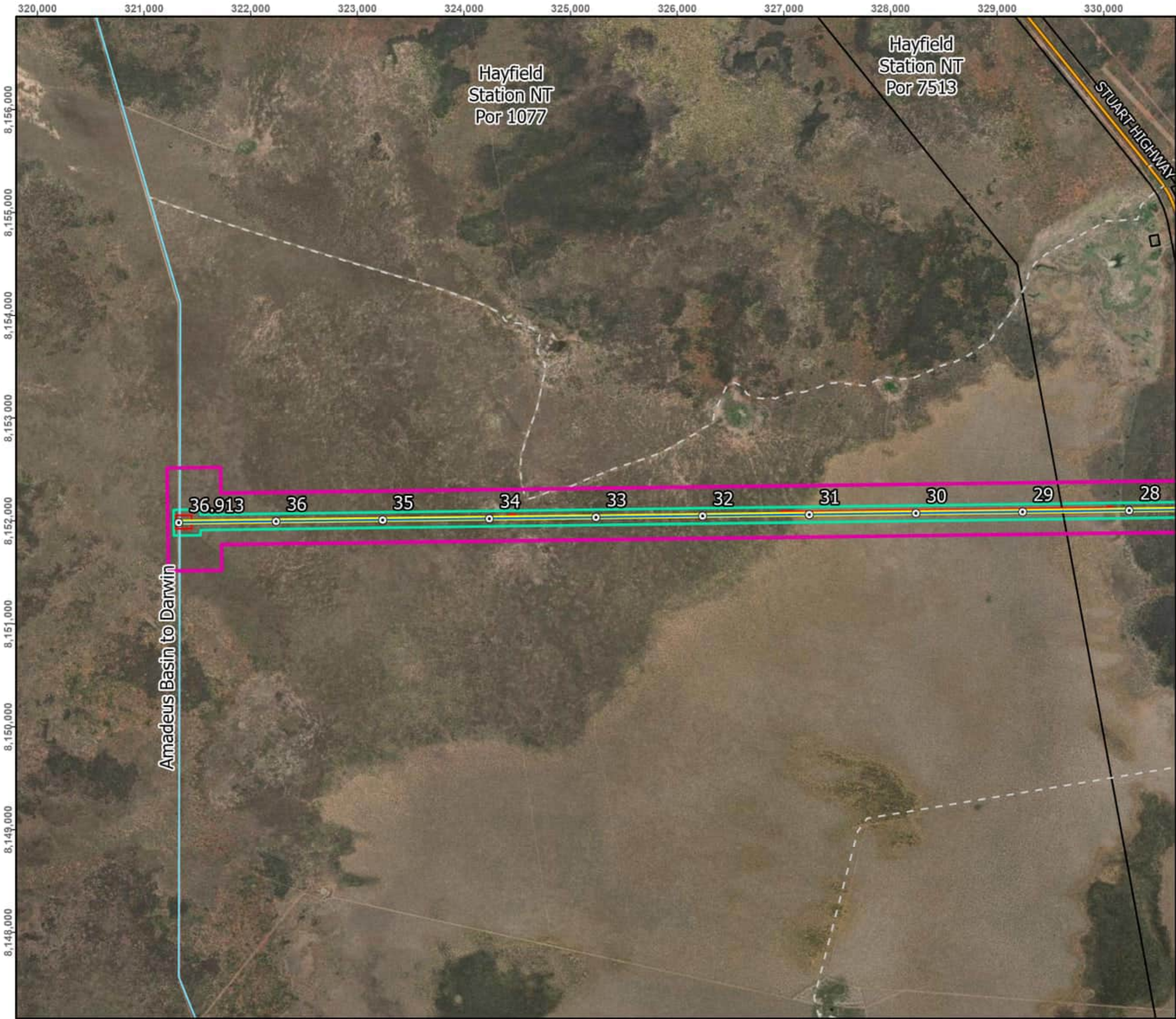

STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

STURT PLATEAU PIPELINE KP 30 - KP 37

FIGURE 7

LEGEND

- Kilometre Points
- Proposed Pipeline Alignment
- Additional Work Area
- Pipeline Construction ROW
- Cadastre
- Project Area
- Survey Area

Road Category

- National Highway
- Local

Service Layer Credits: Esri, TomTom, FAO, NOAA, USGS, Esri, USGS, Maxar

0 1 2 km

Coordinate System:	GCS GDA 1994
Scale:	1:50,000 at A4
Project Number:	680.030294
Date Drawn:	10/17/2024
Drawn by:	CP
Reviewed by:	NC

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2.3 Key Project Features and Activities

2.3.1 Construction

2.3.1.1 Pipeline

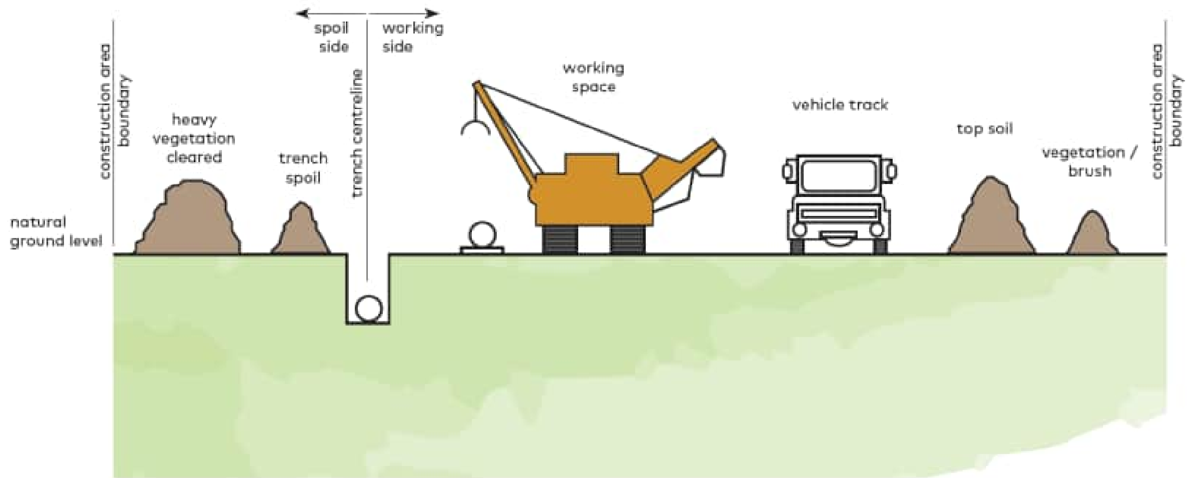
Sequence of Pipeline Construction

An indicative cross section of the pipeline CROW is shown in Figure 8. Two potential CROW footprints have been identified, but only one will be selected based on the construction direction.

Construction activities will occur either from KP 0 to KP 37 or KP 37 to KP 0. Consequently, the working side of the CROW will be located to the north of the pipeline alignment if pipelaying commences at KP 0 or to the south of the pipeline alignment if pipelaying commences at KP 37.

The direction of pipelaying will be dependent upon weather and site conditions (e.g. presence of surface water, soil moisture) at the commencement of construction. The figures in this Referral are based on construction commencing at KP 0. Spatial data for both CROW options has been included in the Referral and assessed in the technical studies undertaken to inform this Referral.

Figure 8: Indicative Cross Section of CROW



Stages of Pipeline Construction

The key activities of trenched pipeline construction are described in Figure 9.

Figure 9: Stages of Trenched Pipeline Construction

Clear and Grade

- Trees, shrubs and groundcover in the CROW are cleared by bull dozers and excavators and stockpiled in the CROW. Breaks are made in the vegetation stockpiles at fence lines, tracks and drainage lines.
- Grading of the CROW is undertaken by a grader with stockpiling of tospoil on one side of the CROW.

Pipe Stringing and Bending

- The pipe lengths are transported to the CROW from layodwn areas by extendable semi-trailers and distributed along the prepared CROW by excavators with vacuum lifters, side-booms or cranes with lifting hooks for welding.
- Hydraulic bending machine is used on the pipe lengths to match changes in elevation or direction of the pipe alignment.

Pipe Welding

- Pipe lengths are welded manually into "strings" in preparation for placement in the pipeline trench.
- Pipeline integrity testing is undertaken.
- Treatment of the wedling joints is completed.

Trench Excavation

- Trenching machines remove sub-soil to the target depth. If rock is encountered, a rocksaw / hammer will be utilised. Blasting will be considered where the previous methods are unsucuessful.
- Excavated sub-soil will be stockpiled on the non-working side of the CROW.
- Breaks in the open trench are left for stock, wildlife and vehicles.

Pipe Lowering In

- Padding from excavated material is sieved onsite, or offsite materials may be placed in the trench to prevent abrasion damage.
- The welded pipe strings are lifted off skids and lowered into the trench using side-boom tractors.
- After lowering in, the strings are welded together in the trench.

Trench Backfilling

- Padding over the pipe is installed.
- Trench blocks are installed to prevent moverment of water along the trench as needed, including watercourses.
- Subsoils are placed in the trench and compacted to reduce settlement.
- Top soils are placed over the trench.

Rehabitlitation of Disturbance

- Structures and infrastructure not required for operations are removed.
- Grading of landform and drainage is undertaken.
- Spreading of cleared vegetation is undertaken.
- Installation of fencing or tracks as required.

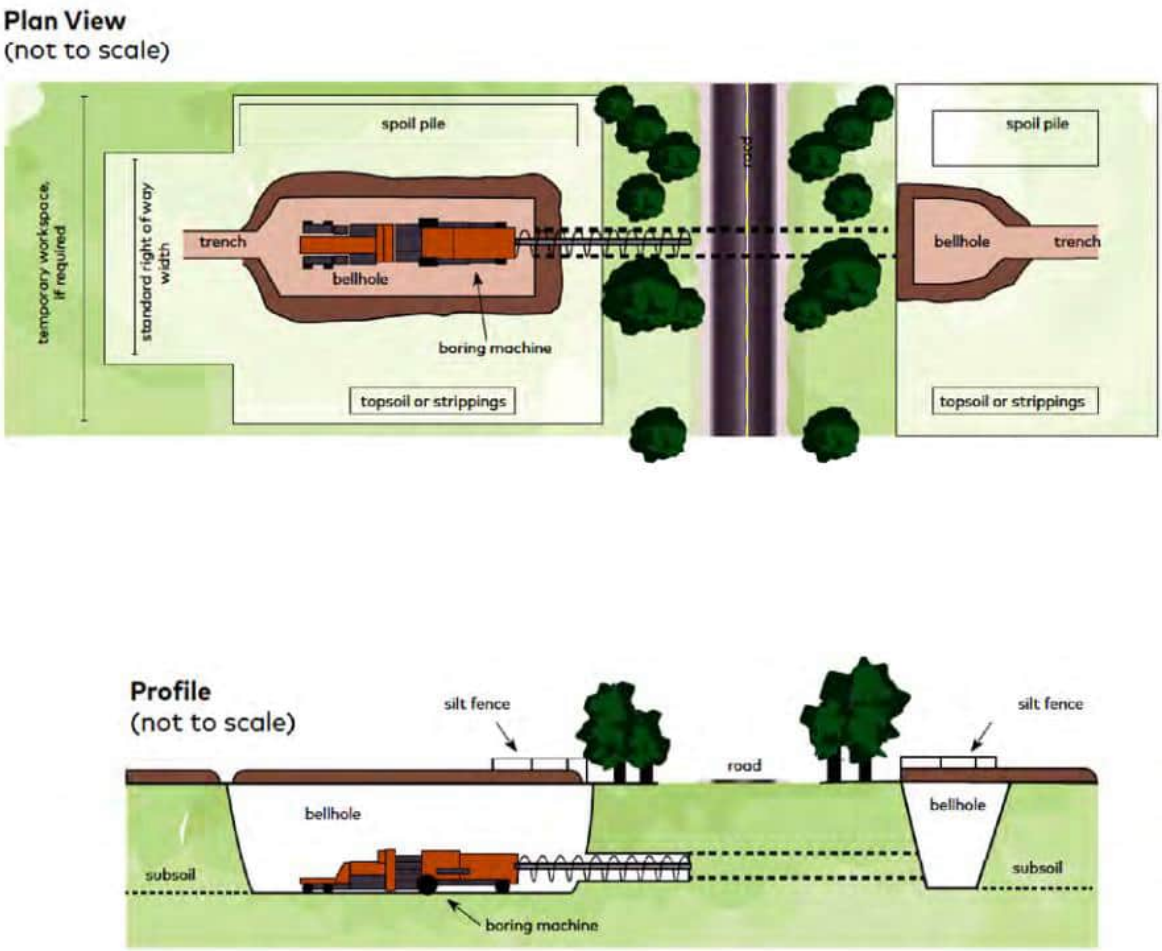
Horizontal Boring

Horizontal boring will be required to construct the pipeline under the Stuart Highway (approximate KP 27.1 km). The key activities for pipeline construction using horizontal boring are:

- The excavation of a bellhole either side of the feature to be bored, for installation of the pipeline beneath the surface feature which cannot be open cut, such as sealed roads.
- The additional disturbance footprint required for the horizontally bored crossing would generally be an area 70 m wide, including the nominal 30 m easement, that will extend both sides of the Stuart Highway.

Since traffic will need to continue to flow on the Stuart Highway this technique will be employed to ensure the pipeline crossing beneath the highway and adjacent table drains can be achieved at this location. This is the only location where a horizontal bored crossing will be needed for the Project. Figure 10 provides a typical set-up for a horizontal bored crossing.

Figure 10: Typical Horizontal Boring Schematic



Rehabilitation of Disturbance

The objective of the rehabilitation of disturbance is to ensure the pre-construction environment is reinstated as far as practicable. Rehabilitation will be restricted along the pipeline easement to ensure the operation and integrity of the pipeline is not compromised from trees and shrubs. Rehabilitation steps would include:

- Removal of all temporary structures and buried infrastructure e.g. septic system/plumbing.
- Removal of all waste.
- Re-establishing topsoil cover.
- Returning surface levels to natural contours.
- Ameliorating construction impacts to soil texture, structure, and chemical composition, where required.
- Reinstating natural drainage patterns.
- Reinstating roadways and road reserves in accordance with regulatory requirements.
- Reinstating fencing and access tracks in accordance with the requirements of landowners.
- Spreading of cleared vegetation back over disturbed areas.
- Completing revegetation through seeding as appropriate.

Installing permanent erosion control measures (such as contour banks) in erosion prone areas.

Indicative Pipeline Specifications

The SPP will be designed, constructed, operated, and decommissioned in accordance with the Australian Standards (AS) 2885 series *Pipelines – Gas and Liquid Petroleum*. The pipeline specifications are provided in Table 5.

Table 5: Indicative Pipeline Specifications

Component	Description
Approximate length	37 km
Material	High strength steel with fusion bonded epoxy external coating except at each end to allow welding. Post welding, the uncoated weld margins will be grit blasted and coated with hand or spray applied epoxy.
Material testing	Factory integrity testing of the epoxy external coasting. On site integrity testing of the epoxy external coating prior to placement in the pipe trench. On site Direct Current Voltage Gradient following completion of construction.
Nominal diameter	Up to 300 mm (12 inches)
Nominal capacity	Max 50 TJ/day
Pipe wall thickness	12.7 mm
Pipe length	18 m (some 12 m)
Pipe monitoring	An impressed current cathodic protection system (ICCP system) will be employed to protect the pipeline from corrosion remotely monitored via SCADA. Dependent upon final design of the ICCP system, an anode ground bed will be required near the Shenandoah Facility. The anode bed will be offset from the pipeline by a minimum of 100 m. The ICCP system will be run with AC power supply from the Tamboran project.

Component	Description
	Cathodic protection (CP) test points will also be installed along the pipeline alignment. Buried ground bed anodes employed as part of the CP system are typically made of magnesium or zinc.
Depth of cover	Minimum: 750 mm Sealed road crossings (Stuart Highway): minimum 3,000 mm at road crown Unsealed road crossings, drainage lines, and floodplains: minimum 1,200 mm
Easement / CROW	Nominally 30 m wide
Pipeline markers	Pipeline markers will be installed over the pipeline at a distance to ensure continual line of sight over its length. In addition, markers will be installed at bends in the pipeline, at property boundary fences and either side of crossings including roads and watercourses. The pipeline marker text will identify the presence of the pipeline and provide the name and contact details of the operator.
Design principles	In accordance with current version of AS 2885 series Pipelines – Gas and Liquid Petroleum
Design life	40 years

2.3.1.2 Surface Facilities

The surface facilities required for the Project are listed in Table 6.

Table 6: Surface Facilities

Surface Facility	Description
Shenandoah Facility	• Pig launcher assembly. • Actuated shutdown valve. • Station Remote Terminal Unit and Associated communications. • Separate pipeline vent fenced compound.
Sturt Plateau Facility	• Pig launcher assembly. • Pipeline Isolation. • Hot-tap connection to AGP.
Temporary Construction Camp	Capacity for up to 150 persons, including: • Accommodation. • Offices and first aid facilities. • Kitchen and dining. • Laundry and ablution blocks. • Recreational areas. • Water supply and use. • Power supply. • Diesel/fuel storage and use. • Vehicle and plant wash-down facilities (biosecurity). • General laydown area. • Wastewater treatment and management. • Waste management facilities.

2.3.1.3 Additional Work Areas

Additional work areas that will be utilised for construction are listed in Table 7 and shown in Figure 4 to Figure 7.

Table 7: Additional Work Areas

Work Area	Description
Construction laydown	• Adjacent to Shenandoah Facility. • Adjacent to Sturt Plateau Facility.
Cleared vegetation stockpiles	• Primarily within the pipeline CROW. • Where insufficient space in the pipeline CROW, it will be stored within laydown areas, truck turnarounds, and additional work areas.
Truck turnarounds.	• Turning bays along the CROW approximately 20 m width and 50 m length are proposed for every 2.5 km. • Final locations will be subject to final design for pre-clearing surveys or site conditions at the time of constructions.
Trenched/bored crossings	• Adjacent to the Stuart Highway where horizontal boring is proposed • Where the pipeline crosses ephemeral waterways

2.3.1.4 Water Supply

Water will be required for dust suppression, trench compaction, hydrostatic testing and for potable uses at the temporary construction camp.

Water will be sourced from new bores, and existing Tamboran bores located adjacent to the Shenandoah Facility. A minimum of two new bores are proposed within the footprint of the temporary construction camp. Bore locations will be determined via groundwater investigation following receipt of an Aboriginal Areas Protection Authority (AAPA) Authority Certificate.

Hardstand and associated piping infrastructure will be required at water bores. Water storages are likely to be turkey's nest dams located at the construction camp, at KP 0 and adjacent to KP 37. The turkey's nest dams may be retained following construction if requested by the landholder. The estimated area required for each turkey's nest storage is 50 m by 50 m. A turkey's nest will be constructed adjacent to the Shenandoah Facility to store water provided by Tamboran and at the temporary construction camp to store water for use in the camp and for dust suppression.

2.3.1.5 Gravel Material

Gravel material will be sourced from borrow pits within the Project Area. An approximately 50 m by 50 m borrow pit is proposed within the footprint of the Sturt Plateau Facility additional work area. Additional gravel material may also be sourced from within the temporary construction camp area. The locations and size of the borrow pits will be finalised following geotechnical assessment.

2.3.1.6 Workforce

Construction of the pipeline and surface facilities is expected to be undertaken by APA staff and contractors.

APA staff will coordinate and oversee the construction activities. Approximately 133 personnel will be on site at any one time during peak construction, reducing to between 70 and 125 following the peak construction period.

2.3.1.7 Access

Port of Darwin Common User Facility

The Common User Facility (CUF) in the Marine Industry Park, located at East Arm Wharf will be used as a pipe yard following delivery of the pipes to the Port of Darwin and prior to delivery to the Project Area (Figure 11). The CUF has 9 ha of existing hardstand for temporary storage of the pipes. A 1.4 ha area will be required for the pipe yard. Pipe will be delivered from the pipe yard direct to the CROW for pipe stringing and subsequent welding.

Access Routes

Equipment and personnel will require daily access to the CROW and worksites throughout construction via existing access tracks through the pastoralist properties, the existing service track adjacent to the AGP, and the CROW itself will act as a thoroughfare.

Existing roads and tracks that will be used to access the Project Area during the construction phase of works are:

- Shenandoah Access.
- AGP easement operations service track (light vehicles only).
- An unnamed access track to the pastoral property.

Existing access routes are shown in Figure 11.

Access Maintenance

Maintenance of the above access tracks will be undertaken to a suitable standard for vehicles. APA will seek agreement from landholders to grant suitable access rights to tracks for construction access and ongoing operational access where required.

APA will maintain the Shenandoah Access and AGP easement operations service track. Tamboran will maintain the unnamed pastoral property access.

APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

MARINE INDUSTRY PARK COMMON USER FACILITY LOCATION

FIGURE 11

LEGEND

- NT Towns
- Project Location
- Rural - National Highway
- Urban - Primary Arterial
- Urban - Sub Arterial
- Urban - Local
- Urban - Collector

Service Layer Credits: Earthstar Geographics, Maxar

0 50 100 km

Coordinate System:	GCS GDA 1994
Scale:	1:3,500,000 at A4
Project Number:	680.030294
Date Drawn:	9/27/2024
Drawn by:	CP

SLR

Path: \\au.slr.local\Corporate\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F11_Marine Industry Park Common User Facility Location

2.3.2 Waste Management

A range of wastes would be generated during construction activities for the Project, mainly during pipeline construction, which include:

- General wastes from transportation and storage of pipe (packaging, pallets, ropes, bevel protectors)
- Wastes from clearing the construction area (vegetation)Small quantities of hazardous wastes such as empty containers, pipeline coating waste, oily rags and the like
- Waste from temporary construction camp
- Laying, welding, and grinding waste (for example, scrap metal, spent welding rods)
- Water from dewatering
- Machinery waste.

Cleared vegetation, topsoil, and subsoil will be generated during the construction of the transmission pipeline and surface facilities. Subsoil materials generated during pipeline construction will be returned to the trench while topsoil is respread and used to assist rehabilitation of the construction footprint and are not considered to be wastes.

Excavated sub-soils will be stockpiled to be re-used in backfilling. The volume of material reused will vary location to location based on the soil profile and quality. In the event that the excavated material cannot be reused, the spoil would be disposed of according to the requirements of the Construction Environmental Management Plan (CEMP).

Project construction wastes will be reused or recycled where practicable or collected and transported by licensed waste contractors for disposal at appropriately licensed facilities. Any contaminated or hazard materials identified on site would be disposed in accordance with NT EPA waste classification and transport requirements.

Dewatering of trenches and bellholes due to rainfall or groundwater ingress will be collected and treated, if required, prior to discharge to land or reused where appropriate such as for dust suppression.

Dewatering of excavated trenches or bellholes will be managed to minimise sedimentation, including the use of sediment control devices to remove suspended solids and dissipate flow. Sediment control devices will be listed in the CEMP.

2.3.3 Pipeline Testing and Commissioning

Hydrostatic Testing

Hydrostatic testing of the pipeline will be undertaken prior to commissioning to ensure that the pipeline passes strength and leak tests.

Hydrostatic testing includes:

- Welding temporary manifolds to the start and end of the pipeline
- Filling the pipeline with water
- Pressurising the pipeline to a minimum of 1.25 times the maximum allowable operating pressure
- Leak testing for a minimum of 24 hours to determine that the pipeline is leak free.

Wastewater from hydrostatic testing will be discharged into a lined turkeys nest near the Shenandoah Facility. The hydrostatic testing water will be tested to determine its suitability for release to ground. The testing will follow the Australian Pipelines and Gas Association (APGA)

Code of Environmental Practice (APGA, 2022). The hydrotesting water will continue to be tested and, if required, treated to ensure it is suitable for release to ground. Treatment may be required in the event that chemical treatment of the source water is required prior to hydrostatic testing, to prevent oxygen corrosion.

Drying and Caliper Pigging

When the dewatering process is complete the pipeline will be dried using compressed dry air. Following pipeline testing and drying, the pipeline will be gauged using an approved geometry pipeline inspection gauge (pig) capable of measuring the internal diameter of the pipe and inspecting the pipeline for ovality and dents. Any defects will be located, removed as a cylinder, and replaced with a length of pretested pipe.

Commissioning

The pipeline will be commissioned following the completion of hydrostatic testing and caliper pigging. Commissioning will proceed sequentially from the point where commissioning gas is available.

Commissioning will be in accordance with a procedure prepared during the detailed design and construction phase of the Project and will include the following activities:

- Instrument calibration
- Gas filling
- Testing and commissioning of stations and valves.

2.3.4 Operation and Maintenance

2.3.4.1 Workforce

Operation of the pipeline and surface facilities is expected to be undertaken by APA Group staff and APA Group contractors.

APA Group staff will monitor the day-to-day operation of the Project from an existing Integrated Operations Centre located in Brisbane, Queensland. Up to two field staff likely to be based in Tennant Creek or Katherine will conduct operations, maintenance activities and continue engagement with landholders.

APA Group's contractors will undertake the easement maintenance, specialist pigging operations, and cathodic protection surveys.

2.3.4.2 Inspection and Maintenance

A routine inspection and maintenance program will be implemented during operation of the pipeline. Frequency of inspections may vary depending upon the particular issue being inspected or in response to specific conditions such as major rainfall events. Aerial patrols will typically be undertaken monthly with ground patrols conducted annually.

Inspection and routine maintenance activities will include:

- Easement maintenance, such as vegetation control, weed management, erosion and subsidence monitoring
- Specialist pigging of the transmission pipeline
- Survey of the ICCP system.

Pigging of the transmission pipeline will be undertaken approximately every 10 years. Minor amounts of gas will be vented during pigging activities to depressurise the pig launcher/receiver.

2.3.4.3 Surface Facilities

The potential for automation of the Shenandoah Facility and Sturt Plateau Facility will be confirmed during detailed design. Inspections will be undertaken on the facilities for erosion, weeds, security, and success of revegetation.

2.3.5 Decommissioning

2.3.5.1 Decommissioning and Rehabilitation Plan

A decommissioning plan for the Project and associated infrastructure will be prepared in advance of the pipeline and ancillary facilities decommissioning. The decommissioning plan will be prepared in consultation with the relevant regulatory authorities and landholders. The decommissioning plan will be prepared to meet the requirements of applicable legislative and best practice guidelines and the APGA Code of Environmental Practice (2022) or latest published version available at the time of decommissioning.

2.3.5.2 Pipeline Decommissioning

The method of the pipeline’s decommissioning will be determined during the preparation of the decommissioning plan. The pipeline’s decommissioning may include:

- Suspension – The transmission pipeline would be depressurised and all remaining natural gas would be purged from the pipeline, capped and filled with an inert gas such as nitrogen, or water with corrosion inhibitors. The cathodic protection system would be maintained to prevent the pipeline corroding. Surface facilities would be removed or left in place if further service is envisaged.
- Abandonment – The pipeline would be disconnected from all sources of hydrocarbons and surface facilities. All remaining natural gas would be purged from the pipeline. Sections of the pipeline may then be filled with water, filled with cementitious mud, or removed. All surface facilities would be removed.

Both identified decommissioning options would result in small scale disturbance and environmental impacts. It is anticipated that relinquishment of the applicable Pipeline Licence (and associated easement) would not be possible until such time as any decommissioning issues are resolved.

Removal of the pipeline as part of abandonment would result in significant disturbance and environmental impacts and is therefore not the preferred option.

2.4 Site Selection and Alternatives

The Project involves the construction of infrastructure to facilitate the transport of gas from Tamboran Resources' approved Beetaloo Basin Shenandoah South Exploration and Appraisal Program, specifically from the Sturt Plateau Compression Facility, to the AGP. The specific purpose of this infrastructure dictates its location and design requirements. Since the infrastructure must provide a direct connection between these two fixed points (between Tamboran Resources' Sturt Plateau Compression Facility and the AGP), there is no feasible alternative site for the Project and options for alternative alignments are constrained.

2.4.1 Alternative Alignments

Three alternative alignments were considered for the pipeline. These alignments are shown Figure 12 and referred to as Alignments X, Y, and Z.

The proposed pipeline alignment was selected as the preferred option based on:

- an Abstract of Records from the Aboriginal Areas Protection Authority dated 23 August 2023
- publicly available data on existing environmental conditions
- existing infrastructure
- sensitive receptors, stakeholder consultation, and field inspections
- operational constraints such as access to the pipeline during wet weather conditions.

An environmental assessment of a 150 m wide corridor provided a relative assessment of the pipeline alignment to minimise potential environmental impacts and inform the pipeline design.

2.4.2 Do Nothing

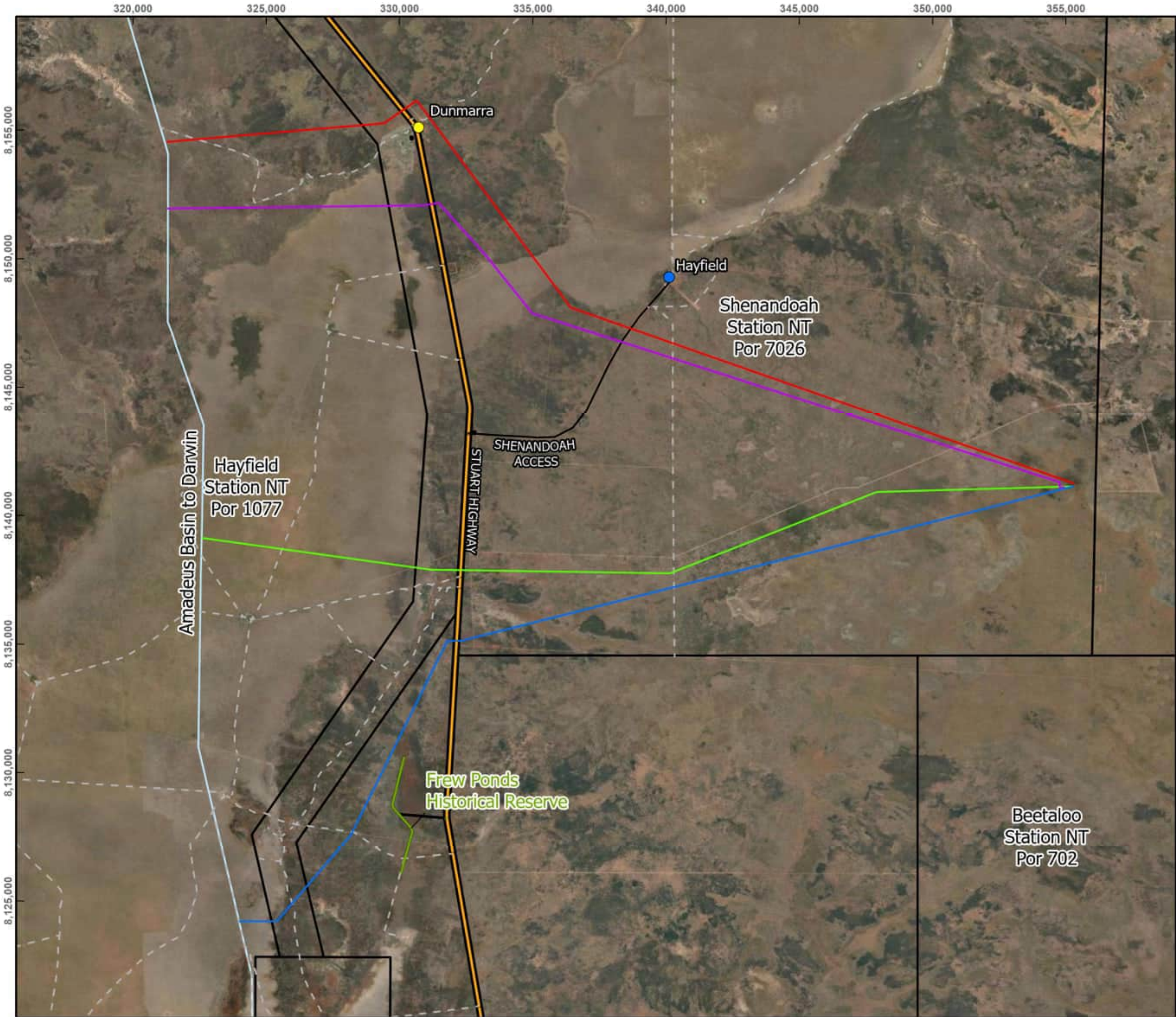
Under the ‘do nothing’ alternative, there would be a loss of energy benefits from Tamboran’s Beetaloo Basin Shenandoah South Exploration and Appraisal Program, as the Project would reduce upstream greenhouse gas (GHG) emissions that would otherwise occur if the gas were vented/flared. While flaring the gas at the wellhead would not significantly change GHG emissions compared to using it for heat or electricity generation, the energy benefits would be realized in the latter scenario, rather than being lost to the environment. It is prudent to note that quantification of the GHG reduction associated with the capture and transport of the appraisal gas via the Sturt Plateau Pipeline for end use, compared to venting/flaring of the gas at the wellhead, will depend on the amount of gas generated during the appraisal phase. An Air Quality and Greenhouse Gas Assessment was conducted for the Project and is provided in Attachment 7.

If the Project does not go ahead, there would also be missed economic opportunities for local communities. These include employment and supply chain opportunities that would arise during the construction phase of the project.

APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

ALTERNATIVE SITES FOR THE STURT PLATEAU PIPELINE

FIGURE 12



LEGEND

- Homestead
- Roadhouse
- Proposed Pipeline Alignment
- Alignment X
- Alignment Y
- Alignment Z
- Existing Gas Pipeline
- Cadastre
- Historical Reserve

Road Category

- National Highway
- Secondary
- Local

Service Layer Credits: Earthstar Geographics

0 2.5 5 km

Coordinate System:	GCS GDA 1994
Scale:	1:200,000 at A4
Project Number:	680.030294
Date Drawn:	9/27/2024
Drawn by:	CP
Reviewed by:	NC

Path: \\au.slr.local\Corporate\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F12_Alternative Sites for the Sturt Plateau Pipeline

2.5 Change Management Procedure

The alignment of the pipeline and location of surface facilities, and additional work areas may be subject to change following the assessment of this referral based on additional investigation, preclearance surveys, unexpected finds, or due to requirements of statutory approvals or agreements. These changes will not result in disturbance outside the nominated Project Area

The nominated Project Area represents the proposed extent of the development envelope within which the Project will be located. Whilst the locations of the pipeline, surface facilities, and additional work areas may change, the Disturbance Footprint will ultimately be within the boundary of the Project Area shown in Figure 3 and will not exceed the overall current Disturbance Footprint of approximately 146 Hectares.

Modification and optimisation of the Project design may include:

- Minor refinements to avoid or reduce impacts on environmental values identified after referral submission, such as sacred sites identified within an Authority Certificate, unexpected archaeological finds during construction activities or ecological features identified during pre-clearance inspections undertaken by qualified fauna spotter/catchers
- Minor refinements to address Native Title Holder feedback based on ongoing consultation
- Minor changes to the project design resulting from on-going detailed project engineering.
- Adjustment of infrastructure locations or approach angles to address specific design requirements from Tamboran or third-party asset owners such as the NT Department of Logistics and Infrastructure (DLI)
- Refinement of the Disturbance Footprint such as the location, dimensions, and number of additional work areas, hydro test water storages, and truck turnarounds, based on detailed construction planning.

The proposed approach (micro-siting change management procedure) to Disturbance Footprint changes confined to within the Project Area is as follows:

- Technical expert(s) (e.g. geotechnical / pipeline engineer, flora or fauna spotter), or others, identify the need to change the location of a project component
- Technical expert(s), pipeline environmental manager, and others as required, assess the proposed change of location, seeking to avoid and mitigate environmental impacts of the new location in accordance with the environmental decision-making hierarchy (as per section 26 of the EP Act).
- Technical expert(s) and the pipeline environmental manager prepare a 'self-assessment' of the environmental impacts of the micro-siting change, including a review of whether the change complies with Project approvals, permits and agreements. The self-assessment will be documented in a brief report, signed by the technical expert(s) and pipeline environmental manager, and maintained in APA's environmental management system.
- The self-assessment report will determine whether the new location will significantly alter the magnitude, extent or duration of environmental impacts assessed in this referral.
- If surveys and assessments demonstrate that the change complies with Project approvals, permits and agreements and it will not significantly alter the magnitude, extent or duration of environmental impacts assessed in this Referral, , then it is

proposed to document the proposed design change and supporting assessments and undertake the change, on the basis that the change is considered to be consistent with the existing assessment.

- If the realignment or design change is likely to significantly alter the magnitude, extent or duration of environmental impacts to the extent that there is potential for significant impact to environmental factors or Matters of National Environmental Significance (MNES) then the change may require referral and assessment under the EP Act or EPBC Act.

APA will undertake the following environmental assessments:

- Vegetation mapping and if suitable habitat is identified, field surveys for threatened species in areas outside of the Survey Area (but still within the Project Area)
- Archaeological surveys unless the proposed realignment or design change is within the existing Survey Area or is already authorised through an appropriate agreement.
- Where relevant to the nature and extent of the change, the following assessments will be undertaken:
  - Noise and air quality assessments to assess whether the changes would result in impacts to sensitive receptors
  - Assessment of land use, hydrology, water resources, soils, and traffic and transport, where changes to the design may increase adverse impacts for these matters.

This change management process seeks to ensure compliance with the EP Act and EPBC Act while providing reasonable flexibility in the location of the Project elements.

2.6 Project Commitments

APA is committed to implementing a range of measures to minimise the potential for significant impacts to the environment. When planning, constructing and operating the Project APA will implement the following measures:

- The Disturbance Footprint will remain within the Project Area
- Design, construction and operation of the Project will comply with conditions of the Authority Certificate
- Limit vegetation clearing to the minimum practicable extent along the CROW
- Minimise the clearing of sensitive or significant vegetation where practicable
- Avoid placement of project infrastructure over channels and flow paths where practicable
- Incorporate appropriate design measures where infrastructure is located within waterways
- Design waterway crossings to not impede/alter the direction of surface water flow
- Undertake works, in watercourses when the channels are dry
- Waterway rehabilitation will be consistent with surrounding environment and contours of the channel at the time of construction
- Avoid areas of severe erosion potential where practicable
- Minimise erosion risk by refining construction techniques, and incorporating erosion and sediment control methods
- Undertake pre-clearing surveys to identify the presence of endangered, vulnerable or rare and other significant flora and fauna species where they are likely to occur.
- Implement the proposed Change Management Process to reduce environmental impacts where appropriate resulting from pre-clearing surveys

- Work with the pastoral lessee to limit disruption to the pastoral lessee’s use of the land for pastoral and other purposes
- Consult with DLI to develop management measures for the crossing of the Sturt Highway
- Rehabilitate additional work areas to be consistent with the surrounding area
- Rehabilitate the CROW to provide for a stable landform
- Properly Clear the Right of Way minimise impacts on adjoining vegetation.
- Undertake annual post-construction monitoring of waterway crossing sites at the end of the wet season, until it has been established that the areas are stable and self-sustaining
- Develop a project specific Environmental Management Plan prior to the commencement of construction.

3.0 References

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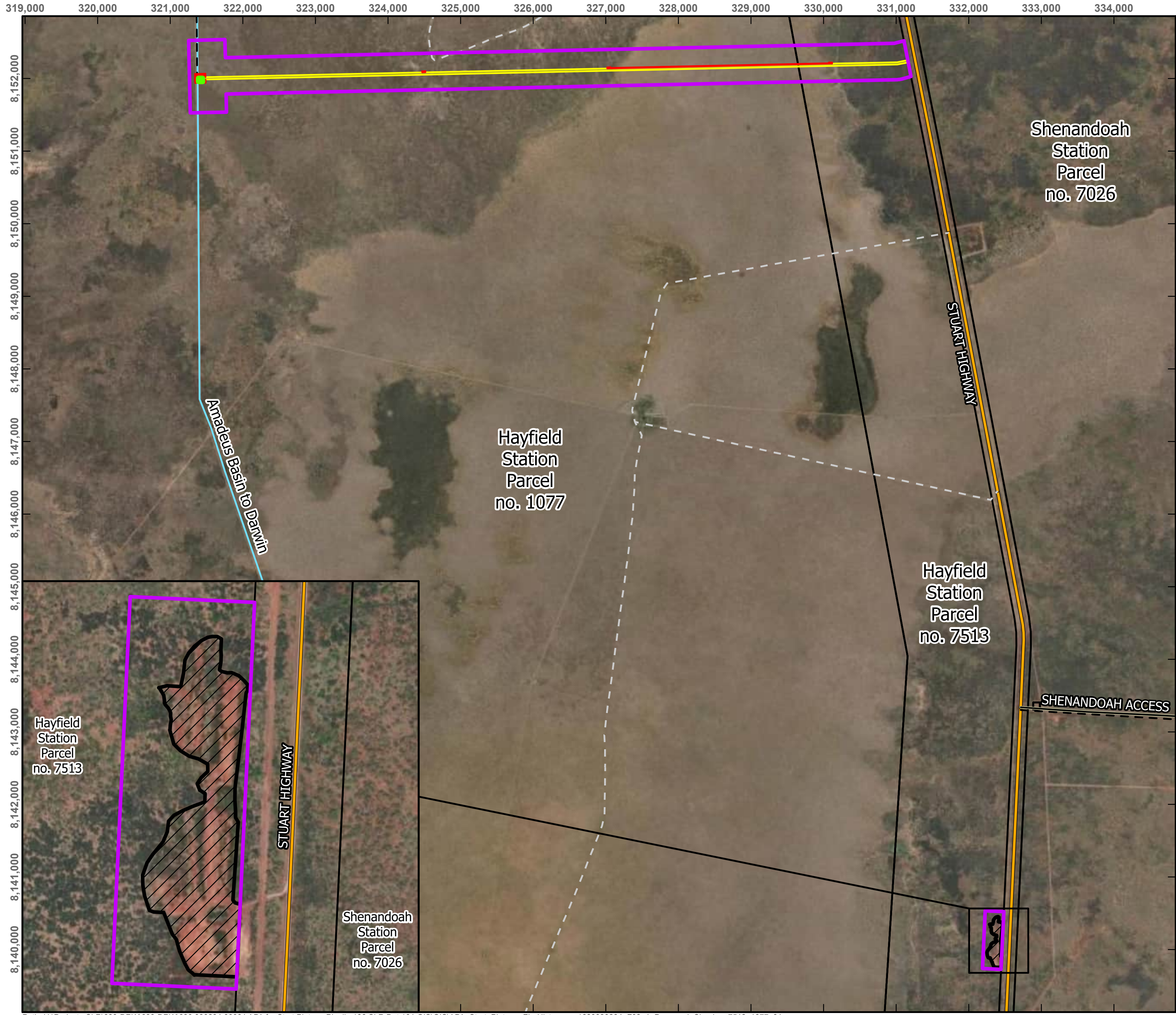
Making Sustainability Happen

Attachment 3 – Proposed Clearing Plan



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

MAP OF PROPOSED CLEARING - NT PORTIONS 7513 AND 1077

FIGURE 3-1

LEGEND

- Project Area
- Pipeline CROW
- Additional Workspaces
- Sturt Plateau Facility
- Previously Cleared Land
- Access Track
- Existing Gas Pipeline
- Cadastre

Road Category

- National Highway
- Secondary
- Local

Service Layer Credits:
Earthstar Geographics, Maxar

0 1 2 km

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:70,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC

SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_F03_1_Proposed_Clearing_7513_1077_01

Attachment 4 – Water Extraction Licence GRF10285

Northern Territory of Australia

LICENCE TO TAKE WATER

Section 60 of the Water Act 1992

Licence Details

Licence Number:	GRF10285
Licence Holder:	TAMBORAN B2 PTY LTD (ABN 42 105 431 525)
Registered Address:	110 – 112 THE CORSO MANLY NSW 2095
Commencement Date:	11 NOVEMBER 2022
Expiry Date:	31 DECEMBER 2024
Water Control District:	DALY ROPER BEETALOO WATER CONTROL DISTRICT
Water Resource:	GUM RIDGE FORMATION
Extraction Point(s):	RN039896, RN038493, RN040894, RN041132, RN041134, RN041136, RN043018
Land on which the water is used:	NT PORTION 702 (16965 CARPENTARIA HWY, PAMAYU), NT PORTION 1079 (8240 CARPENTARIA HWY, ARNOLD), NT PORTION 7026 (14981 STUART HWY, BIRDUM), NT PORTION 7027 (4500 CARPENTARIA HWY, BIRDUM), NT PORTION 701 (13935 CARPENTARIA HWY, ARNOLD)
Licence Trading Allowed	NO
Beneficial use(s) for which water taken under this licence is used	
Petroleum activity	175 ML/YEAR, SECURITY LEVEL NOT SPECIFIED
Total Maximum Water Entitlement:	175 ML/YEAR

These Licence Details form part of the conditions of the licence as specified below.

Preamble

Water extraction licences form part of an adaptive management framework for managing water resources in the Northern Territory.

Compliance and regulation of licences is undertaken in a transparent, timely, fair and respectful manner in accordance with natural justice principles and the Department's Customer Service Charter.

Information about this licence

Notes

The Controller may amend, revoke, suspend or modify this licence at any time, in accordance with s 93 of the Act.

This licence does not guarantee that water will be available from the Water Resource specified in the Licence Details, at any given time.

This licence does not give the Licence Holder a right to access land for the purpose of extraction of water or use of water. It is the Licence Holder's responsibility to ensure they have the legal right to access the land from which water is taken and upon which water is used.

If a Water Allocation Plan applies to a Water Resource to which this licence relates, the licensed water entitlement may be traded in accordance with the requirements of that plan, the Trading Licensed Water Entitlements Policy, and the trade agreement which is made between the buyer and the seller and approved by the Controller.

Renewal, amendment and surrender of this licence

To renew your licence, an application to renew a licence form must be submitted to water.regulation@nt.gov.au at least **6 months** prior to the Expiry Date specified in the Licence Details.

If no application is made to renew the licence, the licence will expire.

To amend the licence or a condition of the licence, the Licence Holder must complete an application to amend a licence form which can be submitted by email sent to water.regulation@nt.gov.au

The Licence Holder may surrender this licence at any time by notifying the Department of its surrender by email sent to water.regulation@nt.gov.au

Compliance

The Licence Holder must comply with the *Water Act 1992* (**the Act**) the Water Regulations 1992 (**the Regulations**) and all other applicable laws. Strict penalties apply for non-compliance.

This licence to take water includes licence conditions which are outlined below. These conditions impose obligations on the Licence Holder, including the requirement to report meter readings to the department on a monthly or quarterly basis. Licence Holders must fulfil all of the duties and perform all of the obligations set out in the conditions of this licence.

Contravention of the licence conditions is an offence under the Act and may result in financial penalties and/or the suspension or revocation of this licence.

Please read the licence conditions carefully. If you have any questions, please contact the Water Resources Division by sending an email to water.regulation@nt.gov.au.

Authorised Officers

Authorised Officers have the power to enter land by appointment, or without notice if required, to ascertain whether a breach of the Act or a breach of a condition of this licence has occurred. It is an offence to obstruct or hinder an Authorised Officer acting in their official capacity under the Act.

Interpretation

Unless a contrary intention appears, words or terms used in the conditions of this licence have the same meaning as in the Act, including any regulations or policies made under the Act.

General Conditions

GC1 All notices, reports, documents or other correspondence required to be provided as a condition of this licence must be provided in electronic form by email to water.regulation@nt.gov.au, unless otherwise agreed with an Officer, or specified as a condition of this licence.

GC2 The Licence Holder must immediately notify the Department on becoming aware of non-compliance (or suspected non-compliance) with any condition of this licence.

GC3 The Licence Holder must notify the Department within 10 business days of any change to the name or contact details of the Licence Holder.

GC4 If there is to be a transfer of the ownership of Land, or an interest in the Land, to which this licence relates, the Licence Holder must inform the Department as soon as practicable, and not later than 10 business days prior to the transfer occurring.

GC5 The Licence Holder must hold an authorised an environment management plan, in accordance with the Petroleum (Environment) Regulations 2016.

GC6 If an environment management plan associated with this licence is revoked, the Licence Holder must notify the Department within 24 hours.

GC7 This licence is in force from the Commencement Date, and until the Expiry Date, as specified in the Licence Details.

Water Extraction Conditions

WEC1 The Licence Holder must only take water from the Water Resource specified in the Licence Details.

WEC2 The Licence Holder may only extract water under this licence for use on Land specified in the Licence Details.

WEC3 The Licence Holder must only extract water from Extraction Point(s) specified in the Licence Details.

WEC4 The Licence Holder must maintain any bore associated with the Extraction Point(s) specified in the Licence Details, in accordance with the *Minimum Construction Requirements for Water Bores in Australia*.

WEC5 The Licence Holder must maintain a contemporaneous written record of all maintenance activities undertaken on any bores. These records must be maintained for the duration of the licence, and three years following its expiry. The records must be made available to the Controller or an Authorised Officer on request.

WEC6 The Licence Holder must not in any year of this Licence (which year commences on 1 May and ends 30 April) extract more than the Extraction Limit (and for any part of a year must not extract more than a pro rata amount) as shown in the Table below.

Commencement Date	Extraction Limit
01-May-2023 to 30-Apr-2024	175 ML
01-May-2024 to 31-Dec-2024	117 ML

The **Extraction Limit** is the Total Maximum Water Entitlement specified in the Licence Details, or, where the Controller has determined an Annual Announced Allocation, the Total Maximum Water Entitlement multiplied by the percentage stated in the Annual Announced Allocation.

WEC7 The Licence Holder must not extract more than *30%* of the Extraction Limit in any one calendar month, without the prior written approval of the Controller.

WEC8 The Licence Holder must extract at least *90%* of the Extraction Limit in at least one year (which year commences on 1 May and ends 30 April) of any three consecutive years for the duration of the licence.

WEC9 If the Licence Holder does not extract the minimum required by WEC8, the Licence Holder must notify the Department the reasons why and provide a projection of water requirements for the remaining term of the licence.

Water Use Conditions

WUC1 The Licence Holder may only use water extracted under this licence on the Land specified in the Licence Details.

WUC2 The Licence Holder may only use water for the beneficial use(s) specified in the Licence Details.

Metering Conditions

MC1 The Licence Holder must, at each Extraction Point specified in the Licence Details, and prior to any extraction occurring under the licence, install and maintain a meter that complies with the *Northern Territory Non-Urban Water Metering Code of Practice for Water Extraction Licences*.

MC2 All water extracted under this licence must be measured by such a water meter.

MC3 The Licence Holder must notify the Department, of a water meter being installed or replaced within 10 business days of that occurring. The notification must contain:

(a) photographs of the meter being replaced and the meter being installed, including a photograph of the serial number and a photograph of the replacement meter and all replacement pipework within 10 metres of the Extraction Point (which is to be photographed while visible); and,

(b) where a water meter has been replaced, the final meter reading and a photograph of the reading on the replaced meter.

MC4 The Licence Holder must maintain records of the manufacturer's specifications of any water meter installed and maintained, as well as contemporaneous written records of any maintenance undertaken of a water meter. These records must be maintained for the duration of the licence, and three years following its expiry. These records must be provided to the Controller or an Authorised Officer upon their request.

MC5 The Licence Holder must not tamper with, or permit any other person to tamper with, any installed water meter.

MC6 The Licence Holder must ensure that each installed water meter is in a condition that it can be conveniently read or examined at any time.

MC7 The Licence Holder must ensure that each installed water meter is safely accessible at all times, and is free from overgrown vegetation or any potential hazards.

Monitoring and Reporting Conditions

MRC1 Within two weeks following the end of each quarter of each year, and within two weeks of the licence expiry date, the licence holder must supply the Controller with a record of water extraction, reported per calendar month, from each bore listed on the licence. The records must be provided by email to water.regulation@nt.gov.au.

Special Conditions

SC1 If there is a conflict between the terms and conditions of this licence and the special conditions listed below, the special conditions will prevail to the extent of the inconsistency.

SC2 The licence holder must provide a written report to the Controller within forty-eight hours of identifying any contravention of the terms and conditions of this licence, including the special conditions. The written report must set out:

(a) comprehensive details of the contravention; and

(b) how the licence holder proposes to rectify the contravention and prevent the contravention from reoccurring.

SC3 The licence holder must pay a $3000 fee (exclusive of GST) within 30 days after the date on which the licence is issued and on each subsequent anniversary of the issuance of this licence for the period of the licence.

Phillipa Hunter
A/Director Water Licensing and Regulation
Delegate of the Controller of Water Resource

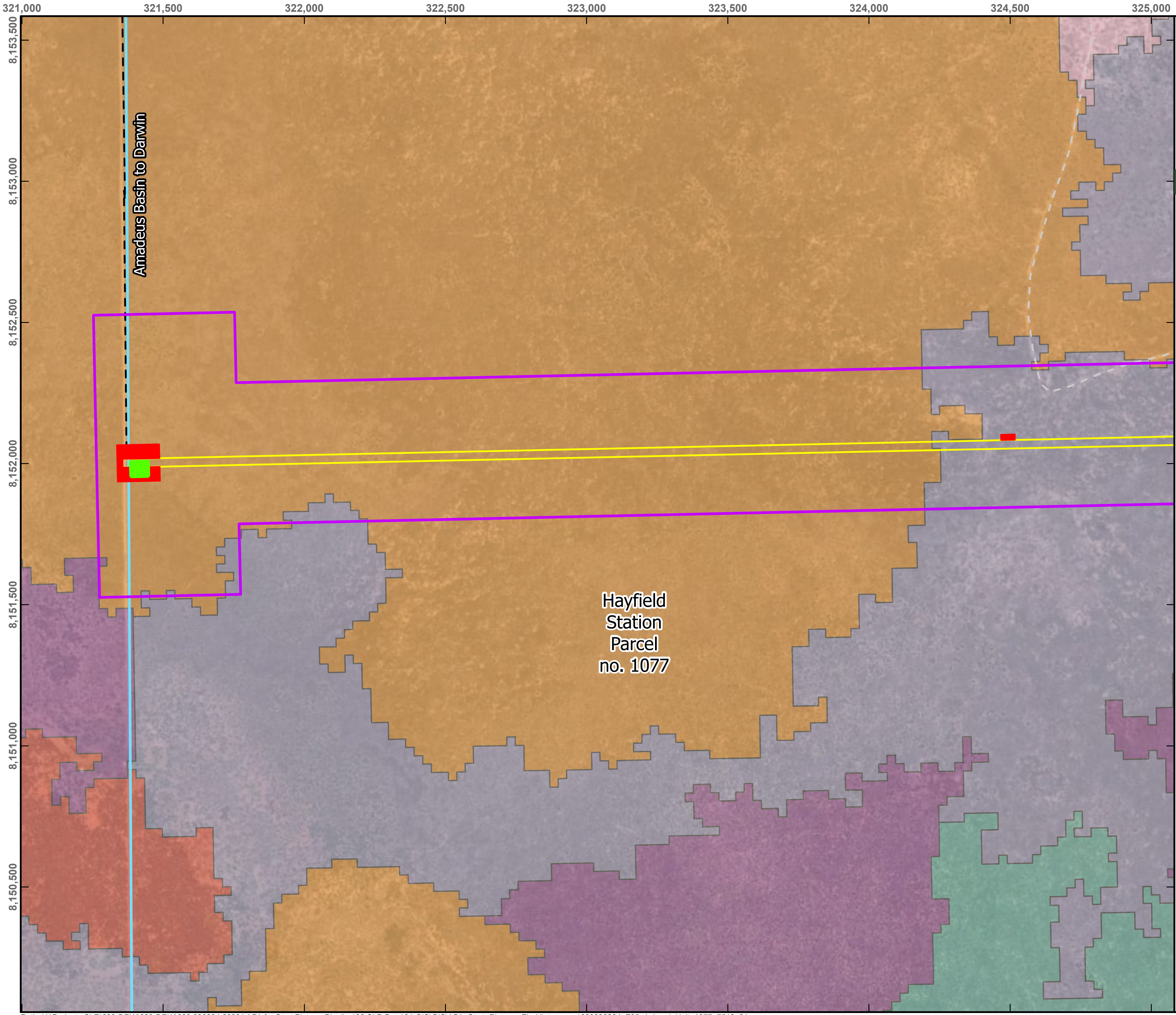
Date: 1 November 2023

This licence should be interpreted in accordance with the *Interpretation Act 1978* (NT).

Term	Definition
Act	the *Water Act 1992* (NT)
Annual Announced Allocation	the percentage determined and announced by the Controller before 1 May by which the Total Maximum Water Entitlement available under a licence is reduced for the forthcoming year
Authorised Officer	a person appointed under section 21 of the Act as an Authorised Officer for the purposes of the Act
Controller	the Controller of Water Resources, appointed under section 18 of the Act, including a delegate of the Controller
Department	the Department of Environment, Parks and Water Security, or any future department or agency that has the responsibilities for administering the functions in the Act relating to the licensing and regulation of water resources
Extraction Limit	the Total Maximum Water Entitlement specified in the Licence Details, or, where the Controller has determined an Annual Announced Allocation, the Total Maximum Water Entitlement multiplied by the percentage stated in the Annual Announced Allocation
Land	the Land from which the water is taken and on which the water is used as listed under the Licence Details
Licence Details	the information in the table on the front page of this document
Officer	A staff member of the Water Regulation Branch of the Water Regulation Division, or of any future branch or business unit that has the responsibilities for the administrative and regulatory functions of the Act
Regulations	the Water Regulations 1992 (NT)
Quarter	Means financial year quarters ending 30 September, 31 December, 31 March, 30 June
Water Allocation Plan	A Water Allocation Plan declared in accordance with section 22B of the *Water Act 1992*
Water Resource	The Water Resource listed under the Licence Details

Attachment 5 – Land Type Map

Spatial Data Source: Brocklehurst, P. and Trueman, M. (IN PREP). 1:250,000."Land Types of the Southern Part of the Northern Territory". July 29, 2015. Rangelands Division, Department of Environment and Natural Resources.



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

LAND UNIT - PARCELS 1077 & 7513

FIGURE 5-1

LEGEND

Project Area

Sturt Plateau Facility

Pipeline CROW

Additional Workspaces

Existing Gas Pipeline

Road Category

Local

Access Track

Land Unit

13a

7a

7b

8a1

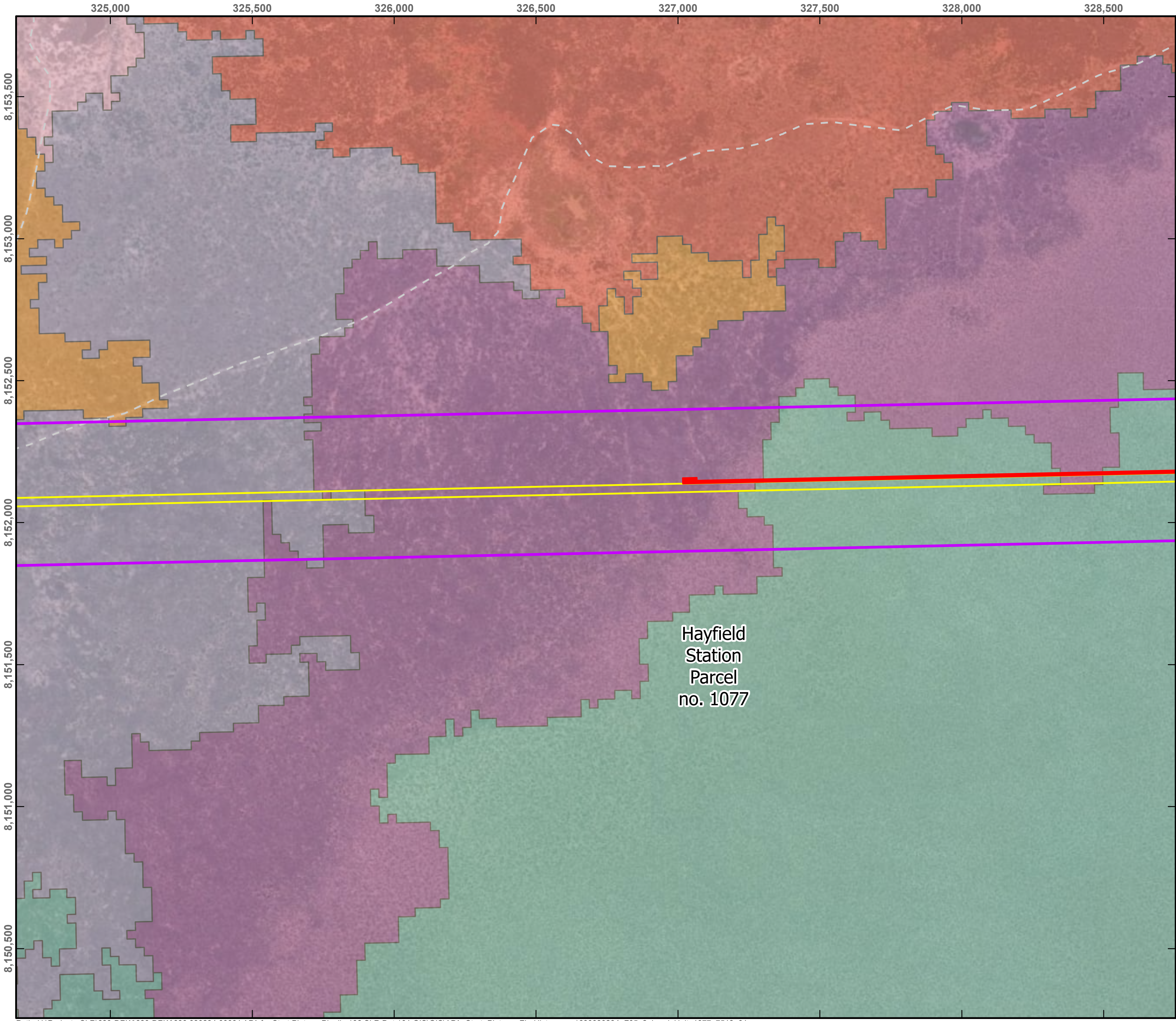
8b3

8d

Service Layer Credits: Earthstar Geographics, Maxar

0 250 500 m

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:18,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

LAND UNIT - PARCELS 1077 & 7513

FIGURE 5-2

LEGEND

- Project Area
- Pipeline CROW
- Additional Workspaces

Road Category

- Local

Land Unit

- 13a
- 7a
- 7b
- 8a1
- 8b3
- 8d

Service Layer Credits: Maxar

0 250 500 m

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:18,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC

SLR

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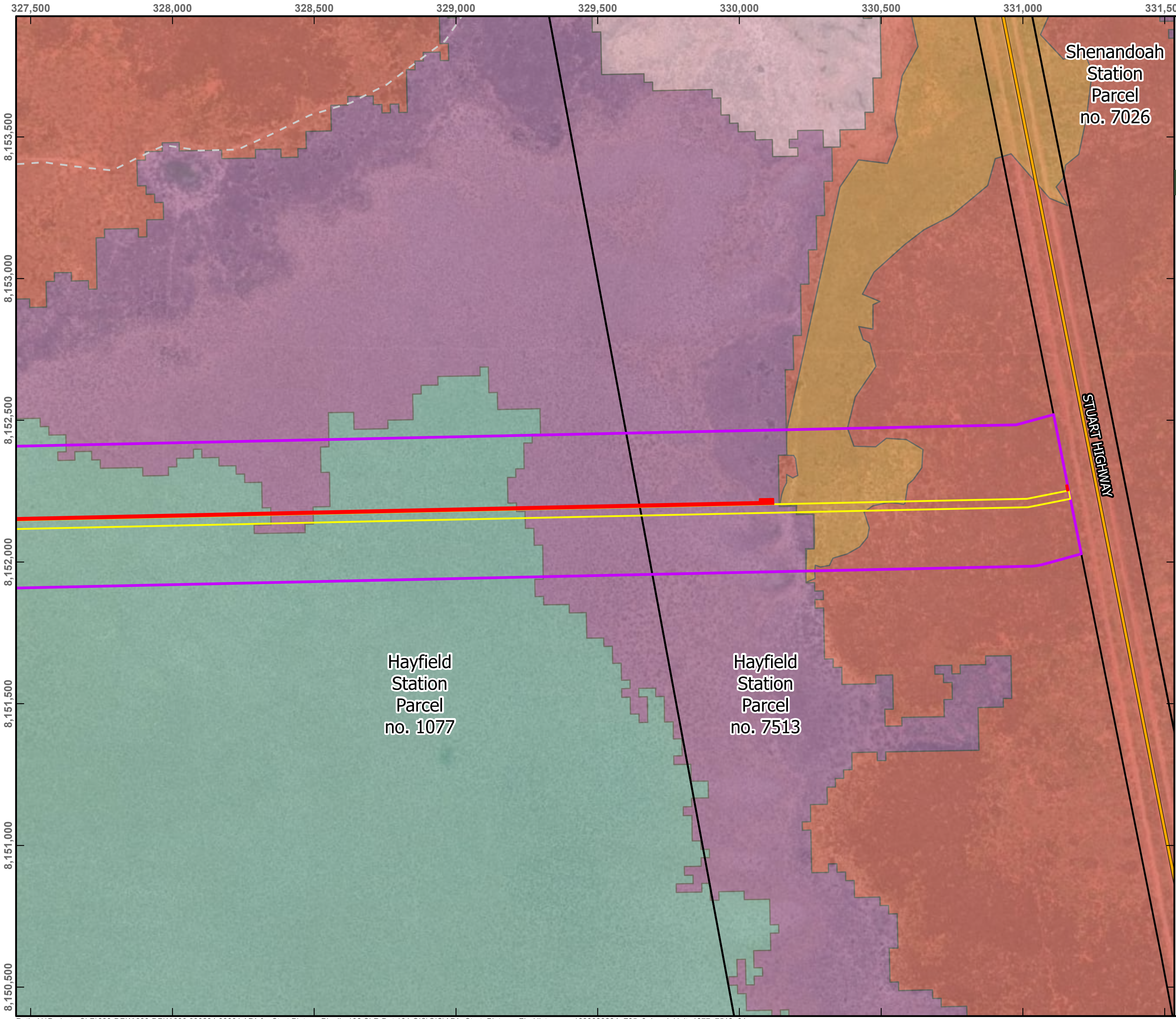


APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

LAND UNIT - PARCELS 1077 & 7513

FIGURE 5-3

LEGEND

Project Area

Pipeline CROW

Additional Workspaces

Cadastre

Road Category

National Highway

Local

Land Unit

13a

7b

8a1

8b3

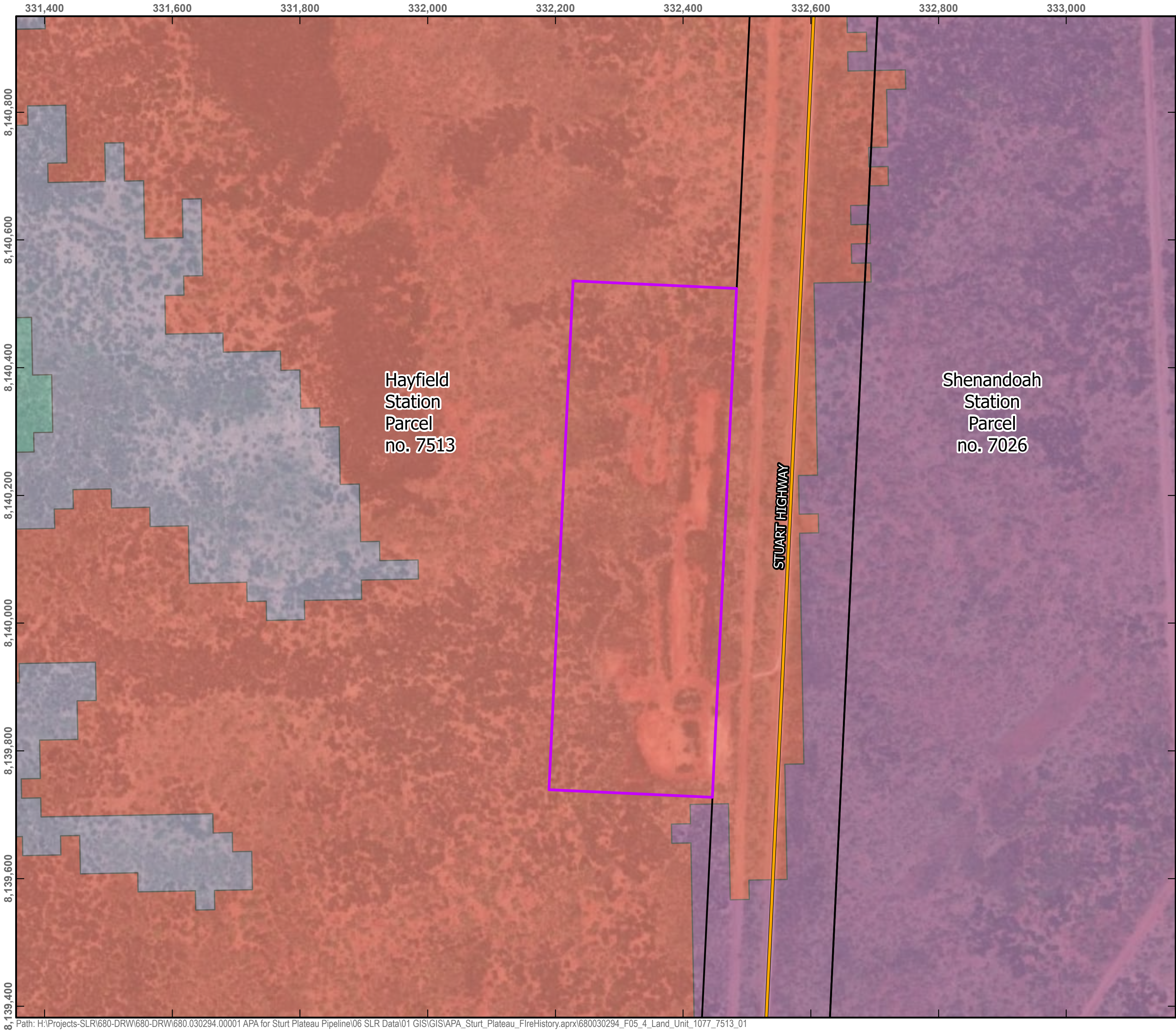
8d

Service Layer Credits: Earthstar Geographics, Maxar

0 250 500 m

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:18,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FIreHistory.aprx\680030294_F05_3_Land_Unit_1077_7513_01



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

LAND UNIT - PARCELS 1077 & 7513

FIGURE 5-4

LEGEND

- Project Area
- Cadastre

Road Category

- National Highway

Land Unit

- 13a
- 7a
- 7b
- 8d

Service Layer Credits: Maxar

0 100 200 m

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:8,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC

SLR

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Attachment 6 – Land Type Descriptions

Source: Burley, P., Carnarvas, M. & Hempel, J. (2019). Soil and Land Suitability Assessment for Irrigated Agriculture in the Dunmarra Area. Available at: https://hdl.handle.net/10070/780402 [accessed 21 September 2024]

Land Unit 7a — Gravelly Low Rises — Area: 9,369 ha

Summary: Gravelly ironstone low rises and pediment slopes with Small-fruited Bloodwood low open woodland.

Lithology: *Tertiary laterite, ferruginous rubble, some red soil and sand (Tl)*. Reworked sandy colluvium overlying deeply weathered sedimentary rocks generally with indurated ferricrete cap.

Landform: Level to gently undulating dissected gravelly low rises and pediments.

Soil Concept: Shallow to moderately deep (0.25-1 m), brown or red massive earths over ferricrete (sandy topsoil).

Soil Classification: *Kandosol*: *Haplic*, *Petroferric*, *Red* or *Brown*; thin A1, moderately gravelly surface/A1, sandy A1, clay loamy B, shallow.

Vegetation: *Corymbia dichromophloia* low open woodland.

Sites: 12 field sites described; 1 analysed; 1 site from previous investigations.

Landscape

Slope: 0-2%

Surface condition: Firm to hard setting with crust

Surface gravels: 5-80% ironstone

Rock outcrop: 0-5% ferricrete

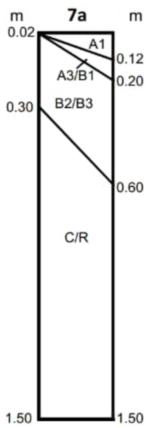
Drainage: Well drained

Runoff: Slow

Permeability: Moderately to highly permeable

Microrelief: Termitaria

General Soil Profile Description



Surface soil: A1: Dark brown, loamy sand; massive, earthy fabric; no mottles; many ironstone gravels; non-calcareous; field pH 6.5. Lower depth 0.02-0.12 m.

Sub-surface layer: A3/B1: Reddish brown, sandy loam; massive, earthy fabric; many ironstone gravels.

Subsoil layer: B2/B3: Dark red or brown; sandy clay loam; massive, earthy fabric; no mottles; many ironstone gravels; non-calcareous; field pH 6.0-7.0. Lower depth <0.6 m.

Substrate layer: C/R: Loose ironstone nodules, ferricrete and/or petroreticulate.

Soil Analytical Properties (representative site: 115)

Very low fertility and nutrient holding capacity. Slightly to moderately acid throughout. Clay content is 16% at surface and decreases with depth. Salinity levels non-saline throughout (max EC_e 0.2 dS/m). Exchangeable cations are low (K, Mg) or very low (Na, Ca). ECEC is very low. Total nitrogen at the surface is very low. Organic carbon is low at the surface, decreasing with depth. Available soil water holding capacity is very low. Laboratory dispersion (R1) is low to high.

Comments

This Land Unit contains a variety of soils and landforms, dominated by deeper, heavier soils (*Kandosols*) on colluvial hillslopes, with occurrences of very shallow to shallow (<0.25-0.5 m) sandy soils (*Tenosols*) and undeveloped soils (*Rudosols*) on crests.

General Land Capability — *Class 3 – severe constraints*

Land Unit 7b | Lancewood Low Rises | Area: 9,843 ha

Summary: Scoured ferricrete low rises and pediment slopes dominated by Lancewood low woodland.

Lithology: *Tertiary laterite, ferruginous rubble (Tl)*. Deeply weathered sedimentary rocks generally with indurated ferricrete cap.

Landform: Scoured, gravelly, level to gently undulating low rises and pediments.

Soil Concept: Shallow to moderately deep (0.25-1 m), brown or red massive earths over ferricrete (clay loamy topsoil).

Soil Classification: *Kandosol*: *Haplic*, *Petroferric*, *Brown*; thin A1, moderately gravelly surface/A1, clay loamy A1, clay loamy B, shallow to moderately deep.

Vegetation: *Acacia shirleyi* low woodland.

Sites: 9 field sites described; 1 analysed; 7 sites from previous investigations.

Landscape

Slope: 0-2%

Surface condition: firm to hard setting surface, sometimes with crust or cryptogam

Surface gravels: 20-50%

Rock outcrop: 0-5%

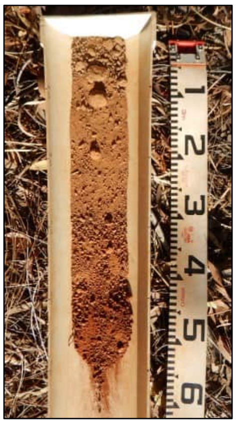
Drainage: Well drained

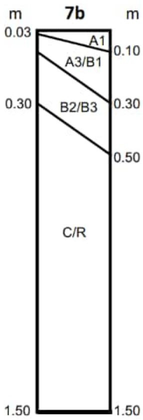
Runoff: Slow

Permeability: Moderately permeable

Microrelief: Termitaria

General Soil Profile Description





Surface soil: A1: Dark brown, sandy clay loam; massive, earthy fabric; no mottles; ironstone gravels common; non-calcareous; field pH 5.5-6.5. Lower depth 0.1 m.

Sub-surface layer: A3/B1: Brown, sandy clay loam; massive, earthy fabric; common ironstone gravels.

Subsoil layer: B2/B3: Brown or dark red, clay loam to light clay; massive, earthy fabric; no mottles; common ironstone gravels; non-calcareous; field pH 5.5-7.0. Lower depth generally <0.5 m, occasionally to 0.9m.

Substrate layer: C/R: Indurated ferricrete and/or petroreticulate.

Soil Analytical Properties (representative site: JINGA003)

Low fertility and nutrient holding capacity. Strongly acid throughout. Clay content 24% at surface, increasing with depth to maximum of 28%. Salinity levels negligible throughout (max EC_e 0.1 dS/m). Exchangeable cations are low (K, Mg) or very low (Na, Ca). ECEC is very low. Total nitrogen at the surface is very low. Surface organic carbon very low at surface, decreasing with depth. Available soil water holding capacity is very low. Laboratory dispersion (R1) is low.

Comments

Soils are generally heavier than Land Unit 7a and substrate is usually indurated, indicating the complete removal of reworked sandy colluvial surface present in 7a, with heavier soils forming in situ from lateritic substrate. While median subsoil field pH was 6.5, the representative site subsoil laboratory pH was <5.5; it is possible that strongly acidic (pH <5.5) subsoils occur more frequently within this Land Unit.

General Land Capability *Class 3 – severe constraints*

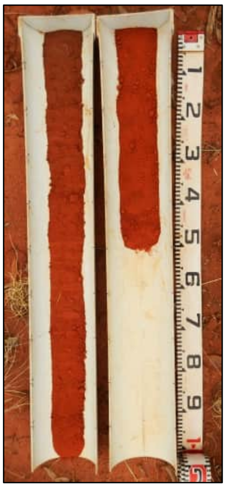
Land Unit 8a1	Elevated Plains	Area: 8,075 ha

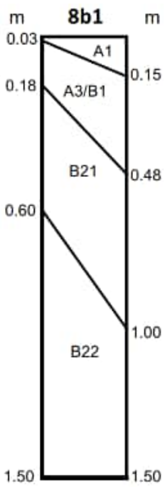
Summary:	Very deep sandy elevated plains on residual plateau surface.
Lithology:	Residual sandy colluvium overlying deeply weathered lateritic sediments.
Landform:	Level elevated plains of residual plateau surface.
Soil Concept:	Very deep (>1.5 m), massive, red earths (sandy clay loam subsoil)
Soil Classification:	*Kandosol*: *Haplic*, *Mesotrophic*, *Red*; thin A1, non-gravelly surface/A1, sandy A1, clay-loamy B, very deep.
Vegetation:	*Corymbia dichromophloia, Erythrophleum chlorostachys, Corymbia ferruginea* mid open woodland
Sites:	25 field sites described; 2 analysed; 1 site from previous investigations.

Landscape

Slope:	0-1%
Surface condition:	Firm with sand veneer
Surface gravels:	0%
Rock outcrop:	0%
Drainage:	Well drained
Runoff:	Very slow
Permeability:	Highly permeable
Microrelief:	Termitaria

General Soil Profile Description





Surface soil:	A1: Dark reddish brown, loamy sand to sandy loam; massive to weak structure; no mottles; no coarse fragments; non-calcareous; field pH 5.5-6.5. Lower depth 0.03-0.15 m.
Sub-surface layer:	A3/B1: Dark red, loamy sand to sandy loam; massive, earthy fabric.
Subsoil layer:	B2: Red; sandy loam (heavy) to sandy clay loam; massive, earthy fabric; no mottles; no coarse fragments; non-calcareous; field pH 5.5-7.0. Lower depth >1.5 m.
Substrate layer:	Loose ironstone nodules, indurated ferricrete and/or petroreticulate. Rarely encountered.

Soil Analytical Properties (representative sites: 027, 056)

Low fertility and nutrient holding capacity. The surface is moderately acid, the subsurface is slightly acid and the subsoil is moderately acid. Clay content is 11% at the surface and increases with depth to a maximum of 28%. Salinity levels are non-saline throughout (max EC_e 0.2 dS/m). Exchangeable cations are all low (K) or very low (Na, Ca, Mg) and ECEC is very low. Total nitrogen is very low at the surface. Organic carbon is extremely low at the surface, decreasing with depth. Available soil water holding capacity is moderate. Laboratory dispersion (R1) is low.

Comments

One of 25 sites was classified as *Tenosol* due to lighter textures throughout (loamy sand to sandy loam (light)). All sites possessed very deep (>1.5 m) non-gravelly soils with the exception of two sites: one site transitioned to C horizon reticulate at 0.95 m depth; one site contained 50% ironstone fragments at 1.4 m depth. These sites occurred close to the Land Unit boundary where depth to substrate or ironstone may be shallower than 1.5 m depth.

General Land Capability *Class 1 – negligible constraints*

Land Unit 8d	**Intergrade Plains**	**Area: 978 ha**

Summary: Imperfectly drained clay plains intergrading lateritic plains and cracking-clay plains

Lithology: Loamy alluvial/colluvial sediments derived from deeply weathered lateritic sediments, with some lacustrine influence from adjacent downs plains

Landform: Level plains intergrading red soil uplands and downs plains.

Soil Concept: Deep to very deep (1->1.5 m), mottled, massive yellow clays.

Soil Classification: *Kandosol*: *Mottled*, *Indeterminable*, *Yellow*; thin A1, non to slightly gravelly surface/A1, clay loamy A1, clayey B, deep to very deep.

Vegetation: *Eucalyptus microtheca* low woodland.

Sites: 4 field sites described; 0 analysed; 1 site from previous investigations.

Landscape

Slope: 0-1%

Surface condition: Firm with surface crust

Surface gravels: 0-10%

Rock outcrop: 0%

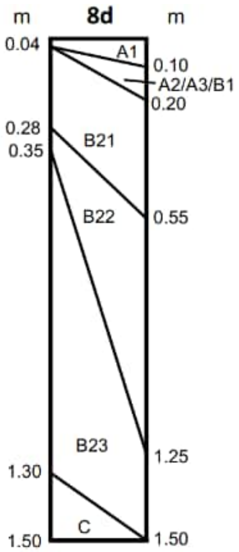
Drainage: Imperfectly drained

Runoff: Very Slow

Permeability: Slowly to moderately permeable

Microrelief: Termitaria

General Soil Profile Description



Surface soil: A1: Brown, clay loam; massive to weak structure; no mottles; no coarse fragments; non-calcareous; field pH 6.5-7.0. Lower depth 0.04-0.10 m.

Sub-surface layer: A3/B1: Yellowish brown, light clay, massive, earthy fabric.

Subsoil layer: B2: Brownish yellow, light clay; massive, earthy fabric; common grey, red and orange mottles; few manganiferous and/or ferro-manganiferous segregations; non-calcareous; field pH 6.5-7.5. Lower depth 1.3->1.5 m.

Substrate layer: C: (when encountered) Reticulate or petroreticulate.

Soil Analytical Properties

Not sampled for laboratory analysis.

Comments

One of four sites was classified as *Mottled Red Chromosol* containing 0.2 m depth of aggraded surface sand.

General Land Capability *Class 3 – severe constraints*

Land Unit 13a — Seasonally Inundated Downs Plains — Area: 2,410 ha

Summary: Seasonally inundated cracking-clay plains, with Coolabah low open woodland.

Lithology: *Black & grey clayey soils (Czb)* underlain by claystone and siltstone of the Mullaman Beds. Soils are partly residual and partly lake and swamp deposits.

Landform: Seasonally inundated level clay plains with gilgai microrelief.

Soil Concept: Very deep (>1.5 m), seasonally-wet, self-mulching, cracking-clays.

Soil Classification: *Vertosol*: *Haplic*, *Self-mulching*, *Aquic*; non-gravelly surface/A1, medium to very fine upper 0.1 m (45%->60% clay), medium to very fine B (45%->60% clay), very deep.

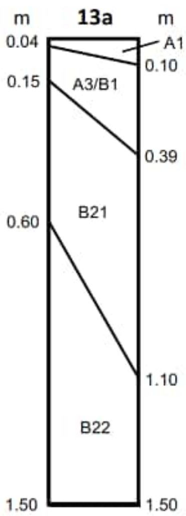
Vegetation: *Eucalyptus microtheca* low open woodland over *Eulalia aurea* tall tussock grassland.

Sites: 5 field sites described; 1 analysed

Landscape

Slope:	0-1%
Surface condition:	Cracking, self-mulching
Surface gravels:	0%
Rock outcrop:	0%
Drainage:	Poorly drained
Runoff:	None
Permeability:	Very slowly permeable
Microrelief:	Normal gilgai

General Soil Profile Description



Surface soil: A1: Grey, medium heavy clay; granular structure; no mottles; no coarse fragments; no segregations; non-calcareous; field pH 6.0-7.0. Lower depth 0.04-0.10 m.

Sub-surface layer: A3/B1: Grey, medium-heavy clay, strong, rough-ped 40-50mm angular blocky structure.

Subsoil layer: B2: Grey, medium heavy clay; strong lenticular structure; common slickensides; 1% 2 mm prominent brown mottles; no coarse fragments; 2% 3 mm manganiferous nodules; field pH 7.0-7.5. Lower depth >1.5 m.

Substrate layer: Unconsolidated material (not described).

Soil Analytical Properties (representative site: 021)

Moderate fertility and nutrient holding capacity. The surface and subsurface are slightly acid to neutral and moderately alkaline in the subsoil. Clay content is approximately 60% throughout the profile. Salinity levels are non-saline throughout (max EC_e 0.1 dS/m). CEC/ECEC is high, exchangeable cations Ca, Mg, K are high and Na is low to moderate. Total nitrogen is very low at the surface. Organic carbon is very low in the surface and decreases regularly with depth. Available soil water holding capacity is very high. Laboratory dispersion (R1) is low to moderate.

Comments

Satelite imagery indicates periods of extensive seasonal inundation depending on amount and pattern of wet season rainfall.

General Land Capability *Class 4 – extreme constraints*

Attachment 7 – Ecological Assessment

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

Level 12 & 13, 80 Ann Street
Brisbane, QLD, 4000

Prepared by:

SLR Consulting Australia

SLR Project No.: 680.030294.00001

Client Reference No.: R04

6 December 2024

Revision: 3.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	26 August 2024	Matthew McIntosh	Scott Harte	Scott Harte
2.0	15 October 2024	Matthew McIntosh	Scott Walker	Scott Walker
2.1	17 October 2024	Natalie Calder	Scott Walker	Scott Walker
3.0	6 December 2024	Matthew McIntosh	Scott Walker	Scott Walker

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with APA SPP Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Table of Contents

Tables in Text

Figures in Text

Appendices

Acronyms and Abbreviations

AECOM	Architecture, Engineering, Construction, Operations, and Management
AGPA	Australian Pipelines and Gas Association Ltd.
ALA	Atlas of Living Australia
AGP	Amadeus Gas Pipeline
AoO	Area of occupancy
APA	APA SPP Pty Ltd
BoM	Bureau of Meteorology
BVG	Broad Vegetation Group
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEPWS	Department of Environment, Parks and Water Security
DBH	Diameter at Breast Height
DoE	Department of the Environment
EMP	Environment Management Plan
EP Act	*Environment Protection Act 2019*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
INFRA	Infraspecific species under the TPWC Act
Int.	Introduced species under the TPWC Act
IUCN	International Union for the Conservation of Nature
LC	Least Concern under the TPWC Act
mbgl	Meters below ground level
MI	Migratory species under the EPBC Act
MNES	Matters of National Significance
(NL)	Not Listed under the TPWC Act
NVIS	National Vegetation Information System
NR Maps	Natural Resources Maps
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Agency
PMST	Protected Matters Search Tool
SCLU Act	*Soil Conservation and Land Utilisation Act 1969*
ROW	Right of Way
SLR	SLR Consulting Australia Pty Ltd
SoBS	Sites of Botanical Significance
SoCS	Sites of Conservation Significance
SPP	Sturt Plateau Pipeline
SREBA	Strategic Regional Environmental and Baseline Assessment
Tamboran	Tamboran B2 Pty Ltd
TEC	Threatened Ecological Community
The Code	Code of Environmental Practice – Onshore Pipelines (AGPA, 2022)

Threatened species categories	EX	Extinct
	EW	Extinct in the wild
	CR	Critically Endangered
	EN	Endangered
	VU	Vulnerable
TPWC Act		*Territory Parks and Wildlife Conservation Act 1976*
TSSC		Threatened Species Scientific Committee
WM Act		*Weed Management Act 2001*
WoNS		Weed of National Significance

1.0 Introduction

1.1 Project background

SLR Consulting Australia Pty Ltd (SLR) was commissioned by APA SPP Pty Ltd (APA) to undertake baseline terrestrial ecology assessments for the construction of the Sturt Plateau Pipeline (‘the SPP’ or ‘the Project’; Figure 1). APA is proposing to construct the SPP to transport appraisal gas from Tamboran B2 Pty Ltd’s (Tamboran) Sturt Plateau Compression Facility development sites in the Beetaloo Sub-basin to the Amadeus Gas Pipeline (AGP). The AGP is a transmission pipeline that extends from the Amadeus Basin in the south of the Northern Territory (NT) to Darwin, in the north. It transports natural gas to Darwin, Alice Springs and regional centres, principally to fuel power generation.

The Project’s combined construction footprint, comprises:

- The construction right of way (ROW) for the proposed pipeline.
- Construction footprints for the Shenandoah Facility and Sturt Plateau Facility.
- A temporary construction camp.
- Additional workspaces required to facilitate construction.
- A cathodic protection anode bed in the eastern end of the pipeline.

The Beetaloo Sub-basin, located 500 km south-east of Darwin in the NT, covers 28,000 km^2 and is estimated to contain 500 trillion cubic feet of gas (P50 gas-in-place resource as estimated by industry). It is in the early stages of its development, with several producers proposing to undertake additional development work to verify gas production quantities and ultimately sell the gas to commercial markets.

The preferred pipeline alignment (proposed pipeline) is approximately 37 km in length and passes through pastoral leasehold land. It crosses the Sturt Highway approximately 35 km south of Birdum and is proposed to be horizontally bored under the Stuart Highway. The pipeline would be buried for its entire length.

The Project commences on NT Portion 7026 (Shenandoah PPL) and extends west, across the Stuart Highway Road corridor and NT Portion 7513, to the AGP located on NT Portion 1077 (both Hayfield PPL). Details of land tenure for each respective lot are listed in Table 1.

Table 1 Land tenure details for the Project

Portion number	7026	7513	1077	Stuart Highway
Tenure Type	PPL	PPL	PPL	NTG road corridor
Station Name	Shenandoah	Hayfield	Hayfield	-
Title	CUFT 752	CUFT 823	CUFT 823	-
Street Number	14981 Stuart Highway, Birdum	-	1143 Buchanan Highway, Birdum	-
Survey ID	S2009/182A	CP005573	S811108	
Area (ha)	147,273	8040	176,702	-
Owner	A.P.N Pty Ltd	A.P.N Pty Ltd	A.P.N Pty Ltd	DIPL

APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

THE PROJECT

FIGURE 1

LEGEND

- Project Area
- Survey Area
- Existing Gas Pipeline
- Homestead
- Roadhouse

Road Category

- Pastoral - National Highway
- Pastoral - Secondary
- Pastoral - Local

Service Layer Credits:
Earthstar Geographics

0 5 10 km

Coordinate System:	GCS GDA 1994
Scale:	1:300,000 at A4
Project Number:	680.030294
Date Drawn:	11-Oct-2024
Drawn by:	CP

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1.2 Purpose and objectives

The purpose of this report is to outline the methods, results and outcomes of terrestrial ecological desk- and field-based assessments for the Project. This is achieved through the assessment of the following environmental matters:

- The terrestrial biodiversity values within the Project Area; including threatened and migratory species listed under the *Territory Parks and Wildlife Conservation Act 2006* (TPWC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Other Matters of National Environmental Significance (MNES) (as listed under the EPBC Act).
- Vegetation communities and watercourses mapped within the Project Area.
- The occurrence of significant sites (i.e. Sites of Conservation Significance (SoCS) and Sites of Botanical Significance (SoBS)), and native flora and fauna species.
- The identification of introduced flora and fauna species (weeds and pests) with potential relevance to the Project Area.

The Project Area of this report is defined by a 250 m buffer from the centre point of the proposed pipeline alignment (500 m linear width). This buffer has been provided to account for potential locations of 'additional work areas', as described in Section 1.3.2.2.

The Survey Area of this report is defined by a 75 m buffer from the centre point of the proposed pipeline alignment (150 m linear width). The Survey Area is equivalent to the area assessed during the May 2024 terrestrial ecology field assessment. Data collected within the Survey Area have been extrapolated from the limit of the 150 m ground-truthed corridor to the Project Area (500 m) corridor. Extrapolated data outside of the area ground-truthed during the field assessment should be interpreted with caution.

1.3 Description of proposed works

1.3.1 Construction methods

Construction of the Project is proposed to be undertaken in a progressive and sequential manner (i.e. clearing, trenching, and backfilling will be undertaken in incremental steps), therefore disturbance during construction will be staged. The typical pipeline construction sequence is (1) clear and grade, (2) pipe stringing, (3) pipe bending, (4) welding of pipe joints, (5) trench excavation, (6) lowering-in of the pipe, (7) backfilling, and (8) rehabilitation.

1.3.1.1 Clearing and grading

Clearing and grading of the ROW is undertaken to provide a safe and efficient area for construction activities. Clearing will be required to remove trees, shrubs and groundcover vegetation. Graders, bulldozers and excavators are generally used to clear and level the ROW. A ROW width of 30 m will generally be cleared and graded.

In areas of woody vegetation, trees and shrubs will be stockpiled as cleared. Rootstock of trees will generally be removed.

Cleared vegetation will be stockpiled on one or both sides of the ROW, as in Figure 2. Breaks will be left in stockpiled vegetation at fence lines, tracks and drainage lines and at locations to allow continued access for stock to water points.

Topsoil will be stripped to depths defined by soil surveys, typically over the full width of the ROW. In soil types with topsoil depth of 30 cm or greater, the stripping depth may be reduced to ensure stockpiles can be accommodated within the 30 m ROW width. Stripped topsoil will be stockpiled on one side of the ROW adjacent to vegetation stockpiles.

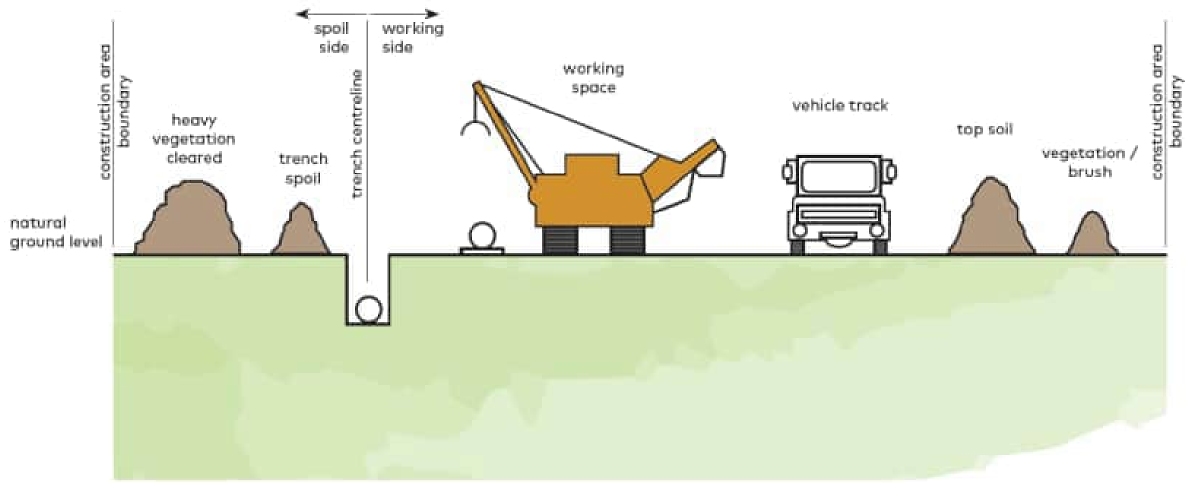


Figure 2 Typical layout for a pipeline construction corridor

1.3.1.2 Pipe stringing, bending and welding

Stringing involves distributing pipe lengths along the ROW in preparation for welding. Where required, pipe lengths will be bent using a hydraulic bending machine to match changes in either elevation or direction of the alignment. Following this, pipe lengths will be welded in to "pipe strings" of up to ~1,200 m in length, allowing for stock and landholder access breaks where required.

1.3.1.3 Trench excavation and horizontal boring

Specialised trenching machines and excavators will excavate to a minimum depth of 1200 mm to achieve the minimum depth of cover of 750 mm, and a minimum of 1650 mm to achieve the 1200 mm depth of cover for open cut crossings. Spoil generated during excavation would be stockpiled on the non-working side of the ROW, separately from vegetation and topsoil stockpiled earlier in the construction program (see Figure 2).

Breaks in the open trench will be included to facilitate stock and wildlife crossings and agricultural vehicle movements. Breaks will also be included at fences and drainage lines as required.

For areas where rock is present, trench excavation will be undertaken by rock saw machines or by excavators with rock hammer attachments. Blasting of rock will only occur in circumstances where a rock saw/rock hammer is found to be ineffective. This is considered unlikely to occur due to favourable geology across most of the alignment. Where blasting of rock is necessary, an operational procedure will be developed in accordance with Australian Standards detailing the blasting method.

Horizontal boring involves the excavation of a hole either side of the feature to be bored for installation of the pipeline beneath the surface feature which cannot be open cut, such as sealed roads. The additional disturbance footprint required for the horizontal bored crossings would generally be an area of 20 m x 70 m adjoining each side of the ROW.

Since traffic will need to continue to flow on the Stuart Highway this technique will be employed to ensure the pipeline crossing beneath the highway and adjacent table drains can be achieved at this location. This is the only location where a horizontal bored crossing will be needed for the Project.

1.3.1.4 Lowering and backfilling

Following trench excavation, the welded pipe strings will be lifted off skids and lowered into the trench using side-boom tractors. After lowering-in, the strings are welded together (a 'tie-in') in the trench.

During backfilling, care will be taken to ensure separation of topsoil and subsoil throughout this process. Subsoils will be compacted to reduce the settlement of the trench over the operational life of the pipeline.

Where required, trench blocks (also known as trench or sack breakers) will be installed prior to backfilling of the trench to control lateral water movement along the trench. Trench breakers are commonly installed in a number of environmental conditions, such as adjacent to watercourses and wetlands, on steep slopes or where drainage patterns change.

1.3.1.5 Reinstatement and rehabilitation of footprint

Rehabilitation of the construction footprint will be undertaken in accordance with the project CEMP and the latest Australian Pipelines and Gas Association Code of Environmental Practice (AGPA) (AGPA, 2022). It will be a progressive process with an aim to restore the land back to its prior productivity within a reasonable timeframe, subject to seasonal constraints.

Key activities would include:

- Removal of all temporary structures and buried infrastructure;
- Removal of all waste;
- Re-establishing topsoil cover;
- Returning all land and waterways to a stable condition;
- Ameliorating construction impacts to soil texture, structure and chemical composition, where required;
- Reinstating natural drainage patterns;
- Reinstating roadways and road reserves in accordance with the requirements of the relevant authority;
- Reinstating fencing and access tracks in accordance with the requirements of landowners;
- Spreading of mulch or timber, where appropriate;
- Application of seed and/or vegetation, where appropriate;
- Installing permanent erosion control measures (such as contour banks, filter strips) in erosion prone areas; and
- Ensuring the pre-construction environment is reinstated and disturbed habitats recreated where they do not affect pipeline operation and integrity (trees and shrubs are discouraged over and near the pipeline to maintain integrity of the pipe coatings) and to enable operational access.

1.3.2 Infrastructure components

Table 2 shows estimated disturbance requirements for the construction and operational phases of the Project, with estimated disturbance from each phase broken into infrastructure components. Further detail on infrastructure components for the Project are provided below.

Table 2 Estimated disturbance area for the Project

Infrastructure component	Disturbance area (ha)[1]	
	Construction	Operation
Pipeline ROW and surface facilities	110.8	111.9
Additional work areas	13.2	0
Temporary construction camp	21.5	0
Cathodic protection anode bed	0.3	0.3
Total	**145.8**	**112.2**

[1] At the time of writing, two construction ROWs were proposed and a final design has not been agreed upon. Due to this, exact disturbance areas are based on a tentative design and construction methodology with final numbers to be amended if required upon the completion of the final design.

1.3.2.1 Proposed pipeline and ROW

The proposed pipeline would be approximately 37 km in length and buried to a minimum of 750 mm, with a 30 m wide construction ROW. Table 3 further details the pipeline and ROW specifications. The pipeline will be buried for its entire length other than at surface facility locations. All surface facilities will be bounded by security fencing. At locations where the pipeline is potentially exposed to increase erosional forces, such as floodplains, additional protection will be provided by increased depth cover (i.e. 1,200 mm depth of cover at unsealed road crossings, drainage lines and floodplains). A visual representation of the ROW is shown in Figure 2.

Table 3 Pipeline an ROW specifications

Component	Description
Length	37 km
Material	High strength steel with fusion bonded epoxy external coating
Nominal diameter	300 mm
Nominal capacity	Max 50 TJ/day
Pipe wall thickness	6.4 mm
Pipe segment length	18 m (some 12 m)
Depth of cover	Minimum 750 mm
Easement / ROW	Nominally 30 m wide (approximately 37 km)
Design principles	In accordance with latest version of AS2885 Pipelines – Gas and liquid petroleum
Design life	40 years

A typical layout for the construction ROW is shown in Figure 2, consisting of the pipeline trench, working space, vehicle access track and stockpile areas either side of the alignment.

The construction corridor will follow the preferred alignment of the pipeline. The construction corridor includes an approximately 20 m wide working side and approximately 10 m wide spoil side as per Figure 2. Most construction activity will take place within this corridor. Construction activities will occur either from KP 0 to KP 37 (Option 1) or KP 37 to KP 0 (Option 2). Consequently, the working side of the ROW will be located to the north of the pipeline alignment if pipelaying commences at KP 0 or to the south of the pipeline alignment if pipelaying commences at KP 37. The direction of pipelaying will be dependent upon weather and site conditions at the commencement of construction. The potential impact of each option on vegetation communities is presented in Section 6.0.

1.3.2.2 Additional work areas

Construction laydown area adjacent to surface facilities

A construction laydown area of up to 1 ha will be required adjacent to the Shenandoah Facility and up to 1.3 ha will be required adjacent to the Sturt Plateau Facility for the storage of equipment and materials.

Cleared Vegetation Stockpiles

Cleared vegetation will be stockpiled within the ROW. Cleared vegetation stockpiles that cannot be accommodated within the ROW will be stockpiled within construction laydown areas adjacent to surface facilities, truck turnarounds and additional work areas associated with trenched/bored crossings.

Truck Turnarounds

Truck turnarounds are turning bays that are required along the ROW to allow trucks delivering pipe and other materials to be able to turn around and return to an appropriate exit point. Fifteen truck turnarounds are proposed to be located approximately every 2.5 km along the alignment. The truck turnaround locations may be subject to change based on pre-clearing surveys or based on site conditions at the time of construction. Truck turnarounds will be an additional 20 m width to the ROW for a length of about 50 m on one side of the ROW only.

Trenched/Bored Crossings

Unsealed roads and minor watercourses will typically be crossed using open cut trenching. The Stuart Highway will be crossed by horizontal boring.

Horizontal boring involves construction of a bell hole either side of the crossing with a horizontal bore hole for installation of the pipeline beneath sensitive surface features. The additional disturbance footprint required for horizontal boring crossings would generally be an area of approximately 20 m x 70 m adjoining each side of the ROW.

Water Bores, Water Storage and Hydrostatic Testing

A minimum of two new bores are proposed. These being located within the footprint of the temporary construction campsite. Hardstand and associated piping infrastructure will be required at water offtakes. Water storages are likely to be turkeys nests located at the construction camp and at KP 0. The estimated area required for each turkeys nest storage is 50 m X 50 m. The turkeys nest dams may be retained following construction.

Borrow pit for gravel material

A 50 m x 50 m borrow pit for gravel material is proposed within the footprint of the Sturt Plateau Facility temporary laydown area. Additional gravel material may be extracted from discrete areas within the site nominated for the camp area.

Cathodic protection anode bed

An impressed current cathodic protection system will be employed to protect the pipeline from corrosion and will require construction of a cathodic protection anode bed. The 300 m x 10 m, buried cathodic protection anode bed will be developed in the southern portion of the project area.

1.4 Regulatory framework

1.4.1 Commonwealth legislation

1.4.1.1 Environment Protection and Biodiversity Act 1999

The EPBC Act is administered by the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places, which are defined in the EPBC Act as MNES.

Database searches and field assessments should be conducted as part of any flora and fauna impact assessment. The results of these assessments can be used to determine the presence or likelihood of occurrence of MNES within the Project area. If any species or communities listed under the EPBC Act are present or likely to occur, an assessment of significance is required. If the proposed action may have a significant impact on a MNES, it must be referred to DCCEEW for assessment. If DCCEEW determines that the proposed action is likely to have significant impacts despite any suggested mitigation strategies, the Project will be considered as a controlled action and will require formal assessment and approval. If the proposed action is not likely to be significant, approval is not required if the action is taken in accordance with the referral. Consequently, the action can proceed, subject to any State, Territory, or local government requirements.

1.4.2 Territory legislation

1.4.2.1 Territory Parks and Wildlife Conservation Act 2006

The TPWC Act is administered by the NT Department of Environment, Parks and Water Security (DEPWS). The TPWC Act makes provisions for the establishment of Territory Parks and other Parks and Reserves and promotes the study, protection, conservation and sustainable utilisation of wildlife. The TPWC Act also covers the classification and management of wildlife, classification and control of feral animals, permits for taking wildlife, and designation and management of protected areas and private sanctuaries.

Wildlife management

The management of wildlife under the TPWC Act is to be carried out in a manner that promotes:

- The survival of wildlife in its natural habitat.
- The conservation of biological diversity within the NT.
- The management of identified areas of habitat, vegetation, ecosystem, or landscape to ensure the survival of populations of wildlife within those areas.

- The control or prohibition of:
  - The introduction or release of prohibited entrants into the NT.
  - Any other act, omission or thing that adversely affects, or will or is likely to adversely affect, the capacity of wildlife to sustain its natural processes.
- The sustainable use of wildlife and its habitat.

Feral animals are to be managed in a manner that reduces their population and the extent of their distribution within the NT and controls any detrimental effect they have on wildlife and the land.

Protected wildlife

Protected wildlife includes all wildlife that is:

- In a park, reserve, sanctuary, wilderness zone or area of essential habitat.
- A vertebrate that is indigenous to Australia.

The TPWC Act uses the International Union for the Conservation of Nature (IUCN) criteria to classify species. IUCN criteria classify wildlife into conservation categories as follows:

- Threatened categories:
  - Extinct (EX).
  - Extinct in the Wild (EW).
  - Critically Endangered (CE).
  - Endangered (EN).
  - Vulnerable (VU).

Threatened wildlife is automatically given protected wildlife status.

1.4.2.2 Environment Protection Act

The *Environment Protection Act 2019* (EP Act) is administered by DEPWS. The EP Act and subordinate regulation (EP Regulation, 2020) legislate the environmental impact assessment and approval process for the NT. The objectives of the act are to:

- Protect the environment of the NT.
- Promote ecologically sustainable development so that the wellbeing of the people the NT is maintained or improved without adverse impact on the environment.
- Recognise the role of environment impact assessment and environmental approval in prompting the protection and management of the environment.
- Provide for broad community involvement during the process of environmental impact assessment and approval.
- Recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.

Additionally, the EP Act identifies activity- and location-based triggers, which may result in the referral of an action to the NT Environment Protection Agency (EPA) for assessment in accordance with the EP Regulation. An activity-based referral trigger includes actions that the Minister considers are likely to have a significant impact on the environment. A location-based referral trigger includes areas that the Minister considers are:

(a) of significance because of a feature of the natural or cultural environment; and

(b) likely to be subject to significant impact by actions.

The NT EPA has developed environmental factors and objectives to improve certainty, and increase transparency, within the environmental impact assessment process. 'Terrestrial ecosystems' is one of the 14 environmental factors (and falls under the Land theme) identified by NT EPA. The objective of the terrestrial ecosystem environmental factor is to 'protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning' (NT EPA, 2022). This objective provides an indicator against which to assess whether the objects of the EP Act can be achieved and are used by the NT EPA to judge whether the environmental impact of a proposed action may be significant and ultimately whether a proposed action is likely to be acceptable (NT EPA, 2022).

1.4.2.3 Weeds Management Act

The *Weeds Management Act 2001* (WM Act) is administered by DEPWS and legislates the declared and potential weeds of the NT and their management. The purpose of the WM Act is to:

- Prevent the spread of weeds in, into and out of the NT and to ensure that the management of weeds is an integral component of land management in accordance with the Katherine Regional Weeds Strategy 2021-2026 (DEPWS, 2021a) or any other strategy adopted to control weeds in the NT.
- Ensure there is community consultation in the creation of weed management plans.
- Ensure that there is community responsibility in implementing weed management plans.

General duties for the owners and occupiers of land identified within the WM Act include, but are not limited to, the requirement for owners and occupiers to:

- Take all reasonable measures to prevent the land being infested with a declared weed.
- Take all reasonable measures to prevent a declared weed or potential weed on the land spreading to other land.
- Within 14 days after first becoming aware of a declared weed that has not previously been, or known to have been, present on the land, notify an officer of the presence of the declared weed.
- Comply with weed management plans relating to declared or potential weeds that are present on the land.
- Dispose of a potential weed on land which the potential weed is already present or at a designated weed disposal area.

1.4.2.4 Soil Conservation and Land Utilisation Act

The *Soil Conservation and Land Utilisation Act 1969* (SCLU Act) is administered by DEPWS and provides for the prevention of soil erosion and for the conservation and reclamation of soil.

1.4.2.5 Pastoral Land Act

Clearing of native vegetation on pastoral land is controlled by the *Pastoral Land Act 1992* (Pastoral Land Act). The Land Clearing Guidelines (DEPWS, 2024c) establish standards for native vegetation clearing and must be applied for ‘development applications for the purpose of clearing of native vegetation’ under the Pastoral Land Act.

2.0 Physical environment

2.1 Bioregional context

The Project Area wholly occurs within the Sturt Plateau bioregion (DEPWS, 2024a), which occupies an area of ~98,575 km^2 in central NT (Bastin, 2008). The bioregion comprises flat to gently undulating plains, with little local relief, and the vegetation is mainly eucalypt forests and woodlands dominated by bloodwoods over perennial grasses (Bastin, 2008). The northwesternmost portion of the Mitchell Grass Downs bioregion occurs ~6.5 km to the south of the western portion of the Project Area (DEPWS, 2024a). A review of spatial imagery suggests that sections of the Project Area intersect habitat units (i.e. seasonally inundated black soil plains) that are characteristic of the Mitchell Grass Downs bioregion (DEWPS, 2024a; Bastin ,2008).

2.2 Land Units and Soils

Land Units within the Project Area comprise:

- Elevated plains & pediments
- Sloping pediments
- Lower clay plains

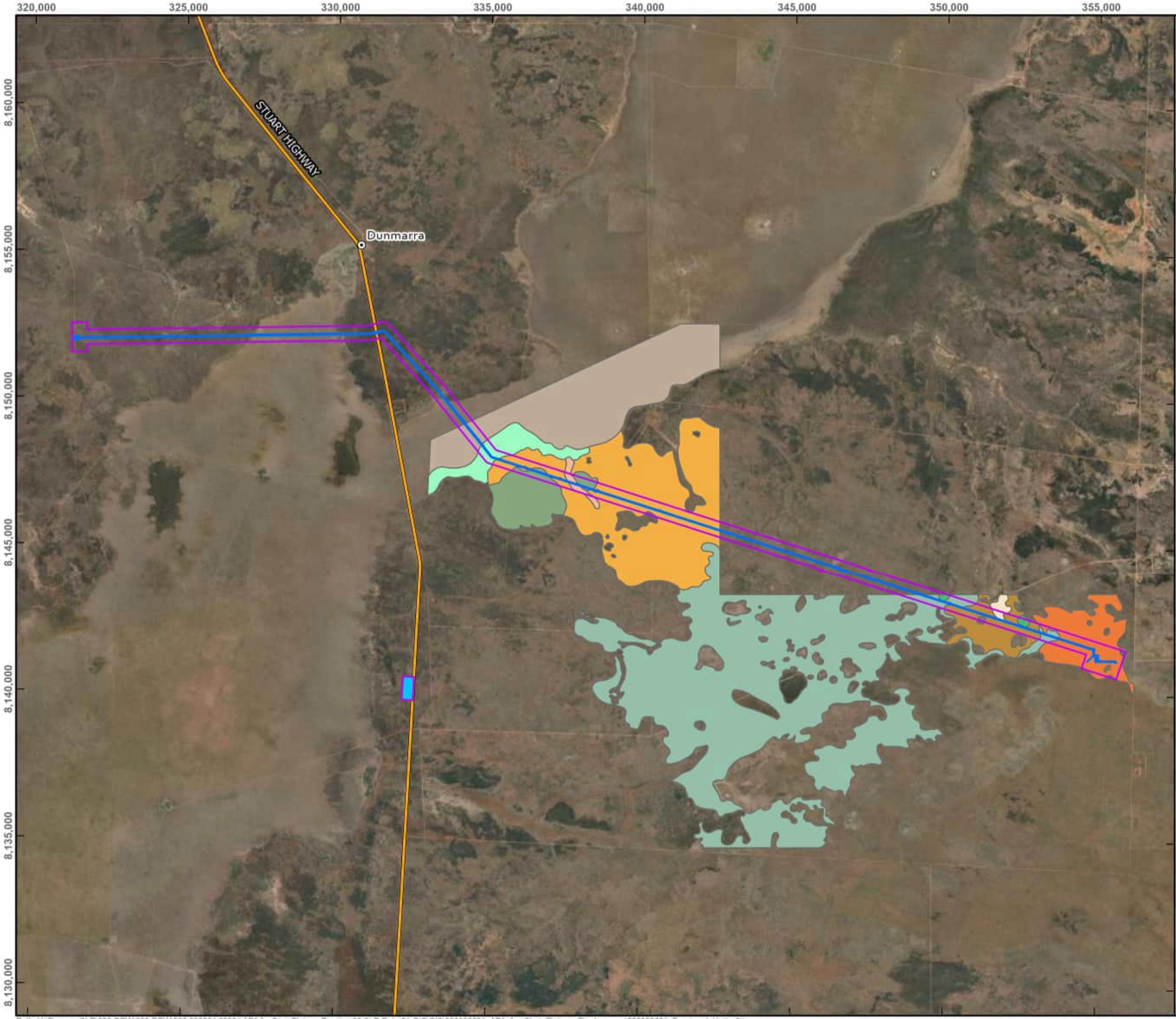
Table 4 shows the land units and land forms at the Project Area (Burley *et. al.* 2019). Figure 3 show the mapped land units.

Available data for soils is shown in Figure 4. The Project Area is dominated by kandosols and tenosols with vertosols within the floodplains. Pockets of hydrosols occur throughout the tenosols. At least one area of rudosols also occurs within the Project Area.

Table 4 Land units and landforms within the Project Area

Land Unit	Landform	Soil	Vegetation
Low Rises			
7a	Gently undulating dissected gravelly low rises and pediment slopes	Very shallow (<0.25 m) to moderately deep (<1 m), massive, brown earthy sands or red earths over ferricrete (Leptic Tenosols and Red/Brown Petroferric Kandosols)	*Corymbia dichromophloia* low open woodland
7b	Scoured gravelly gently undulating low rises and pediment slopes	Generally shallow (<0.5), massive, brown or red earths over indurated ferricrete (Red/Brown Petroferric Kandosols)	*Acacia shirleyi* low woodland
Plains			
8a3	Level sandy wash-slope plains and pediments	Massive, bleached, brown earthy sands or brown earths over ferricrete. Soil depth predominately moderately deep (0.5-1m), though quite variable. (Petroferric Tenosols/Kandosols)	*Corymbia dichromophloia* low open woodland

Land Unit	Landform	Soil	Vegetation
8a4	Broad, imperfectly drained, mostly endorheic plains	Deep (<1.5 m), massive, bleached, brown earthy sands or grey/yellow earths over ferricrete (Petroferric Kandosols)	*Melaleuca nervosa* low open woodland
8b2	Level colluvial plain margins and valley flats within narrow relict drainage features	Moderately deep (0.5-1.0 m), massive, red earths over ferricrete (Red Kandosols)	*Erythrophleum chlorostachys, Corymbia dichromophloia, Corymbia terminalis* low woodland
Inland Wetlands			
13a	Seasonally inundated level clay plains with gilgai microrelief	Very deep (>1.5 m), cracking, self-mulching, grey medium to heavy clay (Grey Vertosols)	*Eucalyptus microtheca* low open woodland



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

LAND UNITS WITHIN THE PROJECT AREA

FIGURE 3

LEGEND

Project Area
Pipeline Construction ROW
Temporary Construction Camp
Town

Road Category

Pastoral - National Highway

Land Unit - Dunmarra Survey

11a
13a
7a
7b
7c
8a2
8a3
8a4
8b2
8d

Service Layer Credits: Earthstar Geographics

0 3 6 km

Coordinate System:	GCS GDA 1994
Scale:	1:175,000 at A4
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Reviewed by:	NC

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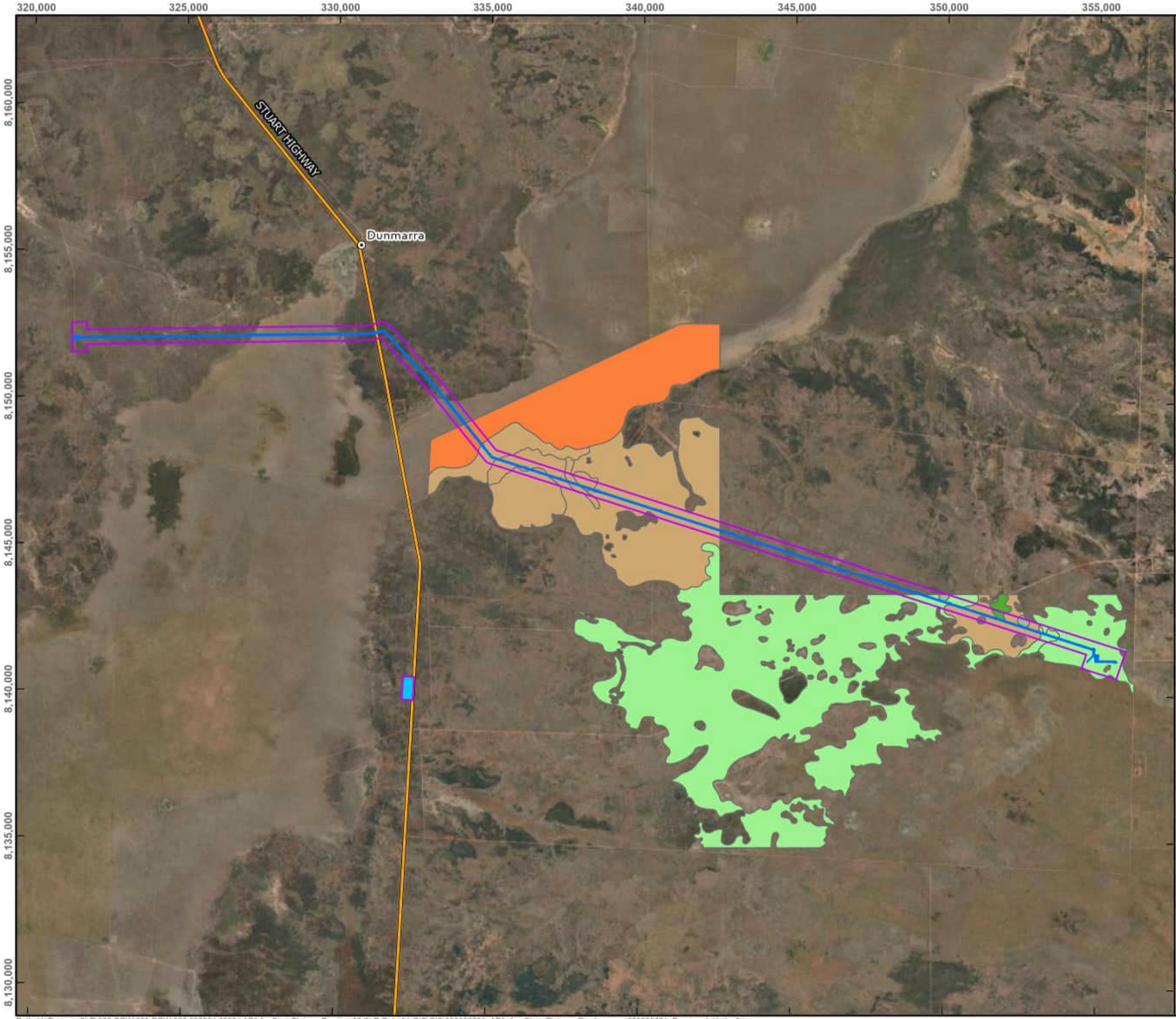

APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

MAPPED SOILS WITHIN THE PROJECT AREA

FIGURE 4

LEGEND

- Project Area
- Pipeline Construction ROW
- Temporary Construction Camp
- Town

Road Category

- Pastoral - National Highway

Soil Type

- Hydrosol
- Kandosol
- Rudosol
- Tenosol
- Vertosol

Service Layer Credits: Earthstar Geographics

0 3 6 km

Coordinate System:	GCS GDA 1994
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2.3 Climate

The climate of the Sturt Plateau is dry and monsoonal, with almost all rainfall occurring between November and March (Bastin, 2008). Mean annual rainfall in the local area to the Project Area is ~677 mm, with the highest annual rainfall recorded being ~1,182 mm (Bureau of Meteorology (BoM), 2024). Over the 2024 period preceding the May 2024 survey the local area experienced uncharacteristically high monthly rainfall, totalling ~1,141 mm (January, 467.8 mm; February, 288.0 mm; March, 353.8 mm; April, 31.8 mm; May, 0.0 mm) (BoM, 2024). This resulted in prolonged, broad-scale flooding of local, low-lying areas and components of the Project Area.

This information was obtained from the Daly Waters Airstrip weather station (station number 014626), located ~50 km from the western portion of the Project Area. Monthly rainfall data from this weather station are available over the 1939 – 2024 period.

2.4 Surface water and drainage

The Project Area is located within the northern portion of the Wiso River basin and a closed sub-catchment of ephemeral first and second order watercourses (DEPWS, 2024a). These watercourses coalesce into a broad seasonal floodplain, predominantly draining to the northeast of the Project Area (DEPWS, 2024a). These watercourses and their relationship to the Project Area are further described in Section 4.0.

2.5 Fire history

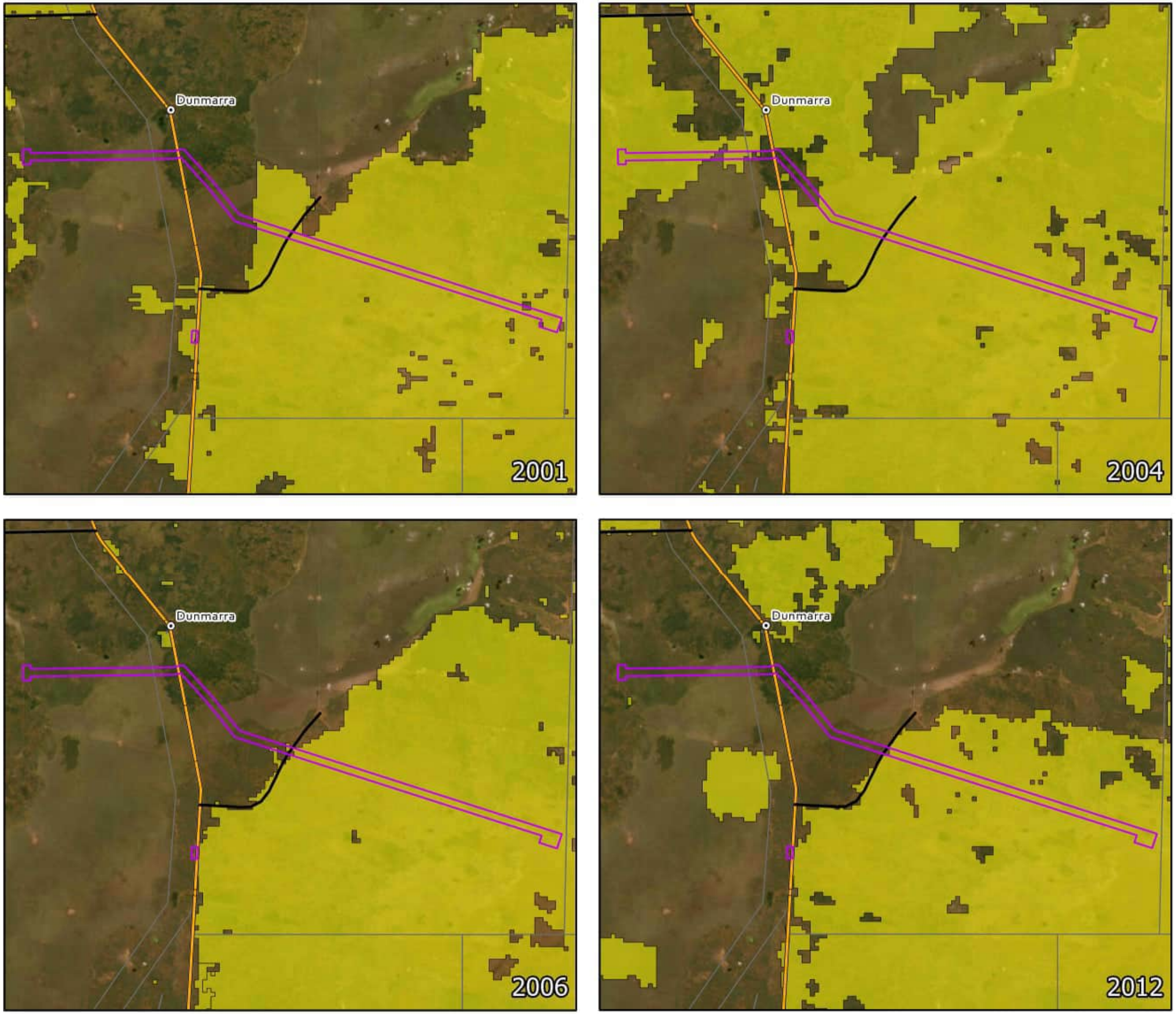
Regional fire scar data based on satellite imagery (Figure 5) indicates that fire activity is frequent in the region with widely varying extents of burnt areas yearly. In 2004, 84% of the Project Area was burnt, whilst more recently in 2023 only 7% was burnt. Significant fire scarring within proximity to the Project Area occurred in 2001, 2004, 2006 and 2012, as shown in Figure 5.

Over the past 25 years, fire has affected the Project Area in 16 of those years, with an average of 18% of the area burned annually. The highest recorded extent of fire was in 2004, when 84% of the area was impacted, while the lowest was 0%. Significant fire events in the past 20 years include 2001 (55%), 2004 (84%), 2006 (49%), 2012 (49%). The impact of fire frequency on ecological values is identified in Section 5.0.

APA STURT PLATEAU PIPELINE
ENVIRONMENTAL APPROVALS

FIRE HISTORY WITHIN THE
PROJECT AREA (NAFI)

FIGURE 5



LEGEND

- Project Area
- Fire Scar (NAFI)
- Town
- Cadastre

Road Category

- Pastoral - National Highway
- Pastoral - Secondary

Service Layer Credits:
Earthstar Geographics, Maxar

0 5 10 km

Coordinate System:	GCS GDA 1994
Scale:	1:350,000 at A4
Project Number:	680.030294
Date Drawn:	14-Oct-2024
Drawn by:	CP
Reviewed by:	MN

SLR

3.0 Flora and fauna assessment methodology

3.1 Overall assessment methodology

SLR employed a joint approach of desktop analysis and field surveys in this study. The study team implemented best practice recommendations from source such as:

- *NT Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al., 2007).
- *Guidelines for Assessment of Impacts on Terrestrial Biodiversity* (NT EPA, 2013).

The methodology encompassed two phases – scoping and field survey. The scoping phase encompassed:

- Project planning and definition of objectives.
- Assignment of qualified ecologists.
- Detailed desktop studies.
- Review of previous studies.
- Collation of existing records.
- Literature review of species and potential threats and impacts.

The field survey phase encompassed the following and were undertaken over 28 May to 2 June 2024:

- Systematic, targeted and incidental flora surveys.
- Vegetation community mapping and assessments.
- Systematic, targeted and incidental fauna surveys.

The survey work involved in this report was conducted under SLRs permit to interfere with wildlife for commercial purposes (permit number 74498), granted by the NT Parks and Wildlife Commission.

3.2 Desktop analysis

3.2.1 Database searches and online mapping resources

The DCCEEW Protected Matters Search Tool (PMST) Report (DCCEEW, 2024a; Appendix A) and the Natural Resource (NR) interactive mapping tool (NR Maps) (DEPWS, 2024a) were utilised to determine species, communities and areas of conservation significance with potential relevance to the Project Area. The search area for the DCCEEW (2024a) and DEPWS (2024a) desktop assessments contained all land within a 30 km buffer of a central coordinate (-16.848109, 133.478383) of the Project Area. The search area therefore incorporates the entirety of the Project Area and similar habitat in the surrounding landscape. The large search area also facilitates the inclusion of species records in a remote landscape where species records may be sparse or localised around developed areas.

The results of database searches and their relevance to the Project Area are discussed in Section 4.0 of this report. Flora and fauna species occurrence records prior to 1980 have been omitted from the interpretation of results. Where a species was returned from DEPWS (2024a) database searches with no date information but is listed as extinct within the NT on the NT Fauna Atlas (DEPWS, 2024b), this species was omitted from database search results and further any interpretation.

The following mapping resources and databases were reviewed as part of the desktop assessment:

- NR Maps (DEPWS, 2024a), including the following layer classes:
    - Watercourse and drainage feature mapping.
    - Fauna atlas.
    - Flora atlas.
    - Significant biodiversity areas.
    - Parks and reserves.
    - Vegetation.
    - Surface water drainage.
    - SREBA layers:
        - Bores
        - Water Table Depth Raster
        - Terrestrial Ecosystems
- Atlas of Living Australia (ALA) species occurrence maps (ALA, 2024).
- NT weeds database (provided by DEPWS, 2024).
- PMST interactive mapping tool (DCCEEW, 2024b).
- National Vegetation Information System (NVIS) Version 6.0 - Australia - Extant Vegetation (NT), (DCCEEW, 2020).

3.2.2 Likelihood of occurrence assessments

SLR has developed an approach for ranking threatened and migratory species and communities recorded from database searches in terms of their likelihood of occurring within the Project Area. The approach is based on the presence of local records, species' ranges and the habitat requirements for each species. Details of the criteria used to assess the likelihood of occurrence for threatened and migratory species are provided in Table 5.

The potential impacts to threatened and migratory species that may occur within the Project Area, an assessment of potential risks and impacts to these species, and management measures to preferentially avoid then mitigate potential impacts are discussed in Section 6.0.

Table 5 Key likelihood of occurrence assessment criteria

Likelihood of occurring	Key criteria	Definition
Present	Species recorded within the Survey Area during baseline assessments or records of this species identified to occur within the Project Area during the desktop assessment.	
High	Known records (<30 km) and/or within species known core range. AND Suitable habitat of high quality is present.	Historical records of the species occur within a 30 km radius of the Project Area, or the Project Area is within the species known range. Suitable habitat of high quality exists with the Project Area.

Likelihood of occurring	Key criteria	Definition
Moderate	Known records (<30 km) and/or within species non-core range. AND Marginally suitable habitat may be present, or habitat is degraded.	Historical records of the species occur within a 30 km radius of the Project Area and/or the Project Area is within the species known non-core range. Marginally suitable habitat may be present, or habitat is moderately degraded or fragmented.
Low	No records (<30 km) and/or outside of species range. OR Habitat present is likely unsuitable, absent, or highly degraded.	No historical records of this species occur within a 30 km radius of the Project Area and/or the Project Area is not within the known range for this species. OR The habitat within the Project Area is not suitable and/or is in extremely poor condition or is absent for the species.

3.2.3 Nomenclature and taxonomy

Apart from technical descriptions and tables, all flora and fauna species are referred to by their common names throughout this report, with their scientific names given in brackets after the first reference. Scientific names for flora species within this report will follow the 'NT Flora Species Checklist' (DEPWS, 2023). Scientific names for fauna species within this report will follow the 'NT Fauna Species Checklist' (DEPWS, 2024b). Where no common name is provided in reference texts, a search was conducted for other accepted common names and, if none were found, only the scientific name was used. An asterisk is used to denote species that are not native to Australia. The taxonomic sequence of birds within Appendix F. is structured in accordance with Gill *et al*. (2024).

3.2.4 Literature review

A review was undertaken of available literature for existing survey effort and ecological data with potential relevance to the Project Area.

3.3 Flora survey methodology

3.3.1 Overall methodology

Techniques described in Brocklehurst *et al*. (2007) were used to collect sufficient data during the field vegetation assessments to validate the vegetation communities identified during baseline assessments within the Survey Area. The key features recorded in the field relevant to this report are:

- Vegetation structure including height of each stratum and cover density.
- Key species within each stratum.
- Geology, landform and other land unit characterisation.

The purpose of flora surveys was to:

- Determine the extent of vegetation communities throughout the Project Area.
- Perform targeted searches for threatened flora species identified during database searches, via ‘meander’ searches.
- Compile a flora species inventory for the Survey Area.

3.3.2 Vegetation assessment sites

Site selection

Ground-truthing of vegetation communities within the Survey Area involved assessments of the floristic structure and composition of communities at various locations. Assessment sites were located where they would provide representative data for the vegetation community that was the subject of the assessment.

The location of the assessment sites and the survey techniques employed were selected to achieve the following:

- Accurately determine the extent of each vegetation community within the Survey Area.
- Provide data on the vegetation community condition.
- Target threatened flora species identified during database searches and their habitat within the Survey Area.
- Compile a flora species inventory for the Survey Area.

Survey techniques

18 vegetation assessments were conducted to validate the vegetation community mapping and to capture any variability in the structure and composition of vegetation communities. The vegetation survey techniques employed, and attributes recorded during the assessments are detailed in Table 6. In general, focus was given to the dominant species, crown cover and median height of the ecologically dominant layer, which is used to describe the structural form of each community based on the structural classification of vegetation communities described in Brocklehurst *et al*. (2007). Vegetation and/or land unit characteristic notes were also undertaken at an additional 24 locations during the field survey period. The location of assessment and vegetation and/or land unit characteristic note locations are shown in Section 5.0.

Various parts of the Survey Area were traversed using the random meander technique documented by Cropper (1993). This technique was applied to supplement other survey techniques and to:

- Locate and record any flora species not identified in vegetation assessment plots or rapid assessments.
- Target threatened flora species.
- Validate NVIS vegetation community mapping.
- Determine the presence and extent of pest flora species.

Table 6 Vegetation attributes measured at vegetation assessment sites

Survey area	Attributes measured
Survey plot (50x50 m)	Key species of each stratum. Median height of each stratum.

Survey area	Attributes measured
	Cover density of each stratum. Representative species list. Land zone and soil characteristics. Central coordinate.
Greater area encompassing the present vegetation association	Incidental species observed. Additional relevant notes.

3.3.3 Vegetation mapping

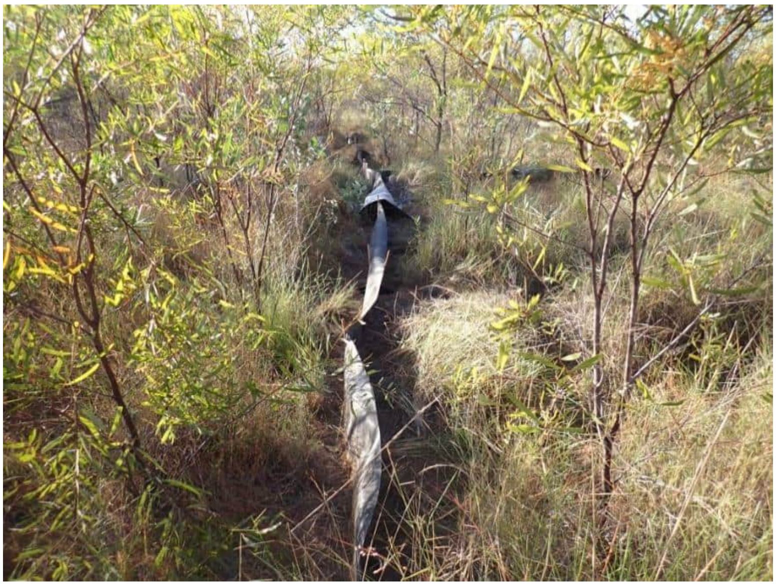
Mapping of vegetation communities was performed using a combination of vegetation traverses, aerial imagery, DEPWS (2024a) NVIS mapping and Strategic Regional Environmental and Baseline Assessment (SREBA) for the Beetaloo Sub-basin broad vegetation group (BVG) mapping (DEPWS, 2024a; Young *et al*., 2022). Using the information gained at each of the vegetation assessment sites, and observations made when traversing the Survey Area, the boundaries of vegetation communities were recorded using handheld GPS devices. Vegetation communities were mapped as distinct units where they were >1 ha in size (inclusive of areas outside of the Survey Area). Where vegetation communities were <1 ha in size they were considered to be non-mappable units.

3.4 Fauna survey methodology

3.4.1 Systematic survey sites

During the survey period systematic survey sites were established in different habitat units within the Survey Area, which were determined through an investigation of aerial imagery and DEPWS (2024a) vegetation mapping. Systematic survey sites were positioned to provide an appropriate spatial distribution within the Survey Area, while encompassing different habitat units and/or areas where project related disturbance was proposed. A description of habitat units, described as SREBA BVGs present at each systematic survey site is provided in Table 7. The location of each systematic survey site is shown in Section 5.0.

Table 7 Systematic fauna survey sites and corresponding habitat units

Site number	Habitat unit description	Representative photograph
Fauna site 1	*Melaleuca* low open woodland on floodplains and drainage depressions	
Fauna site 2	*Corymbia/Eucalyptus* open woodland on sandy loam	

Site number	Habitat unit description	Representative photograph
Fauna site 3	Lancewood forest	

3.4.2 Systematic survey techniques

The survey techniques employed at the systematic survey sites and at additional locations while traversing the Survey Area are detailed in Table 8.

Table 8 Fauna survey methods employed throughout the Survey Area

Survey method	Description
Elliott trapping	At each fauna trap site, type-A Elliott style traps were placed on the ground approximately 5 to 10m apart in a straight line for four nights at each site. Twenty traps were deployed at each site. All traps were baited with a mixture of rolled oats, peanut butter and honey.
Pitfall trapping	Drift fence lines[1] incorporating pitfall and funnel traps were established for four nights at each site. Four pitfalls (20L buckets) were installed along the drift fence at each site; one pitfall at the T-intersection, with the remaining three occurring along a central position along each ‘arm’ of the T-shaped array. The exception to this was ‘Fauna site 3’, where only three pitfalls could be installed due to a high proportion of sub-surface rock. Pitfalls were buried flush with the ground surface with the drift fence intersecting the centre of each bucket.
Funnel trapping	Six funnel traps were installed for four nights at each site. Funnel traps were ‘paired’, one on either side of the drift fence. One pair of funnel traps was placed along each of the three ‘arms’ of the T-shaped drift fence array.
Cage trapping	Four cage traps were placed at each traps site – one in each corner of the 100x100m trap site plot. Cage traps were installed for four nights and baited with a mixture of rolled oats, peanut butter, honey and a variety of different meats.
Camera trapping	Camera traps (motion-sensing infrared cameras) were installed at each trap site to target fauna that may be too cryptic to be detected by other trapping and survey techniques. One camera was deployed at each trap

Survey method	Description
	site for four nights and each camera was baited with a mixture of rolled oats, peanut butter, honey and a variety of different meats.
Active diurnal searches	Active diurnal searches were undertaken within the 100x100m trap site plot each day and concurrently with vegetation assessments throughout the Survey Area. This technique involved intensive investigation of ground-layer habitat features (such as under logs, rocks and leaf litter), low vegetation (under bark and tree stumps) for cryptic fauna, particularly reptiles. Searches were focussed during times of the day when reptile activity was likely to be at its peak. Visual observations of mammal tracks were also made to indicate presence of a species.
Diurnal bird surveys	Birds were surveyed within the 100x100m trap site each day and concurrently with vegetation assessments throughout the Survey Area. Survey effort was focussed on peak activity periods in the morning and around waterbodies, where present. Birds were identified from either direct observation (including observations of loose feathers) or by their calls.
Nocturnal surveys	High-powered spotlights were used to survey nocturnal mammals (flying, arboreal and terrestrial), birds (active nocturnal species and roosting diurnal species), reptiles and frogs within the 100x100m trap site plot at each fauna trap site. Additionally, where an area outside of these trap sites was identified as suitable for nocturnal threatened species, this area was also searched.
Microbat call detection	An Anabat SM4 bat call detector was deployed for one night at each fauna trap site to identify the presence of microbat species.
Incidental observations	In addition to the above-described survey methods, incidental observations of fauna species were continuously made over the field survey period. This included when driving along access roads (day and night) and while traversing the Survey Area on foot. Incidental observations of fauna species were attributed to habitat units' ground-truthed within the Survey Area to inform biodiversity values and habitat utilisation of fauna species within the Project Area.

1 Drift fence arrays were established in a T-shape (2 x intersecting 20 m lengths of drift fence). This method is recommended in Eyre *et al*. (2022) and differs from that recommended within DEPWS (2013), which details 4 x separate 10 m drift fences. However, the total drift fence length between the two methods is equal.

3.4.3 Systematic survey effort

The survey effort for each of the systematic fauna survey techniques described in Table 8 is outlined in Table 9. However, it should be noted that fauna species were continually observed throughout the survey period and incidental records were frequently obtained throughout the survey. Any notable, observations, tracks, scats or other signs of fauna were recorded with reference to the location and habitat type.

Table 9 Fauna survey effort for each systematic survey technique

Method	Systematic trap site survey effort	Total survey effort
Elliott trapping	20 traps x 4 nights x 3 sites	240 trap nights
Pitfall trapping	4 traps x 4 nights x 2 sites 3 traps x 4 nights x 1 site	44 trap nights
Funnel trapping	6 traps x 4 nights x 3 sites	72 trap nights
Cage trapping	4 traps x 4 nights x 3 sites	48 trap nights

Method	Systematic trap site survey effort	Total survey effort
Camera trapping	1 camera x 4 nights x 3 sites	12 camera trap nights
Active diurnal searches	1 person hour x 2 people x 4 days x 3 sites	24 person hours
Diurnal bird surveys	0.5 person hours x 2 people x 4 days x 3 sites	12 person hours
Nocturnal surveys	0.5 person hours x 4 people x 3 nights x 3 sites	18 person hours
Microbat call detection	1 detector nights x 3 sites	3 detector nights

3.4.4 Targeted survey techniques

Targeted survey techniques were used to increase the likelihood of detecting conservation significant species and/or their habitat. Specifically, targeted survey techniques were employed for the Gouldian Finch (*Erythrura gouldiae*), Painted Honeyeater (*Grantiella picta*), Greater Bilby (*Macrotis lagotis*) and Yellow-spotted Monitor (*Varanus panoptes*).

Gouldian Finch targeted survey techniques consisted of waterhole watches and intensive investigations of gregarious Finch and Woodswallow flocks, which are recommended survey methods for this species in CoA (2010).

Painted Honeyeater targeted survey techniques consisted of area searches and call playback during diurnal bird surveys and in areas where Mistletoe, particularly fruiting plants, were abundant. These are recommended survey methods for this species in Rowland (2012).

Daytime searches for signs of activity, including burrows, tracks and diggings were undertaken while traversing the Survey Area on foot for the Greater Bilby and Yellow-spotted Monitor, which is a recommended survey method for the Greater Bilby in CoA (2011a). There are currently no published targeted survey methods for the Yellow-spotted Monitor, however visual searches of microhabitat features (i.e. burrows) are a generalised survey method described in CoA (2011b). Should evidence of these species be identified then additional survey effort would be undertaken to further elucidate the presence and habitat values for these species.

3.4.5 Fauna habitat assessments

Fauna habitat assessments were undertaken at each of the 18 vegetation assessment sites. Fauna habitat assessment data collection at each of these 18 sites generally aligned with that outlined in Appendix 16 of Brocklehurst *et al*. (2007). Due to a high proportion of overlap in data collection requirements at vegetation assessment sites and Appendix 16 of Brocklehurst *et al*. (2007), additional information relating to fauna habitat values were noted on vegetation assessment proformas. To streamline the data collection process, focus was given to detailing fauna values that were present at vegetation assessment sites and in the general community that the assessment was undertaken in. Additional fauna habitat information noted at vegetation assessment sites included:

- Evidence and frequency of disturbance. This included factors such as clearing, infrastructure, and pest flora and fauna species;
- Site drainage and evidence of moisture retention of soils and microrelief (e.g., gilgais, wetland habitats, etc.);
- Evidence of grazing;
- Fire frequency and intensity;
- Presence of surface gravel, pebbles, cobbles and boulders;

- Evidence and type of erosion;
- Evidence of burrows or other large excavations (including those in termite mounds);
- Evidence of leaf litter and large, woody debris;
- Evidence of hollow bearing trees;
- Presence of mistletoe species; and

Any other features (artificial dams or other permanent/semi-permanent water sources, etc.) of relevance to fauna species, particularly threatened fauna.

4.0 Desktop analysis results

4.1 Vegetation communities

4.1.1 NVIS vegetation communities

12 NVIS vegetation communities were identified as occurring within 30 km of the Project Area during database searches (Table 10; DEPWS, 2024a; Figure 6). Six of these communities overlap with the Project Area; Veg. ID: 325, 331, 364, 394, 395, and 1041.

Table 10 NVIS mapped vegetation communities within 30 km of the Project Area

Veg ID	Level 3 description	Community description[1]	Environmental description
315	*Melaleuca* open forest	U+ ^*Melaleuca viridiflora*, *Melaleuca leucadendra*, *Melaleuca cajuputi*\^tree\7\c; M ^*M. leucadendra*, *Pandanus spiralis*, *Acacia auriculiformis*\^tree,palm\6\r; G ^*Pseudoraphis spinescens*, *Paspalum scrobiculatum*, *Oryza rufipogon* \forb,vine,^tussock grass\1\i	Open-forest, floodplain fringes.
325	*Melaleuca* low woodland	U+ ^*Melaleuca citrolens*, *Melaleuca minutifolia +/- Eucalyptus pruinosa*\^tree\6\i; M *Carissa lanceolata*, ^*M. citrolens*, *Melaleuca stenostachya*\^shrub\3\r; G ^*Eulalia aurea*, *Chrysopogon. fallax*, *Triodia microstachya* \forb,^tussock grass, hummock grass\1\i	Low woodland/open woodland, plains/relict drainage fringe.
331	*Corymbia* low woodland	U+ ^*Corymbia dichromophloia*, *Eucalyptus leucophloia +/- Corymbia ferruginea*\^tree\6\i; M ^*Terminalia canescens*, *Petalostigma pubescens*, *Erythrophleum chlorostachys*\^shrub\3\r; G ^*C. fallax*, *Triodia bitextura*, *Grewia retusifolia*\^tussock grass, hummock grass, shrub\1\	Gently undulating plains, shallow red to yellow, gravelly, sandy earths or stoney sands.
355	*Lysiphyllum* low open woodland	U+ ^*Lysiphyllum cunninghamii*, *Eucucalyptus pruinose +/- Eucalyptus terminalis*\^tree\6\r; M ^*Atalaya hemiglauca*, *Acacia lysiphloia +/- L. cunninghamii*\^shrub\3\r; G ^*E. aurea*, *C. fallax*, *Sorghum plumosum* \^tussock grass\1\c	Low lying flat to gently undulating plains, poor to moderately drained, medium to heavy clay soils

Veg ID	Level 3 description	Community description[1]	Environmental description
364	*Acacia* open forest	U+ ^*Acacia shirleyi +/- Macropteranthes kekwickii +/- C. dichromophloia*\^tree\7\c; M ^*Acacia shirleyi*, *Flueggea virosa*, *Acacia lysiphloia*\^shrub\4\i; G ^*C. fallax*, *Enneapogon oblongus*, *Aristida pruinosa*\^tussock grass\1\i	Rises with rocky skeletal soils extending onto shallow gravelly sands in drier areas.
383	*Melaleuca* woodland	U+ ^*M. viridiflora*, *M. leucadendra* +/- *Eucalyptus polycarpa var. polycarpa*\^tree\7\i; M ^*M. viridiflora*, *Sesbania cannabina*, *M. leucadendra*\^tree,shrub\6\r; G *Pseudoraphis spinescens*, ^*Fimbristylis spp*., *Eleocharis dulcis*\tussock grass,^sedge\1\i	Woodland/open-forest, billabongs
390	*Acacia* low open forest	U+ ^*A. shirleyi*\^tree\6\c; G ^*Eriachne ciliata*, *Schizachyrium fragile*, *C. fallax*\^tussock grass\1\i	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south; gravelly lithosols, some shallow red, yellow and black earths; well drained
393	*Macropteranthes* low woodland	U+ ^*M. kekwickii*, *A. shirleyi*\^tree\6\i; G ^*Panicum mindanaense*, *Evolvulus alsinoides*\^tussock grass,forb\1\i	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south; gravelly lithosols, some shallow red, yellow and black earths; well drained
394	*Macropteranthes* (mixed) low woodland	U+ ^*M. kekwickii*, *A. shirleyi*\^tree\6\i; G ^*C. fallax*, *Paspalidium rarum*, *Mnesithea formosa*\^tussock grass\2\i	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south; gravelly lithosols, some shallow red, yellow and black earths; well drained.
395	*Acacia* low woodland	U+ ^*A. shirleyi*, *M. kekwickii*\^tree\6\i; G ^*Eragrostis cumingii*, *M. formosa*, *P. rarum*\^tussock grass\1\i	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south; gravelly lithosols, some shallow red, yellow and black earths; well drained.
428	*Astrebla* low tussock grassland	M ^*Acacia victoriae*, *Acacia farnesiana* \^shrub\4\r; G+ ^*Astrebla pectinata*, *Iseilema vaginiflorum +/- Iseilema membranaceum*\^tussock grass\1\c	Plains, deep grey cracking clays over tertiary alluvium

Veg ID	Level 3 description	Community description[1]	Environmental description
1041	*Eucalyptus* low open woodland	U+ ^*Eucalyptus microtheca* +/- *Lophostemon grandiflorus* +/- *Ventilago viminalis*\^tree\6\r; M ^*Acacia holosericea*, *Atalaya hemiglauca* +/- *V. viminalis*\^shrub\3\r; G *E. aurea*, *C. fallax*, ^*Astrebla spp*.\^tussock grass\1\c	Low lying flat plains, fringing water courses and swamps. Light to heavy grey and brown clays, some loamy soil

1 Sub-formation description: dominant growth form, cover, height and dominant genus for each of the three traditional strata. (*i.e.* Upper (U+), Mid (M) and Ground (G)). Structural classification of vegetation community according to Brocklehurst *et al*., (2007).

4.1.2 Significant and sensitive vegetation communities

There are five significant and sensitive vegetation communities within the NT (DEPWS, 2024c):

- Mangrove forests,
- Monsoon rainforest,
- Riparian vegetation,
- Ssandsheet heath, and
- Old growth forest.

Of the vegetation communities that are DEPWS (2024a) mapped within the Project Area, 'riparian vegetation' is the only sensitive and significant vegetation community that has the potential to occur. This is due to the presence of DEPWS (2024a) mapped first and second order watercourses that intersect the Project Area (see Section 4.3.1).

DEPWS (2024c) describes riparian vegetation as being "native vegetation within and immediately surrounding a waterway".

4.2 Threatened ecological communities

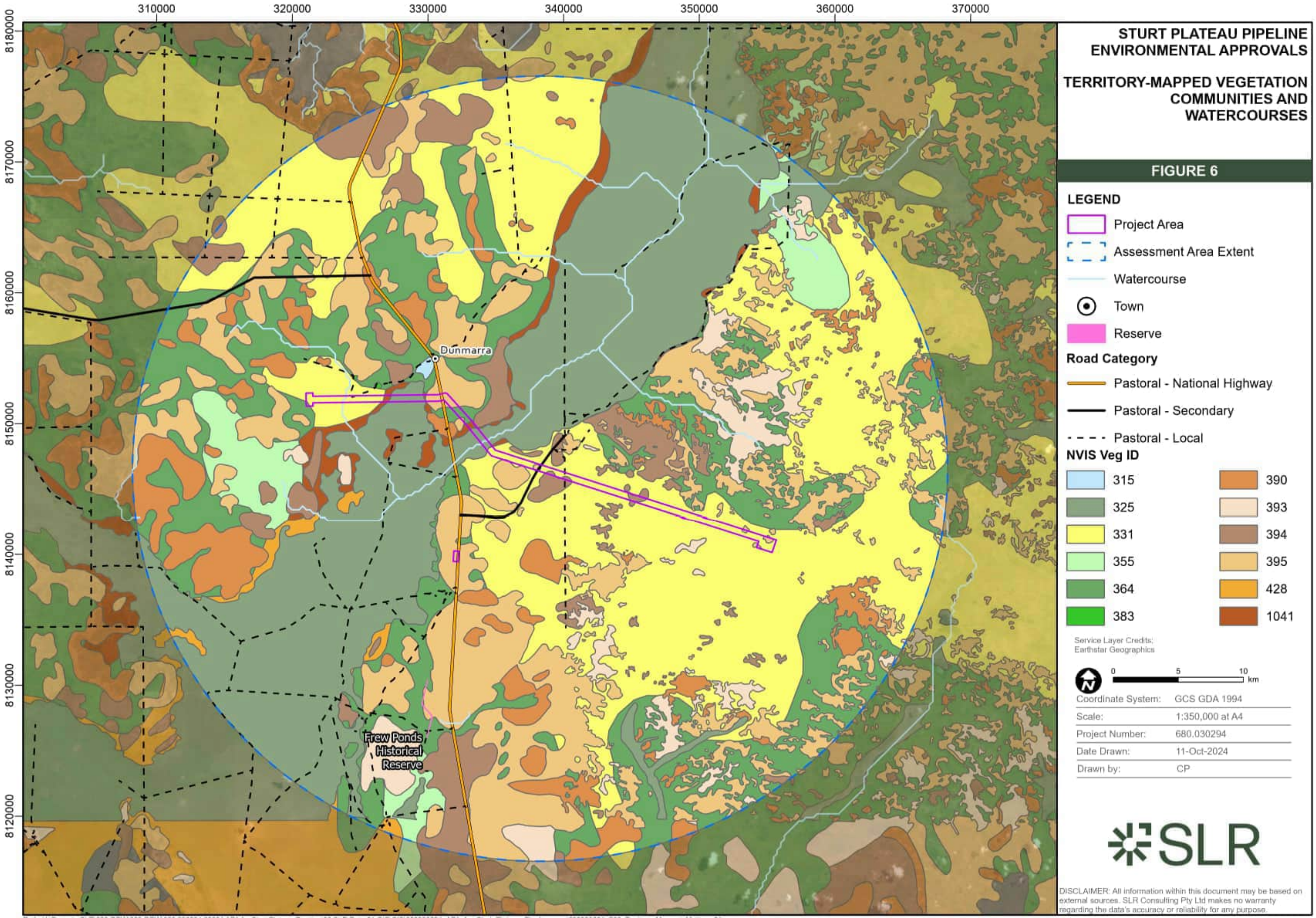
Threatened Ecological Communities (TECs) are a MNES. No TECs were identified as occurring within 30 km of the Project Area (DCCEEW, 2024a; Appendix A). The only TEC known to occur in the NT is the Arnhem Plateau Sandstone Shrubland Complex. This TEC is restricted to the Arnhem Plateau and surrounding outcrops, which occur ~260 km to the north of the Project Area. Therefore, there are no TECs occurring within, or near to, the Project Area.

4.3 Wetlands and watercourses

Project Area occurs in a localised sub-catchment of the Victoria River - Wiso basin (DEPWS, 2024a).

4.3.1 Watercourses

The Project Area intersects one first and one second order DEPWS (2024a) mapped minor watercourses (Figure 6).



Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F03_Territory_Mapped_Matters_01

4.3.2 Wetlands

The Project Area does not overlap with any wetlands identified in the directory of important wetlands (DEPWS, 2024a). The nearest DEPWS (2024a) and DCCEEW (2024b) mapped important wetland is Lake Woods, which occurs ~100 km to the south of the Project Area. The Project Area does not occur within a catchment that flows to Lake Woods based on DEPWS (2024a) watercourse and catchment mapping.

The nearest RAMSAR wetland is associated with the Kakadu National Park and is located >300 km to the north of the Project Area (DCCEEW, 2024b).

4.3.3 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDE) are ecosystems which require access to groundwater in some capacity in order to survive in a particular landscape (BoM, 2022; Eamus & Froend, 2006; Murray et al., 2006). GDEs cover a small percentage of the Australian landscape and are an important biodiversity enhancement by providing unique ecosystem services in seasonally dry areas, providing economically important services such as water purification and improving biodiversity at local to regional scales (Murray et al., 2006). GDEs have been classified by Hatton & Evans (1998) and then further defined by Richardson et al. (2011) and (Doody et al., 2017) as:

- Wetland, lake, remnant terrestrial forest/shrubland and riparian ecosystems where groundwater discharge forms a component of the hydrological environment (Eamus et al., 2006; Murray et al., 2006; O'Grady et al., 2006a; O'Grady et al., 2006b).
- Springs where there is a surface expression of groundwater (i.e. artesian mound springs (Eamus *et al*., 2006).
- Cave and aquifer aquatic ecosystems which rely on groundwater including aquifer dwelling metazoans referred to as stygofauna (Humphreys, 2006).
- Estuarine and marine which rely on submarine discharge of water for nutrients (Paytan et al., 2006).

The presence of mesic environments and key groundwater dependent vegetation (GDV) can be used as an indicator for the delineation of (Biologic, 2021):

- GDEs – ecosystems which rely on permanent or intermittent access to groundwater to meet some or all their water requirements; or
- Inflow Dependent Ecosystems (IDEs) - ecosystems likely to access a water source in addition to rainfall (e.g., surface water, water stored in the unsaturated zone or small-scale groundwater sources), but which could also represent potential GDEs of lower but generally undetermined risk.

The GDE Atlas (BoM, 2022) is a management tool that enables the presence and the water needs of GDEs to be brought into the water planning and allocation process (BoM, 2022). It informs users where the groundwater requirements of ecosystems should be considered and enables this information to be viewed and used to identify the location and characteristics of potential GDEs (BoM, 2022).

The GDE Atlas indicated that no aquatic or subterranean GDEs are present within the Project Area. A section of the action crosses a potential terrestrial GDE; however, is classified as a 'low potential' GDE. A section of the action will cross a minor second order watercourse ephemeral stream; however, this area does not contain any likely associated GDEs.

Stygofauna are a form of GDE that inhabit the interstitial spaces of the cavities of alluvial, sedimentary and karstic aquifers. Data is available that can provide an indication of the likelihood of stygofauna presence, with Hose, *et al.,* (2015) outlining the following factors affecting the distribution of stygofauna:

- **Formation type:** Stygofauna are predominantly found in aquifers with large (mm or greater) pore spaces, which a more common for alluvial, karstic and some fractured rock aquifers.
- **Depth below ground level:** The abundance and diversity of stygofauna typically decreases with depth below ground, with fauna are rarely found more than 100 m below ground level (Hose, *et al.,* 2015).
- **Proximity of exchange and recharge:** Stygofauna are more abundant in areas of surface water-groundwater exchange, compared to deeper areas or those further along the groundwater flow path remote from areas of exchange or recharge

A characterisation of the stygofauna and microbiological assemblages of the Beetaloo Sub-basin was conducted as part of the Gas Industry Social and Environment Research Alliance (Rees *et al.,* 2020). The study found two stygofauna specimens (*Parisia unguis* and *Bathynellaceae Bresvisomabathynella* sp.) and stygofauna eDNA from the Carpentaria Highway Roadside Bore (RN005942) located over 50 km north of the Project Area, while there were no reported findings of stygofauna in the Hayfield homestead bore and the Sturt Plains homestead bore. However, the study did identify eDNA which may indicate stygofauna presence. The results are consistent with Hose *et al* (2015), which indicates stygofauna are likely to be present at lower abundance at the observed groundwater depth within the Shenandoah South sites (~106 m below ground level).

These results are supported by the extensive field surveys of aquatic groundwater fauna undertaken in October 2021 and May 2022, as part of the SREBA aquatic ecosystem studies (Humphreys *et al.*, 2022). A total of 66 groundwater bores were sampled, with the sites selected to obtain spatial coverage across the study area and to stratify sampling by the hydrogeological formations present (Humphreys *et al.*, 2022). Results of the surveys returned a total of 280 stygofauna specimens across 28 taxa, with the highest diversity of stygofauna detected in the Tindall limestone aquifer (Humphreys *et al.*, 2022), which lies approximately 100 km northwest of the Project Area.

The results of the aquatic ecosystem studies (Humphreys *et al.*, 2022) further indicate that total taxa richness across 8 taxa groups occur in riverine sites in northern-draining catchments; specifically, 8 of the top 10 sites occur in the Roper catchment, with the maximum number of species (80) recorded within a seasonally flowing channel of the Little Roper River, which is over 200 km NW of the Project Area.

4.4 Sites of conservation and botanical significance

There are no Sites of Conservation Significance (SoCS) or Sites of Botanical Significance (SoBS) mapped within 30 km of the Project Area (DEPWS, 2024a). The nearest SoCS is located around Lake Wood Conservation Covenant, which is ~100 km to the south of the Project Area. The nearest SoBS is located ~180 km to the south of the Project Area and is associated with the Mitchell Grass Dows Bioregion.

4.5 Parks and reserves

The Frew Ponds Historical Reserve is the only park or reserve that occurs within 30 km of the Project Area (DEPWS, 2024a). This reserve is a memorial to the Frew Ponds Overland Telegraph Line and is located ~9.6 km to the south of the proposed camp and ~19 km southwest of the proposed alignment.

4.6 Flora species

4.6.1 Native and threatened flora species

Over 450 native flora species were returned from database searches as occurring within 30 km of a central coordinate within the Project Area (DEPWS, 2024a). None of these native flora species are threatened under either the TPWC or EPBC Acts (DEPWS, 2024a; DCCEEW, 2024a).

4.6.2 Introduced flora species

A total of 23 introduced flora species that are established within the NT were returned from database searches as occurring within 30 km of the Project Area (Table 11). The classification system of declared weeds within the NT is detailed below (both Class A and Class B weeds are also considered Class C):

- Class A – to be eradicated.
- Class B – growth and spread to be controlled.
- Class C – not to be introduced into the NT.

Of the introduced flora species returned from the desktop assessment, nine are declared weeds in the NT under the WM Act (see Table 11). Two of the introduced species returned from database searches are cited as Commonwealth listed Weeds of National Significance (WoNS; see Table 11).

The Project Area occurs within the Katherine regional weed management area within the NT (DEPWS, 2021a). Table 11 provides the regional status of introduced flora species returned from database searches. Introduced flora species (Table 11) returned from database searches fell within regional weed categories two, three and four within DEPWS (2021a). A description of DEPWS (2021a) weed categories is provided below:

- Category 1 – Priority weeds for eradication.
- Category 2 – Priority weeds for strategic control (including eradication of outliers).
- Category 3 – Weeds of concern.
- Category 4 – Hygiene and biosecurity weeds.
- Category 5 – ‘Alert’ Weeds.

A full description of, and management considerations for, regional weed categories can be found within the Katherine Regional Weeds Strategy 2021-2026 (DEPWS, 2021a).

4.7 Fauna species

4.7.1 Native, threatened and migratory fauna species

A total of 253 native fauna species have been recorded within 30 km of the Project Area (DEPWS, 2024a); 12 amphibian, 156 bird, 19 mammal and 66 reptile species. Of these species, 12 are threatened or migratory under the TPWC and/or EPBC Acts (Appendix B).

A total of 34 threatened or migratory fauna species were returned from database searches as occurring, or having the potential to occur, within 30 km of a central coordinate within the Project Area (DCCEEW, 2024a; DEPWS, 2024a). A likelihood of occurrence assessment was undertaken for each of these 34 species (Appendix B). 15 of these species were determined to have a moderate or high likelihood of occurring within the Project Area (Table 12), with the remaining 19 species determined to have a low likelihood of occurring.

4.7.2 Introduced fauna species

A total of three introduced fauna species were returned from database searches as occurring within 30 km of the Project Area: Cattle (*Bos taurus*), Cane Toad (*Rhinella marina*), and Feral Cat (*Felis catus*).

Table 11 Introduced flora species recorded within 30 km of the Project Area

Family	Scientific name	Common name	WoNS	WM Act class	DEPWS (2021a) category
Amaranthaceae	*Alternanthera pungens*	Khaki Weed	No	B	-
Amaranthaceae	*Amaranthus viridis*	Green Amaranth	No	-	-
Amaranthaceae	*Gomphrena celosioides*	*Gomphrena* Weed	No	-	-
Apocynaceae	*Calotropis procera*	Rubber Bush	No	B/-	3
Asteraceae	*Xanthium strumarium*	Noogoora Burr	No	B	4
Convolvulaceae	*Distimake dissectus*	White *Convolvulus* Creeper	No	-	-
Cyperaceae	*Cyperus rotundus*	Nut Grass	No	-	-
Euphorbiaceae	*Euphorbia hirta*	Asthma Plant	No	-	-
Euphorbiaceae	*Jatropha gossypiifolia*	Bellyache Bush	Yes	A/B	2
Fabaceae	*Parkinsonia aculeata*	*Parkinsonia*	Yes	B	3
Fabaceae	*Senna occidentalis*	Coffee *Senna*	No	B	4
Fabaceae	*Stylosanthes hamata*	Carribbean Stylo	No	-	-
Fabaceae	*Stylosanthes scabra*	Shrubby Stylo	No	-	-
Fabaceae	*Stylosanthes viscosa*	Stylo	No	-	-
Lamiaceae	*Hyptis capitata*	*Hyptis*	No	B	-
Lamiaceae	*Mesosphaerum suaveolens*	*Hyptis*	No	B	4
Meliaceae	*Azadirachta indica*	Neem	No	B	2
Passifloraceae	*Passiflora foetida*	Stinking Passion Flower	No	-	-
Poaceae	*Cenchrus ciliaris*	Buffel Grass	No	Unclassified	-
Poaceae	*Cynodon dactylon*	Couch Grass	No	-	-
Poaceae	*Digitaria bicornis*	Hairy Finger Grass	No	-	-

Family	Scientific name	Common name	WoNS	WM Act class	DEPWS (2021a) category
Poaceae	*Eragrostis amabilis*	Lovegrass	No	-	-
Poaceae	*Eragrostis pilosa*	Lovegrass	No	-	-

Table 12 Threatened and migratory fauna species likelihood of occurrence results summary

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Likelihood of occurrence
TPWC[2]	EPBC[2]						
BIRDS							
VU	EN	Estrilididae	*Erythrura gouldiae*	Gouldian Finch	PM	-	**Moderate**
VU	VU	Falconidae	*Falco hypoleucos*	Grey Falcon	PM / NRM	2	**Moderate**
LC	MI	Glareolidae	*Glareola maldivarum*	Oriental Pratincole	PM	-	**Moderate**
VU	VU	Meliphagidae	*Grantiella picta*	Painted Honeyeater	PM / NRM	1	**Moderate**
EN	EN	Rostratulidae	*Rostratula australis*	Australian Painted-snipe	PM / NRM	1	**Moderate**
LC	MI	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	NRM	11	**Moderate**
REPTILES							
(NL)	CE	Scincidae	*Tiliqua scincoides intermedia*	Northern Blue-tongued Skink	PM	-	**High**
VU	-	Varandiae	*Varanus panoptes*	Yellow-spotted Monitor	NRM	3	**High**

1 Status: CE = Critically Endangered, EN = Endangered, LC = Least Concern, MI = Migratory, (NL) = Not Listed, NT = Near Threatened, VU = Vulnerable.
2 TPWC = *Territory Parks and Wildlife Conservation Act 1976*, EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.
3 PM = Protected Matters Search Tool, NRM = NR Maps

4.8 Available literature

4.8.1 SREBA reports

A SREBA was undertaken for the Beetaloo Sub-basin, which included terrestrial vegetation and fauna surveys (Young *et al.*, 2022). Parts of the Project Area overlap with the Beetaloo Sub-basin, therefore outcomes of the SREBA are likely to be of relevance to the Project Area. Young *et al*. (2022) details outcomes of key ecological values and risks associated with the Beetaloo Sub-basin from the SREBA. These values and risks are summarised in Table 13.

The Project Area overlaps with a total of 13 SREBA mapped BVGs (Young *et al*., 2022; DEPWS, 2024a) (Table 14). Several of these BVGs are described to correspond with regionally significant moderate- and high-value vegetation types and habitat for significant faunal groups and species (Table 13 and Table 14).

SLR reviewed DEPWS (2024a) SREBA bore, water table depth raster and GDE layers to inform the likelihood for the Project Area to overlap with terrestrial GDEs. DEPWS (2024a) SREBA mapping indicates that the Project Area overlaps with a low to moderate confidence seasonal GDE (Table 14). A review of DEPWS (2024a) SREBA bore data and water table depth raster information indicates that groundwater within 30 km of the Project Area (see Section 3.2.1 for central coordinate of search area) sits between 71 and 120 m below ground level (mbgl) (n = 44 bores). In addition to these data, there is one outlier where the water level was recorded at 9 mbgl. However, this bore is located >20 km to the north east of SREBA mapped GDEs.

Table 13 High-level summary of SREBA biodiversity values and risks

<table>
<tr><th>Matter</th><th colspan="2">Biodiversity values and risks</th></tr>
<tr><td>High-value vegetation</td><td colspan="2">Monsoon rainforest, riparian vegetation and wetlands.</td></tr>
<tr><td>Moderate-value vegetation</td><td colspan="2">Run-on woodland, floodplains and bullwaddy.</td></tr>
<tr><td rowspan="2">Significant groups and species</td><td>Fauna</td><td>Waterbirds, Crested Shrike-tit, Gouldian Finch, Greater Bilby, Ghost Bat, Australian Painted-snipe, and Common Brushtail Possum.</td></tr>
<tr><td>Flora</td><td>Eleocharis retroflexa and Carex fascicularis.</td></tr>
<tr><td>Risks to biodiversity</td><td colspan="2">• Habitat degradation, fragmentation and loss.
• Inappropriate fire regimes.
• Reduction in surface water and/or groundwater availability.
• Surface water and/or groundwater contamination.
• Soil contamination, erosion and sedimentation.
• Competition and predation.
• Invasive plants.
• Mortality of native species.</td></tr>
</table>

Table 14 SREBA BVGs mapped across the Project Area

BVG #	BVG description	Significant vegetation type	Vegetation value	SREBA GDE?	GDE nature	GDE type	GDE confidence	BVG identified as habitat for significant groups or species?
1	*Corymbia/Eucalyptus* open woodland on sandy loam	-	Low	-	-	-	-	Crested Shrike-tit Gouldian Finch Greater Bilby
2	*Corymbia/Eucalyptus* woodland (run-on areas and heavier soils)	Run-on	Moderate	-	-	-	-	Crested Shrike-tit Gouldian Finch
5	Riparian woodland (ephemeral streams)	Riparian	High	Yes	Seasonal	Type 2 / Type 3	Low to Moderate	-
9	Lancewood forest	-	Low	-	-	-	-	-
10	Bullwaddy shrubland and woodland	-	Moderate	-	-	-	-	Greater Bilby
11	*Bauhinia* and *Corymbia* open woodland on sandy clay	-	Low	-	-	-	-	Gouldian Finch
12	*Eucalyptus chlorophylla* low open woodland	-	Low	-	-	-	-	Gouldian Finch
13	Silver box low open woodland	-	Low	-	-	-	-	Gouldian Finch
14	Coolabah low open woodland on clay	Floodplain	Moderate	-	-	-	-	-
15	Coolabah, *Lophostemon* and Gutta Percha swamps	Wetland/ floodplain	High / moderate	-	-	-	-	-
16	*Melaleuca* low open woodland on floodplains and drainage depressions	Floodplain/drainage depression	Moderate	-	-	-	-	Crested Shrike-tit Gouldian Finch
17	Tussock grassland	-	Low	-	-	-	-	-
21	*Acacia* shrubland and hummock grassland on sandplains	-	Low	-	-	-	-	Greater Bilby

4.8.2 Beetaloo Basin Shenandoah South E&A Program

Terrestrial ecological assessments were undertaken to support the development of the Beetaloo Basin Shenandoa South E&A Program (Shenandoah South Program). Publicly available information relating to these assessments are available in Environment Management Plan (EMP) for the Shenandoah South Program (Tamboran , 2024). Information within this EMP is relevant to seismic and exploration activities associated with the Shenandoah South Program.

The Project is interlinked with future components the Shenandoah South Program as it is intended to connect future infrastructure associated with the program with the Amadeus gas Pipeline. Because of this, potential impacts to terrestrial ecological values associated with development within the Project Area and the Shenandoah South Program are relevant for the assessment of cumulative impacts. Key outcomes and information within Tamboran (2024), chiefly those provided within Appendix K of the EMP were reviewed to support an assessment of cumulative impacts, which is detailed further in Section 6.5 of this report.

5.0 Field survey results

5.1 Environmental conditions

Daily temperature data over the field assessment period and during the week prior to the field assessment are provided in Table 15. Monthly rainfall totals over the annual period leading up to the 2024 field assessment compared to average monthly rainfall are shown in Figure 7. These data were obtained from the BoM Daly Waters Airstrip Weather Station (Station number: 014626) (BoM, 2024), which is located ~50km to the north of the Project Area and is the nearest BoM weather station with long-term weather data and nearby data over the field assessment period.

No rainfall was recorded from the BoM Daly Waters Airstrip Weather Station in May 2024 or over the field assessment period (BoM, 2024). However, minor (<3mm) overnight rainfall was experienced by field staff over the latter portion of the field assessment. This, in combination with above average monthly rainfall over January to April 2024 and cool night to warm day time temperatures, resulted in optimal conditions for the detection of a wide range of faunal groups. Additionally, above average monthly rainfall prior to the 2024 field assessment resulted in active growth and persistence of a high proportion of annual flora species and a ‘good’ overall vegetation condition within the Survey Area.

Table 15 Daily minimum and maximum temperatures during and leading up to the 2024 field assessment

Date		Temperature (^{0}C)[1]	
		Minimum	Maximum
Prior to field assessment	21/05/2024	14.4	27.4
	22/05/2024	14.4	28.6
	23/05/2024	15.7	30.6
	24/05/2024	14.9	32.3
	25/05/2024	16.2	32.7
	26/05/2024	15.6	32.7
	27/05/2024	15.8	31.8
Field assessment period	28/05/2024	13.6	32.1
	29/05/2024	15.6	32.9
	30/05/2024	22.2	33.1
	31/05/2024	20.9	28.9
	01/06/2024	19.9	26.5
	02/06/2024	16.4	27.9

1 Temperature data obtained from the BoM Daly Waters Airstrip weather station (Station number: 014626; BoM, 2024).

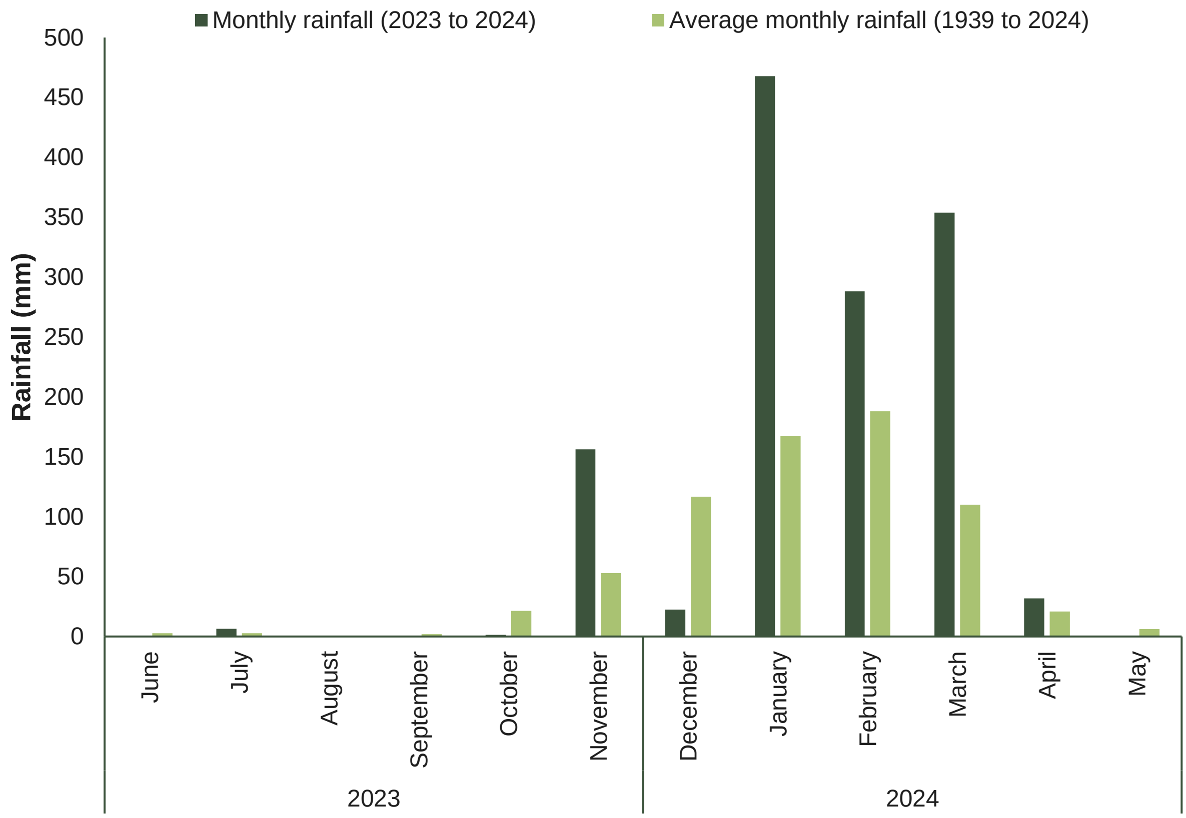


Figure 7 Monthly rainfall compared to average monthly rainfall (BoM, 2024; weather station number: 014626)

5.2 Flora survey results

5.2.1 Vegetation communities

The Survey Area was identified to intersect a total of seven distinct ground-truthed vegetation communities during the field assessment. Ground-truthed vegetation communities are shown in Figures 5 to 8 and the structural classification of each community according to Brocklehurst *et al*. (2007) is provided in Appendix C. A general description of each community, based on ground-truthed observations and data, is provided in Table 16. Ground-truthed vegetation communities did not strictly align with those detailed in Young *et al*. (2022). To support regional continuity in ecological assessments ground-truthed vegetation communities have been attributed to the most appropriate SREBA BVG (Table 16). Three ground-truthed vegetation communities align with SREBA moderate-value floodplain BVGs (Young *et al*., 2022). These ground-truthed communities are:

- *Melaleuca viridiflora* and *Acacia torulosa* low closed shrubland with *Triodia bitextura* hummock grassland;
- *Eucalyptus microtheca* open woodland on floodplains; and
- *E. microtheca* and *Lophostemon grandiflorus* open woodland on floodplain fringes.

No ground-truthed vegetation communities align with SREBA BVGs that equate to high-value vegetation, as described in Young *et al*. (2022). Additionally, no ground-truthed vegetation communities align with SREBA BVGs that equate to a GDE (Young *et al*., 2022).

Seasonal fire impacts were evident across all ground-truthed vegetation communities. Ground-truthed vegetation communities 1 and 2 (Table 16) were observed to be heavily influenced by fire. The dominance of flora species and relative structure of these communities varied considerably, with extensive areas of dense *Acacia* dieback and recruitment.

Table 16 Ground-truthed vegetation community descriptions

Veg. #	Corresponding SREBA BVG	Ground-truthed vegetation community description	Environmental description and soils
1	*Corymbia/Eucalyptus* woodland (run-on areas and heavier soils)	Mixed *Acacia* shrubland to variable grassland with variable emergent *Eucalyptus* and *Corymbia.*	Flats and run-on areas transitioning from yellow to grey clay loam.
2	*Melaleuca* low open woodland on floodplains and drainage depressions.	*Melaleuca viridiflora* and *Acacia torulosa* low closed shrubland with *Triodia bitextura* hummock grassland.	Drainage depressions on grey/brown clay, sandy loam.
3	Coolabah low open woodland on clay.	*Eucalyptus microtheca* open woodland on floodplains.	Floodplains on cracking, black clays.
4	*Corymbia*/*Eucalyptus* open woodland on sandy loam.	*Corymbia dichromophloia* open woodland with variable tussock/hummock grassland.	Flats and plains on red/brown clay, sandy loam.
5	Lancewood forest.	*Acacia shirleyi* open to closed woodland.	Minor rises on red/brown sandy clay loam.
6	Bullwaddy shrubland and woodland.	*Macropteranthes keckwickii* closed woodland.	Flats, run-on areas and minor rises on a red/grey/yellow sandy, clay loam.
7	Coolabah, *Lophostemon* and Gutta Percha swamps.	*E. microtheca* and *Lophostemon grandiflorus* open woodland on floodplain fringes.	Floodplain fringes on variable black, cracking clays to heavy, grey clay loam.

5.2.2 Flora species

A full inventory of flora species identified within the Survey Area during the field assessment is provided in Appendix D, along with the vegetation community that each species was recorded to occur within.

5.2.2.1 Native and threatened flora species

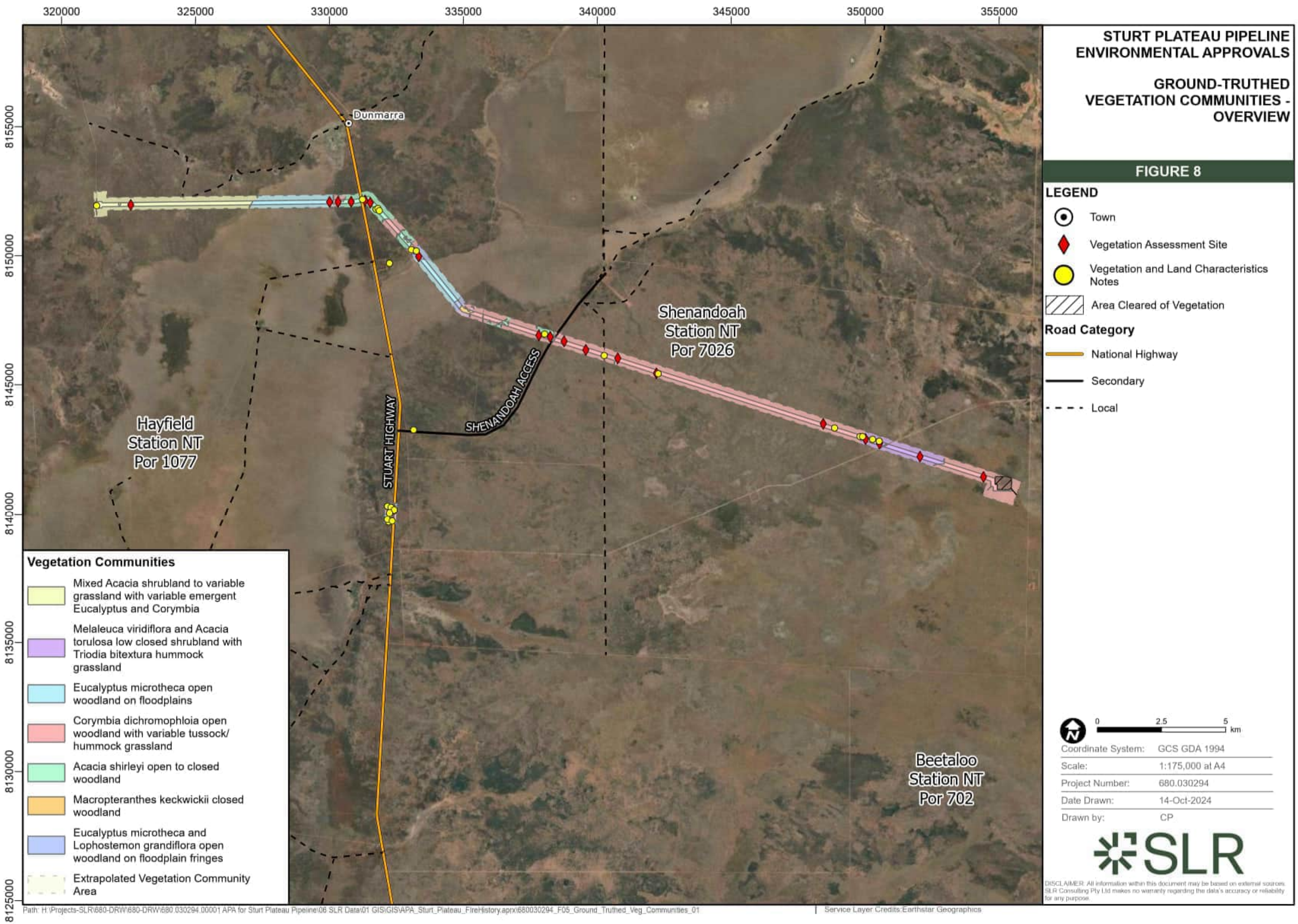
A total of 158 native flora species were identified within the Survey Area over the field assessment period. A full list of these species is provided in Appendix D along with their TPWC and EPBC Act status'. No threatened flora species, as listed under the TPWC or EPBC Acts, or regionally significant flora species, as listed in Young *et al*. (2022), were identified to occur within the Survey Area during the field assessment.

5.2.2.2 Introduced flora species

Several introduced flora species were identified during the field assessment. These species, along with their status as a WoNS, WM Act class, and DEPWS (2021a) category are shown in Table 17. Figure 12 shows the spatial distribution of introduced flora species identified during the field survey program. In general, the occurrence of introduced flora species was limited to previously disturbed areas such as access tracks and other previously cleared areas. However, it should be noted that Caribbean Stylo and Shrubby Stylo (*Stylosanthes hamata* and *Stylosanthes scabra*, respectively) formed a notable component of groundcover in *Acacia shirleyi* and *Corymbia dichromophloia* dominated vegetation communities to the west of the Stuart Highway.

Table 17 Introduced flora species identified within the Survey Area during the field assessment

Family	Scientific name	Common name	WoNS	WM Act class	DEPWS (2021a) category
Fabaceae	*Stylosanthes hamata*	Carribbean Stylo	No	-	-
Fabaceae	*Stylosanthes scabra*	Shrubby Stylo	No	-	-
Fabaceae	*Vachellia farnesiana*	Mimosa Bush	No	-	-
Lamiaceae	*Mesosphaerum suaveolens*	*Hyptis*	No	B	4
Malvaceae	*Sida cordifolia*	Flannel Weed	No	B	4
Passifloraceae	*Passiflora foetida*	Stinking Passion Flower	No	-	-
Poaceae	*Urochloa mosambicensis*	Sabi Grass	No	-	-



STURT PLATEAU PIPELINE
ENVIRONMENTAL APPROVALS
GROUND-TRUTHED
VEGETATION COMMUNITIES -
OVERVIEW
FIGURE 8
LEGEND
Town
Vegetation Assessment Site
Vegetation and Land Characteristics Notes
Area Cleared of Vegetation
Road Category
National Highway
Secondary
Local
Vegetation Communities
Mixed Acacia shrubland to variable grassland with variable emergent Eucalyptus and Corymbia
Melaleuca viridiflora and Acacia torulosa low closed shrubland with Triodia bitextura hummock grassland
Eucalyptus microtheca open woodland on floodplains
Corymbia dichromophloia open woodland with variable tussock/ hummock grassland
Acacia shirleyi open to closed woodland
Macropteranthes keckwickii closed woodland
Eucalyptus microtheca and Lophostemon grandiflora open woodland on floodplain fringes
Extrapolated Vegetation Community Area
320000
325000
330000
335000
340000
345000
350000
355000
8155000
8150000
8145000
8140000
8135000
8130000
8125000
Dunmarra
Hayfield Station NT Por 1077
Shenandoah Station NT Por 7026
Beetaloo Station NT Por 702
STUART HIGHWAY
SHENANDOAH ACCESS
0
2.5
5
km
Coordinate System: GCS GDA 1994
Scale: 1:175,000 at A4
Project Number: 680.030294
Date Drawn: 14-Oct-2024
Drawn by: CP
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.
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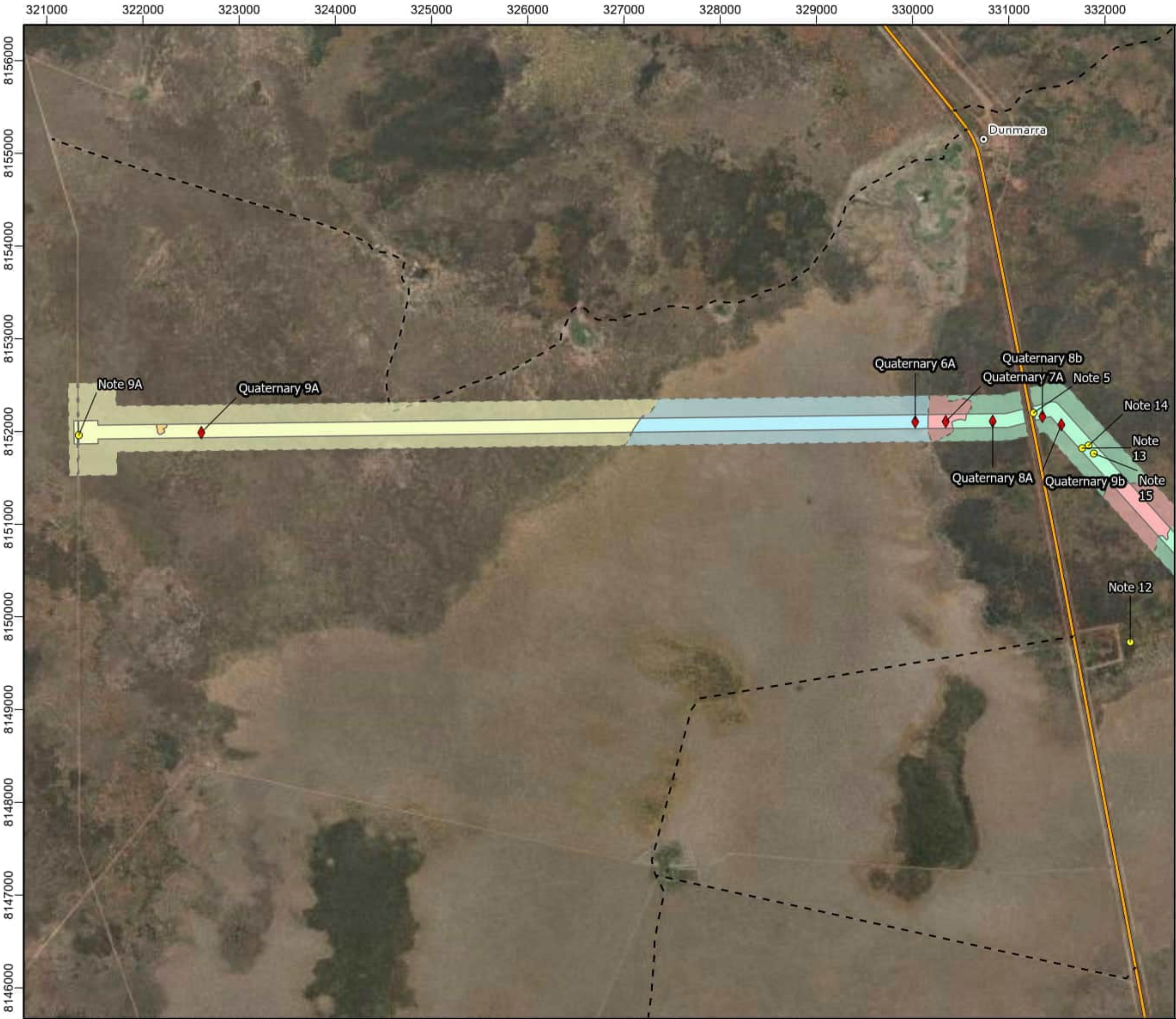

STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

GROUND-TRUTHED VEGETATION COMMUNITIES - WEST

FIGURE 9

LEGEND

Vegetation Assessment Site

Vegetation and Land Characteristics Notes

Vegetation Community

Mixed Acacia shrubland to variable grassland with variable emergent Eucalyptus and

Eucalyptus microtheca open woodland on floodplains

Corymbia dichromophloia open woodland with variable tussock/ hummock grassland

Acacia shirleyi open to closed

Macropteranthes keckwickii closed woodland

Extrapolated Vegetation Community Area

Service Layer Credits: Earthstar Geographics

0 1 2 km

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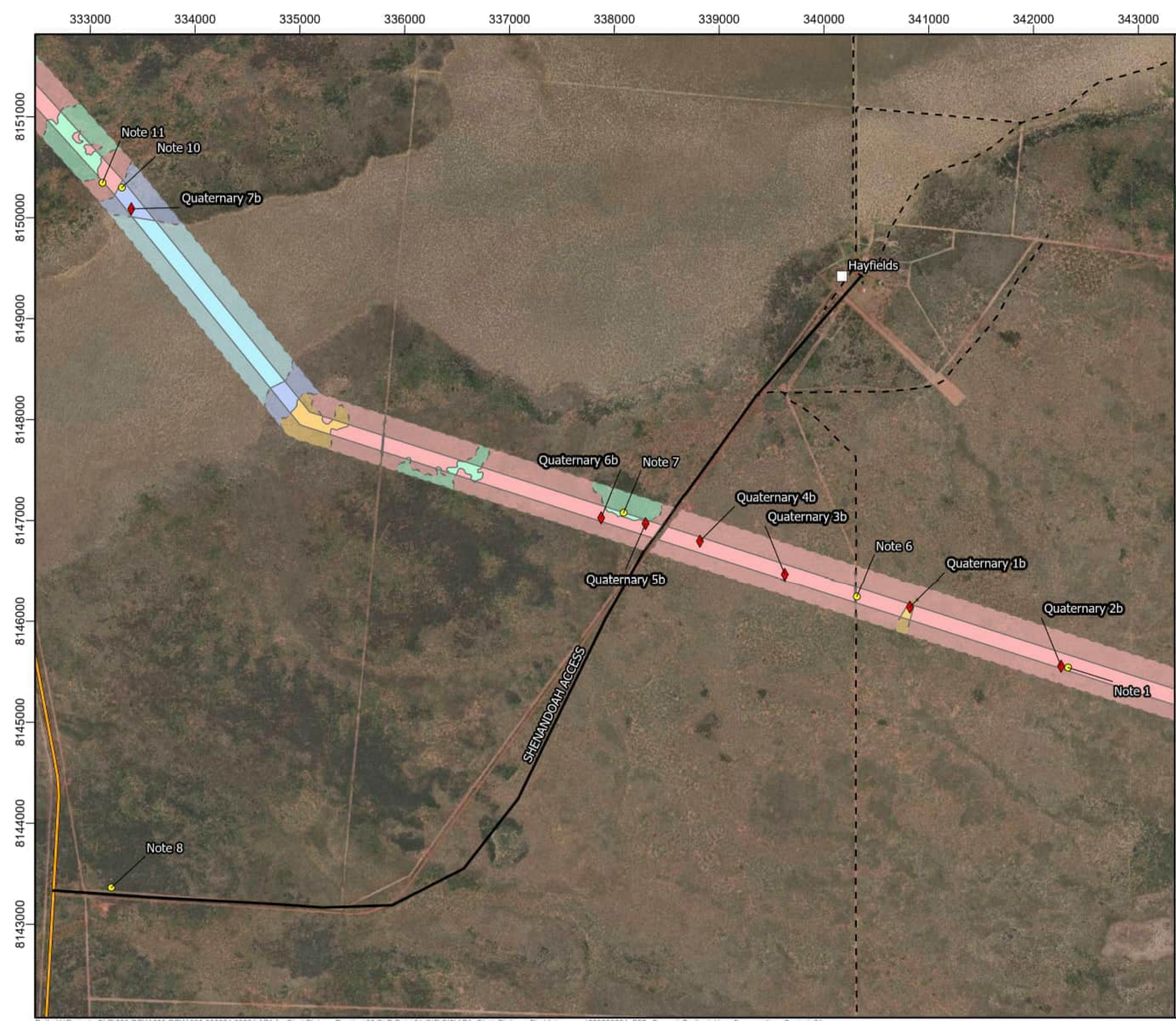

STURT PLATEAU PIPELINE
ENVIRONMENTAL APPROVALS

GROUND-TRUTHED
VEGETATION COMMUNITIES - CENTRAL

FIGURE 10

LEGEND

- Vegetation Assessment Site
- Vegetation and Land Characteristics Notes

Vegetation Community

- Eucalyptus microtheca open woodland on floodplains
- Corymbia dichromophloia open woodland with variable tussock/ hummock grassland
- Acacia shirleyi open to closed
- Macropteranthes keckwickii closed woodland
- Eucalyptus microtheca and Lophostemon grandiflora open woodland on floodplain fringes
- Extrapolated Vegetation Community Area

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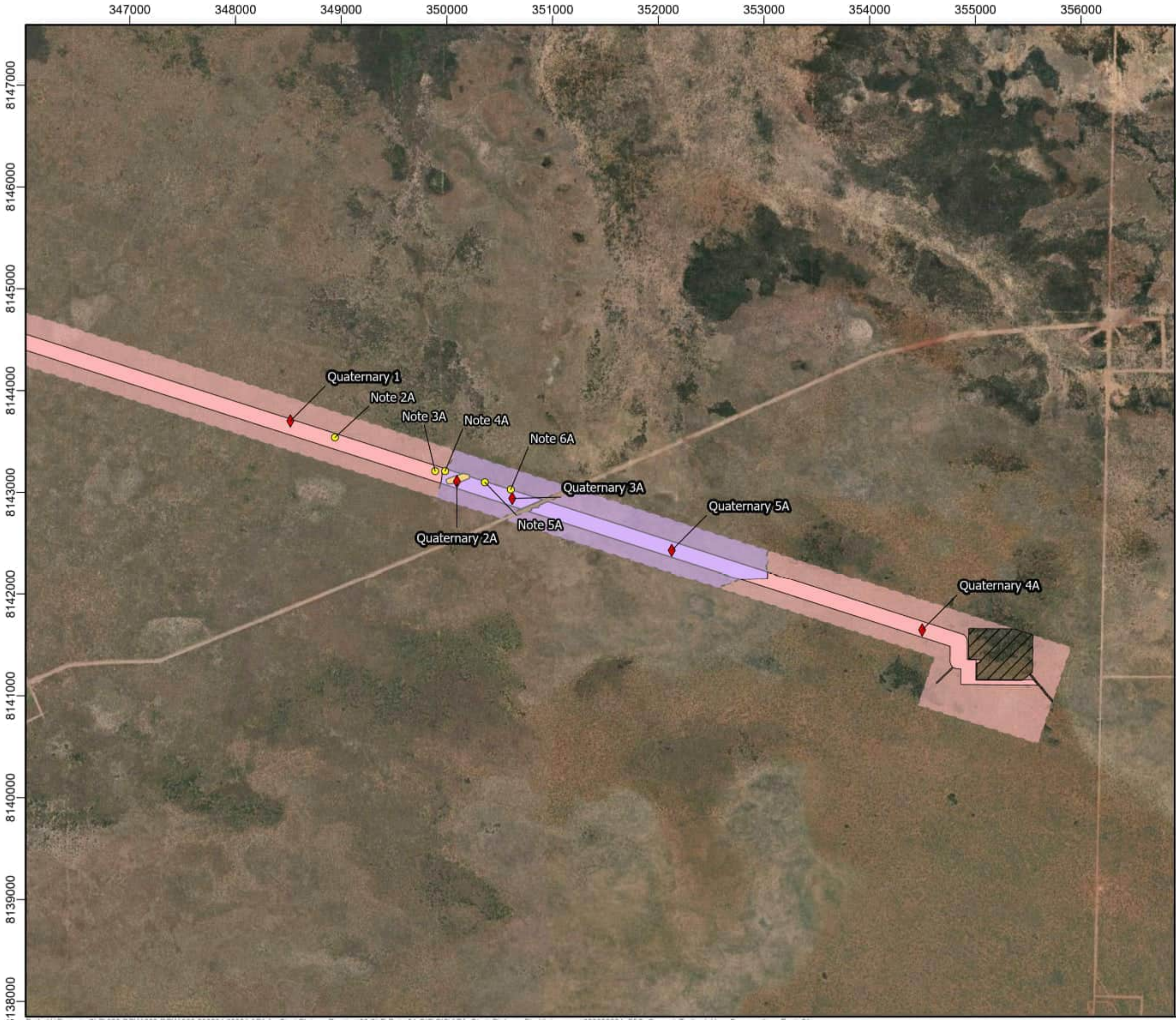


STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

GROUND-TRUTHED VEGETATION COMMUNITIES - EAST

FIGURE 11

LEGEND

- Vegetation Assessment Site
- Vegetation and Land Characteristics Notes
- Area Cleared of Vegetation

Vegetation Community

- Melaleuca viridiflora and Acacia torulosa low closed shrubland with Triodia bitextura hummock
- Corymbia dichromophloia open woodland with variable tussock/ hummock grassland
- Macropteranthes keckwickii closed woodland
- Extrapolated Vegetation Community Area

Coordinate System:	GCS GDA 1994
Scale:	1:50,000 at A4
Project Number:	680.030294
Date Drawn:	14-Oct-2024
Drawn by:	CP

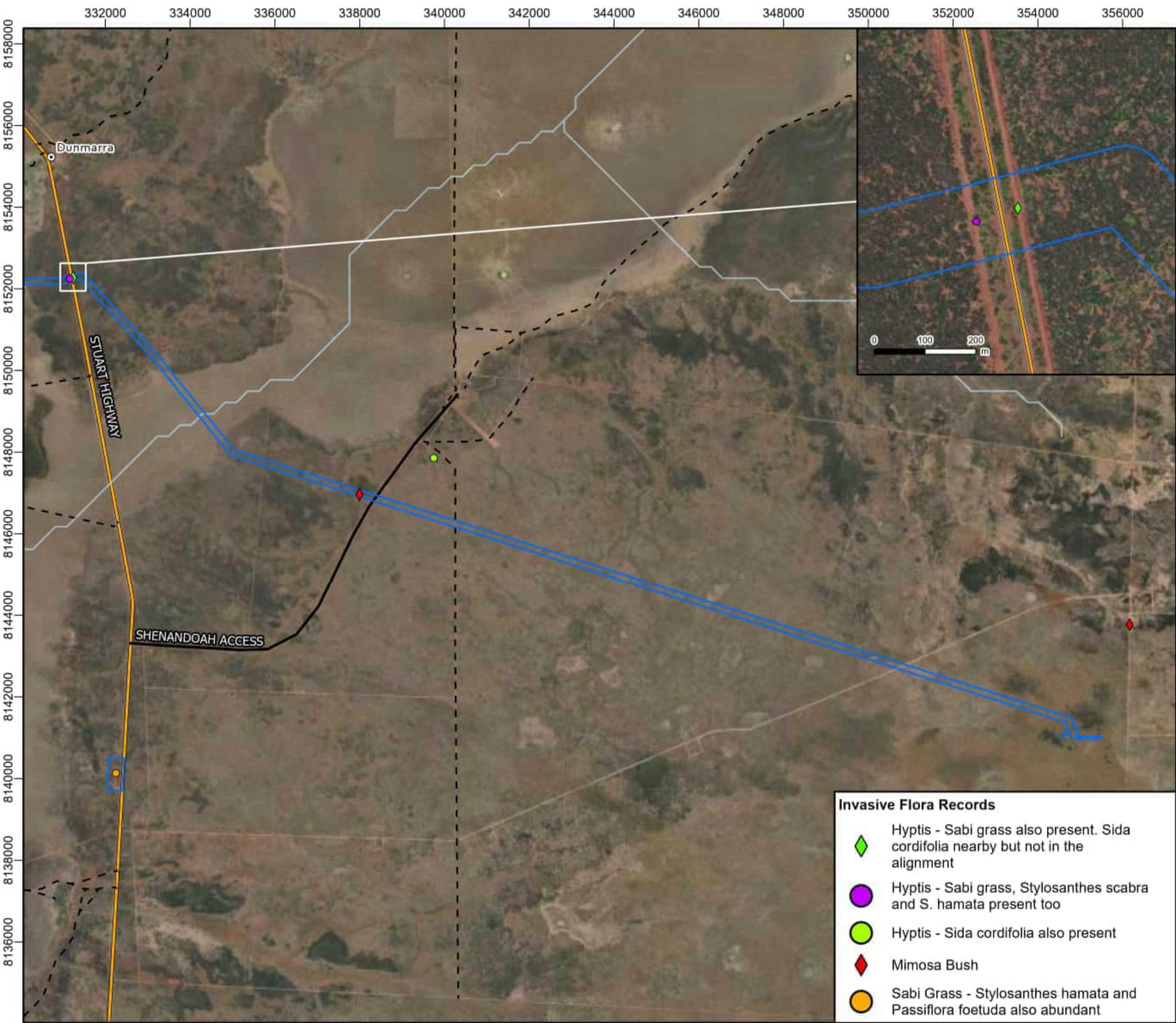
SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_F5C_Ground_Truthed_Veg_Communities_East_01

STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

SPATIAL DISTRIBUTION OF GROUND-TRUTHED INTRODUCED FLORA SPECIES

FIGURE 12



LEGEND

- Survey Area
- Watercourse
- Town

Road Category

- Pastoral - National Highway
- Pastoral - Secondary
- Pastoral - Local

Service Layer Credits:
Earthstar Geographics, Maxar

0 2.5 5 km

Coordinate System:	GCS GDA 1994
Scale:	1:125,000 at A4
Project Number:	680.030294
Date Drawn:	11-Oct-2024
Drawn by:	CP

SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F09_Ground_Truthed_Introduced_Flora_02

5.3 Fauna survey results

5.3.1 Fauna species

5.3.1.1 Native, threatened and migratory fauna species

A total of 119 native fauna species were ground-truthed over the field assessment period; four amphibian, 92 bird, nine mammal and 14 reptile species. A full list of these species is provided in Appendix E along with their TPWC and EPBC Act status'. This included at least four and up to five Microchiroptera species; two species could not be differentiated via call detection methods. The microbat call interpretation report is provided in Appendix F.

Threatened and migratory fauna species, as listed under the TPWC and EPBC Acts, incidentally observed by SLR during the field assessment are as follows:

- Gouldian Finch (*Chloebia gouldiae*). Vulnerable under the TPWC Act and endangered under the EPBC Act.
- Glossy Ibis (*Plegadis falcinellus*). Migratory under the EPBC Act.

Up to 10 Gouldian Finch individuals were observed drinking from an artificial, roadside water source located along the Buchanan Highway (Figure 13) when accessing the western portion of the Survey Area. The surrounding vegetation community was characterised by *Acacia shirleyi* open to closed forest on minor rises, which was surrounded by *Corymbia dichromophloia* open woodland with variable tussock/ hummock grassland. A variety of other finch species were observed to be drinking from the same water source and in higher abundance to the Gouldian Finch. These other finch species are Zebra Finch (*Taeniopygia guttata*), Double-barred Finch (*Stizoptera bichenovii*), Long-tailed Finch (*Poephila acuticauda*) and Pictorella Mannikin (*Heteromunia pectoralis*). No Gouldian Finch individuals were observed within the Survey Area during the 2024 field assessment.

Three Glossy Ibis individuals were flushed from a roadside drain along the Stuart Highway (Figure 13) when accessing the central portion of the Survey Area. The surrounding vegetation community was characterised by *Eucalyptus microtheca* open woodland on floodplains. Surface water was abundant in this area due to accumulation from roadside drains and above average rainfall prior to the 2024 field assessment. No Glossy Ibis individuals were observed within the Survey Area during the 2024 field assessment.

During the 2024 field assessment AECOM representatives were undertaking ecological assessments in areas that overlapped, and were adjacent to, the Project Area. AECOM flushed two Grey Falcon (*Falco hypoleucos*) individuals to the east of the Project Area during these assessments (Figure 13). This species is listed as vulnerable under both the TPWC and EPBC Acts. AECOM provided SLR information regarding this observation, which is detailed below:

> *"Two Grey Falcons were sighted flying overhead and circling around in the sky. One bird made a brief two-note squawking call. The birds were easily identified by the grey plumage and yellow cere (beak) and legs. The timing of the sighting was 29/5/2024 at approximately 2:50pm. The habitat was treeless plains with sparse Melaleuca shrubs. The birds flew away from us in a westerly direction."*

Four TPWC Act near threatened species were identified within the Survey Area during the 2024 field assessment; the Emu (*Dromaius novaehollandiae*), Australia Bustard (*Ardeotis australis*), Bush Stone-curlew (*Burhinus grallarius*), and Pictorella Manikin (*Heteromunia pectoralis*).

5.3.1.2 Introduced fauna species

Two introduced fauna species were observed within the Survey Area during 2024 field assessment; Cattle (*Bos taurus*) and Feral Cat (*Felis catus*). The surrounding land use is primarily Cattle grazing and evidence of Cattle occupation was evident throughout all parts of the Survey Area accessed during the 2024 survey. Cattle impacts were greatest around artificial watering points and fence lines and diminished with distance from these areas. Feral Cats were captured at Fauna Trap Site 1 (Figure 13) via passive infrared camera trap survey methods. Additionally, this species was incidentally observed during night-spotting activities at the Tamboran Camp while enroute to the Survey Area.

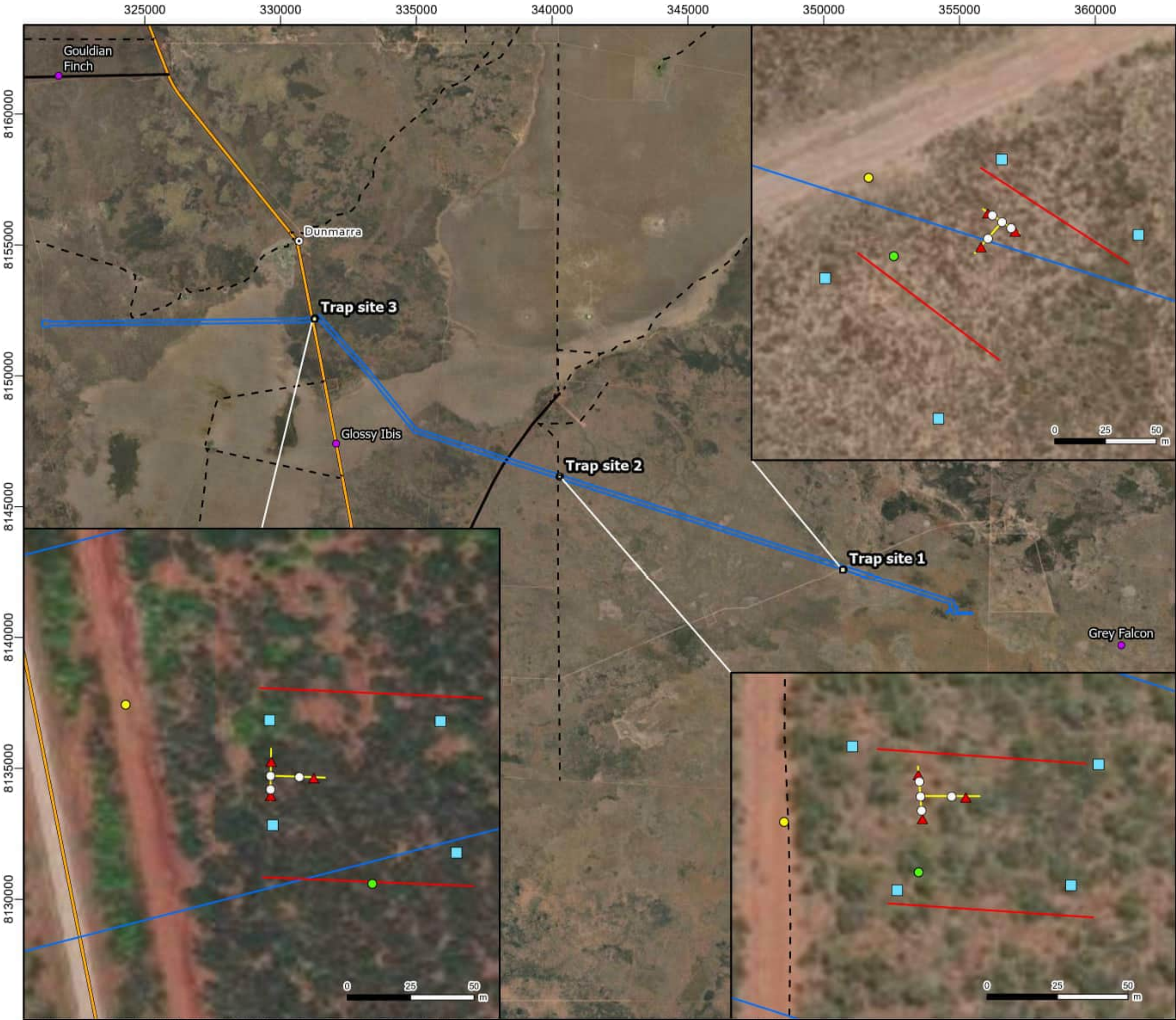
5.3.2 Fauna habitat values and disturbance

A variety of fauna habitat values were ground-truthed within the Survey Area and values were often sympatric with particular ground-truthed vegetation communities.

Fire impacts were evident across all ground-truthed vegetation communities but were most prevalent at ground-truthed vegetation communities 1 and 2. The fire history within these communities resulted in dense, shrubby *Acacia* regrowth and low proportions of leaf litter and woody debris. Trees were also sparse to absent within these communities. All ground-truthed vegetation communities showed impacts from existing clearing within the vicinity of roads and access tracks, which reduced fauna habitat values in these areas. Additionally, Cattle impacts were more prevalent in these areas, particularly along fence lines and near artificial watering points outside of the Project Area.

No perennial water sources were observed within the Survey Area, resulting in an absence of perennial drinking opportunities for fauna species. Ground-truthed vegetation community 3 contained a high proportion of standing water due to prior heavy, flooding rainfall within the local area. This resulted in ephemeral values for large waterbirds and predatory birds, along with those to other taxa groups. Ground-truthed vegetation community 2 acts as a minor drainage depression within the surrounding landscape. Minimal surface water was present within this community at the time of the field assessment. However, the presence of the Desert Spadefoot Toad (*Notoden nichollsi*) and annual flora species that rely on high and prolonged soil-moisture indicates that soils within these areas retain water for extended periods.

Woody debris was most prevalent within ground-truthed vegetation communities 4, 5, and 6, along with leaf litter and surface gravel and pebbles. Surface cobbles were very scarce and were rarely encountered in community 5. Soils were often comprised of varying degrees of clay, loam and sand. Sandy clay soils were evident in ground-truthed vegetation community 4, which may provide burrowing opportunities for a variety of fauna species. No burrows of threatened fauna species were observed. This community also contained the highest proportion of tree hollows, which varied in aperture and relative abundance, due to the size and age of Small-fruited Bloodwood. Although not measured during the field assessment, there are likely to be individuals of the Small-fruited Bloodwood within ground-truthed vegetation community 4 that exceed a diameter at breast height (DBH) of 40 cm.



STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

FAUNA SURVEY DATA

FIGURE 13

LEGEND

- Survey Area
- Threatened and Migratory Fauna Observations
- Town
- Bat Detector
- Cage Trap
- Camera Trap
- Funnel
- Pit Fall
- Drift Fence
- Elliott Trap

Road Category

- Pastoral - National Highway
- Pastoral - Secondary
- Pastoral - Local

Service Layer Credits:
Earthstar Geographics, Maxar

0 2.5 5 km

Coordinate System:	GCS GDA 1994
Scale:	1:195,000 at A4
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6.0 Impact assessment and management

The Project has the potential to impact biodiversity values in a variety of ways during the development phases of the Project. These are summarised below in Table 18 along with recommended management strategies. The estimated impact area to each ground-truthed vegetation community by development of the Project is provided in Table 19.

APGA (2022) outlines common impacts risk to environmental and other values associated with the construction, operational, and rehabilitation phases of onshore pipelines. This document also outlines comprehensive management strategies to reduce the risk of impacts to these environmental and other values. Environmental and other values described in this document are:

- Native vegetation;
- Fauna;
- Biosecurity (e.g., pests, weeds, disease);
- Natural and Historical Heritage;
- Indigenous Heritage;
- Soil (e.g., erosion, acid sulfate);
- Water (e.g., hydrology, watercourses);
- Waste (e.g., hazardous, non-hazardous);
- Emissions (e.g., dust, noise, vibration, gas);
- Third parties (e.g., nuisance); and
- Chemicals and contamination.

It is recommended that standard impact management practices are implemented during the construction, operation, and rehabilitation phases of the Project to minimise impacts to environmental and other values described in APGA (2022). Management recommendations provided in Table 18 are generally based on those provided, or otherwise described, in APGA (2022).

Outcomes of desktop and field assessments identified several matters of Territory and National environmental significance that warrant further impact assessment and potential management. These are:

- Sensitive and significant vegetation communities (riparian vegetation);
- Parks and Reserves;
- Introduced flora and fauna species; and
- Threatened and migratory fauna species.

Impact assessment and management recommendations for these matters of Territory and National environmental significance are provided below.

6.1 Sensitive and significant vegetation communities

Significant and sensitive vegetation in the NT is identified in the NT Land Clearing Guidelines (DEPWS, 2024c), these guidelines provide a framework for assessing potential impacts on significant and sensitive vegetation.

Sensitive vegetation is a term, applied to ecosystems easily impacted by neighbouring or adjacent land uses or management. Significant vegetation also includes spatially restricted habitat types that are important to a relatively large number of wildlife species, including rainforest, monsoon vine forest or vine thicket; sandsheet heath; riparian vegetation; mangroves; and vegetation containing large trees with hollows suitable for fauna. Most of these significant vegetation types are also sensitive (DEPWS, 2024c).

6.1.1 Riparian vegetation

The Project Area intersects one first and one second order DEPWS (2024a) mapped minor watercourse. Native vegetation within and immediately surrounding these DEPWS (2024a) mapped watercourses equates to ‘riparian vegetation’ as defined in DEPWS (2024c). Table 20 provides the recommended widths for riparian buffers described within DEPWS (2024c).

Riparian vegetation plays a critical role in the maintenance of instream ecological processes as well as providing physical stability to the waterway, ameliorating water quality and providing critical habitat or resources for a range of plant and animal species often not available elsewhere within a landscape. Clearing of riparian vegetation and drainage depressions has the potential to not only result in the direct removal of sensitive/significant vegetation and impact on the values associated with this habitat, but also to negatively impact receiving environments immediately adjacent and downstream of developmental impacts (DEPWS, 2024c).

The value of riparian vegetation within the Project Area is considered to be low on the basis that:

- The key indicator species is *Eucalyptus microtheca*, which is typified as a facultative phreatophyte and not highly dependent of groundwater sources for survival;
- A review of DEPWS (2024a) spatial imagery does not indicate a distinct bed or bank area for the mapped watercourses and surrounding vegetation is not distinctly different in the vicinity of these mapped watercourses.
- There was no known presence or likelihood of occurrence of threatened or otherwise significant plants or animals within the riparian vegetation communities;
- There was no known occurrence of high density phreatophytic vegetation;
- The local and regional impact to the riparian communities is likely to be low; and
- DEPWS (2024a) mapped watercourses are described as non-perennial.

In regard to the assessment of impacts based on the proposed Disturbance Footprint, the following outcomes can be confidently determined:

- Low value riparian vegetation that is not distinctly different to that within the broad, surrounding area;
- Project Area is located at the start of catchment therefore minimal influence to the overall community;
- Short term impact where the timing of the disturbance will be during the dry season when it is highly unlikely that these communities will be inundated from seasonal rainfall;
- The Disturbance Footprint will be rehabilitated with native flora; and
- The Disturbance Footprint is linear with minimal proposed disturbance to native vegetation and interruptions to surface water flow paths.

Overall, the Project has a low likelihood of impacting riparian vegetation. However, it is recommended that the clearing of riparian vegetation is avoided and DEPWS (2024c) recommended buffers are applied where possible. Should clearing of riparian vegetation be unavoidable, it is recommended that APGA (2022) impact management strategies to water (e.g., hydrology and watercourses) and soil (erosion) are adopted to minimise the risk of impacts. These include applying appropriate sediment and erosion control on slopes, regular monitoring of the area, reduction of the extent and duration of soil disturbance, control of water movement through the area and stabilisation of areas immediately after works. Additionally, it is recommended that native groundcover vegetation and non-woody shrubs be reinstated via natural top-soil seedbank after any clearing occurs. This will aid in managing the risk of impacts to riparian vegetation, watercourses, and water quality via erosion.

6.1.2 Groundwater Dependent Ecosystems

No ground-truthed vegetation communities within the Study area equate to SREBA BVGs described as GDEs. However, the Project Area intersects a SREBA 'low potential' terrestrial GDE, which coincides with DEPWS (2024a) mapped watercourses. DEPWS (2024c) states that "*Generally, where groundwater is within 20 m of the land surface some species of native plant may access and use groundwater*". A review of DEPWS (2024a) SREBA mapped GDEs, bores, and water table depth raster information indicates that the water table below the Project Area is >70 mbgl. Therefore, it is unlikely that vegetation within the Project Area equates to a terrestrial GDE as depth to groundwater is beyond the rooting depth of native species(Canadell *et al*., 1996; Schenk & Jackson, 2002). This is supported by SLR ground-truthed data within the vicinity of the SREBA mapped GDE. The key indicator species in this general area was *Eucalyptus microtheca*, which is typified as a facultative phreatophyte and not highly dependent of groundwater sources for survival. Overall, it is unlikely that development of the Project Area will impact upon a terrestrial GDE.

Clearing applications where the proposed Disturbance Footprint will be used for activities that require water within close proximity to a GDE must consider the impact of water use (NTPS, 2020). Taking or diverting water from natural waterways or groundwater should not have a significant impact on the health of GDEs including the 'halo of hydrological influence' surrounding GDEs (NTPS, 2020).

The Project intends to use groundwater for dust suppression, compaction, hydrostatic testing and potable water services for the campsite during the construction phase of the Project. The water sources will be obtained from existing and new groundwater extraction licence entitlements. It is expected that any GDEs in close proximity to the action will not be impacted as water use will be short-term during the construction phase and minimal infrequent water use is expected during the operational phase.

Further, based on the outcomes of the stygofauna studies discussed in section 4.3.3, the depth of the groundwater, likely low abundance of stygofauna and short duration and volume of water extraction for construction, impacts to stygofauna from water extraction are considered highly unlikely. Any impacts are likely to be extremely localised, in the vicinity of metres.

Changes in groundwater quality may also result in impacts to stygofauna. Impacts to aquifers may be mitigated through, for example, the use of low toxicity drilling fluid systems during the construction of new bores. Based upon the above information, the presence of significant assemblages of stygofauna in the area is considered limited and impacts considered unlikely.

6.2 Parks and reserves

The Frew Ponds Historical Reserve is the only park or reserve that occurs within 30 km of the Project Area (DEPWS, 2024a). This reserve is a memorial to the Frew Ponds Overland Telegraph Line and is located ~18 km to the south of the Project Area. Localised development of the Project Area will not result in an impact to this or any other parks or reserves. No further management is required or recommended.

6.3 Introduced flora and fauna species

Very few introduced flora and fauna species were identified within the Survey Area during the field assessment. Of these, most are commensurate with those occurring within the surrounding region and land use (i.e. Cattle grazing).

Introduced flora species generally occurred in low abundance and were generally isolated to sections of existing access tracks and prior disturbance. No WoNS were identified within the Survey Area and only two WM Act declared weed species (Class B) were identified; Hyptis and Flannel Weed. These two species are also listed under DEPWS (2021a) as Category 4 weeds. All remaining introduced flora species are not afforded a relevant class under the WM Act or category under DEPWS (2021a).

Feral Cats were observed within the Survey Area and at the ‘Tamboran Camp’. The presence of this species at the Tamboran Camp highlights the importance of introducing management strategies for this species around the Temporary Construction Camp.

Biosecurity management strategies provided in APGA (2022) are recommended to be applied at all stages of the Project. This will result in the Project having a low risk of instigating the establishment and proliferation of introduced flora and fauna species. To assist with this, it is recommended that native groundcover and non-woody shrubs are allowed to grow over any cleared area. This will reduce the likelihood of introduced species establishing and will also reduce the net loss of biodiversity values within the Project Area due to vegetation clearing during the construction phase of the Project.

6.4 Threatened and migratory fauna species

No threatened or migratory fauna species were observed within the Survey Area during the 2024 field assessment. Three species were incidentally observed within the broader region over the field survey period; Gouldian Finch, Grey Falcon, and Glossy Ibis. The following species were determined to have a moderate or high likelihood of occurring within the Project Area based on outcomes or desk- and field-based assessments:

- Gouldian Finch;
- Grey Falcon;
- Painted Honeyeater;
- Australian Painted-snipe;
- Northern Blue-tongued Skink;
- Yellow-spotted Monitor;
- Oriental Pratincole; and
- Glossy Ibis.

Potential impacts to these species were assessed against the MNES Significant impact guidelines (DoE, 2013). These assessments are provided in Table 21. The outcomes of these assessments are that none of these species will be significantly impacted by development of the Project. Recommendations and strategies to manage the risk of impacts to biodiversity values within the Project Area are provided in Table 18.

Table 18 Impact pathways during development of the Project and management recommendations

Impact pathway	Further description and management recommendations
Direct removal of native vegetation and fauna habitat	During the construction phase of the Project vegetation communities will be required to be cleared and maintained for the development of infrastructure components. Routine maintenance of woody regrowth above the pipeline and 3 m buffer area to incorporate vehicle movement will be maintained during the operation phase. No further clearing of native vegetation is likely to be required during the operational phase of the Project. It is recommended that native groundcover vegetation and non-woody shrubs be re-established via natural top-soil seedbank after any clearing occurs. This will aid in managing the risk of impacts to native vegetation communities, watercourses, and water quality via erosion, and fauna habitat values within the Disturbance Footprint. This is of particular note as this will reduce the net loss of potential habitat for threatened and migratory fauna species within the Disturbance Footprint. The reinstation of native groundcover species will also aid in reducing the potential for introduced flora to establish within cleared areas. It is recommended that vegetation clearing is undertaken during the dry season when surface water is absent and soil moisture is low. This will aid minimising impacts to biodiversity values and will also facilitate streamlined workflow.
Mortality of fauna species and impacts to threatened species breeding places.	During construction, the Project may result in the mortality of native fauna species through vegetation clearing or trench entrapment. The Code (AGPA, 2022) provides recommendations and strategies for mitigating potential impacts to native fauna species that are at risk of impacts during the construction phase of the Project. These include, but are not limited to, the provision of spotter catchers, daily fauna checks of trenches, fauna shelters, earth plugs or access ramps at prescribed distances of open trench. The implementation strategies such as these during the construction phase of the Project will minimise the potential for individuals of this species to be directly impacted by the Project. Pre-clearance surveys for threatened species breeding places are recommended to be undertaken by spotter catchers prior to the commencement of sequential clearing. The objectives of these surveys should be to identify breeding places and adaptively manage impacts to these places should they be encountered. An example of adaptive management is to introduce clearing

Impact pathway	Further description and management recommendations
	exclusion zones during the construction phase of the Project. This is recommended as species may commence utilisation of the Disturbance Footprint after the completion of the baseline flora and fauna assessment. Examples of species to consider during these pre-clearance surveys are the Grey Falcon (nests) and Yellow-spotted monitor (burrows).
Introduction of pest flora and fauna species	See Section 6.3 of this report.

Table 19 Estimated area of impact to each ground-truthed vegetation community by development of the Project

Veg. #	Ground-truthed description	Estimated impact area (ha)[1]	
		Option 1	Option 2
1	Mixed *Acacia* shrubland to variable grassland with variable emergent *Eucalyptus* and *Corymbia.*	18.95[2]	18.90
2	*Melaleuca viridiflora* and *Acacia torulosa* low closed shrubland with *Triodia bitextura* hummock grassland.	9.22[2]	9.21
3	*Eucalyptus microtheca* open woodland on floodplains.	20.42	20.51[2]
4	*Corymbia dichromophloia* open woodland with variable tussock/hummock grassland.	64.84[2]	64.76
5	*Acacia shirleyi* open to closed woodland.	16.61	16.79[2]
6	*Macropteranthes keckwickii* closed woodland.	2.33[2]	2.22
7	*E. microtheca* and *Lophostemon grandiflorus* open woodland on floodplain fringes.	2.06[2]	2.01
Total		**134.43**	**134.41**

1. Exact impact areas to ground-truthed vegetation communities are subject to change based on changes to Project design once finalised.
2. Indicates ‘worst case’ impact areas for development options, which have been used to inform impact area calculations for threatened species habitat. The sum of these values is 136.58 ha.

Table 20 Recommended widths of riparian buffers within the Land Clearing Guidelines (DEPWS, 2024c)

Riparian class	Stream order	Minimum buffer width (m)	Measured from
Drainage depression	N/A	25	The outer edge of the drainage depression, which is the extent of the associated poorly drained soils and associated vegetation

Riparian class	Stream order	Minimum buffer width (m)	Measured from
Intermittent streams	First		The outer edge of the riparian vegetation or levee (whichever is the greater). If braided channels are present, the edge of the outer most stream channel.
	Second	50	As above.
Creeks	Third and fourth	100	
Rivers	Fifth or higher	250	

Table 21 Significant impact assessment for threatened and migratory fauna species with a moderate to high likelihood of occurrence within the Project

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
Threatened species						
VU	EN	*Erythrura gouldiae*	Gouldian Finch	**Species ecology and threats:** The Gouldian Finch is found from the Cape York Peninsula of northern Australia through north-west Queensland and to the Northern Territory and Kimberley Region of Western Australia. The nesting period for this species is typically between April and July, however this may be extended in some years. This species nests in tree hollows, preferring small patches of open woodland, usually on ridges dominated by cavity bearing trees such as *Eucalyptus brefifolia* in the west and *Eucalyptus tintinnans* in the east. The understorey of these communities is dominated by grasses such as *Sarga spp*., *Schizachyrium spp*., and *Triodia spp*. and nesting usually occurs within 2-4 km of perennial waterholes or springs (TSSC, 2016a). The largest known breeding population of this species occurs north of Katherine (O'Malley, 2006). Non-breeding birds disperse widely, following grass and seed resources, with evidence of banded juveniles moving 200 km in a few weeks. Additionally, vagrants have been recorded on the edge of the Simpson Desert ~1,000 km south of the normal distribution (TSSC, 2016a; Garnett & Baker, 2021). This species feeds almost exclusively on grass seed and depend on a relatively small number of grass species, which seed at different times throughout the year. In the wet season, this species relies on a small number of perennial grass species, including *Alloteropsis semialata* and *Chrysopogon fallax*, consuming the seeds directly off plants as they ripen. In the dry season, they depend on the large volume of annual grass seed that is produced towards the end of the previous wet season that lies dormant on the ground (TSSC, 2016a). Other grass species that this species has been documented to forage on include *Triodia spp*. (including *Triodia bitextura*), *Heteroppogon triticeus*, *Sehima nervosum*, *Xerochloa laniflora* and *Themeda triandra*. Threats to this species described in O'Malley (2006), Garnet & Baker (2021), and TSSC (2016a) are: • Inappropriate fire regimes. • Impacts from overgrazing and Feral Pigs (*Sus scrofa*). • Historically, Air Sac Mite (*Stemostoma tracheacolum*) was investigated for its role in causing population declines. Although the mite was often identified in sick birds, its role in causing poor condition remains unclear. • Loss and competition for hollows during breeding. Critical components of suitable core habitat for this species appear to the be presence of favoured annual and perennial grasses (especially *Sorghum*), a nearby source of surface water and, in the breeding season, unburnt hollow-bearing *Eucalyptus* (DCCEEW, 2024c). **Habitat values within the Project Area:** This species was not observed within the Survey Area during the 2024 field assessment. However, ≤10 individuals of this species were	Lead to a long-term decrease in the size of a population.	This species is estimated to occur as one, but may occur as two, populations within Australia. Western birds are panmictic, however Einasleigh Uplands/Cape York Peninsula birds may be isolated. Aside from this, the population of this species is not severely fragmented and is not subject to extreme fluctuations in its extent of occurrence and area of occupancy (AoO). The number of mature individuals can fluctuate at a site level, but there is no evidence of fluctuations of an order of magnitude at a populations level (Garnett & Baker, 2021). The population of this species within the local area is part of a broader panmictic population and individuals have demonstrated ability to travel across large distances in search of resources. Therefore, development of the Project will not lead to a long-term decrease in the size of a population of this species.
					Reduce the AoO of the species.	The population of this species is not severely fragmented and is not subject to extreme fluctuations in its extent of occurrence and AoO (Garnett & Baker, 2021). Therefore, development of the Project will not reduce the AoO of the species.
					Fragment an existing population into two or more populations.	The population of this species within the local area is part of a broader panmictic population and individuals have demonstrated ability to travel across large distances in search of resources (Garnett & Baker, 2021). Therefore, development of the Project will not fragment an existing population into two or more populations.
					Adversely affect habitat critical to the survival of the species.	Potential foraging habitat for this species was ground-truthed within the Project area. The estimated area of potential foraging habitat for this species that may be impacted by development of the Project is ~112.14 ha. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat within the Project area, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.
					Disrupt the breeding cycle of a population.	The spatial distribution of tree species (*E. brevifolia* and *E. tintinnans*) that this species is documented to use during breeding does not overlap with the Project Area (ALA, 2024). This is consistent with known existing and large breeding populations of this species (O'Malley, 2006) and other breeding areas described in TSSC (2016a). As the Project area does not occur within known breeding locations for this species and no evidence of breeding was observed during the 2024 field assessment development of the Project will not disrupt the breeding cycle of a population of this species.
					Modify, destroy, remove, isolate or decrease the availability or quality of	Potential foraging habitat for this species was ground-truthed within the Project area. The estimated area of potential foraging habitat for

Status[1] TPWC Act[2]	Status[1] EPBC Act[2]	Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
				opportunistically observed on one occasion drinking from an artificial water source. This water source is located ~9.5km to the north of the westernmost portion of the proposed alignment, along the Buchanan Highway (~4km west of the Stuart Highway intersection). The surrounding vegetation community was characterised by *Acacia shirleyi* open to closed forest on minor rises, which was surrounded by *Corymbia dichromophloia* open woodland with variable tussock/ hummock grassland. Grass species ground-truthed during the 2024 field assessment that this species is known or likely to forage on are *Chrysopogon fallax*, *Sorghum timorense*, *Schizachyrium fragile*, *Triodia bitextura*, *Sehima nervosa*, and *Themeda triandra*. These grasses were found across ground-truthed vegetation communities 1, 2, 4, 5 and 6. Based on this, it is estimated that there may be ~112.14 ha of foraging habitat for this species within the Disturbance Footprint. The spatial distribution of tree species (*E. brevifolia* and *E. tintinnans*) that this species is documented to use during breeding does not overlap with the Project Area (ALA, 2024). This is consistent with known existing and large breeding populations of this species (O'Malley, 2006) and other breeding areas described in TSSC (2016a). As the Project Area does not occur within known breeding locations for this species, and no evidence of breeding was observed during the 2024 field assessment, the Project Area is unlikely to contain breeding habitat for this species. Outside of seasonally ephemeral floodplains and drainage depressions, surface water was limited within the Survey Area. There are no perennial water sources that may be utilised by this species within the Project Area that will be affected by development of the Project.	habitat to the extent that the species is likely to decline.	this species that may be impacted by development of the Project is ~112.14 ha. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, development of the Project will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Impacts from overgrazing and Feral Pigs are the key threats to this species from invasive fauna. Invasive flora, such as introduced grass species, may also competitively exclude preferred food sources for this species. Feral Pigs were not returned from database searches as being relevant to the Project Area (ALA, 2024). However, this species occurs widely across northern Australia and may access portions of the Project Area. Development of the Project is not likely to increase the likelihood of Feral Pigs utilising the Project Area based on their wide-ranging occurrence. The existing land-use of the Project Area is for Cattle grazing. Therefore, impacts from grazing are likely to be pre-existing and development of the Project will not result in the establishment of this species. The implementation of biosecurity management strategies, as described in the Code (AGPA, 2022), will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat.
					Introduce disease that may cause the species to decline.	Although not a disease, the Air Sac Mite may have contributed to previous population declines of this species. The threat posed by this species is assumed to be constant across different areas (O'Malley, 2006). Therefore, development of the Project will not introduce disease that may cause this species to decline.
					Interfere with the recovery of the species.	As Development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery plan (O'Malley, 2006), or the recovery of, this species.
				Outcome:	This species has not been observed to occur within the Project Area. Development of the Project may impact up to ~112.14 ha of habitat for this species. This is ~0.05% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of habitat, development of the Project will not result in a significant impact to this species.	
VU	VU	*Falco hypoleucos*	Grey Falcon	**Species ecology and threats:** This species is sparsely distributed across a large area of Australia, however, is considered rare or nomadic across much of its range. Throughout its distribution, this species has been recorded to prefer lightly timbered country, especially stony plains and lightly timbered *Acacia* scrublands (Morcombe, 2003). However, it has also been recorded to occur around inland wooded watercourses (Garnett *et al*., 2011). The presence of this species in an area and modelled habitat	Lead to a long-term decrease in the size of an important population of the species.	This species consists of a single, panmictic population across Australia that is not severely fragmented or subject to extreme fluctuation in the extent of occurrence, AoO, locations or mature individuals (Garnett & Baker, 2021). Additionally, the Project Area occurs within the central portion of this species' broad distribution (Menkhorst *et al*., 2017, Garnett & Baker, 2021). Based on these factors, the Project Area does not contain an important population of this species. Therefore, development of the Project will not lead to a long-term decrease in the size of an important population of this species.

<table>
<tr><th colspan="2">Status[1]</th><th rowspan="2">Scientific name</th><th rowspan="2">Common name</th><th rowspan="2">Species ecology, threats, and habitat values within the Project</th><th rowspan="2">Significant impact criteria</th><th rowspan="2">Outcomes[3]</th></tr>
<tr><th>TPWC Act[2]</th><th>EPBC Act[2]</th></tr>
<tr><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">suitability are both highly variable between seasons and years (Garnett & Baker, 2021).

Breeding occurs from June to November and eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (Eucalyptus camaldulensis) and Eucalyptus coolabah. However, this species is also known to nest in telecommunication towers.

This species consists of a single, panmictic population across Australia that is not severely fragmented or subject to extreme fluctuation in the extent of occurrence, AoO, locations or mature individuals (Garnett & Baker, 2021). No important populations of this species are described.

There is no defined habitat that is critical to the survival of this wide-ranging panmictic species. Key considerations for habitat that may equate to habitat critical to the survival of this species are areas that are necessary for activities such as foraging, breeding, roosting or dispersal.

Threats to this species are described in TSSC (2020) are:
Egg collection and falconry (both low risk);
Birdwatchers, photographers, collision with traffic, collision with fences and powerlines (all moderate risk);
Small population size and nest shortage (both high risk); and
Predation by cats, increased temperatures in arid and semi-arid Australia, and grazing by exotic herbivores (all very high risk).
Habitat values within the Project Area:
This species was not observed within the Survey Area during the 2024 field assessment and no distinct breeding or roosting locations were identified. Two individuals of this species were observed by AECOM ~5.5km to the east of the Project Area in June 2024. Due to the wide range of habitats that this species occupies and the presence of nearby records, all ground-truthed vegetation communities within the Project Area are likely to constitute habitat for this species. As no active breeding places were observed, habitat for this species within the Survey Area is likely to be primarily for foraging.</td><td>Reduce the AoO of an important population.</td><td>This species consists of a single, panmictic population across Australia that is not severely fragmented or subject to extreme fluctuation in the extent of occurrence, AoO, locations or mature individuals (Garnett & Baker, 2021). Additionally, the Project Area occurs within the central portion of this species' broad distribution (Menkhorst et al., 2017, Garnett & Baker, 2021). Based on these factors, the Project Area does not contain an important population of this species. Therefore, development of the Project will not lead to a reduction in the AoO of an important population.</td></tr>
<tr><td>Fragment an existing important population into two or more populations.</td><td>This species consists of a single, panmictic population across Australia that is not severely fragmented or subject to extreme fluctuation in the extent of occurrence, AoO, locations or mature individuals (Garnett & Baker, 2021). Additionally, the Project Area occurs within the central portion of this species' broad distribution (Menkhorst et al., 2017, Garnett & Baker, 2021). Based on these factors, the Project Area does not contain an important population of this species. Therefore, development of the Project will not lead to the fragmentation of an existing important population into two or more populations.</td></tr>
<tr><td>Adversely affect habitat critical to the survival of the species.</td><td>No active or distinct roosting or breeding places for this species were identified within the Survey Area during the 2024 field assessment. Additionally, habitats within the Project Area are not necessary for the dispersal of this species.

Ground-truthed vegetation communities contain potential foraging habitat for this species. Therefore, it is estimated that ~134.70 ha of potential foraging habitat for this species may be impacted by development of the Project. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area.

Whilst there is a net loss of potential foraging habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.</td></tr>
<tr><td>Disrupt the breeding cycle of an important population.</td><td>This species consists of a single, panmictic population across Australia that is not severely fragmented or subject to extreme fluctuation in the extent of occurrence, AoO, locations or mature individuals (Garnett & Baker, 2021). Additionally, the Project Area occurs within the central portion of this species' broad distribution (Menkhorst et al., 2017, Garnett & Baker, 2021). Based on these factors, the Project Area does not contain an important population of this species. Therefore, development of the Project will not lead to the disruption in the breeding cycle of an important population.</td></tr>
<tr><td>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</td><td>No active or distinct roosting or breeding places for this species were identified within the Survey Area during the 2024 field assessment. Additionally, habitats within the Project Area are not necessary for the dispersal of this species.

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Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
						development of the Project. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, development of the Project will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Predation by Feral Cats are described as a threat to this species. Feral Cats were detected within the Survey Area during the 2024 field assessment. Based on this, this species is likely to be pre-established within the surrounding region. The implementation of biosecurity management strategies, as described in the Code (AGPA, 2022), will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat.
					Introduce disease that may cause the species to decline.	Disease is not a known threat to this species. Therefore, the Project will not introduce disease that will case this species to decline.
					Interfere substantially with the recovery of the species.	As Development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery plan objectives (TSSC, 2020), or the recovery of, this species.
				Outcome:	The Project Area does not occur in a location that supports an important population of this species. Development of the Project may impact up to ~134.70 ha of potential habitat for this species. This is ~0.05% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of potential foraging habitat, development of the Project will not result in a significant impact to this species.	
VU	VU	*Grantiella picta*	Painted Honeyeater	**Species ecology and threats:** This species is seasonally migratory within Australia. This species breeds on the inland slopes of the Great Dividing Range south-east of an almost straight line from Chinchilla in Queensland to the Grampians in Victoria. After the Spring to Summer breeding season, there are very few records of this species in the southeastern portion of its Australian distribution. During the non-breeding season, most records of this species occur in northwestern Queensland south of the Gulf of Carpentaria and in the northeastern Northen Territory, south of the Roper River. The northward migration starts in March and most birds return to the breeding range from September to November (Garnett & Baker, 2021). This species often occurs singly or in pairs, and less often in small flocks. Preferred habitat for this species includes areas where mistletoe is abundant, the fruit of which its diet primarily consists of. Such habitats may include eucalypt forests/woodlands, riparian woodlands of Black Box and River Red Gum, Box-ironbark-yellow gum woodlands, *Acacia* dominated woodlands, Paperbarks, Casuarinas, *Callitris*, and trees on farmland or gardens. Preferred woodlands are those in wider blocks of remnant vegetation with a high proportion of mature trees as these often host more mistletoe. However, this species has also been	Lead to a long-term decrease in the size of an important population of the species.	This species occurs as a single population within Australia (Garnett & Baker, 2021). There are no important populations of this species described within DAWE (2021). Therefore, development of the Project will not lead to a long-term decrease in the size of an important population of the species.
					Reduce the AoO of an important population.	This species occurs as a single population within Australia (Garnett & Baker, 2021). There are no important populations of this species described within DAWE (2021). Therefore, development of the Project will not reduce the AoO of an important population.
					Fragment an existing important population into two or more populations.	This species occurs as a single population within Australia (Garnett & Baker, 2021). There are no important populations of this species described within DAWE (2021). Therefore, development of the Project will not fragment an existing important population into two or more populations.
					Adversely affect habitat critical to the survival of the species.	The Project Area contains potential foraging habitat for this species, which is defined as habitat critical to the survival of this species in DAWE (2021). The estimated extent of disturbance to potential foraging habitat for this species is ~83.96 ha. This estimated extent of disturbance is ~0.04% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area.

Status[1] TPWC Act[2]	Status[1] EPBC Act[2]	Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
				observed in narrow roadside strips if ample mistletoe fruit is available (DoE, 2015). Habitat critical to the survival of this species is described in DAWE (2021) as: • Breeding habitat: Known or likely breeding habitat in Boree/Weeping Myall, Brigalow woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range in New South Wales, Victoria and southern Queensland. • Foraging habitat: All preferred foraging species within known and likely foraging habitat particularly mistletoes of the genus *Amyema* growing on forest and woodland eucalypts and Acacias. • Habitat for the long-term maintenance of the species: All key Biodiversity Areas with Painted Honeyeater as a Trigger species. Suitable habitat in future climate niches as information becomes available. Threats to this species is described in DAWE (2021) are: • Habitat loss (very high risk); • Habitat degradation (very high risk); • Competition (moderate risk); • Climate variability and change (very high risk). This species exists as single population within Australia (Garnett & Baker (2021). No important populations of this species are described in DAWE (2021). No key Biodiversity areas for this species are described for the Northern Territory in DAWE (2021). **Habitat values within the Project Area:** This species was not observed within the Survey Area during the 2024 field assessment. *Amyema maidenii* was observed to be fruiting during the field assessment and the field assessment was undertaken over a period when this species may occur during the non-breeding season. The Project Area occurs within the non-breeding range for this species, therefore values for this species are limited to those for foraging. *A. maidenii* was observed to occur on *Corymbia dichromophloia*, *Acacia shirleyi*, and *Terminalia canescens* across ground-truthed vegetation communities 4, 5, and 6. It should be noted that *A. maidenii* was observed to grow extensively on these host species in the broader region during the 2024 field assessment.		Whilst there is a net loss of potential foraging habitat within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.
					Disrupt the breeding cycle of an important population.	This species occurs as a single population within Australia (Garnett & Baker, 2021). There are no important populations of this species described within DAWE (2021). Therefore, development of the Project will not disrupt the breeding cycle of an important population. Furthermore, the Project Area occurs outside of the breeding distribution for this species.
					Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The Project Area contains potential foraging habitat for this species. The estimated extent of disturbance to potential foraging habitat for this species is ~83.96 ha. This estimated extent of disturbance is ~0.04% of that represented within the broader region based on ground-truthed observations and NVIS mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar or equal values will remain unimpacted. Therefore, development of the Project will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Invasive species are not described as a threat to this species. The implementation of biosecurity management strategies, as described in the Code (AGPA, 2022), will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat.
					Introduce disease that may cause the species to decline.	Disease is not a known threat to this species. Therefore, the Project will not introduce disease that will case this species to decline.
					Interfere substantially with the recovery of the species.	As Development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery plan objectives (DAWE, 2021), or the recovery of, this species.
				Outcome:	The Project Area does not occur in a location that supports an important population of this species. Development of the Project may impact up to ~83.96 ha of habitat for this species. This is ~0.04% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of potential foraging habitat, development of the Project will not result in a significant impact to this species.	
EN	EN	*Rostratula australis*	Australian Painted-snipe	**Species ecology and threats:** This species has been recorded at wetland sites throughout much of Australia but is most common in the eastern states. This species is a distinct but can be hard to detect due to its cryptic and crepuscular behaviour. This species typically occurs in shallow freshwater wetlands and other permanently or temporarily inundated areas, particularly	Lead to a long-term decrease in the size of a population.	This highly mobile species occurs as a single population across Australia (Garnett & Baker, 2021; DCCEEW, 2022). No individuals of this species have been recorded within the Project Area and surrounding records are centralised around seasonal wetlands. Distinct wetland values and associated BVGs are not present within the Project. Therefore, development of the Project will not lead to a long-term decrease in the size of a population.

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
				where rank tussocks of grasses, sedges, rushes or reeds are present (DCCEEW, 2024c; Morcombe, 2003). This species breeds in shallow, temporary or infrequently filed freshwater or brackish wetlands following flooding, preferring wetlands with complex shorelines and a patchwork of shallow water, small islands, exposed wet mulch, and low dense cover (less than knee height). This species forages on seeds and invertebrates, including insects, worms, molluscs and crustaceans from the water's edge (Garnett & Baker, 2021). There is some evidence of partial migration from southeastern wetlands to coastal central and northern Queensland in autumn and winter. All sightings south of Queensland since 2015 have been between October and April, but some birds appear to stay in northern Australia all year round (Garnett & Baker, 2021). There is one local record of this species within 30 km of the Project, which is located ~2.7 km (from 1991) to the north of the Project (DEPWS, 2024a; ALA, 2024). There are several other nearby records of this species to the south of the Project around Lake Woods (ALA, 2024). Furthermore, Marcelina, the first Australian Painted-snipe to be tracked, has been recorded utilising an area of seasonal wetland area ~20km to the northeast of the Project in June 2024 (Pers. comms. Matt Herring from 'Tracking Australian Painted-snipe', June 2024). Threats to this species is described in DCCEEW (2022) are: • Changes to water regimes (very high risk); • Structural changes to wetlands (very high risk); • Drainage of wetlands (very high risk); • Fragmentation of waterways (moderate risk); • Deterioration of water quality (moderate risk); • Invasive plants (very high risk); • Climate variability and change (high risk); • Livestock overgrazing (moderate risk); • Invasive animals (moderate risk); • Human disturbance (moderate risk); • Fire (moderate risk); and • Low genetic diversity (high risk). Habitat critical to the survival of this species is described in DCCEEW (2022) as: • Any natural wetland habitat where the species is known or likely to occur (especially with suitable breeding habitat); and • Any location that may be periodically occupied by this species when wetland conditions are favourable. **Habitat values within the Project Area:** This species was not observed within the Survey Area during the 2024 field assessment. No distinct freshwater wetlands or other permanently inundated areas were ground-truthed within the Survey Area. Potential	Reduce the AoO of the species.	This highly mobile species occurs as a single population across Australia (Garnett & Baker, 2021; DCCEEW, 2022). No individuals of this species have been recorded within the Project Area and surrounding records are located around distinct, seasonal wetlands (ALA, 2024). Distinct wetland values and associated BVGs are not present within the Project Area. Therefore, development of the Project will not reduce the area of occupancy of the species
					Fragment an existing population into two or more populations.	This highly mobile species occurs as a single population across Australia (Garnett & Baker, 2021; DCCEEW, 2022). Localised clearing of vegetation does not present a barrier to dispersal for this highly mobile species. Therefore, development of the Project will not fragment an existing population into two or more populations.
					Adversely affect habitat critical to the survival of the species.	This species has not been recorded within the Project Area. The Project Area may contain intermittent and opportunistic foraging habitat for this species. The estimated extent of disturbance to potential foraging habitat for this species is ~22.57 ha. This estimated extent of disturbance is ~0.65% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.
					Disrupt the breeding cycle of a population.	The Project Area does not contain suitable breeding (wetland) habitat for this species. Therefore, development of the Project will not disrupt the breeding cycle of the species.
					Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	This species has not been recorded within the Project Area. The Project Area may contain intermittent and opportunistic foraging habitat for this species. The estimated extent of disturbance to potential foraging habitat for this species is ~22.57 ha. This estimated extent of disturbance is ~0.65% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, development of the Project will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Invasive plants and animals are described as threats to this species. Introduced flora species were infrequently encountered during the 2024 field assessment. The implementation of biosecurity management strategies, as described in the Code, will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat.
					Introduce disease that may cause the species to decline.	Disease is not a known threat to this species. Therefore, development of the Project will not introduce disease that will case this species to decline.

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
				habitat for this species within the Project Area is limited to temporarily inundated open woodland (ground-truthed vegetation communities 3 and 7), which is only inundated via extreme seasonal rainfall. The estimated extent of disturbance to potential habitat for this species is ~22.57 ha. Habitat values for this species within the Project Area are likely to be limited to those for opportunistic foraging, as distinct wetland, and preferred, values are absent. This is supported by ground-truthed vegetation communities not corresponding to SREBA wetland BVGs.	Interfere with the recovery of the species.	As Development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery plan objectives (DCCEEW, 2022), or the recovery of, this species.
				Outcome:	This species has not been observed to occur within the Project Area. Development of the Project may impact up to ~22.57 ha of habitat for this species. This is ~0.65% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of habitat, development of the Project will not result in a significant impact to this species.	
(NL)	CE	*Tiliqua scincoides intermedia*	Northern Blue-tongued Skink	**Species ecology and threats:** This species occurs across northern Australia from Eighty Mile Beach in Western Australia, across the southern Kimberly and Top End of the Northern Territory, to approximately the Gregory Downs/Cloncurry area in western Queensland. (DCCEEW, 2023b). This species occurs in a wide variety of ecosystems but is not identified to occur in mangroves. This species has been recorded from dissected sandstone plateaus and gorges, limestone ranges, granite, basalt and dolerite hills, glacial shale undulations, sand plains, sandy waterways, swamps, cracking clay floodplains and coastal flats. Vegetation associations include riparian forest, vine scrub, monsoon rainforest, *Pandanus*-lined gorges, *Melaleuca* forest, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. Most, but not all, detections have occurred near seasonal or permanent water. (DCCEEW, 2023b). This species shelters under shrubs and thick grasses, in leaf litter, within burrows, and under built structures and discarded household items. DCCEEW (2023b) provides a wide-ranging description of habitat that is critical to the survival of this species. It was found that, on average, individuals of this species spend 95% of their time in small, fragmented patches of relatively dense vegetation that provide cool shade and damp conditions within an otherwise inhospitable landscape. These areas are considered to be habitat critical to the survival of this species. One DCCEEW (2023b) example of habitat critical to the survival of this species is dense thickets within floodplains, grasslands, shrublands, savannas and woodlands. Threats to this species identified in DCCEEW (2023b) are: • Mining, water drawdown, inundation, illegal collection, traditional hunting (all moderate risk); • Frequent sever fire, post-fire predation by Feral Cats, impacts from Cattle, Asian Water Buffalo and Feral Pigs (all high risk); and • Impacts from the Cane Toad (very high risk). DCCEEW (2023c) recovery actions for this species are centralised around managing impacts to this species from the Cane Toad.	Lead to a long-term decrease in the size of a population.	No individuals of this species have been recorded within the Project Area. Impacts from the introduced Cane Toad is the key factor influencing population decline in this species and the catalyst for this species threatened status (DCCEEW, 2023b). Cane Toads are pre-established in the surrounding region based on outcomes of the desktop assessment. Based on existing impacts being the leading factor contributing to general population decline in this species, development of the Project is will not contribute to long-term decreases in the size of a local population.
					Reduce the AoO of the species.	No individuals of this species have been recorded within the Project Area. The estimated AoO of this species is 704 km^2 (DCCEEW, 2023b) and the Project Area occurs within an extensive area of DCCEEW (2024c) modelled core distribution (habitat) for this species. Clearing for linear infrastructure (30 m wide) will not reduce the AoO of this species, particularly because the Project Area occurs within a broad area of DCCEEW (2024c) modelled core distribution for this species.
					Fragment an existing population into two or more populations.	Individuals of this species have home ranges of 2 to 12 ha (DCCEEW, 2023b). Clearing for linear infrastructure (30 m wide) will not represent a barrier that will fragment the existing mainland population of this species into two or more populations.
					Adversely affect habitat critical to the survival of the species.	Ground-truthed vegetation communities may contain habitat that is critical to the survival of this species. Therefore, it is estimated that ~134.70 ha of potential foraging habitat for this species may be impacted by development of the Project. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.
					Disrupt the breeding cycle of a population.	This species is viviparous, giving birth at the start of the wet season (December to January) after mating in the dry season (August to September) (DCCEEW, 2023b). No distinct breeding cycle requirements are described in DCCEEW (2023b) for this species.

Status[1] TPWC Act[2]	Status[1] EPBC Act[2]	Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
				Habitat values within the Project Area: This species was not observed within the Survey Area during the 2024 field assessment. However, based on the wide variety of habitats that this species is known to occupy, the Project Area likely supports suitable habitat for this species across all ground-truthed vegetation communities. These habitats may also be considered habitat critical to the survival of this species based on examples provided within DCCEEW (2023b).		Therefore, development of the Project will not disrupt the breeding cycle of this species.
					Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Ground-truthed vegetation communities may contain habitat for this species. Therefore, it is estimated that ~134.70 ha of potential habitat for this species may be impacted by development of the Project. This estimated extent of disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, development of the Project will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Cane Toads are the key introduced species identified in DCCEEW (2023b) that pose a threat to this species. It is also identified that Feral Cat predation of this species due to post-fire exposure and Cattle impacts is a high-risk threat to this species. Feral Cats and Cattle were ground-truthed within the Survey Area during the 2024 field assessment, therefore these species are pre-established in the local area. No Cane Toads were observed during the 2024 field assessment. However, this species was returned from database searches as occurring within the desktop assessment area. Therefore, it is likely that Cane Toads are pre-established in the surrounding region. The implementation of biosecurity management strategies, as described in the Code, will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat. As invasive species that are harmful to this species are already pre-established in the surrounding region development of the Project has a low risk of contributing to the establishment of these species.
					Introduce disease that may cause the species to decline.	Disease is not a known threat to this species. Therefore, the Project will not introduce disease that will case this species to decline.
					Interfere with the recovery of the species.	As development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery (DCCEEW, 2023b) of this species.
				Outcome:	This species has not been observed to occur within the Project Area. Development of the Project may impact up to ~134.70 ha of habitat for this species. This is ~0.05% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of habitat, development of the Project will not result in a significant impact to this species.	
VU	-	*Varanus panoptes*	Yellow-spotted Monitor	**Species ecology and threats:** This species has a broad geographic range across the far north of Australia, from the Kimberly's to Cape York Peninsula, and southwards through most of Queensland. In the Northern Territory, it has been recorded across most of the Top End and the Gulf Region (south to Katherine, Judbarra/Gregory National Park and the Gulf hinterland). This terrestrial species occupies a wide variety of habitats, including coastal beaches, floodplains, grasslands and woodlands. In these	Lead to a long-term decrease in the size of an important population of the species.	This species has not been observed within the Project Area and there are no important populations of this species within the Project Area. Therefore, development of the Project will not lead to a long-term decrease in the size of an important population of this species.
					Reduce the area of occupancy of an important population.	This species has not been observed within the Project Area and there are no important populations of this species within the Project Area. Therefore, development of the Project will not reduce the area of occupancy of an important population.

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
				areas, it predominantly feeds on small terrestrial vertebrates and insects (DEPWS, 2024b). This species nests in a deep (1.0 to 3.6 m) burrow, which is the deepest known of any vertebrate. Nesting occurs during the late-wet season and early dry season (February to June). Nests often occur in warrens (groups of up to 30 burrows close to one another). Nesting generally occurs along rivers and creeks in sandy areas with an open canopy and scattered shrubs and grasses (Doody *et al*., 2015). The advance of the Cane Toad across the Northern Territory presents the key threat to this species. This species is highly susceptible to Cane Toad toxin and monitors can easily ingest Cane Toads large enough to result in death (DEPWS, 2024b). No important populations of this species are defined. This species has a broad distribution across northern and eastern Australia, with a disjunct, but wide-ranging distribution in central-western Western Australia (Wilson & Swan, 2023).\ **Habitat values within the Project Area:** This species was not observed within the Survey Area during the 2024 field assessment. However, based on the wide variety of habitats that this species is known to occupy, the Project Area likely supports suitable habitat for this species across all ground-truthed vegetation communities. These habitats have the potential to be used by this species for foraging. Breeding habitat is excluded herein because no evidence of breeding (i.e. burrows) was observed for this species during the 2024 field assessment. A review of Wilson & Swan (2023) and ALA (2024) shows that the Project Area does not occur near the limit of this species' range; the Project Area occurs within the broad distribution of this species. The Project Area does not occur near the limit of the species' range, therefore the Project Area is not likely to contain key source populations of this species or populations that are necessary for maintaining genetic diversity. Overall, the Project Area is not likely to comprise an important population of this species.	Fragment an existing important population into two or more populations.	This species has not been observed within the Project Area and there are no important populations of this species within the Project Area. Therefore, development of the Project will not fragment an existing important population into two or more populations.
					Adversely affect habitat critical to the survival of the species.	Ground-truthed vegetation communities may contain foraging habitat that is critical to the survival of this species. Therefore, it is estimated that ~134.70 ha of potential foraging habitat for this species may be impacted by development of the Project. The estimated extent of potential disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, the effect of impacts to habitat critical to the survival of the species are not likely to be adverse.
					Disrupt the breeding cycle of an important population.	This species has not been observed within the Project Area and there are no important populations of this species within the Project Area. Therefore, development of the Project will not disrupt the breeding cycle of an important population of this species. Furthermore, no evidence of burrows (or warrens) for this species were ground-truthed within the Survey Area.
					Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Ground-truthed vegetation communities may contain foraging habitat that is critical to the survival of this species. Therefore, it is estimated that ~134.70 ha of potential foraging habitat for this species may be impacted by development of the Project. The estimated extent of potential disturbance is ~0.05% of that represented within the broader region based on ground-truthed observations and DEPWS (2024a) mapping within the desktop assessment area. Whilst there is a net loss of potential foraging habitat for this species within the Disturbance Footprint, contiguous vegetation within the surrounding landscape with similar values will remain unimpacted by the Project. Therefore, development of the Project will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
					Result in invasive species that are harmful to the species becoming established in the species habitat.	Cane Toads are the key introduced species identified in DEPWS (2024b) that pose a threat to this species. No Cane Toads were observed during the 2024 field assessment. However, Cane Toads were returned from database searches as occurring within the desktop assessment area. Therefore, it is likely that Cane Toads are pre-established in the surrounding region. The implementation of biosecurity management strategies, as described in the Code, will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat. As invasive species that are harmful to this species are already pre-established in the surrounding region development of the Project has a low risk of contributing to the establishment of these species.
					Introduce disease that may cause the species to decline.	Disease is not a known threat to this species. Therefore, the Project will not introduce disease that will case this species to decline.

Status[1] TPWC Act[2]	Status[1] EPBC Act[2]	Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
					Interfere substantially with the recovery of the species.	As development of the Project will not result in a significant impact to the above criteria, the Project will not interfere with the recovery of this species.
				Outcome:	The Project Area does not occur in a location that supports an important population of this species. Development of the Project may impact up to ~134.70 ha of potential habitat for this species. This is ~0.05% of that available in the surrounding region, the balance of which will remain unimpacted by the Project. Despite a net loss of habitat, development of the Project will not result in a significant impact to this species.	
Migratory species						
LC	MI	*Glareola maldivarum*	Oriental Pratincole	**Species ecology and threats:** Within Australia this species is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland. Inland habitats include open plains, floodplains or short grasslands. They often occur near terrestrial wetlands (DCCEEW, 2024c). This species does not breed in Australia and generally roosts in bare areas such as claypans or areas with low vegetation, such as saltmarsh or airfields. This species forages aerially at heights varying from just above the ground up to 300 m. During the non-breeding season, this species feeds on a variety of insects, including dragonflies, cicadas, beetles, moths, ants, termites, locusts, grasshoppers, flies, bees and wasps (DCCEEW, 2024c). The population of this species is estimated to range from ~2.5-2.8 million individuals and in Australia there are no immediate threats to its survival (DCCEEW, 2024c). **Habitat values within the Project Area:** This species was not observed within the Project Area during the 2024 field assessment and only one individual has been recorded within 30 km of the Project after 1980 (ALA, 2024). This one individual represents <0.00004% of the estimated population (lower range) of this species. Therefore, the Project Area and broader desktop assessment area does not support an ecologically significant proportion of the population of this species. The Project Area does not support breeding habitat for this species. Additionally, ground-truthed vegetation communities are not suitably open to support roosting habitat for this species. Foraging habitat for this species is limited to the airspace above the Project Area and linear vegetation clearing will not diminish the abundance of prey for this species. This species is widely distributed across Australia during the non-breeding season and there are no immediate threats to this species in Australia that result in population declines of this species. Furthermore, the Project Area does not occur at the limit of the non-breeding range of this species (ALA, 2024). Overall, the Project Area does not support important habitat for this species.	Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the species.	The Project Area does not support important habitat for this species. Therefore, development of the Project will not substantially modify, destroy or isolate an area of important habitat for this species.
					Result in invasive species that are harmful to the species being established in an area of important habitat for the species.	Invasive species within Australia are not described as a threat to this species. Additionally, the Project Area does not support important habitat for this species. Therefore, development of the Project will not result in invasive species that are harmful to this species being established in an area of important habitat.
					Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population.	The Project Area does not support an ecologically significant proportion of the population of this species. Therefore, development of the Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population.
				Outcome:	This species has not been recorded to occur within the Project Area. Additionally, the Project Area does not support important habitat for this species or an ecologically significant proportion of the population of this species. Therefore, development of the Project will not significantly impact this species.	

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
LC	MI	*Plegadis falcinellus*	Glossy Ibis	**Species ecology and threats:** This species preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, floodplains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. This species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons, however, these are not preferred habitats for this species. (DCCEEW, 2024c). Within Australia, this species disperses in response to good rainfall, expanding its range in Autumn. However, the core breeding (Spring and Summer) areas used at within the Murray-Darling Basin region of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. This species feeds in very shallow water, foraging mostly for aquatic invertebrates. However, this species will also eat fish, frogs and tadpoles, dryland invertebrates, lizards, small snakes and nestling birds. Seeds of aquatic plants may also be eaten, including commercial rice, which is recorded as a major diet item in parts of northern Australia. This species roost in trees or shrubs usually near, but sometimes far, from waterbodies (DCCEEW, 2024c). Wetland destruction or degradation is the major threat this species, particularly within the breeding range. Other identified threats include clearing, grazing, burning, increased salinity, groundwater extraction, hunting, pesticides, and invasion by exotic plants and fish resulting in habitat modification (DCCEEW, 2024c). The population of this species within Australia is estimated to be ~12% (~144,000 individuals) of the worldwide population, which ranges from ~1.2-3.2 million individuals (DCCEEW, 2024c). **Habitat values within the Project:** This species was not observed within the Project Area during the 2024 field assessment. However, three individuals were incidentally observed on one occasion to be foraging in seasonally inundated open *Eucalyptus microtheca* woodland ~5km to the south of the Disturbance Footprint. A further 11 records of this species were returned from database searches as occurring within 30 km of the Project Area. Cumulatively, these observations (14 individuals) represent <0.01% of the estimation Australian population of this species and ~0.001% of the worldwide population of this species. Therefore, the Project Area and broader desktop assessment area does not support an ecologically significant proportion of the population of this species. This species may utilise floodplain vegetation within the Project Area for foraging and roosting when these areas are inundated after heavy seasonal rainfall that results in flooding. This vegetation type occurs extensively outside of the Project Area. Minor clearing of vegetation within potential foraging habitat for this species will not diminish foraging opportunities for this species as this species is known not forage in open areas where surface water is present. This species roosts opportunistically, therefore development of the Project will not remove roosting habitat that is necessary for this species. The Project Area does not overlap with known breeding habitat for this species. Based on this, the Project does not support habitat of critical importance to this species. Populations of this species within Australia	Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the species.	The Project Area does not support important habitat for this species. Therefore, development of the Project will not substantially modify, destroy or isolate an area of important habitat for this species.
					Result in invasive species that are harmful to the species being established in an area of important habitat for the species.	Habitat invasion and modification by exotic plants and fish are identified as a threat to this species. The implementation of biosecurity management strategies, as described in the Code, will result in the Project having a low risk of resulting in invasive species that are harmful to this species becoming established in the species habitat.
					Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population.	The Project Area does not support an ecologically significant proportion of the population of this species. Therefore, development of the Project will not seriously disrupt the lifecycle of an ecologically significant proportion of the population.

Status[1]		Scientific name	Common name	Species ecology, threats, and habitat values within the Project	Significant impact criteria	Outcomes[3]
TPWC Act[2]	EPBC Act[2]					
				are not known to be declining and the Project Area does not occur on the limit of the species range (ALA, 2024; Menkhorst *et al*., 2017). Overall, the Project Area does not support an important population of this species.		
				Outcome:	This species has not been recorded to occur within the Project Area. Additionally, the Project Area does not support important habitat for this species or an ecologically significant proportion of the population of this species. Therefore, development of the Project will not significantly impact this species.	

1 Status: CE = Critically Endangered, EN = Endangered, LC = Least Concern, MI = Migratory, NE = Not Evaluated, (NL) = Not Listed, VU = Vulnerable.

3 TPWC = *Territory Parks and Wildlife Conservation Act 1976*, EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.

3 Impact area (ha) estimates are based off the 'worst case' impacts to relevant ground-truthed vegetation communities between development options. Per cent impact to habitats within the surrounding region are based off impacts to ground-truthed vegetation communities and the proportion DEPWS (2024a) NVIS communities that align with these communities within the desktop assessment area.

6.5 Cumulative impact assessment

The Beetaloo Basin Shenandoah South E&A Program (Shenandoah South Program) was identified to be relevant for consideration in the assessment of cumulative impacts associated with the Project. This is because the Project is intended to interconnect future components the Shenandoah South Program with the existing Amadeus gas pipeline.

Publicly available terrestrial ecological information relating to the Shenandoah South Program is available in the Environment Management Plan (EMP) for this program (Tamboran, 2024). Formal significant impact assessments following the methodology provided herein are not provided in Tamboran (2024). Therefore, direct comparison between outcomes to assist in the assessment of cumulative impacts can not be undertaken. *In lieu* of this, SLR reviewed the extent of vegetation communities documented to be impacted as part of the Shenandoah South Program. This is due to their connectedness with threatened fauna habitat values and subsequent detailed impact assessments provided in this report. However, only the total area (ha) of each vegetation community ground-truthed within Shenandoah South Program Lease Pad Areas are provided in Tamboran (2024) and not the area of proposed impact to each of these ground-truthed vegetation communities. Therefore, quantitative cumulative impact assessments can not be undertaken based on publicly available information for the Shenandoah South Program. Cumulative impact assessments are thus limited to qualitative assessments based on the available information.

Potential disturbance to vegetation communities associated with the Shenandoah South Program is generally characterised by the construction of (see Figure 23 in Appendix K of Tamboran, 2024):

- Exploration drill pads;
- Seismic lines;
- Gravel pits; and
- Well pad access tracks.

Vegetation clearing for infrastructure will not contribute notable additional impacts with consideration to those assessed in this report. Particularly in consideration to the extensive areas of contiguous vegetation in the surrounding region that will remain unimpacted by the Project and the Shenandoah South Program. Overall, development of the Project will not result in significant cumulative impacts based on publicly available information at the time of writing.

7.0 Conclusions and recommendations

The baseline flora and fauna assessment for the Project Area identified a variety of biodiversity values as occurring within the Project Area through desk- and field-based assessments. Based on the outcomes of these assessments, several of these matters were relevant for impact assessment due to their occurrence within, or proximity to, the Project Area. These matters are:

- Sensitive and significant vegetation communities (riparian vegetation);
- Introduced flora and fauna species; and
- Threatened and migratory fauna species.

Significant impact assessments of threatened and migratory fauna species revealed that development of the Project is not at risk of significantly impacting these species. Additionally, the Project is not at risk of impacting local Parks and Reserves. Clearing of native vegetation has the potential to impact upon riparian vegetation values. However, the implementation of APGA (2022) standard practices to manage impacts to native vegetation, water, and soil will likely result in impacts being of low risk within otherwise sparse vegetation communities. To support this, it is recommended that clearing activities are undertaken during the dry season when soil moisture is low. Furthermore, post clearing for temporary and below-ground infrastructure, it is recommended that native groundcover and non-woody shrub species are re-established across cleared areas via existing seedbank within reinstated topsoil. This will reduce the extent and likelihood of long-term impacts to biodiversity and environmental values within the Disturbance Footprint and minimise the potential for establishment of introduced flora species. The implementation of APGA (2022) biosecurity management strategies will also aid in minimising any impacts from introduced species.

The Code (AGPA, 2022) provides recommendations and strategies for mitigating potential impacts to native fauna species that are at risk of impacts during the construction phase of the Project. These include, but are not limited to, the provision of spotter catchers, daily fauna checks of trenches, fauna shelters, earth plugs or access ramps at prescribed distances of open trench. The implementation strategies such as these during the construction phase of the Project will minimise the potential for individuals of this species to be directly impacted by the Project.

Pre-clearance surveys for threatened species breeding places are recommended to be undertaken by spotter catchers prior to the commencement of sequential clearing. The objectives of these surveys should be to identify breeding places and adaptively manage impacts to these places should they be encountered. An example of adaptive management is to introduce clearing exclusion zones during the construction phase of the Project. This is recommended as species may commence utilisation of the Project Area after the completion of the baseline flora and fauna assessment.

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Appendix A EPBC Act Protected Matters Report

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 09-May-2024

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	19
Listed Migratory Species:	13

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 https://www.dcceew.gov.au/parks-heritage/heritage

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

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

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Falcunculus frontatus whitei Crested Shrike-tit (northern), Northern Shrike-tit [26013]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Trichosurus vulpecula arnhemensis Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Elseya lavarackorum Gulf Snapping Turtle [67197]	Endangered	Species or species habitat may occur within area	In buffer area only
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Varanus mertensi Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat may occur within area	In feature area
Varanus mitchelli Mitchell's Water Monitor [1569]	Critically Endangered	Species or species habitat may occur within area	In feature area
SHARK			
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Cecropis daurica			
Red-rumped Swallow [80610]		Species or species habitat may occur within area	In feature area
Cuculus optatus			
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundo rustica			
Barn Swallow [662]		Species or species habitat may occur within area	In feature area
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus			
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum			
Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Reptile			
Crocodylus johnstoni			
Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area	In buffer area only

Extra Information

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In buffer area only

Geological and Bioregional Assessments [Resource Information]

Name	State	Website	Buffer Status
Beetaloo GBA region	NT	GBA website	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix B Potential occurrence of threatened and migratory species

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Table B1 Likelihood of occurrence for threatened and migratory fauna species returned from database searches (post-1980 records; 30 km search radius)

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
BIRDS								
VU	EN	Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	PM	-	This species prefers open forests and woodland with a mosaic of vegetation types, particularly near riverine systems and permanent water where there is an abundance of prey species (DCCEEW, 2024c, and reference therein). Resident pairs prefer intact, extensive woodlands and forests with a mosaic of open vegetation types that contain permanent water. The home range in northern Australia has been reported up to 200 km^2, with indications it may be even larger (Aumann & Baker-Gabb, 1991). Satellite tracking studies have shown this species is capable of travelling distances of over 1,500 km and soaring of heights of >1km (DCCEEW, 2023). The breeding range of this species occurs across the Kimberly, east to Cape York Peninsula, and on the Tiwi islands, but this species may also breed at very low densities in the Wet Tropics and Einasleigh Uplands of Queensland (DCCEEW, 2023). Birds recorded in central Australia, far outside the breeding range, likely include dispersive juveniles and seasonal migrants from further north (DCCEEW, 2024c; DCCEEW, 2023)	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest post-1980 record of this species is located ~190 km to the northwest of the Project Area, with most other nearby records commencing ~200 km to the north of the Project Area around Mataranka (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. The Project Area does not support preferred habitat for this species due to an absence of permanent water and associated riparian vegetation. The Project Area may support dispersive and opportunistic habitat for this species, particularly when high seasonal rainfall result in ephemeral inundation of open floodplains. Due to an absence of preferred habitat (permanent water) and local records, and the Project Area occurring outside of the DCCEEW (2024c) modelled core distribution for this species, this species is considered to have a low likelihood of occurring within the Project Area.
LC	MI	Apodidae	*Apus pacificus*	Fork-tailed Swift	PM	-	This species is a non-breeding visitor to all states and territories of Australia. This species is almost exclusively aerial, flying from <1 m above the ground to at least 300 m or higher. Within Australia, this species occurs over a wide area across a variety of disturbed and un-disturbed habitats. This species often occurs over inland plains, but also sometimes above foothills or near cliffs and beaches in coastal areas. This species arrives in Australia around September to October and has generally departed Australia by May (DCCEEW, 2024c).	**Low** – There are no DEPWS local records of this species within 30 km of the Project Area (DEPWS, 2024a), however there are several post-1980 records of this species on the ALA (2024) along the Sturt Highway. The nearest of these (collected in 2020) occurs ~9 km south of the proposed alignment and adjacent to the proposed camp (ALA, 2024). As this species is predominantly aerial it is unlikely to utilise terrestrial habitats within the Project Area. Therefore, this species has a low likelihood of occurring within the Project Area.
LC	MI	Charadriidae	*Charadrius veredus*	Oriental Plover	PM / NRM	1	This species arrives in northern Australia between Exmouth and Derby in Western Australia and some records along the coast of the Top End and Gulf of Carpentaria (DCCEEW, 2024c). Inland records of this species predominantly occur on black soil plains of northern Western Australia, Northern Territory and north-western Queensland. Inland habitats can also include freshwater systems as well as flat, open, semi-arid or arid grasslands. They have also been recorded in recently burned areas (DCCEEW, 2024c). This species is a regular summer migrant that has been recorded across all mainland states but is most regularly recorded across coastal areas and the northern inland (Pizzey & Knight, 2012).	**Low** – There is one local record of this species within 30 km of the Project Area (DEPWS, 2024a). This record is associated with a section of an open plain (~24 km) to the northeast of the Project Area that is subject to longer periods of water retention (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) non-core modelled distribution for this species. Sections of the Project Area overlap with open *Eucalyptus microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
LC	MI	Cuculidae	*Cuculus optatus*	Oriental Cuckoo	PM	-	This species migrates to Australia from Asia and can be found from September to March. This species occupies a wide range of dense to open woodland and forest habitats, especially on the edges of riparian forest and occasionally gardens. (Menkhorst *et al*., 2017).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local records of this species are located ~200 km to the north and east of the Project Area (ALA, 2024). The Project Area occurs within the margin of the southernmost extent of the DCCEEW (2024c) non-core modelled distribution for this species. Based on an absence of nearby records and the Project Area occurring on the margin of the non-core modelled distribution for this species, this species has a low likelihood of occurring within the Project Area.
VU	EN	Estrilididae	*Erythrura gouldiae*	Gouldian Finch	PM	-	The Gouldian Finch is found from the Cape York Peninsula of northern Australia through north-west Queensland and to the Northern Territory and Kimberley Region of Western Australia. Breeding habitat includes areas characterised by rocky hills with hollow-bearing smooth-barked gums. Feeding habitat includes areas dominated by spear grasses or native sorghum, cockatoo grass, golden beard grass, or spinifex-dominated communities (TSSC, 2016a).	**Moderate** – There are no DEPWS (2024a) records of this species within 30 km of the Project Area. Most records of this species commence ~50 km north of the Project Area around Daly Waters, with records increasing in density further north of this point (ALA, 2024). Records directly south of this point within the NT (inclusive of the Project Area) are scarce, suggesting infrequent dispersal into areas south of Daly Waters (ALA, 2024). During the field assessment ≤10 individuals of this species were opportunistically observed on one occasion drinking from an artificial water source. This water source is located ~9.5 km to the north of the westernmost portion of the proposed alignment, along the Buchanan Highway (~4 km west of the Stuart Highway intersection). No individuals of this species were observed within the Project Area. The Project Area overlaps with the DCCEEW (2024c) modelled core distribution for this species. The Project Area may support foraging habitat for this species during optimal years where precluding environmental conditions support population expansions and subsequent southerly dispersal. However, there are no microhabitat features unique to the Project Area that would result in this species targeting habitats within the Project Area that are not more abundant or of higher quality in the broader region. In consideration of this and nearby observations of this species made during field assessment, this species is determined to have a moderate likelihood of occurring within the Project Area.
VU	VU	Falconidae	*Falco hypoleucos*	Grey Falcon	PM / NRM	2	This species is sparsely distributed across a large area of Australia, however, is considered rare or nomadic across much of its range. Throughout its distribution, this species has been recorded to prefer lightly timbered country, especially stony plains and lightly timbered *Acacia* scrublands (Morcombe, 2003). However, it has also been recorded to occur around inland wooded watercourses (Garnett *et al*., 2011). The presence of this species in an area and modelled habitat suitability are both highly variable between seasons and years (Garnett & Baker, 2021).	**Moderate** – There are two DEPWS (2024a) local records of this species within 30 km of the Project Area. However, there are several nearby post-1980 records of this species on ALA (2024). The nearest of these being within ~20 km to the north and south of the Project Area, however these records have a spatial resolution of 10 km (ALA, 2024). Two individuals of this species were observed on one occasion by AECOM on the 29 May 2024 at a location ~5.6 km to the east of the easternmost portion of the proposed alignment. These individuals were observed

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
								flying overhead and circling above treeless plains with sparse *Melaleuca* shrubs. The Project Area contains habitat that is broadly suitable for this species but this habitat is ubiquitous with that of the surrounding area and region. Therefore, there are no unique values for this species within the Project Area that are not widely represented within local or broader area. The Project Area occurs within a section of DCCEEW (2024c) modelled non-core distribution for this species, but modelled core distribution occurs just to the south and west of the Project Area. Based on the presence of local records, modelled habitat suitability being highly variable between seasons and years, and an absence of unique values for this species within the Project aera, this species is considered to have a moderate likelihood of occurring within the Project Area.
NT	VU	Falcunculidae	*Falcunculus frontatus whitei*	Crested Shrike-tit (northern)	PM	-	The northern sub-species of the Crested Shrike-tit is endemic to north-western Australia, occurring in the Kimberly region of Western Australia and in the north of the Northern Territory. This sub-species has been recorded in eight different woodland types in northern Australia, which are mainly dominated by Darwin Woolybutt (*Eucalyptus miniata*), Darwin Stringybark (*Eucalyptus tetrodonta*) or Smooth-stemmed Bloodwood (*Eucalyptus bleeseri*). Within these habitats, this sub-species is thought to forage for invertebrates, mostly in foliage branches, and the trunk and bark of trees. The scarcity of records of this sub-species suggests that populations are at very low density and may consist of small groups of two to five individuals. Populations may be widely spaced, possibly up to 20 km apart, and occupying large home ranges (20 ha) that individuals remain resident within throughout the year (TSSC, 2016b and references therein).	**Low** – There are no DEPWS (2024a) local records of this species within 30 km of the Project Area. The nearest records of this species are ~50 km to the north of the Project Area (ALA, 2024). The Project Area occurs to the south of the southern extent of the DCCEEW (2024c) modelled core distribution for this sub-species. Due to an absence of local records and the Project Area occurring outside of the DCCEEW (2024c) modelled distribution for this species, this species is considered to have a low likelihood of occurring within the Project Area.
LC	MI	Glareolidae	*Glareola maldivarum*	Oriental Pratincole	PM	-	Within Australia this species is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland. Inland habitats include open plains, floodplains or short grasslands. They often occur near terrestrial wetlands (DCCEEW, 2024c).	**Moderate** – There are no DEPWS (2024a) local records of this species within 30 km of the Project Area. However, there is one nearby post-1980 records of this species on ALA (2024) from the Dunmarra Roadhouse, which is ~3 km to the north of the Proposed alignment along the Stuart Highway. The Project Area occurs within the DCCEEW (2024c) non-core modelled distribution for this species. Sections of the Project Area overlap with seasonally waterlogged open woodlands or other open grassy habitats that may support habitat for this species. This is supported by the broader spatial distribution of northern inland records of this species (ALA, 2024). The Project Area has the potential to support habitat for this species, however the Project Area does not support any unique habitat values that are not widely abundant in the broader region. Based on this and the

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
								Project Area occurring in the non-core modelled distribution for this species, this species is considered to have a moderate likelihood of occurring within the Project Area.
NE	MI	Hirundinidae	*Cecropis daurica*	Red-rumped Swallow	PM	-	This species can be found in the northern parts of Australia. This bird is found in mountains, hilly country, river gorges, valleys and sea cliffs. This species is insectivorous and forages on the wing (Menkhorst *et al*., 2017).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~280 km to the north of the Project Area (ALA, 2024). The Project Area occurs within the southern extent of the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of nearby records and the Project Area occurring towards the southern extent of the modelled distribution for this species, this species is considered to have a low likelihood of occurring within the Project Area.
NE	MI	Hirundinidae	*Hirundo rustica*	Barn Swallow	PM	-	This species is typically found patchily along the north coast of the mainland and is typically found in open country in coastal lowlands utilising a wide variety of habitats (DES, 2023 and references therein)	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~280 km to the north of the Project Area (ALA, 2024). Inland records of this species are sparse and infrequent, with most records occurring in coastal areas (ALA, 2024). Therefore, the Project Area is likely to support unsuitable, absent, or highly degraded habitat for this species. The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and habitat values for this species within the Project Area likely being low, this species is considered to have a low likelihood of occurring within the Project Area.
LC	MI	Laridae	*Hydroprogne caspia*	Caspian Tern	NRM	1	This species mostly occurs in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes, waterholes, reservoirs, rivers and creeks. They also utilise artificial wetlands, including reservoirs, sewage ponds and saltworks. This species predominantly forages in open wetlands, including lakes and rivers (DCCEEW, 2024c).	**Low** – There is one DEPWS (2024a) local record of this species and three additional nearby post-1980 records of this species (ALA, 2024), which are located ~3 km to the north and ~4.5 km to the south of the Project Area. These records are located around seasonally inundated or waterlogged in low-lying *Eucalyptus microtheca* open woodland. Sections of the Project Area overlap with open *Eucalyptus microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
VU	VU	Meliphagidae	*Grantiella picta*	Painted Honeyeater	PM / NRM	1	This species is seasonally migratory within Australia. This species breeds on the inland slopes of the Great Dividing Range south-east of an almost straight line from Chinchilla in Queensland to the Grampians in Victoria. After the Spring to Summer breeding season, there are very few records of this species in the southeastern portion of its Australian distribution.	**Moderate** – There is one DEPWS (2024a) local record within 30 km of the Project Area, and an additional two ALA (2024) local records of this species within close proximity of the Project Area; one adjacent to the Dunmarra Roadhouse~3 km to the north of the proposed alignment and one ~2 km to the south of the proposed camp (ALA, 2024). Most other records of

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
							During the non-breeding season, most records of this species occur in northwestern Queensland south of the Gulf of Carpentaria and in the northeastern Northen Territory, south of the Roper River. The northward migration starts in March and most birds return to the breeding range from September to November (Garnett & Baker, 2021 and references therein). This species often occurs singly or in pairs, and less often in small flocks. Preferred habitat for this species includes areas where mistletoe is abundant, the fruit of which its diet primarily consists of. Such habitats may include eucalypt forests/woodlands, riparian woodlands of Black Box and River Red Gum, Box-ironbark-yellow gum woodlands, Acacia dominated woodlands, Paperbarks, Casuarinas, Callitris, and trees on farmland or gardens. Preferred woodlands are those in wider blocks of remnant vegetation with a high proportion of mature trees as these often host more mistletoe. However, this species has also been observed in narrow roadside strips if ample mistletoe fruit is available (DoE, 2015 and references therein).	this species in the inland areas of the NT are sparse and scattered (ALA, 2024). The proposed alignment occurs within the DCCEEW (2024c) modelled non-core distribution for this species, however, the proposed camp occurs within a small area of DCCEEW (2024c) modelled core distribution for this species. Due to the presence of local records and the Project Area occurring within modelled non-core and core habitat for this species, this species is considered to have a moderate likelihood of occurring within the Project Area. It should be noted that this moderate likelihood outcome is relevant to foraging habitat for this species only.
NE	MI	Motacillidae	*Motacilla cinerea*	Grey Wagtail	PM	-	An uncommon migrant in Australia, this species is rarely recorded in the Northern Territory or Queensland. It prefers montane forests and forested areas associated with watercourses (Menkhorst *et al*., 2017).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~250 km to the northeast of the Project Area (ALA, 2024). Inland records of this species are infrequent, sparse, and scattered (ALA, 2024). The Project Area occurs in the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and a paucity of inland records in Australia the Project Area is unlikely to support suitable habitat for this species. Based on this, this species is considered to have a low likelihood of occurring within the Project Area.
NE	MI	Motacillidae	*Motacilla tschutschensis*[4]	Eastern Yellow Wagtail	PM	-	This species is a rare but regular migrant to coastal areas within Australia. It typically inhabits open habitats, often near water and occasionally on drier inland plains and edges of mangroves (Morcombe, 2003). The highest densities of records of this species within Australia are located along the east coast (ALA, 2024).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local records of this species are located ~280 km to the north and east of the Project Area (ALA, 2024). All other records of this species in Australia occur in coastal locations (ALA, 2024). Project Area occurs in the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and a paucity of inland records in Australia the Project Area is unlikely to support suitable habitat for this species. Based on this, this species is considered to have a low likelihood of occurring within the Project Area.
EN	EN	Rostratulidae	*Rostratula australis*	Australian Painted-snipe	PM / NRM	1	This species has been recorded at wetland sites throughout much of Australia but is most common in the eastern states. The Australian Painted-snipe is a distinct species but can be hard to detect due to its cryptic and crepuscular behaviour. This species typically occurs in shallow freshwater wetlands and other permanently or temporarily inundated areas,	**Moderate** – There is one local record of this species within 30 km of the Project Area, which is located ~2.7 km (from 1991) to the north of the Project Area (DEPWS, 2024a; ALA, 2024). There are several other nearby records of this species to the south of the Project Area around Lake Woods (ALA, 2024). Furthermore, Marcelina, the first Australian Painted-

Status[1] TPWC[2]	EPBC[2]	Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
							particularly where rank tussocks of grasses, sedges, rushes or reeds are present (DCCEEW, 2024c; Morcombe, 2003). There is some evidence of partial migration from southeastern wetlands to coastal central and northern Queensland in autumn and winter. All sightings south of Queensland since 2015 have been between October and April, but some birds appear to stay in northern Australia all year round (Garnett & Baker, 2021).	snipe to be tracked, has been recorded utilising an area of seasonally wetland area ~20 km to the northeast of the Project Area in June 2024 (Pers. comms. Matt Herring from 'Tracking Australian Painted-snipe', June 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. When ephemerally inundated, the Project Area may support values for this species. However, these values are highly ephemeral and are not unique compared to those within the surrounding area that this species has been recorded to utilise. Based on this, this species is considered to have a moderate likelihood of occurring within the Project Area.
LC	MI	Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	PM / NRM	2	This species has a widespread but patchy distribution along all coastlines and in inland parts of Australia. Within this broad distribution this species can be found in coastal and inland wetlands with varying levels of salinity (DCCEEW, 2024c and references therein). However, this species is most commonly found in muddy or rocky shores of estuaries, deltas of streams, banks upstream, lakes, pools, billabongs, reservoirs, and dams (DCCEEW, 2024c and references therein).	**Low** – There are two DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). The Project Area occurs just to the south of DCCEEW (2024c) modelled core distribution for this species. Sections of the Project Area overlap with open *Eucalyptus microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
LC	VU, MI	Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	PM / NRM	17	This species occurs around the entire coast of Australia outside its breeding season, where it is found in a broad range of permanent or ephemeral water bodies, primarily brackish (DCCEEW, 2024c and references therein). It prefers muddy edges of shallow fresh or brackish wetlands, and uses flooded paddocks, sedge lands and other ephemeral wetlands.	**Low** – There are 17 DEPWS (2024a) local records of this species within 30 km of the Project Area. The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
CE	CE, MI	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	PM	-	This species occurs around the coasts of Australia and is quite widespread inland, however inland areas extending from eastern Australia into central inland Australia do not represent a core occurrence area for this species within Australia (Menkhorst *et al.*, 2017).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest records of this species are located ~100 km to the south of the Project Area around Lake Woods (ALA, 2024). Inland records of this species within

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
							This species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets, lagoons and also around non-tidal swamps, lakes, and lagoons near the coast, foraging on mudflats and nearby shallow water (DCCEEW, 2024c; Higgins & Davies, 1996).	Australia are sparse, scattered and overall infrequent, with most records occurring coastally (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and suitable, preferred, coastal habitats being absent, this species is considered to have a low likelihood of occurring within the Project Area.
NE	MI	Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	PM	-	Most records of this species are around the coasts of Australia or within south-eastern Australia (ALA, 2024). Inland records of this species are sparse and scattered, with most occurring around the Alice Springs area (ALA, 2024). This species prefers shallow wetlands (fresh and marine) and tends not to utilise small or ephemeral water bodies (Menkhorst *et al*., 2017; DCCEEW, 2024c).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~100 km to the south of the Project Area around Lake Woods (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and suitable permanent wetland habitats for this species within the Project Area this species is considered to have a low likelihood of occurring within the Project Area.
LC	MI	Scolopacidae	*Tringa glareola*	Wood Sandpiper	NRM	2	This species uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent aquatic plants or grass, and dominated by taller fringing vegetation, such has dense stands of rushes or reeds, shrubs or dead or live trees, especially *Melaleuca* and River Red Gums (*Eucalyptus camaldulensis*) and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they area drying. They are rarely found using brackish wetlands, or dry stunted saltmarsh. Typically, they do not use coastal flats, but are occasionally recorded in stony wetlands. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (DCCEEW, 2024c).	**Low** – There are two DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
LC	EN, MI	Scolopacidae	*Tringa nebularia*	Common Greenshank	NRM	3	This species is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often around tidal pools, rock-flats and rock platforms. This species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges	**Low** – There are three DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north and ~5km to the south of the proposed alignment (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within.

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
							and saltmarsh, mangroves, thickets of rushes, and dead or live trees (DCCEEW, 2024c).	This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
LC	MI	Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	NRM	5	This species occupies permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. It is less often recorded at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia, they prefer intertidal mudflats, although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide. At the Top End, they often use ephemeral pools on inundated freshwater and tidal floodplains (DCCEEW, 2024c).	**Low** – There are five DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north of the proposed alignment (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species. Sections of the Project Area overlap with open *E. microtheca* woodland on black soil that is subject to seasonally ephemeral inundation/water logging. These areas are unlikely to contain suitable habitat for this species due to the high density of groundcover and a lack of suitably open areas for this species to forage within. This species has a low likelihood of occurring within the Project Area based on an absence of suitable ground-truthed habitat.
LC	MI	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	NRM	11	This species preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, floodplains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. This species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons, however, these are not preferred habitats for this species (DCCEEW, 2024c).	**Moderate** – There are 11 DEPWS (2024a) local records of this species within 30 km of the Project Area, plus several others on ALA (2024). The nearest of these records are located ~3 km to the north and ~5 km to the south of the proposed alignment (ALA, 2024). Additionally, three individuals of this species were incidentally observed on one occasion to be foraging in seasonally inundated open *E. microtheca* woodland ~5 km to the south of the proposed alignment. The Project Area occurs within the Menkhorst *et al*. (2017) modelled core distribution for this species. When inundated, the Project Area may support some values for this species, however these values are highly ephemeral and are not unique compared to those within the surrounding area. Based on this, this species is considered to have a moderate likelihood of occurring within the Project Area.
VU	VU	Tytonidae	*Tyto novaehollandiae kimberli*	Masked Owl (northern mainland)	PM	-	The distribution of the Masked Owl (northern) is poorly known. This sub-species has been recorded in riparian forests, Melaleuca swamps, open forest and on the edges of mangroves, as well as along the margins of sugar cane fields (DCCEEW, 2024c).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ≥250 km to the north, east and west of the Project Area (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. Based on this and an absence of local records, this species is considered to have a low likelihood of occurring within the Project Area.
MAMMALS								
NT	VU	Emballonuridae	*Saccolaimus saccolaimus nudicluniatus*	Bare-rumped Sheath-tailed Bat	PM	-	This species has been detected at 11 locations in mostly coastal and adjacent areas of the Northern Territory and 21 locations along the tropical east coast of Queensland, from Iron Range to Jerona. Most	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~480 km to the north of the Project Area (ALA, 2024). The

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
							recently, the species was also detected at 40 locations throughout the Kimberly region of Western Australia. Habitat for this species is variable and includes northern tropical savanna woodlands and forests, coastal sand dunes, mangroves, paperbark woodlands, riparian forests and lowland rainforests, as well as sandstone and limestone ranges and gorges (Baker & Gynther, 2023). This species prefers to roost in groups, ranging from 10 to 100 individuals, in large trees with deep, hollow pipes, where the hollow is at least 18cm in diameter and the entrance to the hollow is at least 6m above the ground (Baker & Gynther, 2023).	Project Area overlaps with a very small and isolated area of DCCEEW (2024c) modelled non-core distribution for this species on the southernmost extent of modelled occurrence within central NT. The Project Area occurs outside of the Baker & Gynther (2023) modelled distribution for this species. Based on this and an absence of local records this species is considered to have a low likelihood of occurring within the Project Area.
NT	VU	Megadermatidae	*Macroderma gigas*	Ghost Bat	PM	-	The distribution of this species is discontinuous across Australia with two ranges in Queensland: coastal and near-coastal eastern Queensland, from Cape York to near Rockhampton, and western Queensland (DCCEEW, 2024c; Hourigan, 2011). It has been recorded hunting in rainforest, deciduous vine thicket, open woodland, spinifex, black soil and grassland habitats. Ghost Bats roost in caves, boulder piles, shallow escarpments and mines, and have very specific roosting requirements with respect to temperature and humidity (Van Dyck *et al*., 2013). Contemporary genetic studies show that the entire species is dependent upon relatively few regional breeding sites. Although this species may disperse widely, females rarely move from their natal roost and individuals have been recorded travelling 12 km from a daytime roost to forage (Baker & Gynther, 2023).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~200 km to the north of the Project Area (ALA, 2024). The Project Area marginally overlaps with DCCEEW (2024c) modelled non-core distribution for this species. Due to an absence of local records and the Project Area not supporting necessary roosting habitat for this species, this species is considered to have a low likelihood of occurring within the Project Area.
NT	VU	Phalangeridae	*Trichosurus vulpecula arnhemensis*	Common Brushtail Possum (north-western)	PM	-	This subspecies (referred to herein as this species) of the Common Brushtail Possum occurs discontinuously from the Gulf of Carpentaria hinterland near Borroloola, Northern Territory, westward to the Kimberly, Western Australia. Most of the current population appears to be in the Northern Territory (TSSC, 2021). This species mainly occurs in tall eucalypt open forests with large hollow-bearing trees, particularly where the understorey includes some shrubs that bear fleshy fruits. However, it also occurs in some mangrove communities (especially where these contain hollow-bearing trees), some rainforests, and some semi-urban areas (notably around Darwin) (TSSC, 2021).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~200 km to the north of the Project Area (ALA, 2024). The Project Area overlaps with DCCEEW (2024c) modelled core distribution for this species. However, does not overlap with the Baker & Gynther (2023) modelled distribution for this species. Furthermore, occurrences of this species, which may not represent occurrences of this sub-species, in the central parts of the NT are very sparse and scattered. Based on this and an absence of local records, this species is considered to have a low likelihood of occurring within the Project Area.
VU	VU	Thylacomyidae	*Macrotis lagotis*	Greater Bilby	PM	-	This species' original distribution encompassed arid and semi-arid regions of Australia which has now been reduced to areas in western Northern Territory and into northern parts of Western Australia, as well as a small area near the Diamantina River in and around Astrebla Downs National Park in western Queensland (Menkhorst & Knight, 2011). Its habitat mostly consists of sandy deserts, hummock grasslands and Acacia shrublands (Menkhorst & Knight, 2011). However,	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). There is one record from 1930, which is ~3 km to the north of the Project Area and a variety of 2011 records of this species ~65 km to the southwest of the Project Area (ALA, 2024). The Project Area overlaps with DCCEEW (2024c) modelled non-core distribution for this species and just outside of the Baker & Gynther (2023) modelled extant distribution for this species. Overall,

Status[1] TPWC[2]	Status[1] EPBC[2]	Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
							broad-scale surveys of this species in the NT in the 1990's indicated that laterite and drainage line land systems were occupied more frequently than sand plain and dune systems (DENR, 2006).	the Project Area occurs on the northern fringe of historical occurrence records of this species as well as the historical distribution for this species. Furthermore, no evidence of this species was observed during the baseline assessment. Based on this, this species is considered to have a low likelihood of occurring within the Project Area.
REPTILES								
LC	EN	Chelidae	*Elseya lavarackorum*	Gulf Snapping Turtle	PM	-	This species is restricted to rivers that drain into the Gulf of Carpentaria, which includes the Calvert to Nicholson River systems in the Northern Territory and associated sub-systems; Roper, Limmen Bight, Robinson and Nicholson Rivers (DEWHA, 2008; DCCEEW, 2024c). Within these river systems and their associated overflow lagoons and oxbow lakes this species is found in deeper permanent pools, most often with muddy, sandy or rocky bottoms. This species also occurs in the middle reaches of rivers, upstream of saline regions and downstream of escarpments, including plunge pools. Steep rocky gorges and river reaches with intact riverbanks seem to be preferred habitat for this species (DCCEEW, 2024c).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located >245 km to the northeast of the Project Area (ALA, 2024). The Project Area does not occur within the DCCEEW (2024c) modelled distribution for this species and there are no notable watercourses that would support preferred habitat for this species within the Project Area. Based on this, this species is considered to have a low likelihood of occurring within the Project Area.
VU	VU	Elapidae	*Acanthophis hawkei*	Plains Death Adder	PM	-	The exact distribution of this species is unclear. Suitable habitat for this species consists of flat, treeless, cracking-soil riverine floodplains. Based on the presence of suitable habitat, the potential geographic range of this species extends from Western Queensland, across the north of the Northern Territory to north-east Western Australia. Fragmented populations of this species are known to occur in the Mitchell Grass Downs of western Queensland, the Barkly Tableland on the Northern Territory/Queensland border and east of Darwin in the Northern Territory (DSEWPC, 2012).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). Most records of this species are located >350 km to the north of the Project Area, however there is one pre-1980 record ~90 km to the south of the Project Area (ALA, 2024). The Project Area occurs outside of the DCCEEW (2024c) modelled distribution for this species. The Project Area also occurs outside of the Wilson & Swan (2023) modelled distribution for this species. Based on this and an absence of local records, this species is considered to have a low likelihood of occurring within the Project Area.
(NL)	CE	Scincidae	*Tiliqua scincoides intermedia*	Northern Blue-tongued Skink	PM	-	This species occurs across northern Australia from Eighty Mile Beach in Western Australia, across the southern Kimberly and Top End of the Northern Territory, to approximately the Gregory Downs/Cloncurry area in western Queensland (DCCEEW, 2023b). This species occurs in a wide variety of ecosystems but is not identified to occur in mangroves. This species has been recorded from dissected sandstone plateaus and gorges, limestone ranges, granite, basalt and dolerite hills, glacial shale undulations, sand plains, sandy waterway, swamps, cracking clay floodplains and coastal flats. Vegetation associations include riparian forest, vine scrub, monsoon rainforest, *Pandanus*-lined gorges, *Melaleuca* forest, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. Most, but not all, detections	**High** – There are no DEPWS (2024a) local records of this species within 30 km of the Project Area. However, a review of ALA (2024) revealed records, one being contemporary (from 2020), of this species from the Dunmarra Roadhouse, ~3 km to the north of the Project Area. The Project Area overlaps with the DCCEEW (2024c) modelled core distribution for this species. Due to the wide variety of habitats that this species is known to occupy, the Project Area likely supports suitable habitat for this species. Based on this, this species is considered to have a high likelihood of occurring within the Project Area.

Status[1]		Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
TPWC[2]	EPBC[2]							
							have occurred near seasonal or permanent water (DCCEEW, 2023b). This species shelters under shrubs and thick grasses, in leaf litter, within burrows, and under built structures and discarded household items. They tend to avoid areas with bare ground (DCCEEW, 2023b).	
VU	EN	Varandiae	*Varanus mertensi*	Merten's Water Monitor	PM	-	This species is highly aquatic and seldom ventures more than 5 to10 m from the edge of the water, except when transiting among core aquatic activity areas. Habitats that this species is recorded from are perennial and semi-permanent pools in upper catchment areas, including springs, seeps, swamps, creeks and gorges. The margins of permanent streams, rivers and lakes in lower catchment areas. Floodplain billabongs, lagoons, swamps and soaks. Perennial waterholes in woodlands, and man-made irrigation channels and the margins of dams (DCCEEW, 2023c).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~125 km to the east and north of the Project Area (ALA, 2024). The Project Area occurs within the DCCEEW (2024c) modelled non-core distribution for this species. The Project Area does not support suitable watercourse habitats for this species. Due to an absence of local records and habitats within the Project Area likely being unsuitable for long-term occupation of this species, this species is considered to have a low likelihood of occurring within the Project Area.
VU	CE	Varandiae	*Varanus mitchelli*	Mitchell's Water Monitor	PM	-	This species occurs across the wet-dry tropics of northern Australia from Yampi Sound Training Area in the far west Kimberly of Western Australia across the Kimberly and Top End of the Northern Territory, to approximately Boodjamulla National Park in Queensland (DCCEEW, 2023d). This species inhabits freshwater and saline wetlands that range from seasonal gorges in upper catchments to large rivers and coastal floodplains. It is recorded from rivers, creeks, riffle zones, gorges, springs, lagoons, swamps, mangroves, and foreshores. This species has a strong association with *Pandanus* and other areas of woody vegetation that are directly adjacent to waterbodies, e.g., rainforest, *Melaleuca*, and mangroves. It is often encountered basking or resting on *Pandanus* and other woody vegetation near the water, partially submerged logs, mangroves, riverbanks, rocks, and manmade structures such as rocky sea walls and slabs of concrete (DCCEEW, 2023d). Darwin is home to one of the few recorded remnant subpopulations of this species (DCCEEW, 2023e). In the Darwin area, this species is known to inhabit and rely upon saline foreshore and riparian areas adjacent to the city. Occurrences of this species in the Darwin area are likely to be under-reported as it is not often considered that this species may occur in saline riparian habitats and surveys are often undertaken in the cool, dry months, when this species is inactive and almost impossible to detect (DCCEEW, 2023d).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest local record of this species is located ~160 km to the northeast of the Project Area (ALA, 2024). A small section of the Project Area overlaps with the DCCEEW (2024c) modelled non-core distribution for this species. The remainder of the Project Area does not overlap with DCCEEW (2024c) modelled core or non-core habitat. The Project Area does not support suitable watercourse or wetland habitats for this species. Due to an absence of local records and habitats within the Project Area likely being unsuitable for the occupation of this species, this species is considered to have a low likelihood of occurring within the Project Area.
VU	-	Varandiae	*Varanus panoptes*	Yellow-spotted Monitor	NRM	10	This species has a broad geographic range across the far north of Australia, from the Kimberly's to Cape York Peninsula, and southwards through most of Queensland. In the Northern Territory, it has been recorded across most of the Top End and the Gulf	**High** – There are ten DEPWS (2024a) local records this species within 30 km of the Project Area, which are all located within 10 km of the proposed alignment or proposed camp (DEPWS, 2024a; ALA, 2024). Based on the presence of local records and suitable

Status[1] TPWC[2]	Status[1] EPBC[2]	Family name	Scientific name	Common name	Source[3]	Local records	Ecology	Likelihood of occurrence
							Region (south to Katherine, Judbarra/Gregory National Park and the Gulf hinterland). This terrestrial species occupies a wide variety of habitats, including coastal beaches, floodplains, grasslands and woodlands. In these areas, it predominantly feeds on small terrestrial vertebrates and insects (DEPWS, 2021).	habitat (floodplains, grasslands and woodlands) for this species occurring within the Project Area, this species is considered to have a high likelihood of occurring.
SHARKS AND RAYS								
VU	VU, MI	Pristidae	*Pristis pristis*	Large-tooth Sawfish	PM	-	This is a marine/estuarine species that typically spends its first three to four years in freshwater growing to about half its adult size (4 m+). Juveniles and sub-adults of this species predominantly occur in rivers and estuaries, while large mature individuals tend to occur more often in coastal and offshore waters up to 25 m deep. In northern Australia, this species is generally confined to freshwater drainages and the upper reaches of estuaries, occasionally being found as far as 400 km from the sea. This species tends to move up reivers during flood periods and small individuals (1.5 m) have been caught in remote ponds where they have been isolated for several years between floods. Preferred habitat for this species is mud bottoms of river embayments and estuaries, but also occurs in upstream environments. This species is not found near riparian vegetation and is typically found in turbid channels of large rivers over soft mud bottoms more than 1 m deep with a preference for deeper sections of rivers adjacent to a sand or silt shallow, such as a sandbar or shallow backwater (DCCEEW, 2024c and references therein).	**Low** – There are no local records of this species within 30 km of the Project Area (DEPWS, 2024a). The nearest record of this species is located ~220 km to the east of the Project Area (ALA, 2024). The Project Area overlaps with the outer margin of the DCCEEW (2024c) modelled non-core distribution for this species. The Project Area does not support suitable watercourse habitats for this species. Due to an absence of local records and habitats within the Project Area likely being unsuitable for the occupation of this species, this species is considered to have a low likelihood of occurring within the Project Area.

1. Status: CE = Critically Endangered, EN = Endangered, LC = Least Concern, MI = Migratory, NE = Not Evaluated, (NL) = Not Listed, NT = Near Threatened, VU = Vulnerable.
2. TPWC = *Territory Parks and Wildlife Conservation Act 1976*, EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.
3. PM = Protected Matters Search Tool, NRM = NR Maps
4. Synonymous with *Motacilla flava*.

Appendix C Ground-truthed vegetation communities

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Table C1 Floristic composition and structure of ground-truthed vegetation communities

Veg #	Land unit	Ground-truthed floristic composition and structure[1]	Representative photograph
1	Flats and run-on areas transitioning from yellow to grey clay loam.	U ^*Eucalyptus microtheca*, ^*Eucalyptus spp*., ^*Corymbia spp*.\^tree\7\r; M+^*Acacia lysiphloia*, *Acacia holosericea*, *Melaleuca viridiflora*, *E. microtheca*\^shrub\4\c,i; G ^*Aristida inaequiglumis*, ^*Eriachne armitii*, ^*Sehima nervosa*, *Sporobolus sp*., *Ludwigia perennis*\^tussock and hummock grasses,forbs\2\c.	

Veg #	Land unit	Ground-truthed floristic composition and structure[1]	Representative photograph
2	Drainage depressions on grey/brown clay, sandy loam.	U ^*M. viridiflora*, ^*Acacia torulosa*, *Macropteranthes keckwickii*\^tree,shrub\6\r; M+^*M. viridiflora*, ^*A. torulosa*, *Acacia difficilis*\^shrub\5\d; G ^*Triodia bitextura*, *Cyperus spp*.\^tussock and hummock grasses,sedges,forbs\1\d.	
3	Floodplains on cracking, black clays.	U+^*E. microtheca*\^tree\6\c; M ^*E. microtheca*\^shrub\5\r; G ^*Dichanthium sericeum*\^tussock grasses,sedges,forbs\2\d.	

Veg #	Land unit	Ground-truthed floristic composition and structure[1]	Representative photograph
4	Flats and plains on red/brown clay, sandy loam.	U+^*Corymbia dichromophloia*, *Eucalyptus pruinosa*, *Erythrophleum chlorostachys*, *Terminalia canescens*\^tree\7\c; M ^*T. canescens*, ^*Acacia ssp.*, *Calytrix exstipulata*, *Dodonaea hispidula*, *Alphitonia excelsa*\^shrub\5\i; G ^*T. bitextura*, ^*Aristida inaequiglumis*\^tussock and hummock grasses,forbs\1\c.	
5	Minor rises on red/brown sandy clay loam.	U+^*Acacia shirleyi, Macropteranthes keckwickii, Gyrocarpus americanus* \^tree\7\c; M ^*M. keckwickii*, *Santalum lanceolatum*\^shrub\5\r; G ^*Aristida sp.*, ^*Enneapogon sp.*, ^*Sporobolus sp.*, *Panicum sp.*, *Stylosanthes spp.*\^tussock grasses,forbs\1\c.	

Veg #	Land unit	Ground-truthed floristic composition and structure[1]	Representative photograph
6	Flats, run-on areas and minor rises on a red/grey/yellow sandy, clay loam.	U+^*M. keckwickii*, *A. shirleyi*, *Bauhinia cunninghamii*, *Terminalia volucris*, *Grevillea striata*\^tree\7\c; M ^*M. keckwickii*, *A. shirleyi*, *T. volucris*, *S. lanceolatum*, *Carissa lanceolata*\^shrub\5\i; G ^*Panicum sp*.\^tussock grasses,forbs\1\c.	
7	Floodplain fringes on variable black, cracking clays to heavy, grey clay loam.	U+^*E. microtheca*, *Lophostemon grandiflous*, *Acacia difficilis*, *Hakea arborescens*\^tree\6\i; M ^*S. lanceolatum*, *E. microtheca*, *Acacia spp.*\^shrub,tree\4\c; G ^*A. inaequiglumis, Eragrostis cumingii, L. perennis, Cyperus spp.*\^tussock grasses,forbs.sedges\1\c.	

stic composition and structure description is based on the NVIS information hierarchy (Brocklehurst *et al*., 2007).

Appendix D Ground-truthed flora species list

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Table D1 Ground-truthed flora species

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Acanthaceae	*Rostellularia adscendens*	Pinktongues				X			
LC	-	Amaranthaceae	*Achyranthes aspera*	Chaff-flower	X						
LC	-	Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed		X	X				
LC	-	Amaranthaceae	*Dysphania kalpari*	Rat-tail Goosefoot					X		
LC	-	Amaranthaceae	*Gomphrena canescens*	Batchellors Buttons					X		
LC	-	Amaranthaceae	*Gomphrena sp.*	*Gomphrena*		X					
LC	-	Amaranthaceae	*Ptilotus fusiformis*	Skeleton Plant				X			
LC	-	Amaranthaceae	*Ptilotus sp.*	*Ptilotus*					X		
LC	-	Apocynaceae	*Carissa lanceolata*	Currant Bush		X		X			
LC	-	Apocynaceae	*Cynanchum viminale*	Caustic Vine						X	
LC	-	Asparagaceae	*Thysanotus chinensis*	*Thysanotus*		X					
LC	-	Asteraceae	*Pterocaulon serrulatum*	Fruit-salad Bush		X		X			
LC	-	Asteraceae	*Pterocaulon sphacelatum*	Apple Bush		X		X			
LC	-	Astreaceae	*Bidens bipinnata*	Cobblers Pegs				X	X		
LC	-	Bignoniaceae	*Dolichandrone heterophylla*	Lemonwood		X					
LC	-	Bixaceae	*Cochlospermum gregorii*	Kapok Bush				X			
LC	-	Boraginaceae	*Ehretia saligna*	Coonta				X			
LC	-	Boraginaceae	*Heliotropium spp.*	*Heliotropium*		X					
LC	-	Byblidaceae	*Byblis liniflora*	Flypaper Trap		X					
LC	-	Campanulaceae	*Lobelia sp.*	*Lobelia*		X					
LC	-	Capparaceae	*Capparis lasiantha*	Split-arse-jack					X		
LC	-	Caryophyllaceae	*Polycarpaea sp.*	*Polycarpaea*				X	X		
LC	-	Celastraceae	*Denhamia cunninghamii*	Narrow-leaf *Maytenus*				X			
LC	-	Celastraceae	*Stackhousia intermedia*	Wiry *Stackhousia*		X					
LC	-	Cleomaceae	*Cleome viscosa*	Tickweed				X			
LC	-	Combretaceae	*Macropteranthes kekwickii*	Bullwaddy		X	X	X	X	X	
LC	-	Combretaceae	*Terminalia canescens*	Winged Nut Tree		X		X	X		
LC	-	Combretaceae	*Terminalia volucris*	Rosewood		X		X	X	X	
LC	-	Commelinaceae	*Cartonema parviflorum*	*Cartonema*		X					
LC	-	Commelinaceae	*Murdannia graminea*	Blue *Murdannia*		X					
INFRA	-	Convolvulaceae	*Evolvulus alsinoides*	Blue Periwinkle				X	X		
LC	-	Convolvulaceae	*Ipomoea sp.*	*Ipomoea*		X	X	X	X		
LC	-	Convolvulaceae	*Jacquemontia browniana*	Snake Stem				X			
LC	-	Convolvulaceae	*Jacquemontia sp.*	*Jacquemontia*				X			

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Convolvulaceae	*Operculina aequisepala*	Onion Vine			X				
LC	-	Convolvulaceae	*Xenostegia tridentata*	*Xenostegia*				X			
-	-	Cucurbitaceae	*Citrullus lanatus*	Water Melon				X			
LC	-	Cucurbitaceae	*Cucumis argenteus*	-				X			
LC	-	Cucurbitaceae	*Cucumis melo*	Bush Cucumber				X			
LC	-	Cyperaceae	*Cyperus spp.*	Cyperus		X	X				X
LC	-	Droseraceae	*Drosera burmanni*	Tropical Sundew		X					
LC	-	Droseraceae	*Drosera derbyensis*	Sundew		X					
DD	-	Droseraceae	*Drosera finlaysoniana*	Sundew		X					
LC	-	Ebenaceae	*Diospyros humilis*	Ebony						X	
LC	-	Euphorbiaceae	*Mallotus nesophilus*	Mallotus						X	
LC	-	Fabaceae	*Abrus precatorius*	Crab's Eye Vine						X	
INFRA	-	Fabaceae	*Acacia colei*	Kalkardi	X			X			
LC	-	Fabaceae	*Acacia difficilis*	River Wattle		X		X			
LC	-	Fabaceae	*Acacia galioides*	Wattle		X					
LC	-	Fabaceae	*Acacia holosericea*	Silver Wattle	X					X	
LC	-	Fabaceae	*Acacia lysiphloia*	Turpentine Bush	X			X			
LC	-	Fabaceae	*Acacia shirleyi*	Lancewood					X	X	
LC	-	Fabaceae	*Acacia torulosa*	Torulosa Wattle		X		X			
LC	-	Fabaceae	*Acacia wickhamii*	Wickham's Wattle				X			
LC	-	Fabaceae	*Bauhinia cunninghamii*	Bean Tree	X					X	
LC	-	Fabaceae	*Crotalaria aridicola subsp. densifolia*	Chillagoe Horse Poison				X			
LC	-	Fabaceae	*Crotalaria medicaginea*	Clover-leaf Rattlepod	X		X				
LC	-	Fabaceae	*Dichrostachys spicata*	Single Thorn Prickly Bush					X		
LC	-	Fabaceae	*Erythrophleum chlorostachys*	Cooktown Ironwood				X	X		
LC	-	Fabaceae	*Indigofera linifolia*	Native Indigo				X			
LC	-	Fabaceae	*Indigofera linnaei*	Birdsville Indigo				X			
LC	-	Fabaceae	*Indigofera sp.*	*Indigofera*				X	X		
LC	-	Fabaceae	*Neptunia sp.*	*Neptunia*	X	X					
LC	-	Fabaceae	*Petalostylis cassioides*	Butterfly Bush				X			
Int.	-	Fabaceae	*Stylosanthes hamata*	Carribbean Stylo				X	X		
Int.	-	Fabaceae	*Stylosanthes scabra*	Shrubby Stylo				X	X		
LC	-	Fabaceae	*Tephrosia spp.*	*Tephrosia*				X	X		
LC	-	Fabaceae	*Uraria lagopodioides*	*Uraria*				X			
Int.	-	Fabaceae	*Vachellia farnesiana*	Mimosa Bush				X		X	

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Fabaceae	*Vigna lanceolata*	Pencil Yam	X	X					
LC	-	Fabaceae	*Zornia sp.*	*Zornia*						X	
LC	-	Goodeniaceae	*Goodenia sp.*	*Goodenia*	X	X		X			
LC	-	Hemerocallidaceae	*Dianella sp.*	*Dianella*				X			
LC	-	Hernadiaceae	*Gyrocarpus americanus*	Helicopter Tree				X	X		
LC	-	Lamiaceae	*Clerodendrum floribundum*	Smooth *Clerodendrum*				X			
Int.	-	Lamiaceae	*Mesosphaerum suaveolens*	*Hyptis*				X	X		
LC	-	Lauraceae	*Cassytha filiformis*	Dodder Laurel		X					
LC	-	Lecythidaceae	*Planchonia careya*	Cocky Apple				X			
LC	-	Loganiaceae	*Mitrasacme spp.*	*Mitrasacme*	X	X		X			
LC	-	Loganiaceae	*Strychnos lucida*	Strychnine Tree						X	
LC	-	Loranthaceae	*Amyema maidenii*	Pale-leaf Mistletoe				X	X	X	
LC	-	Malvaceae	*Abutilon sp.*	*Abutilon*					X	X	
LC	-	Malvaceae	*Brachychiton megaphyllus*	Red Flowering Kurrajong		X		X			
LC	-	Malvaceae	*Corchorus sidoides*	Flannel Weed					X	X	
LC	-	Malvaceae	*Gossypium australe*	Native Cotton				X			
LC	-	Malvaceae	*Grewia savannicola*	Dog's Balls				X			
LC	-	Malvaceae	*Hibiscus geranioides*	*Hibiscus*				X			
LC	-	Malvaceae	*Hibiscus meraukensis*	Ballerina *Hibiscus*				X			
INFRA	-	Malvaceae	*Hibiscus sturtii*	Sturt's *Hibuscus*				X			
LC	-	Malvaceae	*Melhania oblongifolia*	Velvet *Hibiscus*				X	X	X	
Int.	-	Malvaceae	*Sida cordifolia*	Flannel Weed				X	X		
LC	-	Malvaceae	*Waltheria indica*	*Waltheria*	X	X		X			
LC	-	Marsileaceae	*Marsilea sp.*	Nardoo		X	X				
LC	-	Menispermaceae	*Tinospora smilacina*	Snake Vine				X			
LC	-	Menyanthaceae	*Nymphoides sp.*	*Nymphoides*			X				
LC	-	Myrtaceae	*Calytrix exstipulata*	Turkey Bush				X	X		
LC	-	Myrtaceae	*Corymbia confertiflora*	Broad-leaf Carbeen				X			
LC	-	Myrtaceae	*Corymbia dichromophloia*	Small-fruited Bloodwood				X	X		
LC	-	Myrtaceae	*Corymbia sp.*	Corymbia	X			X	X		
LC	-	Myrtaceae	*Eucalyptus camaldulensis*	Red River Gum				X			
LC	-	Myrtaceae	*Eucalyptus leucophloia*	Snappy Gum				X			
LC	-	Myrtaceae	*Eucalyptus microtheca*	Coolabah	X	X	X				X
LC	-	Myrtaceae	*Eucalyptus pruinosa*	SilverBox	X	X		X			
LC	-	Myrtaceae	*Lophostemon grandiflorus*	Northern Swamp Box							X

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Myrtaceae	*Melaleuca nervosa*	Yellow-barked Paperbark		X					
LC	-	Myrtaceae	*Melaleuca viridiflora*	Broad-leaved Paperbark	X	X					
LC	-	Nyctaginaceae	*Boerhavia sp.*	Tar Vine	X	X					
LC	-	Oleaceae	*Jasminum molle*	*Jasminum*						X	
LC	-	Onagraceae	*Ludwigia perennis*	Upright Primrose	X	X	X				X
Int.	-	Passifloraceae	*Passiflora foetida*	Stinking Passion Flower				X	X		
LC	-	Phyllanthaceae	*Breynia cernua*	*Breynia*				X	X	X	
LC	-	Phyllanthaceae	*Flueggea virosa*	White Currant				X	X		
LC	-	Phyllanthaceae	*Phyllanthus sp.*	*Phyllanthus*		X		X			
LC	-	Picrdoendraceae	*Petalostigma banksii*	Smooth-leaved Quinine				X			
LC	-	Picrdoendraceae	*Petalostigma pubescens*	Quinine Bush		X		X			
LC	-	Poaceae	*Aristida calycina*	Dark Wiregrass					X	X	
LC	-	Poaceae	*Aristida contorta*	Bunched Kerosene Grass		X		X	X		
LC	-	Poaceae	*Aristida holathera*	Erect Kerosene Grass		X		X	X		
LC	-	Poaceae	*Aristida inaequiglumis*	Unequal Three-awn		X		X			
LC	-	Poaceae	*Aristida sp.*	*Aristida*	X						
LC	-	Poaceae	*Bothriochloa ewartiana*	Desert Bluegrass	X	X					
LC	-	Poaceae	*Chrysopogon fallax*	Golden Beard Grass	X			X			
LC	-	Poaceae	*Cymbopogon bombycinus*	Silky Oilgrass	X						
LC	-	Poaceae	*Dichanthium sericeum*	Silky Bluegrass	X		X				
LC	-	Poaceae	*Digitaria brownii*	Cotton Panic Grass					X		
LC	-	Poaceae	*Ectrosia scabrida*	Hares-foot Grass		X					
LC	-	Poaceae	*Elytrophorus spicatus*	Spikegrass	X	X					
LC	-	Poaceae	*Enneapogon lindleyanus*	*Enneapogon*					X		
LC	-	Poaceae	*Enneapogon sp.*	*Enneapogon*			X				
LC	-	Poaceae	*Eragrostis cumingii*	Fairy Grass		X					
LC	-	Poaceae	*Eragrostis spp.*	Lovegrass	X	X					
LC	-	Poaceae	*Eriachne armittii*	Longawn Wanderrie Grass	X	X					
LC	-	Poaceae	*Eriachne ciliata*	Slender Wanderrie				X	X		
LC	-	Poaceae	*Eriachne obtusa*	Northern Wanderrie	X	X					
LC	-	Poaceae	*Eulalia aurea*	Silky Browntop	X						
LC	-	Poaceae	*Heteropogon contortus*	Black Speargrass	X						
LC	-	Poaceae	*Iseilema sp.*	Flinders Grass	X						
LC	-	Poaceae	*Panicum decompositum*	Native Millet	X			X	X	X	
LC	-	Poaceae	*Panicum effusum*	Hairy Panic	X			X	X	X	

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Poaceae	*Schizachyrium fragile*	Firegrass		X		X			
LC	-	Poaceae	*Sehima nervosum*	White Grass	X			X			
LC	-	Poaceae	*Setaria surgens*	Brown Pigeon Grass		X					
LC	-	Poaceae	*Sorghum timorense*	Downs *Sorghum*	X			X			
LC	-	Poaceae	*Sporobolus australasicus*	Australian Dropseed	X	X	X	X	X	X	
LC	-	Poaceae	*Themeda triandra*	Kangaroo Grass	X						
LC	-	Poaceae	*Triodia bitextura*	Curly Spinifex		X		X	X	X	
Int.	-	Poaceae	*Urochloa mosambicensis*	Sabi Grass				X	X		
LC	-	Proteaceae	*Grevillea mimosoides*	*Grevillea*				X			
LC	-	Proteaceae	*Grevillea parallela*	Silver *Grevillea*				X			
LC	-	Proteaceae	*Grevillea striata*	Beefwood				X		X	
LC	-	Proteaceae	*Hakea arborescens*	Yellow *Hakea*				X			
LC	-	Proteaceae	*Hakea lorea*	Long-leaf Corkwood					X		
LC	-	Rhamnaceae	*Alphitonia excelsa*	Soap Tree		X		X	X	X	
LC	-	Rhamnaceae	*Ventilago viminalis*	Supplejack				X			
LC	-	Rubiaceae	*Gardenia ewarti*	Native *Gardenia*		X		X			
LC	-	Santalacae	*Santalum lanceolatum*	Sandalwood				X	X	X	
LC	-	Sapindaceae	*Atalaya hemiglauca*	Whitewood						X	
LC	-	Sapindaceae	*Dodonaea hispidula*	Distichostemon				X			
LC	-	Sapindaceae	*Dodonaea physocarpa*	Baloon Hopbush				X			
LC	-	Stylidiaceae	*Stylidium sp.*	*Stylidium*		X					
LC	-	Thymelaeaceae	*Pimelea sanguinea*	Thecanthes	X	X		X	X		
LC	-	Violaceae	*Hybanthus aurantiacus*	Orange Spade Flower				X			
LC	-	Violaceae	*Hybanthus enneaspermus*	Blue Spade Flower				X			
LC	-	Vitaceae	*Cayratia trifolia*	*Cayratia*			X	X			
LC	-	Xyridaceae	*Xyris complanata*	Yellow Iris		X					

1. Status: CE = Critically Endangered, DD = Data Deficient, EN = Endangered, (Int) = Introduced in the Northern Territory, LC = Least Concern, NE = Not Evaluated, NT = Near Threatened, VU = Vulnerable.
2. TPWC = *Territory Parks and Wildlife Conservation Act 1976*, EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.
3. Mixed *Acacia* shrubland to variable grassland with variable emergent *Eucalyptus* and *Corymbia*.
4. *Melaleuca viridiflora* and *Acacia torulosa* low closed shrubland with *Triodia bitextura* hummock grassland on sandy loam drainage depressions
5. *Eucalyptus microtheca* open woodland.
6. *Corymbia dirchromophloia* open woodland.
7. *Acacia shirleyi* open to closed woodland.
8. *Macropteranthes kekwickii* closed to open tall shrubland.
9. *Eucalyptus microtheca* and *Lophostemon grandiflorus* open woodland on floodplain fringes.

Appendix E Ground-truthed fauna species list

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Table E1 Ground-truthed fauna species

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
AMPHIBIANS											
LC	-	Myobatrachidae	*Notoden nichollsi*	Desert Spadefoot Toad		X					
LC	-	Hylidae	*Litoria caerulea*	Green Tree Frog			X	X	X		
LC	-	Hylidae	*Litoria inermis*	Peters' Frog		X					
LC	-	Hylidae	*Litoria rubella*	Red Tree Frog				X			
BIRDS											
NT	-	Casuariidae	*Dromaius novaehollandiae*	Emu		X					
LC	-	Anseranatidae	*Anseranas semipalmata*	Magpie Goose			X				
LC	-	Anatidae	*Dendrocygna eytoni*	Plumed Whistling-Duck			X				
LC	-	Anatidae	*Anas superciliosa*	Pacific Black Duck		X	X				
LC	-	Anatidae	*Anas gracilis*	Grey Teal			X				
LC	-	Anatidae	*Aythya australis*	Hardhead			X				
LC	-	Phasianidae	*Synoicus ypsilophorus*	Brown Quail	X						
LC	-	Columbidae	*Phaps chalcoptera*	Common Bronzewing	X	X		X	X	X	
LC	-	Columbidae	*Ocyphaps lophotes*	Crested Pigeon	X	X		X	X	X	
LC	-	Columbidae	*Geopelia cuneata*	Diamond Dove		X					
LC	-	Columbidae	*Geopelia placida*	Peaceful Dove		X		X			
LC	-	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove		X		X			
NT	-	Otididae	*Ardeotis australis*	Australian Bustard	X						
LC	-	Centropodidae	*Centropus phasianinus*	Pheasant Coucal		X		X			
LC	-	Podargidae	*Podargus strigoides*	Tawny Frogmouth				X	X		
LC	-	Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar				X			
LC	-	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar		X		X			
NT	-	Burhinidae	*Burhinus grallarius*	Bush Stone-curlew		X		X			
LC	-	Charadriidae	*Vanellus miles*	Masked Lapwing				X			
LC	-	Turnicidae	*Turnix sp.*	Button-quail	X						
LC	-	Glareolidae	*Stiltia isabella*	Australian Pratincole			X				
LC	-	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork			X				
LC	-	Anhingidae	*Anhinga novaehollandiae*	Australasian Darter			X				
LC	-	Ardeidae	*Ardea pacifica*	White-necked Heron			X				
LC	-	Ardeidae	*Ardea alba*	Great Egret			X				
LC	-	Ardeidae	*Ardea intermedia*	Intermediate Egret			X				
LC	-	Ardeidae	*Egretta novaehollandiae*	White-faced Heron			X				
LC	-	Ardeidae	*Egretta picata*	Pied Heron			X				

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Ardeidae	*Nycticorax caledonicus*	Nankeen Night-Heron			X				
LC	MI	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis			X				
LC	-	Threskiornithidae	*Threskiornis molucca*	Australian White Ibis			X				
LC	-	Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis			X	X			
LC	-	Threskiornithidae	*Platalea regia*	Royal Spoonbill			X				
LC	-	Accipitridae	*Elanus axillaris*	Black-shouldered Kite			X	X			
LC	-	Accipitridae	*Hieraaetus morphnoides*	Little Eagle			X				
LC	-	Accipitridae	*Aquila audax*	Wedge-tailed Eagle	X	X		X			
LC	-	Accipitridae	*Circus approximans*	Swamp Harrier			X				
LC	-	Accipitridae	*Circus assimilis*	Spotted Harrier			X	X			
LC	-	Accipitridae	*Accipiter fasciatus*	Brown Goshawk		X		X	X		
LC	-	Accipitridae	*Milvus migrans*	Black Kite	X	X	X	X			
LC	-	Accipitridae	*Haliastur sphenurus*	Whistling Kite		X	X	X			
LC	-	Strigidae	*Ninox boobook*	Australian Boobook				X			
LC	-	Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher					X	X	
LC	-	Meropidae	*Merops ornatus*	Rainbow Bee-eater		X					
LC	-	Falconidae	*Falco cenchroides*	Nankeen Kestrel	X	X	X	X			
LC	-	Falconidae	*Falco longipennis*	Australian Hobby					X		
LC	-	Falconidae	*Falco berigora*	Brown Falcon		X		X			
LC	-	Cacatuidae	*Calyptorhynchus banksii banksii*	Red-tailed Black-cockatoo		X		X	X	X	
LC	-	Cacatuidae	*Eolophus roseicapilla*	Galah	X	X	X	X			
LC	-	Psittacidae	*Aprosmictus erythropterus*	Red-winged Parrot		X	X	X	X		
LC	-	Psittacidae	*Psitteuteles versicolor*	Varied Lorikeet			X				
LC	-	Ptilonorhynchidae	*Chlamydera nuchalis*	Great Bowerbird		X					
LC	-	Maluridae	*Malurus lamberti*	Variegated Fairy-wren				X		X	
LC	-	Maluridae	*Malurus melanocephalus*	Red-backed Fairy-wren	X			X		X	
LC	-	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater					X	X	
LC	-	Meliphagidae	*Gavicalis virescens*	Singing Honeyeater					X	X	
LC	-	Meliphagidae	*Ptilotula keartlandi*	Grey-headed Honeyeater	X						
LC	-	Meliphagidae	*Conopophila rufogularis*	Rufous-throated Honeyeater	X						
LC	-	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	X	X	X	X	X	X	X
LC	-	Meliphagidae	*Melithreptus albogularis*	White-throated Honeyeater				X	X	X	
LC	-	Meliphagidae	*Melithreptus gularis*	Black-chinned Honeyeater				X			
LC	-	Meliphagidae	*Philemon citreogularis*	Little Friarbird		X		X	X	X	
LC	-	Pardalotidae	*Pardalotus striatus*	Striated Pardalote		X		X			

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Acanthizidae	*Smicrornis brevirostris*	Weebill				X			
LC	-	Acanthizidae	*Gerygone olivacea*	White-throated Gerygone				X			
LC	-	Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler		X		X		X	
LC	-	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	X	X		X	X	X	
LC	-	Campephagidae	*Lalage tricolor*	White-winged Triller				X	X	X	
LC	-	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella				X	X	X	
LC	-	Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird		X		X		X	
LC	-	Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush				X			
LC	-	Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	X	X	X	X	X	X	X
LC	-	Artamidae	*Artamus cinereus*	Black-faced Woodswallow		X		X	X	X	
LC	-	Artamidae	*Artamus minor*	Little Woodswallow					X		
LC	-	Artamidae	*Cracticus nigrogularis*	Pied Butcherbird				X	X	X	
LC	-	Artamidae	*Gymnorhina tibicen*	Australian Magpie		X		X		X	
LC	-	Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	X	X	X	X	X	X	X
LC	-	Monarchidae	*Grallina cyanoleuca*	Magpie-lark	X	X	X	X	X	X	X
LC	-	Monarchidae	*Myiagra nana*	Paperbark Flycatcher						X	
LC	-	Corcoracidae	*Struthidea cinerea*	Apostlebird		X		X	X	X	
LC	-	Corvidae	*Corvus orru*	Torresian Crow	X	X	X	X	X	X	X
LC	-	Petroicidae	*Microeca fascinans*	Jacky Winter	X					X	
LC	-	Petroicidae	*Melanodryas cucullata*	Hooded Robin		X			X		
LC	-	Cisticolidae	*Cisticola exilis*	Golden-headed Cisticola	X		X				
LC	-	Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark	X				X	X	
LC	-	Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird		X		X			
LC	-	Estrildidae	*Taeniopygia guttata*	Zebra Finch	X			X		X	
LC	-	Estrildidae	*Stizoptera bichenovii*	Double-barred Finch	X			X		X	
LC	-	Estrildidae	*Poephila acuticauda*	Long-tailed Finch	X			X		X	
VU	EN	Estrildidae	*Chloebia gouldiae*	Gouldian Finch					X		
NT	-	Estrildidae	*Heteromunia pectoralis*	Pictorella Mannikin	X				X		
LC	-	Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	X						
MAMMALS											
Int.	-	Bovidae	*Bos taurus*	Cattle	X	X	X	X	X	X	X
LC	-	Canidae	*Canis familiaris dingo*	Dingo		X					
LC	-	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat		X		X	X		
Int.	-	Felidae	*Felis catus*	Feral Cat		X		X			
LC	-	Macropodidae	*Notamacropus agilis*	Agile Wallaby		X		X			

Status[1]		Family name	Scientific name	Common name	Ground-truthed vegetation community						
TPWC[2]	EPBC[2]				1[3]	2[4]	3[5]	4[6]	5[7]	6[8]	7[9]
LC	-	Macropodidae	*Osphranter rufus*	Red Kangaroo				X			
NT	-	Macropodidae	*Onychogalea unguifera*	Northern Nailtail Wallaby				X			
LC	-	Miniopteridae	*Miniopterus orianae*	Large Bent-winged Bat		X		X	X		
LC	-	Molossidae	*Chaerephon jobensis*	Greater Northern Free-tailed Bat		X		X	X		
LC	-	Muridae	*Pseudomys delicatus*	Delicate Mouse				X			
LC / LC	- / -	Vespertilionidae	*Scotorepens greyii / Chalinolobus nigrogriseus*	Little Broad-nosed Bat / Hoary Wattled Bat		X		X	X		
REPTILES											
LC	-	Agamidae	*Chlamydosaurus kingii*	Frilled Lizard				X			
LC	-	Agamidae	*Ctenophorus isolepis*	Central Military Dragon		X					
LC	-	Agamidae	*Diporiphora magna*	Yellow-sided Two-lined Dragon				X			
LC	-	Boidae	*Antaresia childreni*	Children's Python				X			
LC	-	Boidae	*Aspidites melanocephalus*	Black-headed Python				X			
LC	-	Boidae	*Liasis olivaceus*	Olive Python				X			
LC	-	Diplodactylidae	*Strophurus ciliaris*	Northern Spiny-tailed Gecko					X		
(NL)	-	Gekkonidae	*Gehyra gemina*	Plain Tree Dtella				X	X		
LC	-	Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko				X	X		
LC	-	Scincidae	*Carlia munda*	Shaded-litter Rainbow Skink				X	X		
LC	-	Scincidae	*Ctenotus helenae*	Clay-soil *Ctenotus*		X					
LC	-	Scincidae	*Ctenotus pulchellus*	Red-sided *Ctenotus*				X			
LC	-	Scincidae	*Ctenotus robustus*	Eastern Striped *Ctenotus*				X			
LC	-	Scincidae	*Menetia greyii*	Common Dwarf Skink					X		

1. Status: CE = Critically Endangered, DD = Data Deficient, EN = Endangered, (Int) = Introduced in the Northern Territory, LC = Least Concern, MI = Migratory, NE = Not Evaluated, NT = Near Threatened, VU = Vulnerable.
2. TPWC = *Territory Parks and Wildlife Conservation Act 1976*, EPBC = *Environment Protection and Biodiversity Conservation Act 1999*.
3. Mixed *Acacia* shrubland to variable grassland with variable emergent *Eucalyptus* and *Corymbia*.
4. *Melaleuca viridiflora* and *Acacia torulosa* low closed shrubland with *Triodia bitextura* hummock grassland on sandy loam drainage depressions
5. *Eucalyptus microtheca* open woodland.
6. *Corymbia dirchromophloia* open woodland.
7. *Acacia shirleyi* open to closed woodland.
8. *Macropteranthes kekwickii* closed to open tall shrubland.
9. *Eucalyptus microtheca* and *Lophostemon grandiflorus* open woodland on floodplain fringes.

Appendix F Microbat call identification report

Sturt Plateau Pipeline

Ecological Assessment

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

6 December 2024

Night Time Ecology

Bioacoustic Analysis

Sturt Pipeline

SLR Consulting

August 2, 2024

DISCLAIMER:

The Client acknowledges that the Final Report is intended for the sole use of the Client, and only to be used for the authorised purpose.

Night Time Ecology will not be liable for any loss or damage whatsoever arising from the use and/or reliance on the Final Report by any third party.

LIMITATIONS AND CONSIDERATIONS

To gain a comprehensive understanding of the ecosystems and species present in an area, surveys are best undertaken over several years and across different seasons. The results presented in this report are based on surveys conducted over four nights and provides only a “snap-shot” of information about the species present on the site.

Extraneous noise caused by insects and farm machinery can have detrimental impacts on the ability of bat call sequence detection. This noise can have consequences on the detection of sequences as well as the formal identification of species.

Glossary and acronyms

PCA	Principal component analysis

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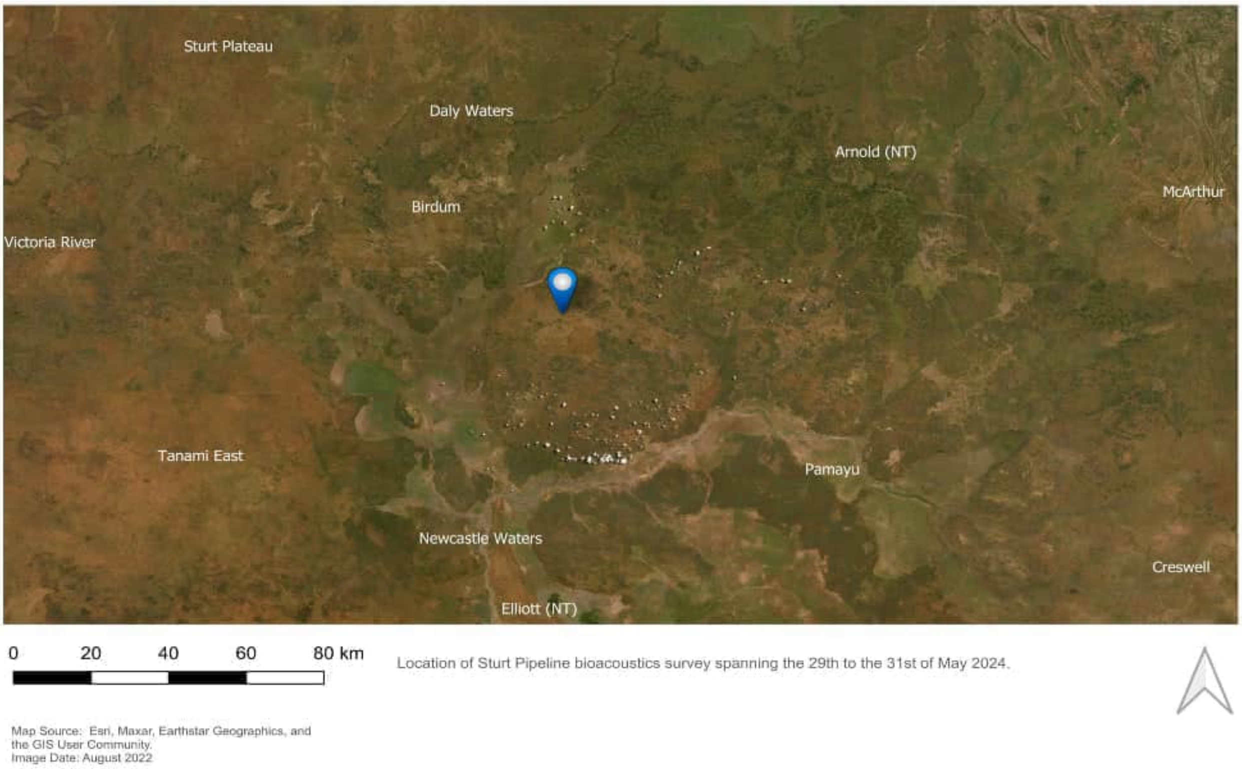
1.0 Introduction

Night Time Ecology was commissioned by SLR Consulting Pty Ltd to undertake bioacoustic analysis of ultrasonic microchiropteran recordings collected over three nights for the Sturt Pipeline Project (the Project). The data was collected on a Songmeter and supplied as full-spectrum waveform files.

Figure 1 Aerial Image of Sturt Pipeline Bat Survey Area



2.0 Acoustic Analysis Methodology

The full-spectrum files were automatically processed by Night Time Ecology's PteronSpectra Ultrasonic software. This produced a spreadsheet with standard call metrics for identification as well as producing the most likely species based on those metrics, derived from existing keys (e.g., Milne 2002, Penny *et al*. 2004, Reinhold *et al*. 2001). The species selected were filtered based on geographic relevance via the Australasian Bat Society's BatMap (Australasian Bat Society 2021).

In accordance with recommendations contained within the *Bat Calls of NSW* key (Pennay *et al*. 2004), call sequences containing less than three consecutive pulses were excluded from analysis due to insufficient information to allow for accurate identification. Manual confirmation of species identification was achieved by comparing call spectrograms and derived metrics of labelled files with those of regionally relevant reference calls and/or with published call descriptions (e.g., Milne 2002, Reinhold *et al*. 2001). The likelihood of species' occurrence in the Project Area was confirmed by referring to relevant distributional information (e.g., Australasian Bat Society 2021; Churchill 2008; van Dyck *et al*. 2013).

From the resultant data, two statistical analyses were undertaken to provide support of the findings. Initially, a principal component analysis (PCA) was performed to visualise the metrics of each recording in two dimensions. Secondly, hierarchical clustering was performed on the average metric data to produce a dendrogram. After combining the clustering and the PCA plot, visual inspection of all three plots highlighted possible clustering and outliers different to those labelled during the automated stage.

2.1 Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon, 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Armstrong *et al.* (2021).

3.0 Results

Over the span of the three nights, only 277 files (8%) of the 3,470 recordings contained valid calls meeting or exceeding the minimum requirements for identification laid out by Pennay *et al*. (2004). Representative calls for all species recorded can be found in **Appendix 1**.

Table 1 Valid and Invalid Recordings per Night

Night	Valid	Invalid	Total
29th	50	153	203
30th	170	700	870
31st	57	2,340	2,397
Total	277 (8%)	3,193	3,470

Table 2 *Per Night Species List from Supplied Data*

Species	Confidence[1]	Night 1	Night 2	Night 3	Total
C. jobensis	++	3	4	5	12
S. flaviventris	+++	27	40	13	80
M. schreibersii orianae	++	4	3	7	14
		Inconclusive			
S. flaviventris/C. jobensis		6	61	24	91
S. greyii/C. nigrogriseus		9	66	3	78

Notes. [1] *+++ = Confident, ++ = Probable, + = Possible, based on similarity to the keys metrics and shapes.*

Figure 2 Principal Component Analysis Plot Coloured by Pteron Identification

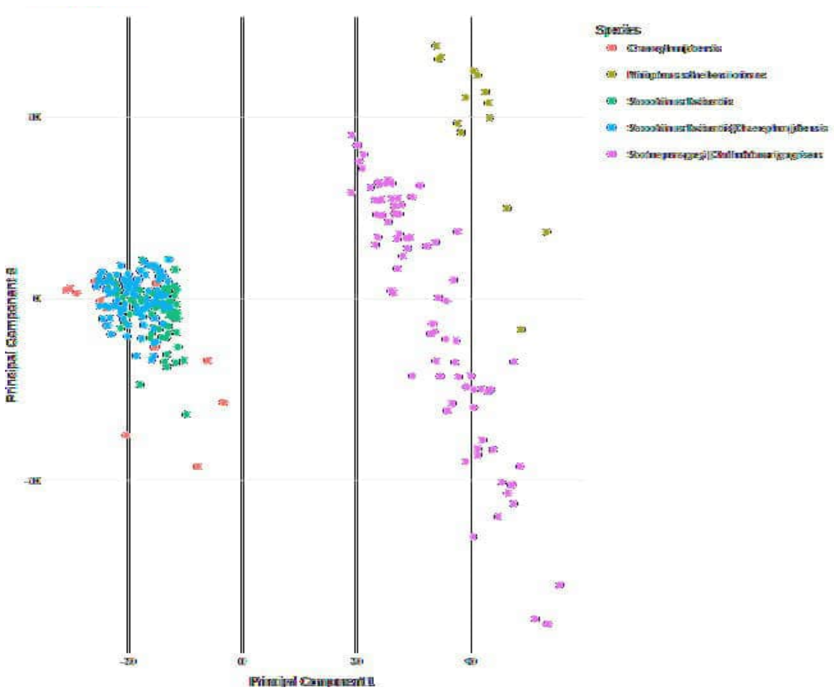
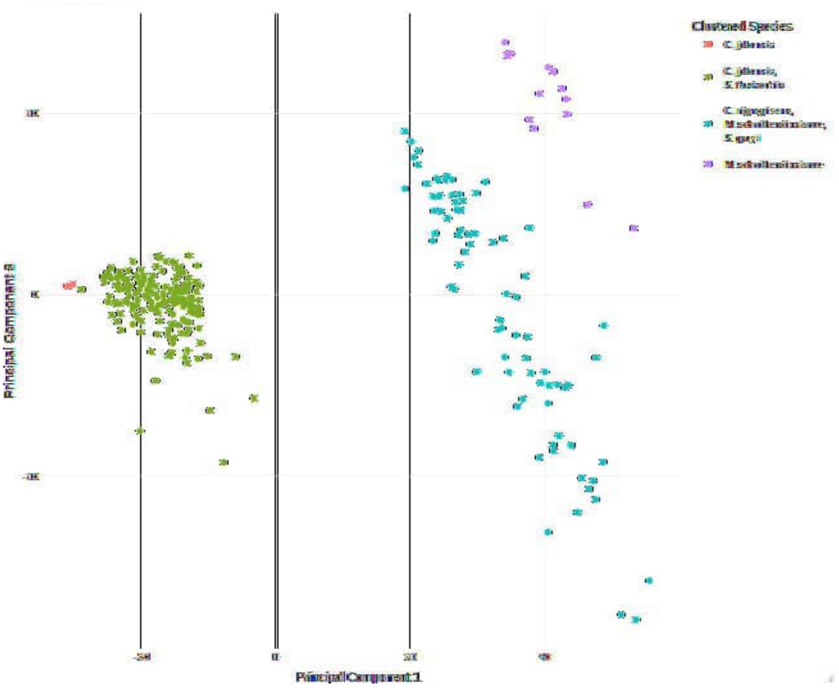


Figure 3 Principal Component Analysis Plot Coloured by Hierarchical Clustering



4.0 Discussion

The PCA plots shown in **Figure 2** and **Figure 3** highlight the challenge of differentiating species with similar call qualities from bioacoustic surveys, illustrated by the overlapping clustering of *C. jobensis* and *S. flaviventris*. However, as a confirmatory tool, the resultant clustering patterns of the hierarchical cluster analysis (**Figure 3**) suggests a statisical alignment with the species identification from the available data (**Figure 2**). Visual confirmation of known calls against the representative examples from the analyis, verified the findings of this report.

5.0 Conclusion

Call sequences of *Chaerephon jobensis, Miniopterus schreibersii orianae, Saccolaimus flaviventris* as well as *Scotorepens greyii/Chalinolobus nigrogriseus* were recorded over the three nights in the Sturt Pipeline Project Area. The presence of *Chalinolobus nigrogriseus* or *Scotorepens greyii* cannot be differentially supported as several recordings contained non-differentiating features characteristic of both these species.

No species identified in this analysis are listed under either the Commonwealth *Environment Protection and Biodiversity Conservation Act (1999)* or the *Territory Parks and Wildlife Conservation Act (1976)*.

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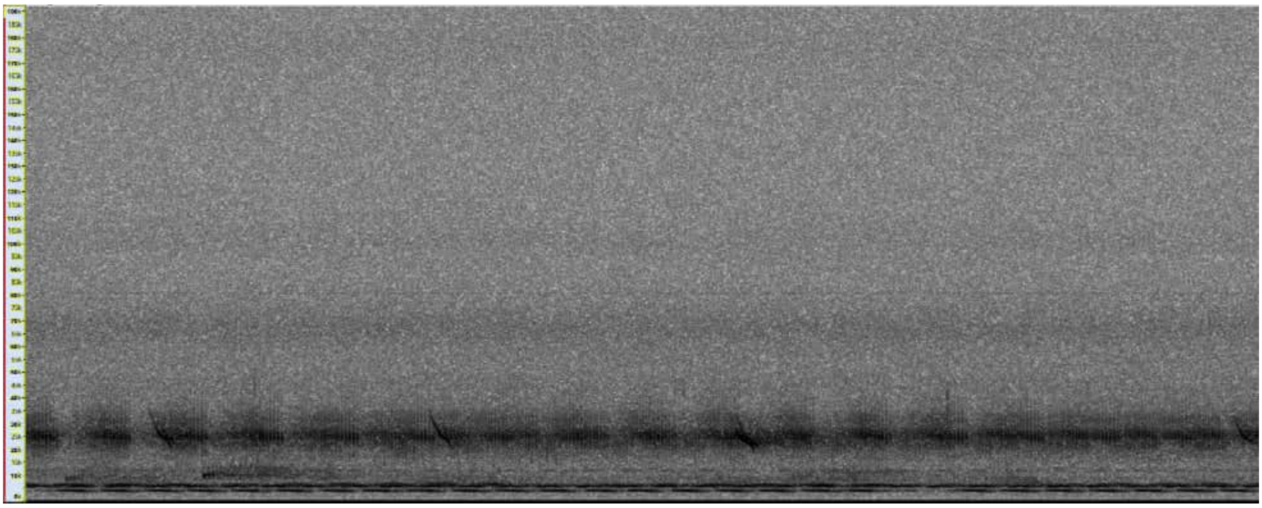
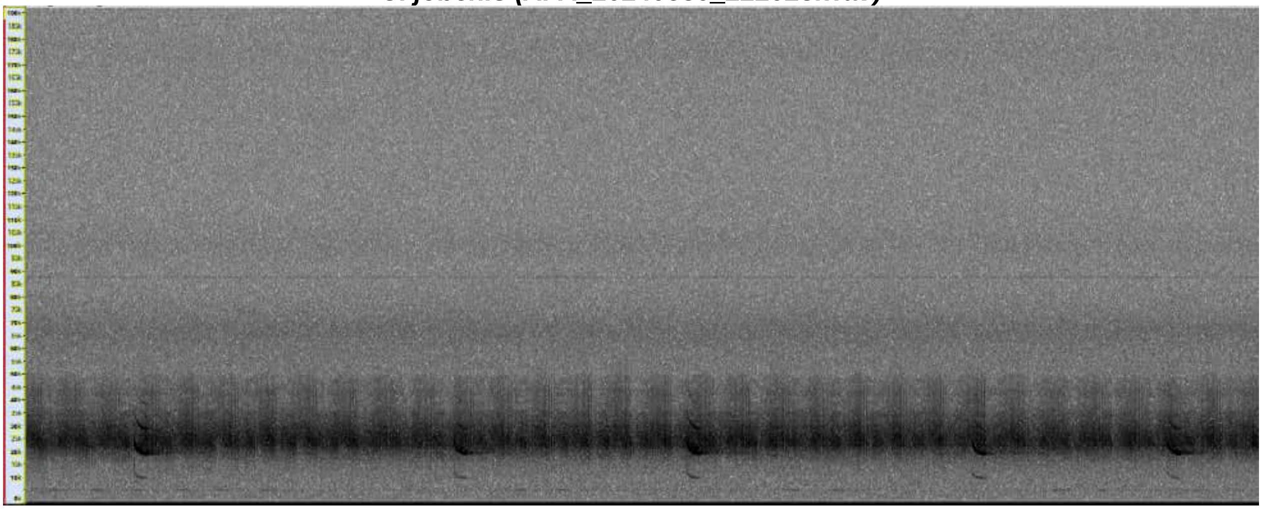
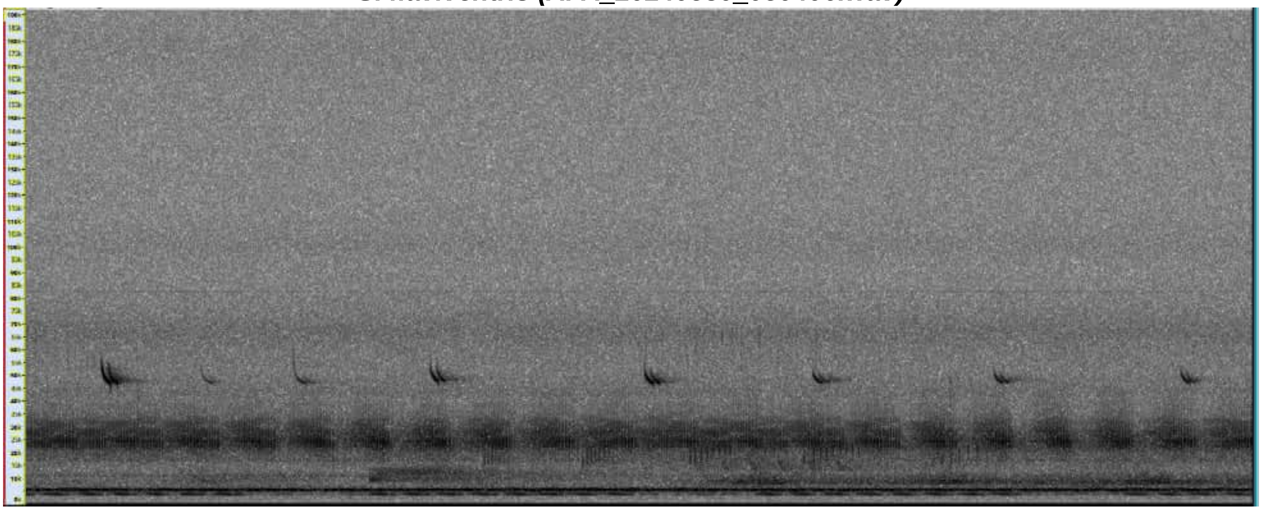
Appendix 1



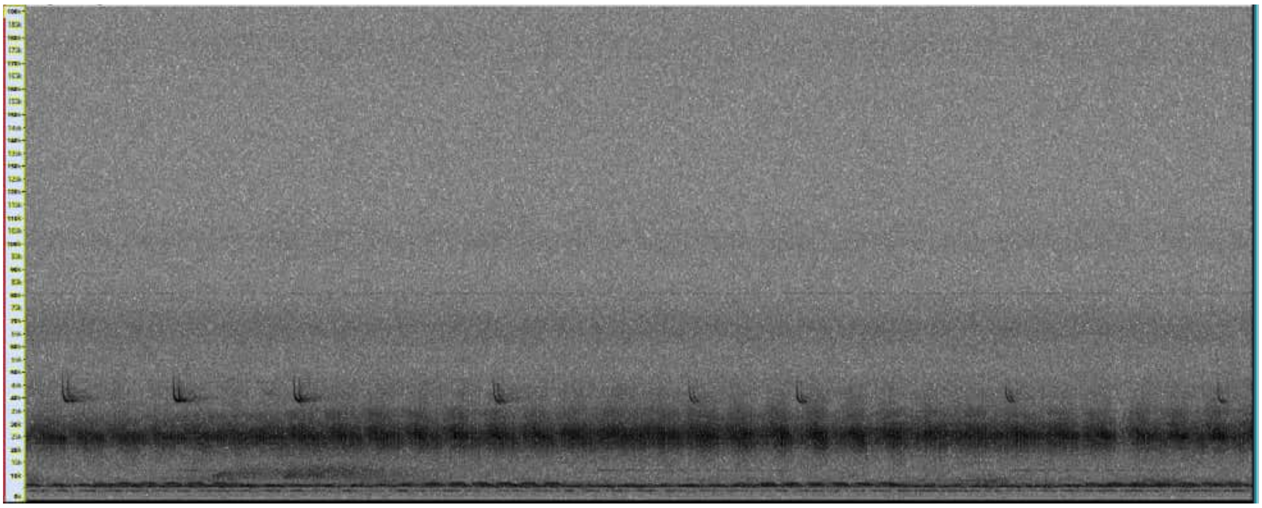
C. jobenis (APA_20240530_222928.wav)



S. flaviventris (APA_20240530_050406.wav)



M. schreibersii orianae (APA_20240530_211949.wav)



C. nigrogriseus/S. greyii (APA_20240531_004412.wav)

Revision history

Revision No.	Revision date	Details	Prepared by	Reviewed and Approved by
V1	Draft	Draft for Client Review	Isaac Floyd	Isaac Floyd
Final	02 August 2024	Report finalised	Isaac Floyd	Isaac Floyd

Distribution list

Copy #	Date	Type	Issued to	Name
V1	19 July 2024	Electronic	SLR Consulting	Ellen Clark
Final	02 August 2024	Electronic	SLR Consulting	Matthew McIntosh

Citation: Night Time Ecology, 2024, *Bioacoustic Analysis of Sturt Pipeline Data*, Report to SLR Consulting.

Report compiled by Night Time Ecology

ABN: 98 900 740 332

Making Sustainability Happen

Attachment 8 – Land Management Plan

Land Management Plan

Sturt Plateau Pipeline

APA SPP Pty Ltd

Level 12, 80 Ann Street
Brisbane QLD 4000

Prepared by:

SLR Consulting Australia

SLR Project No.: 680.030294.00001

16 December 2024

Revision: 2.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	13 November 2024	Luisa Figueiredo	John Postlethwaite	John Postlethwaite
2.0	16 December 2024	Luisa Figueiredo	John Postlethwaite	John Postlethwaite

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with APA SPP Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Appendices

1.0 Introduction

1.1 Background and Purpose

APA SPP Pty Ltd commissioned SLR Consulting Australia Pty Ltd (SLR) to undertake a Land Management Plan (LMP) as part of a series of technical studies required to inform the environmental approvals for the Sturt Plateau Pipeline (SPP) project (the Project). The Project is proposed to be developed approximately 50 km south of Daly Waters, in the Northern Territory.

This document provides supporting information to Appendix E, within the Standard Pastoral Land Clearing Applications for the Project within Shenandoah Perpetual Pastoral Lease (PPL) (NT Portion 7026) and Hayfield PPL NT Portions 7513 and 1077in accordance with Section 91F *Pastoral Land Act 1992* for.

The purpose of the LMP is to outline measures to be implemented to prevent adverse impacts on the surrounding water quality and pollution of the downslope environment during site clearing and construction works. This LMP applies to employees, contractors, and all personnel associated with the planning and execution of the proposed clearing and construction works.

1.2 Scope

This LMP details the environmental requirements and typical practices that need to be implemented to ensure compliance with the proposed works at the Project. The plan includes:

- Description of proposed works;
- Relevant legislation and design guidelines;
- Description of site and soils using publicly available information;
- Sensitivity of receiving environment;
- Requirements for implementation of Erosion Sediment and Control Plan (ESCP) works during the construction phase of the Project;
- Typical (indicative) types of measures/controls; and
- Requirements for monitoring of compliance during the clearing and subsequent pipeline construction phases and incident reporting.

1.3 Regulatory Framework

To inform the preparation of this LMP, the following legislation, regulations, statutory requirements, guidelines, and strategies relevant to the site construction works were reviewed.

The following legislation is applicable to the proposed construction works in relation to water management during construction:

- *Environment Protection Act 2019*
- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*
- *Soil Conservation and Land Utilisation Act 1969*
- *Water Act 1992*

- *Waste Management and Pollution Control Act 1998*
- *Weeds Management Act 2001*
- *Work Health and Safety (National Uniform Legislation) Act 2011 (WHS Act)*
- *Work Health and Safety (National Uniform Legislation) Regulations 2011*

The following guidelines are also applicable to the proposed works:

- ANZECC Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 2000)
- AS 1940:2017 The storage and handling of flammable and combustible liquids
- AS/NZS 4452:1997 The storage and handling of toxic substances
- Guidelines to Prevent Pollution from Building Sites, Version 1 (NT EPA 2015)
- Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018)
- National Environmental Protection Council Schedule B: Guideline for the Investigation of Soil and Groundwater (NEPC, 2013)
- Land Clearing Guidelines – Northern Territory Planning Scheme – version 1.4 (August 2024).

The relevant regulatory items have been identified within this LMP and shall be complied with during the proposed clearing and construction works.

1.4 Construction Activities

Project activities that have the potential to cause environmental impacts (unless controlled) include:

- Stripping of vegetation, subsoil and topsoil;
- Ground disturbances;
- Stockpiling of excavated material;
- Construction and establishment of infrastructure (including water management structures);
- Vehicle and machinery movements;
- Storage of fuels and chemicals;
- Containment of liquid waste, fuel, and oil spills; and
- Revegetation areas.

All works listed above are envisioned to be undertaken within the construction corridor / footprint.

2.0 Site Description

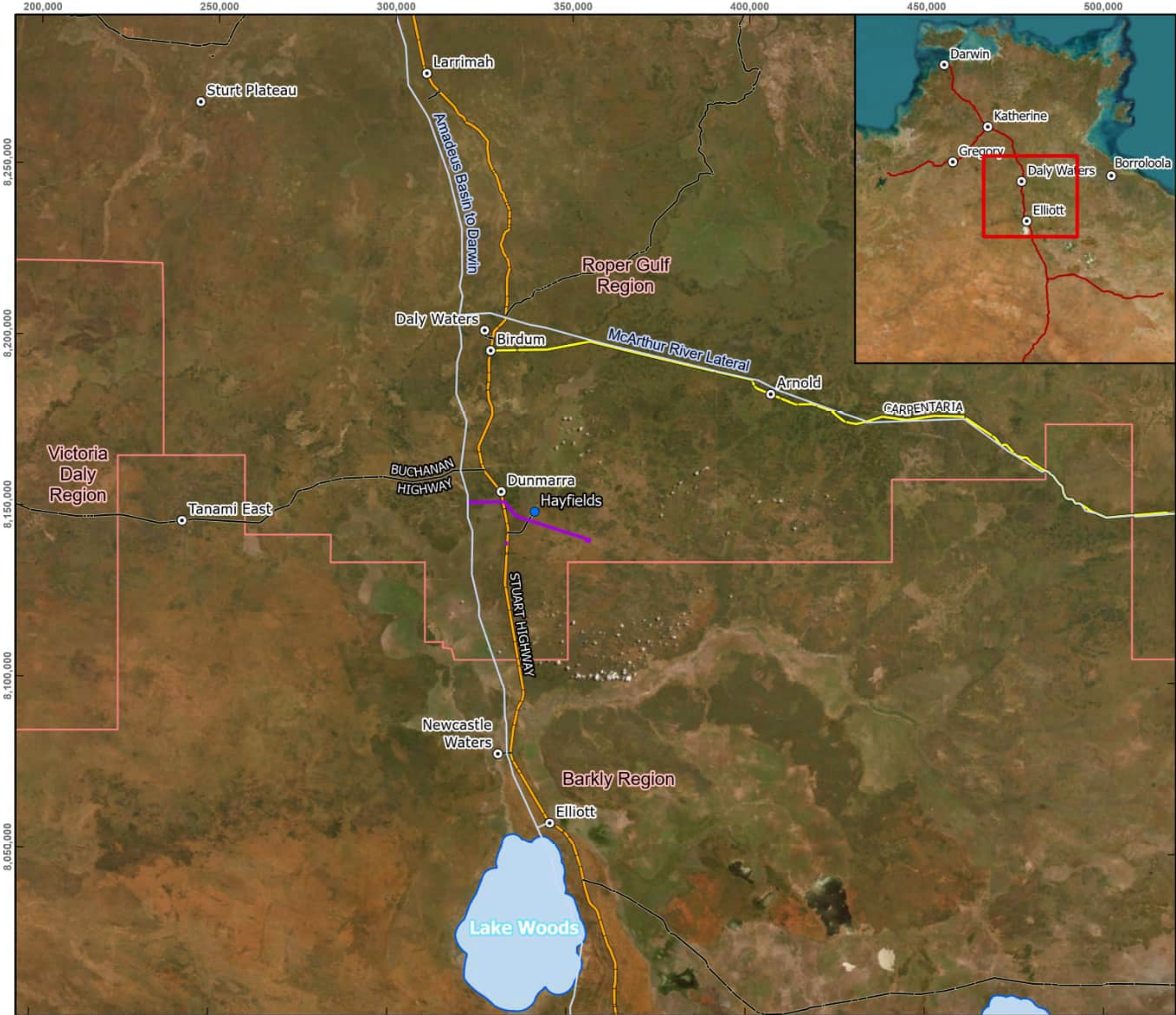
2.1 Location and Land Use

The Project is situated in the Birdum region of the Northern Territory within the Roper Gulf Local Government Area (LGA) and bordering the Barkly LGA. The regional context of the Project is shown in **Figure 1.**

According to the Soil and Land Suitability Assessment for Irrigated Agriculture in Dunmarra Area (Burley et. al., 2019), the land use classes are presented in Table 1. At the time of the survey, the primary use of the land was rangeland grazing native vegetation class of cattle across most of the study area.

Table 1 - Land use mapping classes in the Dunmarra study area

Primary Class	Secondary Class	Percent of the study area
Class 1 – Conservation and Natural Environments	1.1.6 – Protected landscape	<0.1%
	1.2.5 – Traditional indigenous uses	4.2%
	1.3.2 – Stock route	7.4%
Class 2 – Production from Relatively Natural Environments	2.1.0 – Grazing native vegetation	71.3%
Class 5 – Intensive Uses	5.4.4 – Remote communities	<0.1%
	5.7.2 – Roads	0.5%
	5.7.5 – Navigation and communication	<0.1%
Class 6 – Water	6.1.0 – Lake (production) 6.5.2 – Marsh/wetland (production)	0.08% 16.6%



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

REGIONAL CONTEXT OF THE STURT PLATEAU PIPELINE

FIGURE 1

LEGEND

- Town
- Homestead
- Existing Gas Pipeline
- Local Government Area
- Project Area
- Site of Conservation Significance

Road Category

- National Highway
- State Arterial
- Secondary

Service Layer Credits:
Earthstar Geographics

0 25 50 km

Coordinate System:	GCS GDA 1994
Scale:	1:1,500,000 at A4
Project Number:	680.030294
Date Drawn:	10/14/2024
Drawn by:	CP
Reviewed by:	MN

SLR

Path: \\au.slr.local\Corporate\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\680030294_APA_for_Sturt_Plateau_Pipeline.aprx\680030294_F01_Regional context of the Sturt Plateau Pipeline

2.2 Topography and Drainage

According to the Soil and Land Suitability Assessment for Irrigated Agriculture in Dunmarra Area (DENR Technical Report 5/2019D), the Dunmarra research area is situated between 224 and 282 metres above sea level. The lower Sturt Plateau's gently sloping erosional plain dominates the region. The research area's north and east have higher elevations made up of remnant plateau plains, having slopes that are comparatively flat (<1%). The higher plains progressively descend over gently sloping gravelly lateritic plains that are studded with isolated depressions and divided by drainage lines filled with colluvium. The research region is divided by the Sturt Plain, a significant drainage area of lower elevation where the sloping plains and drainage lines converge.

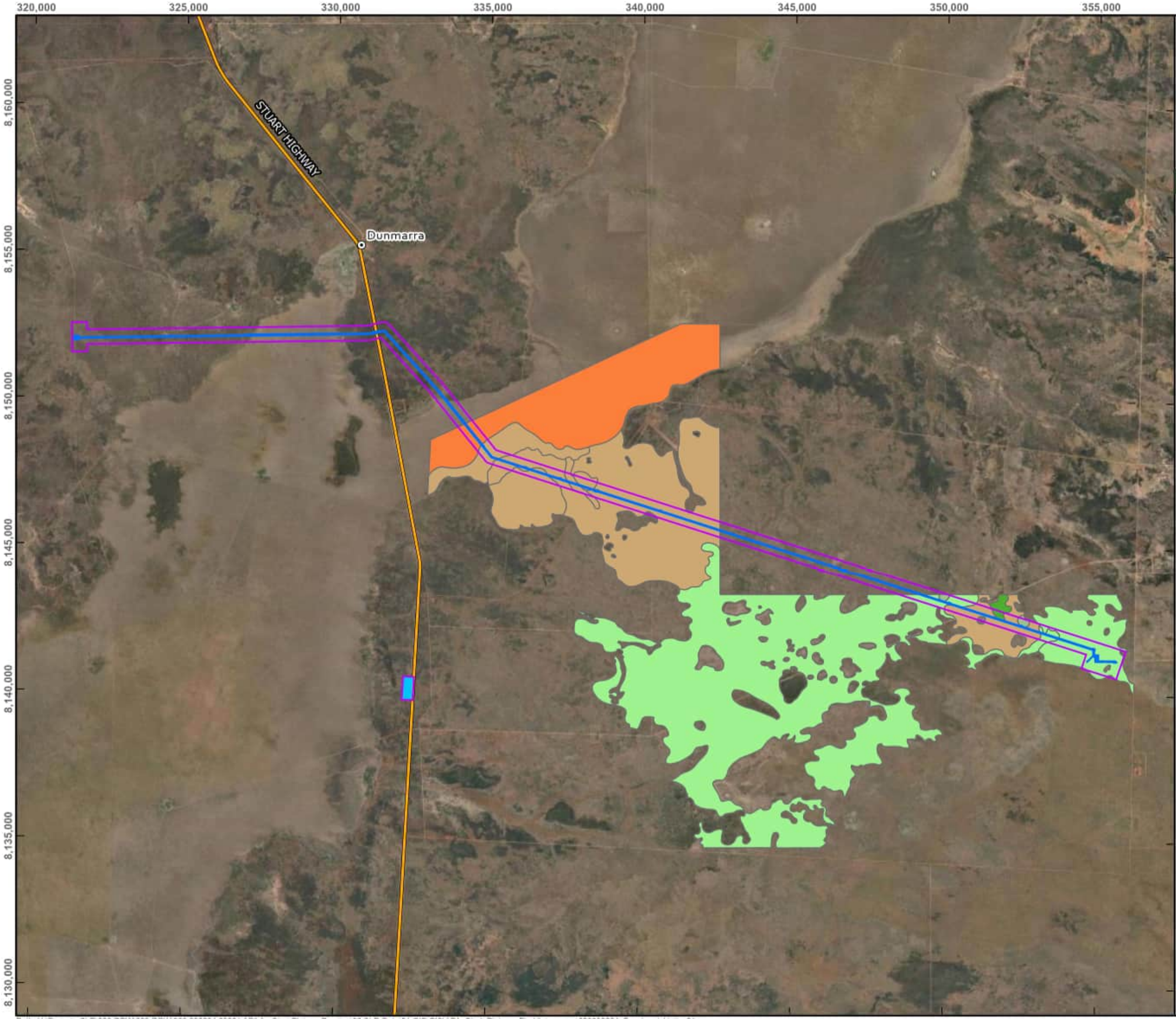
The Sturt Plain drainage area is a large level plain with a slope of less than 0.5% that is composed of gilgai microrelief and grey cracking-clays. Generally, the plain drains southward. Seasonal flooding occurs because a portion of the plain in the north-eastern half of the research area is partially enclosed. The study area's south-west is the Sturt Plain proper, which is characteristic of the Barkly Tableland's treeless Mitchell Grass Plains. The indicative runoff directions are shown in **Appendix A and B**.

Based on the current pipeline alignment plans, it is understood that the Sturt Pipeline project corridor crosses the southern end of a large ephemeral waterbody within the Newcastle Creek catchment. The ephemeral waterbody overflows to the southwest at a level of about 228 m AHD near the Stuart Highway. The land the pipeline crosses is typical of the 'channel country' characteristics with numerous undefined ephemeral drainage lines which receive and convey flood waters during the wet season.

2.3 Site Soils

As per the studies within the Soil and Land Suitability Assessment for Irrigated Agriculture in Dunmarra Area (DENR Technical Report 5/2019D, February 2019), at the Dunmarra research area the most common soil classes are Kandosol (75%) Tenosol (12%), Vertosol (8%), and Hydrosol (2.5%). **Figure 2** indicates the soil classes in the study area.

No soil sampling is available to confirm the soil parameters at this stage of the project. The erosion risk associated with soil erodibility was obtained from Soil and Land Suitability Assessment for Irrigated Agriculture in Dunmarra Area (DENR Technical Report 5/2019D), which considers the erodibility rating as, 'Moderate'. In this case, for the proposed clearing and construction works, the risk is acceptable, and the implementation of management measures will be required.



APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

MAPPED SOILS WITHIN THE PROJECT AREA

FIGURE 2

LEGEND

- Project Area
- Pipeline Construction ROW
- Temporary Construction Camp
- Town

Road Category

- Pastoral - National Highway

Soil Type

- Hydrosol
- Kandosol
- Rudosol
- Tenosol
- Vertosol

Service Layer Credits: Earthstar Geographics

0 3 6 km

Coordinate System:	GCS GDA 1994
Scale:	1:175,000 at A4
Project Number:	680.030294
Date Drawn:	12-Nov-2024
Drawn by:	CP
Reviewed by:	NC

SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Land_Units_01

3.0 Soil and Water Management Strategy

3.1 Soil and Water Management Controls

The primary risk to surface water quality during clearance and construction is erosion due to ground disturbance associated with site earthworks. Construction works will expose site soils and there is potential for sediments to mobilise into receiving watercourses. Without appropriate controls there is potential for an increase in turbidity and nutrient loads in the receiving watercourses.

This LMP provides a preliminary assessment and proposes mitigation measures for the scheme at this planning stage. Refer to **Appendix C** for the ESCP. It is envisaged that once the pipeline and construction corridor, access road locations and creek crossing construction methods are confirmed, a series of more detailed site-specific ESCPs, commensurate with and closely aligned with the defined phasing of construction, will be prepared as part of the CEMP for the Project.

Mitigation measures and site management practices should include:

- Minimising the disturbance footprint (staging construction as necessary);
- Separation/diversion of ‘clean’ water catchment runoff from disturbed runoff areas to minimise sediment laden water volumes for management (where possible);
- Excavation dewatering activities to ensure that no discharge of untreated sediment laden or contaminated water occurs to downstream catchment areas or surface water features;
- Minimising soil erosion (i.e., rehabilitation, drainage, and erosion control measures) at the source, rather than trapping resultant sediment. Where this is not practicable, then all reasonable measures will be made to trap sediment by implementing sediment control measures compliant with the required treatment standards. Upslope and downslope Erosion and Sediment Control (ESC) measures, e.g. sediment fencing, whoa boys, coir logs shall be installed prior to any ground disturbance;
- Conducting best practice land clearing procedures for all proposed disturbance areas. This will be further defined prior to construction so that clearance activities and disturbed areas a minimised and phased effectively with subsequent construction and rehabilitation tasks;
- Sediment fences to control sheet flow from the disturbance areas during the construction works;
- If soil stockpiles are required, then these stockpiles will be placed in areas away from roadways and other surface water flow paths. Suitable sediment control measures will be installed downslope of soil stockpiles and upslope clean water runoff diverted (where possible);
- Seeding or revegetation of external disturbed areas as soon as reasonably practicable;
- Ensure that no material is tracked on to the Sturt Highway or Buchanan Highway;
- Where there is potential for sediment laden runoff to enter surface water features, e.g. ephemeral watercourses, suitable protection measures will be installed upslope of the gullies. These may include mesh/gravel inlet filters, coir logs;
- Effective dust suppression measures (where required);

- Any liquid wastes, fuels and oils stored on-site will be sufficiently bunded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents, and other chemicals during the construction phase will be controlled in accordance with a Spill Management Plan;
- Appropriate site storage of hydrocarbons within bunded areas, and adoption of a Spill Management Plan.
- Prior to each stage of construction the area to be cleared will be delineated to ensure no over clearing occurs; and
- Implementing an effective monitoring and maintenance program for the site for the whole of the construction and revegetation phases.

3.2 Excavation Dewatering

3.2.1 Proposed Dewatering System

Potential does exist for water ponding within site excavations to be contaminated due to the nature of the proposed works. Water captured within temporary construction excavations will be preferentially re-used on-site (e.g., for dust suppression).

3.2.2 Discharge of Water

The Site Construction Contractor will develop a dewatering procedure for site which will include testing, treatment (if required) and appropriate site based approvals. Water that does not meet the discharge water quality requirements will be contained on-site and treated further prior to additional testing.

Discharge can use a syphon system or a pump, with a priority on delivering low energy flows to land. The flow from the outlet must be directed onto a non-erodible surface or material and, for discharges to waters, sufficient energy must be dissipated before the flow enters the natural watercourse to ensure no erosion shall occur. The pump inlet must be placed so that it will not disturb or take in any sediment or sediment laden water.

Water must never be discharged or reused onsite in a manner that exceeds the capacity of sediment controls and/or generates runoff with the potential to discharge from site.

3.2.3 Water Quality Management

Discharges must meet water quality standards for turbidity, pH and there should be no visible sheen from hydrocarbons in accordance with NT Environmental Protection Authority (EPA). These criteria aim to minimise the potential for water contamination, erosion, and sedimentation when dewatering is required during construction projects.

The discharge water criteria are summarised in **Table 2** and must be adhered to during dewatering, in compliance with WMPC Act. Water quality monitoring will be undertaken to determine if the water meets the requirements in **Table 2** and will not pollute the downstream receiving waters. This monitoring is described in **Section 4.1**. Water that meets these requirements can then be discharged from site back to the environment. Water that does not meet the discharge water quality requirements will be contained on-site and treated further prior to additional testing. No Dewatering will occur directly into a watercourse.

Table 2 - Dewatering Water Quality Release Criteria (NT EPA, 2015)

Indicators	Criteria
Physico-Chemical Parameters	
pH	6.5 – 8.5
Turbidity (NTU)	<75[1]
Dissolved Oxygen	90^{th} percentile > 80% saturation or 6 mg/L
Litter	No visible litter washed from site
Oil and grease	No visible oil or grease
[1]The Office of Supervising Scientist decided that a site-specific guideline value for turbidity in surface water derived for protection of aquatic organisms of between 50 – 70 NTU during the dry season was appropriate for a World Heritage Area (Supervising Scientist, 2021). As the 50 – 70 NTU range is for the protection of aquatic organisms in a World Heritage Area, water with a higher NTU being discharge to land would not adversely impact aquatic organisms as there are no receptors in the discharge vicinity.	

3.3 Erosion and Sedimentation Control Program

Prior to commencement of any clearing works on site, the Contractor shall provide construction management plan outlining methodology, program and proposed construction phase erosion and sedimentation plans. The erosion and sedimentation control plans are to identify hazards and risks and provide mitigation measures pre and during construction and the include rehabilitation plan post works.

3.4 Storage and Use of Hydrocarbons and Chemicals

The storage and use of hydrocarbon fuels and other chemicals on site presents a potential risk if spilled substances migrate to site soils or are mobilised and spread to the downstream receiving environment. Chemicals used onsite during both the construction and operational phases may include fuels, lubricants and (minimally) herbicides.

Accidental spill or discharge of hydrocarbons, such as fuels and oils in vehicles and/or earthmoving equipment, has potential to contaminate downstream waterbodies or groundwater. The risk of hydrocarbon and chemical spills will be mitigated by:

- Storage of hydrocarbons in accordance with AS 1940:2017 The storage and handling of flammable and combustible liquids.
- Storage of chemicals in accordance with AS/NZS 4452:1997 The storage and handling of toxic substances.
- Storage of hydrocarbon fuels within bunded storage areas.
- Minimise usage of herbicides and apply in accordance with label requirements.
- A Spill Management Plan, including emergency response and NT EPA notification procedures.

Requirements for the storage and use of hydrocarbon fuels and other chemicals on site will be documented in both the Construction and Operational Environmental Management Plans.

4.0 Monitoring, Maintenance and Reporting

4.1 Monitoring

The performance of ESC devices will decline if they are not maintained. All ESC devices will be inspected regularly and following significant rainfall events as detailed in **Table 3**. The results of all inspections and monitoring activities shall be recorded.

Table 3 - Monitoring Requirements

Control Parameter	Monitoring Frequency	Target Level
ESC Devices	Weekly and following significant rainfall events (i.e. >10 mm in a 24-hour period)	All ESC devices functioning as intended including desilting as required
Water Quality	Weekly during excavation dewatering	As per NT EPA
Sediment on Roads	Visual monitoring during working hours	No sediment/mud tracked onto roads

4.2 Maintenance

All ESC measures will be maintained in a functioning condition until individual areas have been deemed successfully sealed, rehabilitated, or no longer required due to excavation works. Where controls are observed to not be functioning correctly, they will be restored to meet the required standard. Where significant erosion is observed to be occurring on a regular basis, additional controls will be implemented.

4.3 Reporting

Any incidents related to soil and water management during the proposed works will be reported in line with compliance incident management requirements detailed in the CEMP.

5.0 Roles and Responsibilities

All staff must comply with this LMP. Specific responsibilities are detailed in **Table 4**.

Table 4 - Responsibilities Relating to ESC and Water Management

Position	Responsibility
SLR	• Prepare and update this LMP, in consultation with the construction team, to the satisfaction of regulators.
Site Construction Manager	• Establishment of best practice culture and monitoring. • Enforcement of the requirements of this LMP.
HSE Manager	• Monitoring and maintenance of ESC structures in accordance with this LMP.
Site Dewatering Crew (if required)	• Dewater site excavations in accordance with this LMP.
All Construction Personnel	• Undergo appropriate inductions and training. • Comply with the relevant Acts, Regulations and Standards. • Compliance with this LMP. • Promptly report to management on any non-conformances or breaches of the system.

6.0 Limitations of this Plan

This LMP is preliminary and intended for the proposed clearing and construction of pipeline works and sets out minimum requirements. Further detailed assessment and construction phase ESC plans are to be prepared once the pipeline alignment and associated disturbance areas are confirmed, including adopted pipe construction across watercourses.

The Principal Contractor will need to review the adequacy of ESC measures on-site at each stage of construction and may be required to adjust measures to ensure that they are appropriate at all times to prevent harm to the environment as site conditions change over time.

Given the limitations of the information available at the time of preparing this LMP, such as construction sequencing and preferred pipe construction methodology, locations of stockpiling and lay-down and staff amenity areas, it is recommended that more a detailed assessment of measures be undertaken prior to commencement of works.

Sincerely,

SLR Consulting Australia

Luisa Figueiredo,
Senior Project Consultant – Civil and Structural Engineering

John Postlethwaite,
Technical Director – Engineering and Design

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Appendix A Runoff Direction and Slope Overview

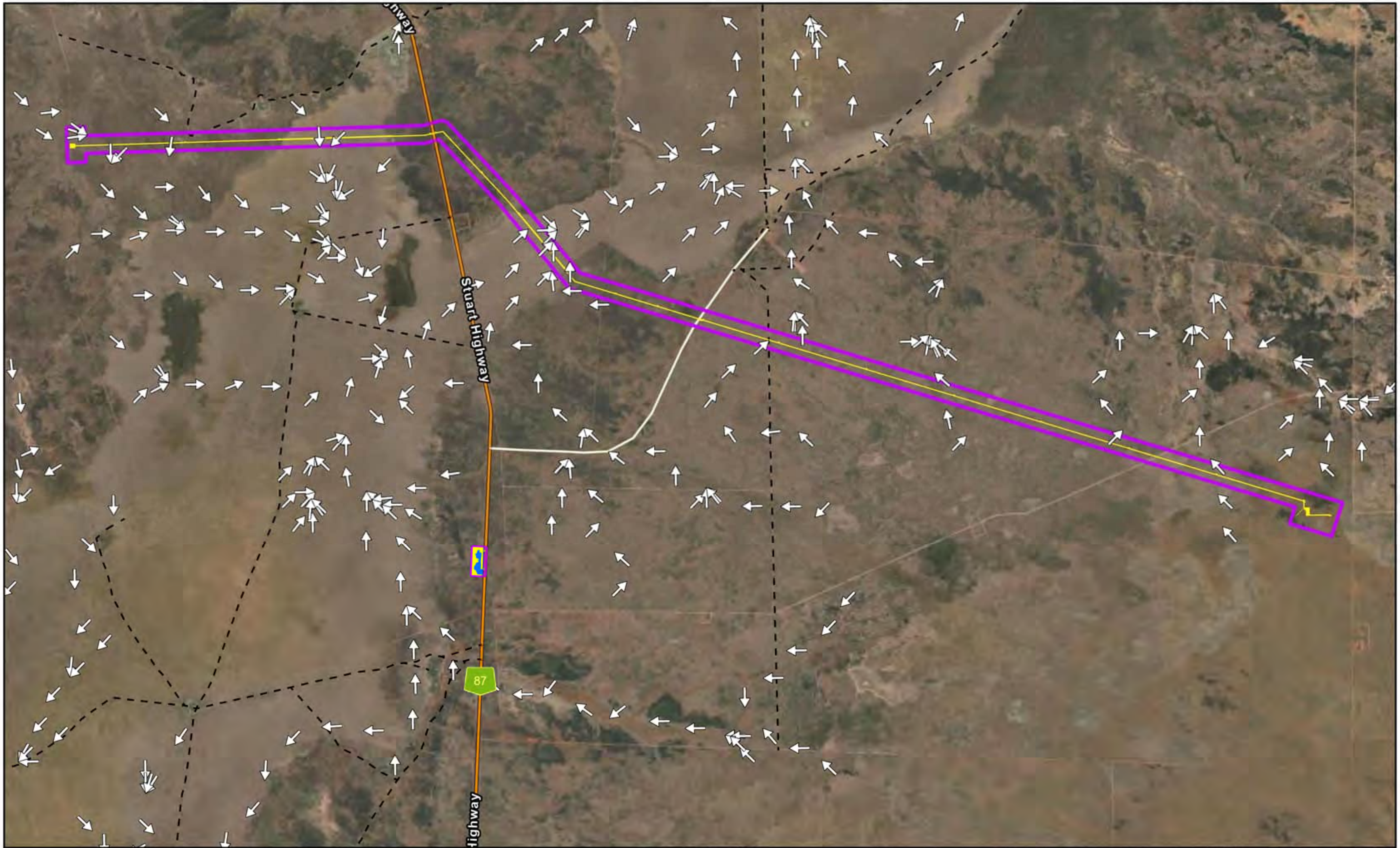
Land Management Plan

Sturt Plateau Pipeline

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

16 December 2024



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Coordinate System: GCS GDA 1994

Date Drawn: 08-Nov-2024
Project Number: 680.032094

SLR

Service Layer Credits:
Esri, TomTom, FAO, NOAA, USGS, Northern Territory Government, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Earthstar Geographics, Esri, USGS

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LEGEND

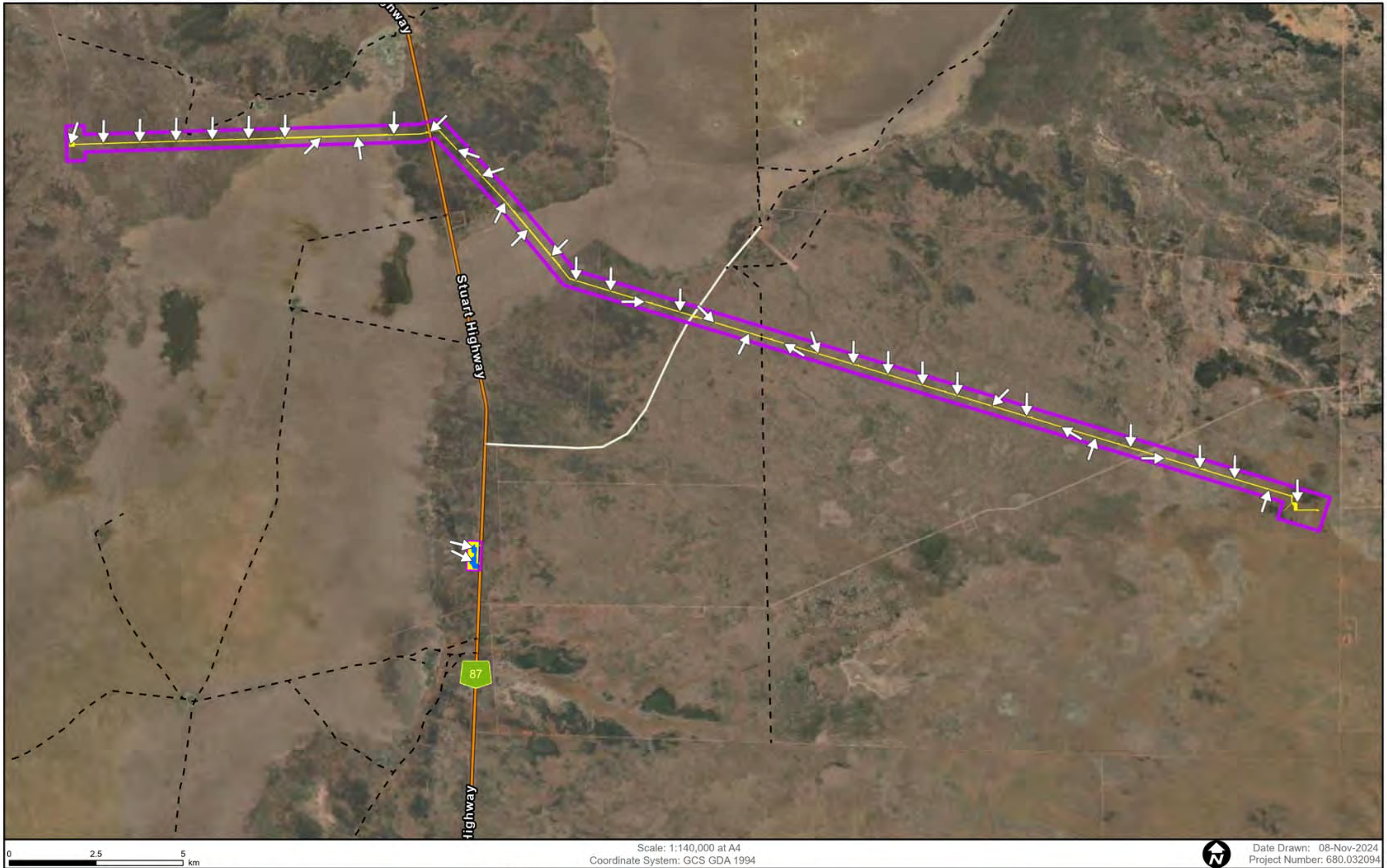
- Proposed Clearing Area
- Project Area
- Existing Cleared Extent
- Runoff Flow Direction

Road Category

- Pastoral - National Highway
- Pastoral - Secondary
- Pastoral - Local

RUNOFF FLOW DIRECTION

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_Overview_01



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Date Drawn: 08-Nov-2024
Project Number: 680.032094

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LEGEND

- Proposed Clearing Area
- Existing Cleared Extent
- Project Area
- Slope Direction

Road Category

- Pastoral - National Highway
- Pastoral - Secondary
- Pastoral - Local

SLOPE

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_Overview_01

Appendix B Flood Extent

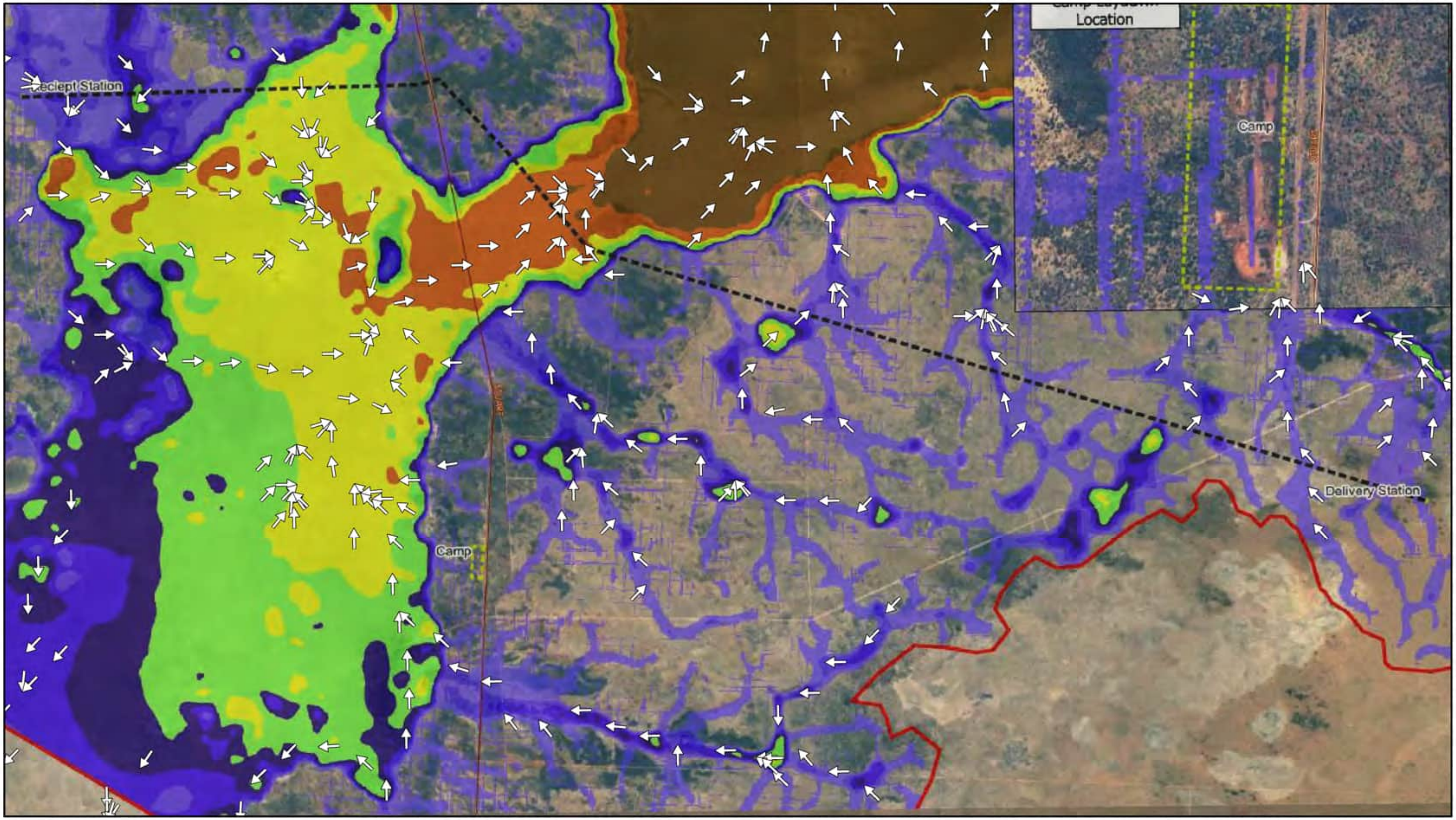
Land Management Plan

Sturt Plateau Pipeline

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

9 December 2024



0 2.5 5 km

Scale: 1:130,000 at A4
Coordinate System: GCS GDA 1994

Date Drawn: 08-Nov-2024
Project Number: 680.032094

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Legend
Hydraulic Model Extent
Pipeline
Peak Flood Depth (m)
<= 0.30
0.30 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 3.00
> 3.00

SLR

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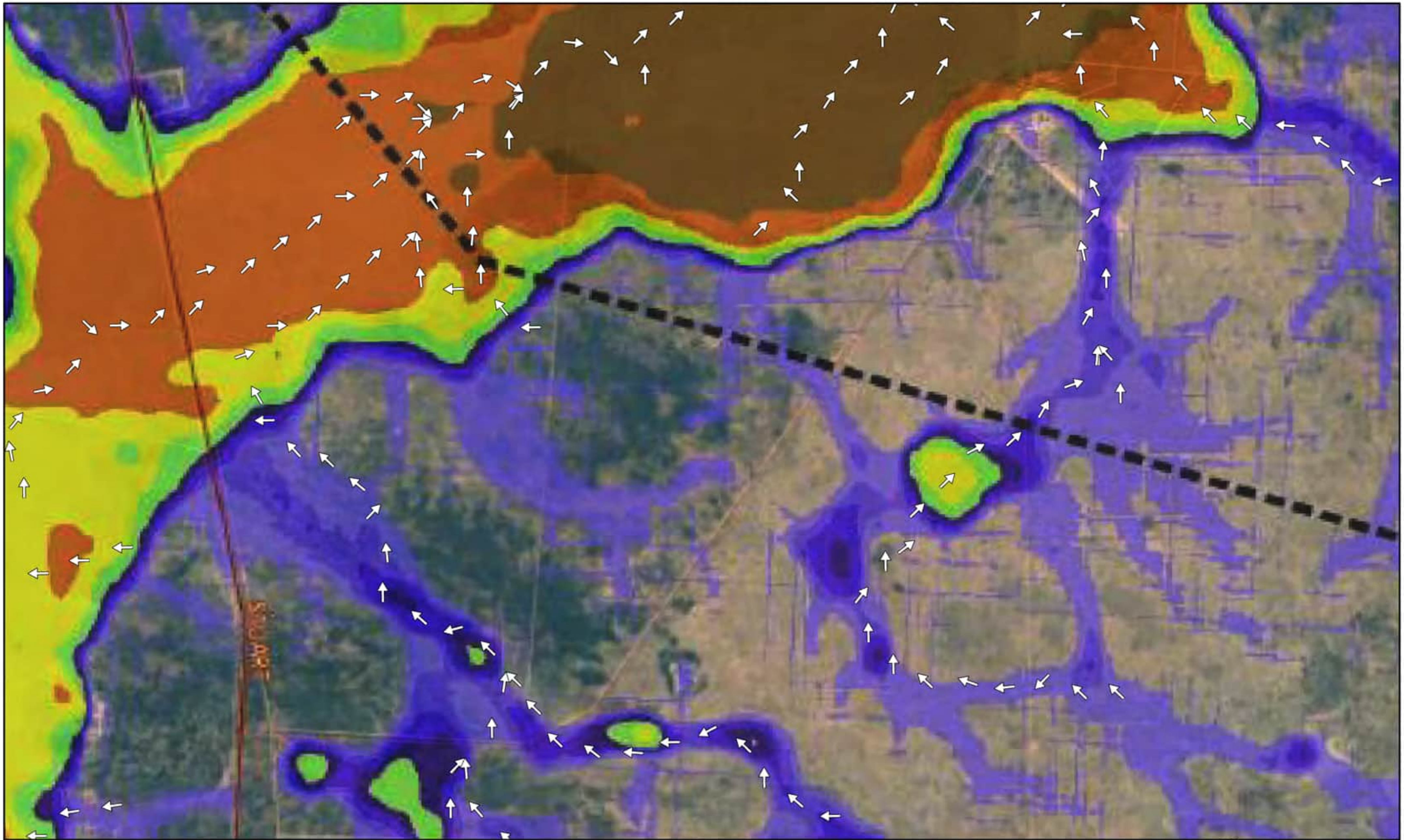
FLOOD EXTENT OVERVIEW

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_Overview_01



0 2.5 5 km

Scale: 1:50,000 at A4
Coordinate System: GCS GDA 1994

Date Drawn: 08-Nov-2024
Project Number:

Service Layer Credits:
Esri, TomTom, FAO, NOAA, USGS, Earthstar Geographics, Esri, USGS

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Legend

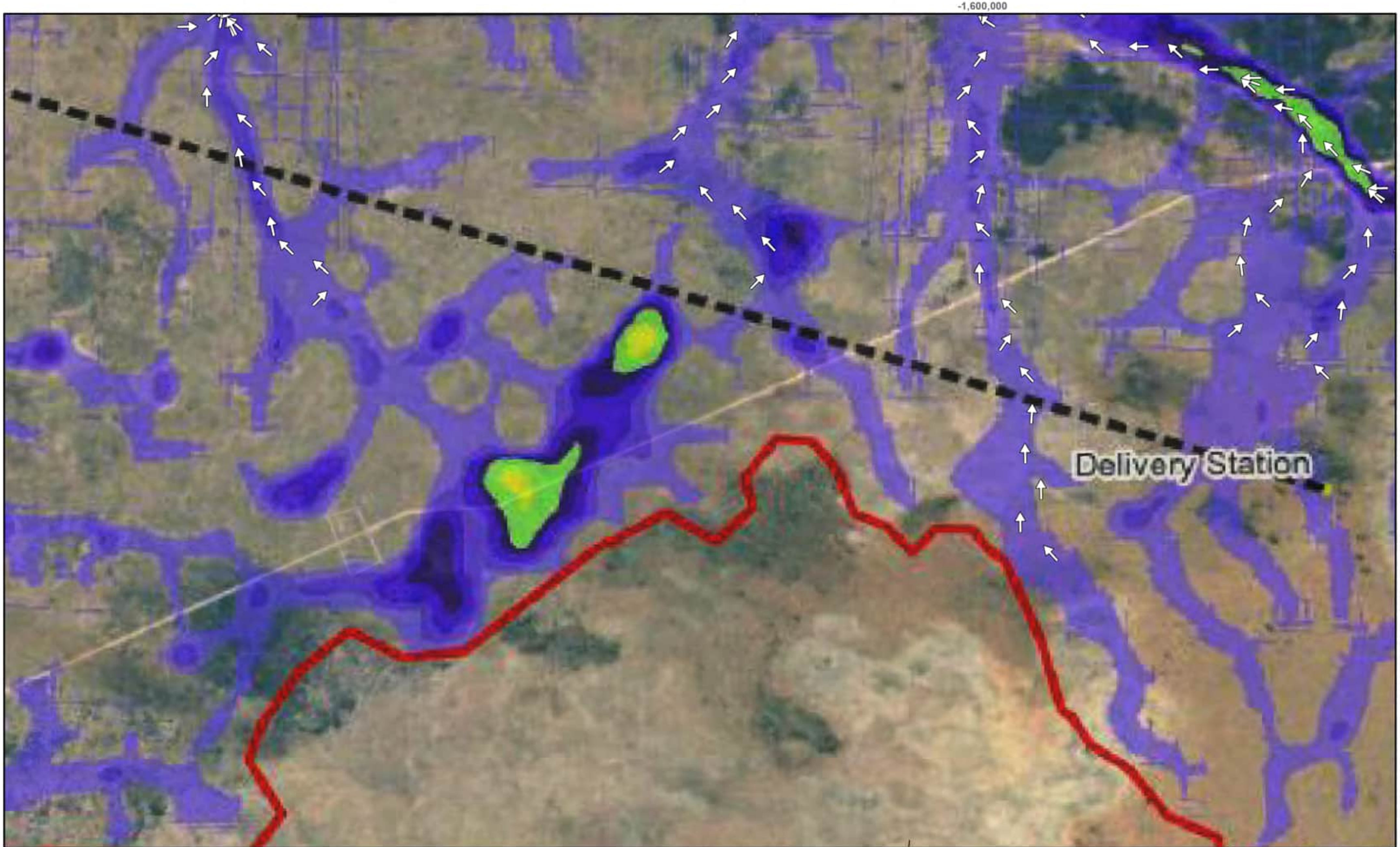
- Hydraulic Model Extent
- Pipeline

Peak Flood Depth (m)

- <= 0.30
- 0.30 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00

FLOOD EXTENT CENTRAL

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_Central_01



0 2.5 5 km

Scale: 1:50,000 at A4
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Date Drawn: 08-Nov-2024
Project Number:

Service Layer Credits:
Esri, TomTom, FAO, NOAA, USGS, Esri, USGS, Maxar

SLR

Legend

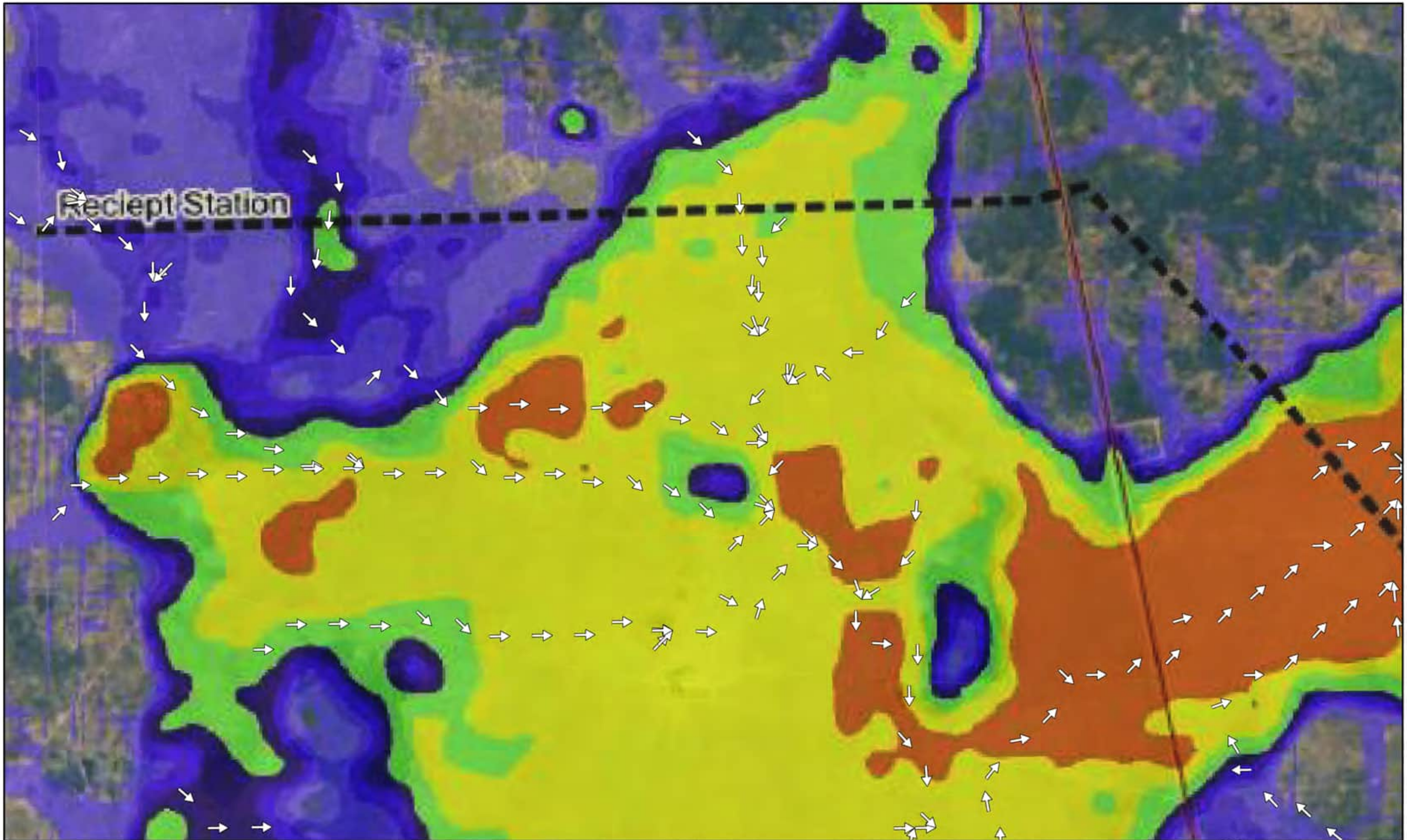
- Hydraulic Model Extent
- Pipeline

Peak Flood Depth (m)

- <= 0.30
- 0.30 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00

FLOOD EXTENT EAST

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_East_01



0 2.5 5 km

Scale: 1:50,000 at A4
Coordinate System: GCS GDA 1994

Date Drawn: 08-Nov-2024
Project Number:

Service Layer Credits:
Esri, TomTom, FAO, NOAA, USGS, Earthstar Geographics, Esri, USGS

Legend

Hydraulic Model Extent

Pipeline

Peak Flood Depth (m)
- <= 0.30
- 0.30 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00

FLOOD EXTENT WEST

SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_Fxx_Catchment_Flood_West_01

Appendix C ESCP

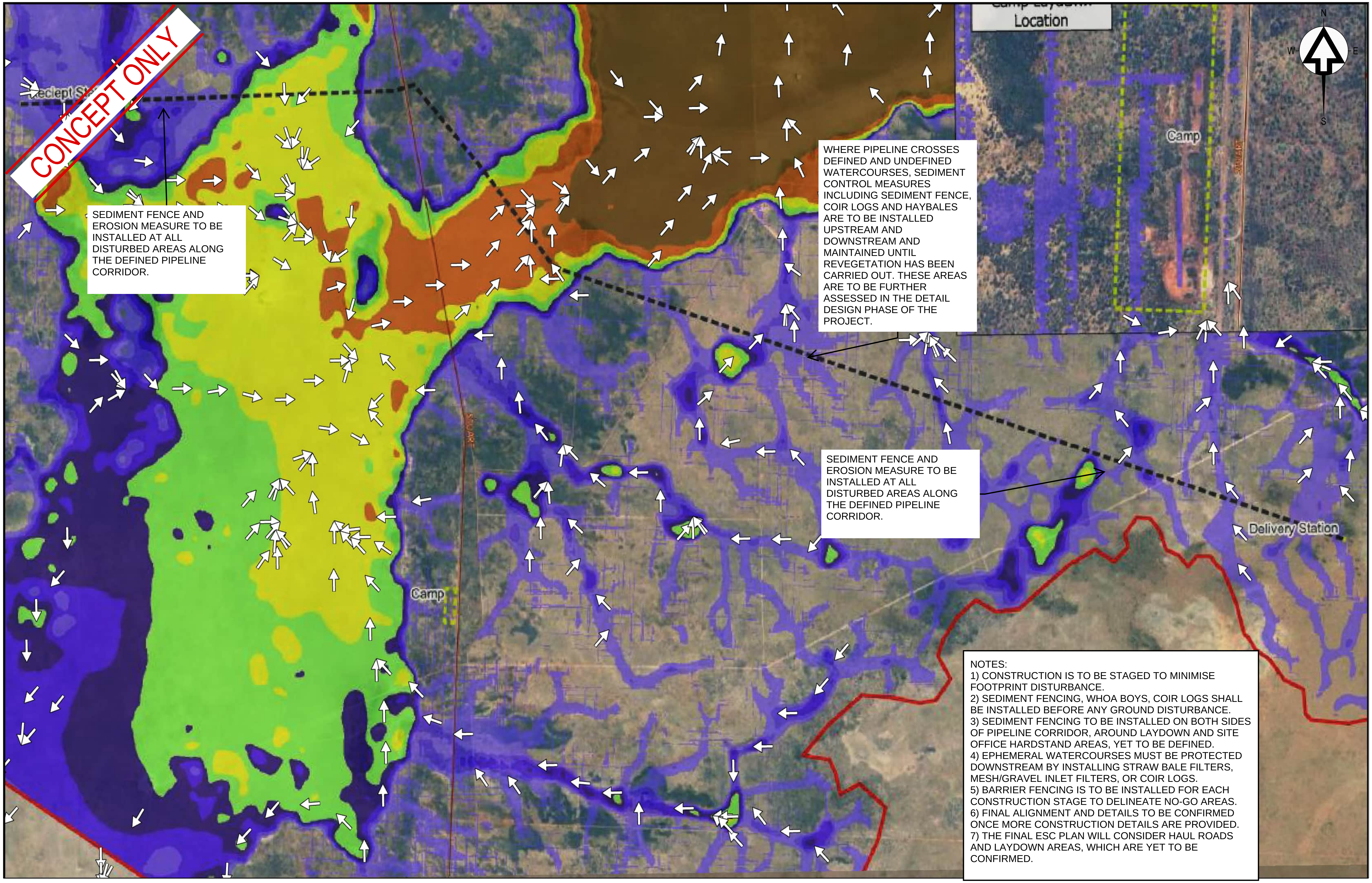
Land Management Plan

Sturt Plateau Pipeline

APA SPP Pty Ltd

SLR Project No.: 680.030294.00001

9 December 2024



NOTES:
1) CONSTRUCTION IS TO BE STAGED TO MINIMISE FOOTPRINT DISTURBANCE.
2) SEDIMENT FENCING, WHOA BOYS, COIR LOGS SHALL BE INSTALLED BEFORE ANY GROUND DISTURBANCE.
3) SEDIMENT FENCING TO BE INSTALLED ON BOTH SIDES OF PIPELINE CORRIDOR, AROUND LAYDOWN AND SITE OFFICE HARDSTAND AREAS, YET TO BE DEFINED.
4) EPHEMERAL WATERCOURSES MUST BE PROTECTED DOWNSTREAM BY INSTALLING STRAW BALE FILTERS, MESH/GRAVEL INLET FILTERS, OR COIR LOGS.
5) BARRIER FENCING IS TO BE INSTALLED FOR EACH CONSTRUCTION STAGE TO DELINEATE NO-GO AREAS.
6) FINAL ALIGNMENT AND DETAILS TO BE CONFIRMED ONCE MORE CONSTRUCTION DETAILS ARE PROVIDED.
7) THE FINAL ESC PLAN WILL CONSIDER HAUL ROADS AND LAYDOWN AREAS, WHICH ARE YET TO BE CONFIRMED.

SLR
LEVEL 16, 175 EAGLE STREET
BRISBANE
QUEENSLAND, 4000
AUSTRALIA
T: +61 (0)7 3858 4800
www.slrconsulting.com

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Sheet Size:	A3
Projection:	GCS GDA 1994

APA Group

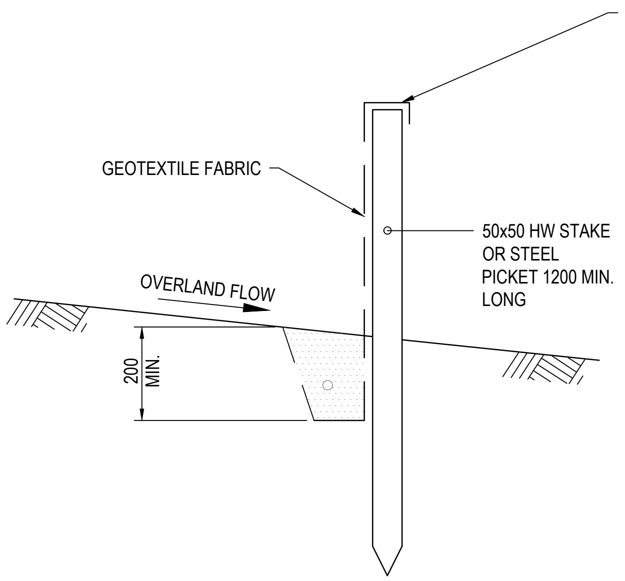
STURT PLATEAU PIPELINE

EROSION AND SEDIMENT CONTROL PRELIMINARY PLAN

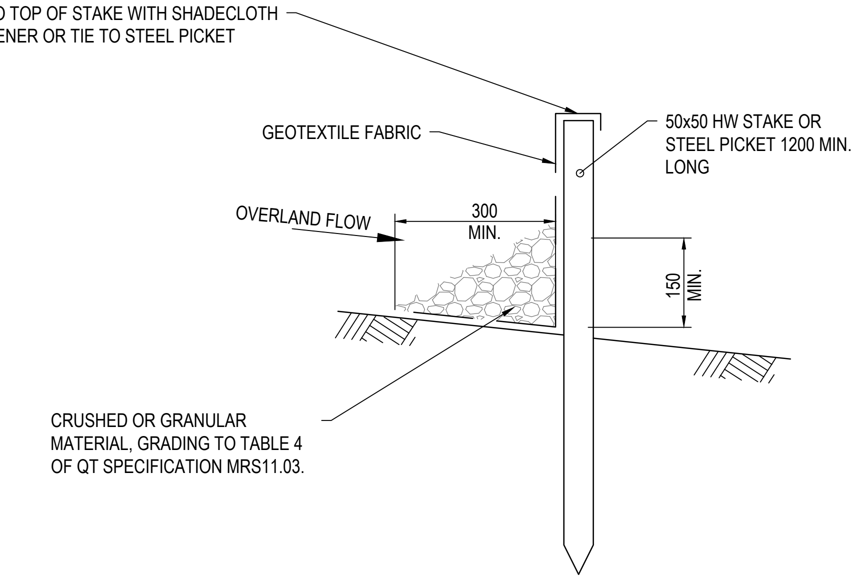
FIGURE 1

EROSION AND SEDIMENT CONTROL NOTES

1. PRIOR TO ANY WORKS COMMENCING, THE CONTRACTOR SHALL PLAN AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN FOR THE SITE, IN ACCORDANCE WITH LOCAL GOVERNMENT AUTHORITY AND RELEVANT APPROVAL CONDITIONS.
2. ALL CONTROL MEASURES ARE TO MONITORED, MAINTAINED AND MODIFIED AS REQUIRED THROUGHOUT THE COURSE OF THE WORKS.
3. THE ESCP WAS DEVELOPED IN ACCORDANCE WITH 'THE BEST PRACTICE EROSION AND SEDIMENT CONTROL GUIDELINE' (IECA, 2008) AND GENERAL BEST PRACTICE.
4. ALL ESC MEASURES SHALL BE INSPECTED ON A WEEKLY BASIS AND MAINTAINED AS REQUIRED THROUGHOUT THE COURSE OF THE WORKS AND FOLLOWING EACH INCIDENCE OF RAIN (>10mm).
5. ALL SEDIMENT COLLECTED SHAL BE REGULARLY REMOVED AND IF UNSUITABLE FOR REUSE DISPOSED OF IN AN APPROVED MANNER
6. ESC MEASURES SHALL BE INSTALLED PRIOR TO ANY GROUND DISTURBANCE.
7. ALL TEMPORARY ESC MEASURES SHALL BE REMOVED WHEN NO LONGER REQUIRED.
8. SEDIMENT FENCES SHALL BE PLACED AROUND THE DOWNSLOPE BATTER OF ALL TEMPORARY SOIL STOCKPILE AREAS. THESE STOCKPILES SHALL NOT BE PLACED IN CONCENTRATED FLOW PATHS.
9. GROUND DISTURBANCE WORKS SHALL BE STAGED TO MINIMISE THE POTENTIAL FOR SEDIMENT TO BE MOBILISED IN RUNOFF AT ANY GIVEN TIME. BASED ON THE SEQUENCING OF THE CONSTRUCTION WORKS, ADDITIONAL ESC MEASURES MAY BE REQUIRED TO RETAIN SEDIMENT LADEN RUNOFF AS REQUIRED. WORKS WILL BE UNDERTAKEN DURING THE DRY SEASON, AS BEST AS PRACTICALLY POSSIBLE.
10. VISUAL INSPECTIONS OF ALL VEHICLES LEAVING THE SITE WILL BE UNDERTAKEN AND WHERE IT IS DEEMED POSSIBLE THAT SEDIMENT COULD BE TRACKED ONTO THE ADJACENT STREETS, THE VEHICLES SHALL BE WASHED DOWN IN A SUITABLE LOCATION SUCH THAT THE WASH DOWN WATER REPORTS TO APPROPRIATE SEDIMENT CONTROLS. STREET SWEEPING WILL BE USED AS A CONTINGENCY MEASURE WHERE SEDIMENT IS OBSERVED ON THE STREETS.
11. ANY DETAILS OF EXISTING SERVICES SHOWN ON THE DRAWINGS ARE NOT TO BE TAKEN AS INDICATING ALL EXISTING SERVICES OR LOCATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO ADEQUATELY INFORM HIMSELF AS TO THE LOCATIONS OF ANY AND ALL SERVICES.



SEDIMENT FENCE ALTERNATIVE - 1
NOT TO SCALE



SEDIMENT FENCE ALTERNATIVE - 2
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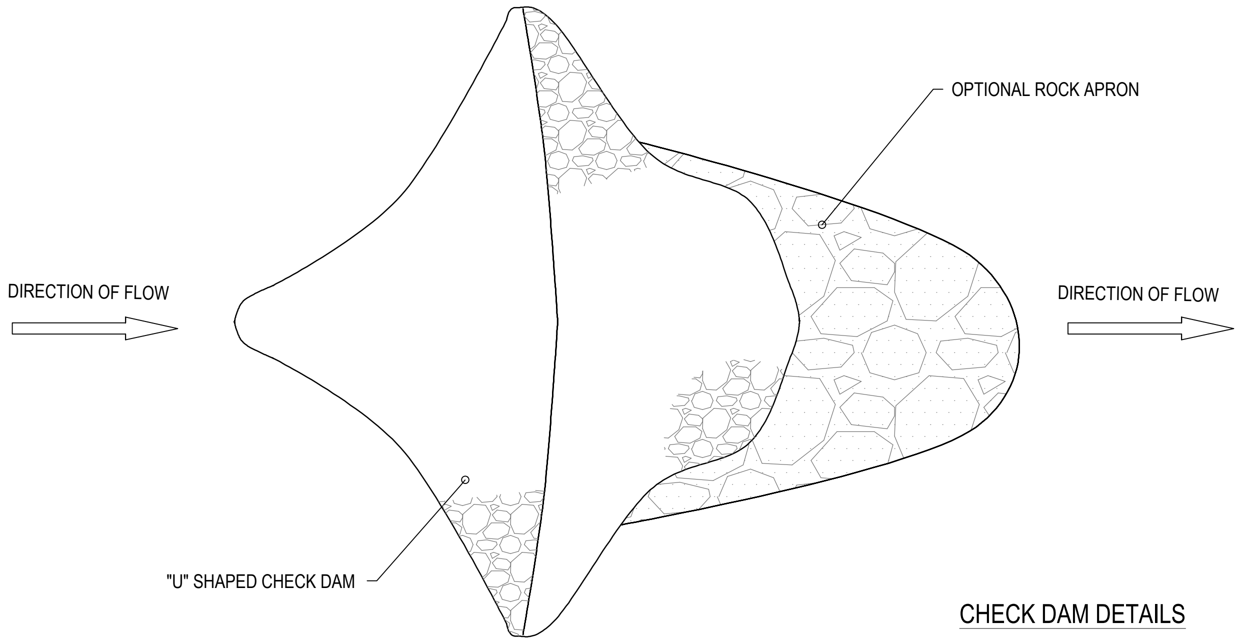
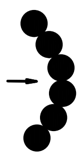
SEDIMENT FENCE - SECTIONS
NOT TO SCALE

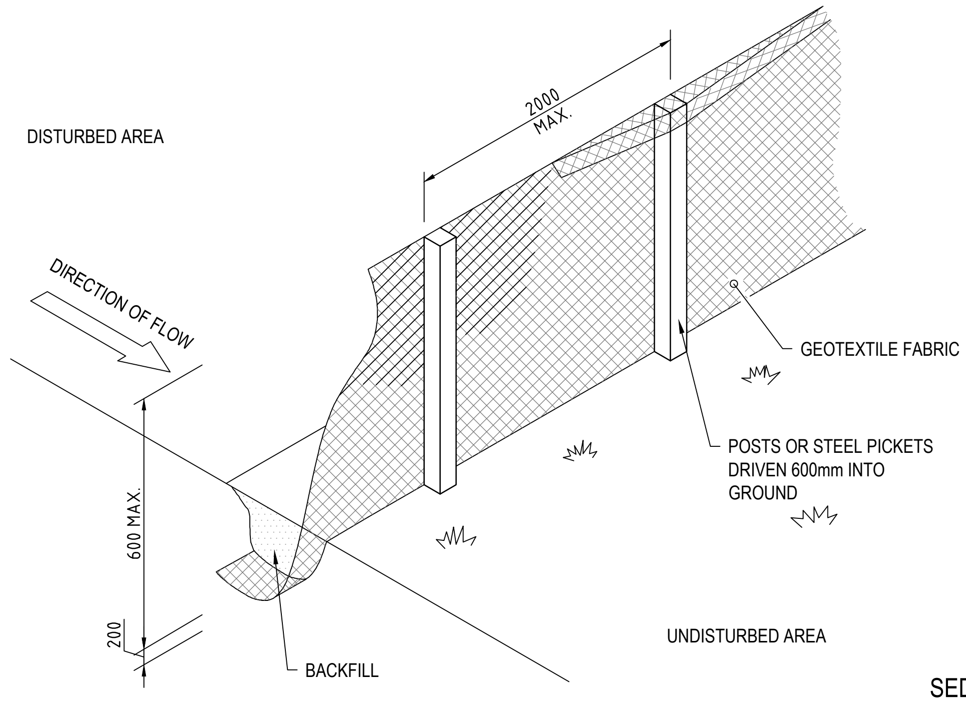


CHECK DAM PLAN VIEW
NOT TO SCALE

CHECK DAM DETAILS



DENOTES CHECK DAM (COIR LOGS, ROCK, SANDBAGS, ETC) REFER LAYOUT PLAN FOR LOCATION AND EXTENTS.



SEDIMENT FENCE ELEVATION
NOT TO SCALE

SEDIMENT FENCE DETAILS

SF — DENOTES SEDIMENT FENCE, REFER LAYOUT PLAN FOR LOCATION AND EXTENTS.

SLR
LEVEL 16, 175 EAGLE STREET
BRISBANE
QUEENSLAND, 4000
AUSTRALIA
T: +61 (0)7 3858 4800
www.slrconsulting.com

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Sheet Size:	A3
Projection:	GCS GDA 1994

APA Group

STURT PLATEAU PIPELINE

EROSION AND SEDIMENT CONTROL DETAILS

FIGURE 2

Making Sustainability Happen

Attachment 9 – Heritage Desktop Assessment (REDACTED)

Disclaimer: This report has been redacted to ensure culturally sensitive information related to sacred sites (Figure 15 and Appendix 1) and artefact scatter and scar trees (Figure 13 and Figure 14) is not published.

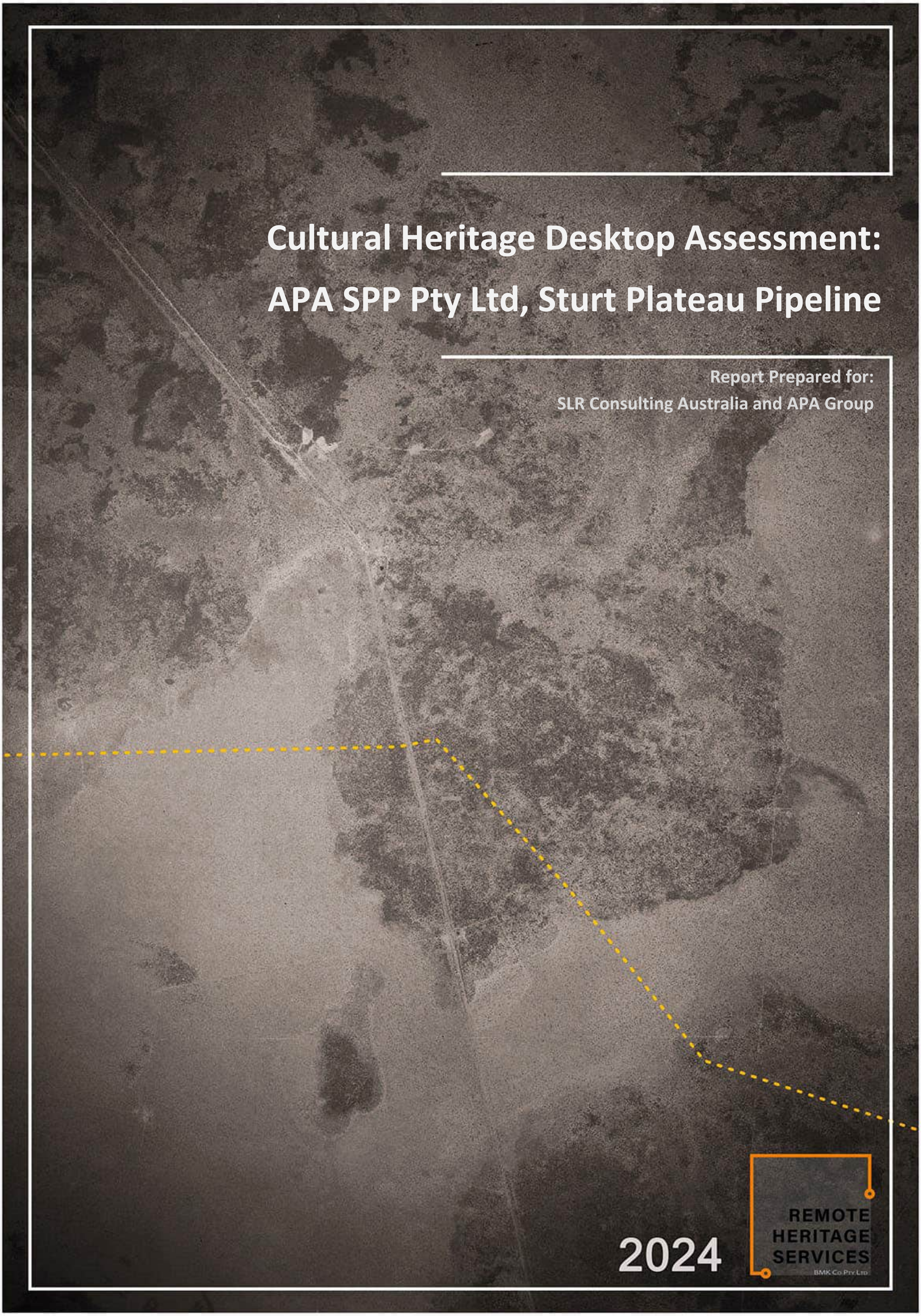
Abstract of Records Disclaimer

This Abstract of Records has been provided by the Aboriginal Areas Protection Authority to APA Group for the sole purpose of inclusion in the land clearing application for the Department of Land, Planning and Environment, Department of Agriculture and Fisheries, NT Pastoral Land Board, NT Environment Protection Authority, Department of Mines and Energy, Commonwealth Department of Climate Change, Energy, the Environment and Water, Department of Mines and Energy and Northern Land Council. If the Department of Land, Planning and Environment, Department of Agriculture and Fisheries, NT Pastoral Land Board, NT Environment Protection Authority, Department of Mines and Energy, Commonwealth Department of Climate Change, Energy, the Environment and Water, Department of Mines and Energy and Northern Land Council is required by law to publish the application, then the Authority consents to the publication as required. It is an offence under s 38 of the Northern Territory Aboriginal Sacred Sites Act 1989 (NT) to permit further access to this information without the prior written consent of the Authority. For the identified subject land, the Abstract of Records identifies:

- *Any registered or recorded sacred sites known to the Authority; and*
- *Any Restricted Work Areas (RWAs) established by the Authority in previously issued Authority Certificate(s).*

The Abstract may show no sacred sites in the subject land, or part thereof, but this may be a function of the fact that the Authority has not yet undertaken work in the region, or that the work required to register a sacred site has not yet been completed. ***It does not mean there are no sites in the area****. Where RWAs have been identified in the Abstract, APA Group cannot rely on this information as it only applies to those prior works and prior proponent to which the relevant Authority Certificate was issued.*

Accordingly, the Abstract of Records is ***not*** *evidence of whether or not a sacred site exists in the subject land and whether they are protected. Given this significant limitation, the Abstract may be used for information purposes only and not as a basis for proceeding with works or use. Further, an Abstract does not provide a defence against prosecution under the Sacred Sites Act, only an Authority Certificate issued by the Authority can do these things.*



Cultural Heritage Desktop Assessment: APA SPP Pty Ltd, Sturt Plateau Pipeline

Report Prepared for:
SLR Consulting Australia and APA Group

2024

REMOTE HERITAGE SERVICES
BMK Co Pty Ltd

Document Version Control

Version/ Date	Author	Reviewed	Review date
REV001 - 26/08/2024	Alan Hay & Ben Keys	SLR & APA	27/08/2024 to 3/09/2024
REV002 -10/09/2024	Ben Keys		

Cultural Heritage Desktop Assessment: APA SPP Pty Ltd, Sturt Plateau Pipeline.

(FINAL REPORT)

Prepared for: SLR Consulting Australia Pty Limited, on behalf of the APA SPP Pty Ltd (APA)

Prepared by: Remote Heritage Services
PO 1006
Maleny, QLD 4552

Cover Image: Aerial Image, Dunmarra NT 1983.

REMOTE HERITAGE SERVICES
BMK Co Pty Ltd

EXECUTIVE SUMMARY

SLR Consulting Australia, acting on behalf of APA SPP Pty Ltd, commissioned Remote Heritage Services (RHS) to conduct a Preliminary Cultural Heritage Assessment (PCHA) for a proposed 37-kilometer gas pipeline project across the Sturt Plateau in the Northern Territory. This assessment aims to map the baseline risk of encountering cultural heritage within the Project Area, identify applicable regulatory requirements, and propose appropriate management approaches at the project's outset.

The proposed Sturt Plateau Pipeline (SPP) will connect Tamboran Resources' gas development in the southern Beetaloo Basin to the existing Amadeus Gas Pipeline. The project will involve:

- The construction of a 30m wide right-of-way (RoW) for installing a buried 300mm diameter steel pipeline
- Construction of the Shenandoah Facility (receipt station) at the start of the pipeline and Sturt Plateau Facility (delivery station) at the end of the pipeline
- A cathodic protection anode bed in the eastern end of the pipeline
- A temporary construction accommodation
- Additional workspaces required to facilitate construction, including water bores and gravel sources.

SUMMARY OF KEY FINDINGS

Land Tenure and Native Title
The project area spans multiple perpetual pastoral leases, the Stuart Highway and intersects two Native Title Determinations: the Shenandoah and Hayfield Pastoral Lease Native Title Determinations.

Heritage Register Searches
Searches of National, Commonwealth and Northern Territory heritage and Sacred Site registers noted:

- No listings on National or Commonwealth Heritage Lists within the Project Area.
- No known Aboriginal archaeological places within the Project Area. The closest previously recorded archaeological place, Dunmara Site 1 (flaked telegraph insulator), is located 2.2 km north of the SPP corridor near the Dunmarra Roadhouse.
- No declared sites on the Northern Territory Heritage Register in close proximity. The nearest Declared heritage site, the 'Frew Ponds Overland Telegraph Line Memorial Reserve', lies 17 km south of the proposed SPP corridor and 10 km south of the temporary construction camp.
- Several registered and recorded sacred sites are located nearby but not within the Project Area.

Archaeological Predictive Model
An archaeological predictive model was developed based on environmental, historical, and archaeological background research. Key predictions include:

- Higher likelihood of archaeological sites near water features, particularly in riparian zones of the large ephemeral lake system, minor watercourses, drainage lines and claypans.
- Varying potential based on geology, with alluvium and colluvium zones having high potential for raw materials suitable for the manufacture of stone artefacts.
- Potential for seed processing evidence in Black Soil Plains

- Low likelihood of rock art sites or large quarry complexes
- Potential for contact period archaeological sites related to early European activities

Summary of Recommendations

Based on the findings of this PCHA, the following recommendations are made:

1. Obtain a Sacred Sites Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989.*
2. Implement a process to avoid impacts to heritage places protected by the *NT Heritage Act 2011*, including:
    - Conducting archaeological field assessments prior to final pipeline alignment and construction
    - Developing a report with constraints mapping and management recommendations
    - Establishing protocols for inadvertent discoveries of cultural heritage
3. Engage Traditional Owners/Site Custodians in heritage management decision-making.
4. Implement workforce training and inductions on cultural awareness and heritage protection.

This PCHA serves as a critical initial step to ensure compliance with cultural heritage regulations and best practices while mitigating potential risks associated with cultural heritage encounters during the project's execution. The findings and recommendations presented will guide future cultural heritage management strategies and inform the proposed cultural heritage field assessments of the Project Areas.

Contents

FIGURES AND TABLES

1 INTRODUCTION

SLR Consulting Australia, acting on behalf of the APA SPP Pty Ltd (APA), has engaged Remote Heritage Services (RHS) to conduct a Preliminary Cultural Heritage Assessment (PCHA) for a proposed 37-kilometer gas pipeline project across the Sturt Plateau (Sturt Plateau Pipeline) in the Northern Territory.

This PCHA aims to map the baseline risk of encountering cultural heritage within the Project Area, identify applicable regulatory requirements, and propose appropriate management approaches at the Project's outset. The assessment serves as a critical initial step to ensure compliance with cultural heritage regulations and best practices, while mitigating potential risks associated with cultural heritage encounters during the project's execution. The findings in this report will also be used to inform the proposed cultural heritage field assessments of the Project Areas.

In brief, the proposed Sturt Plateau Pipeline (SPP) will connect Tamboran Resources' gas development in the southern Beetaloo Basin, to the southeast of the Project Area, with the existing Amadeus Gas Pipeline, to the west. The pipeline will be made of steel with a diameter of up to 300 mm and be buried underground with a minimum cover of 750 mm. The project will involve:

- The construction of a 30m wide right-of-way (RoW) for installing a buried 300mm diameter steel pipeline
- Construction of the Shenandoah Facility (receipt station) at the start of the pipeline and Sturt Plateau Facility (delivery station) at the end of the pipeline
- A cathodic protection anode bed in the eastern end of the pipeline
- A temporary construction accommodation
- Additional workspaces required to facilitate construction, including water bores and gravel sources.

The construction process will involve several steps: surveying the alignment, vegetation clearing, pipe delivery, bending and welding, trench excavation, pipeline installation, backfilling, hydrostatic testing and site rehabilitation. The project team will use open trench construction methods for most of the pipeline, with directional drilling used to cross the Stuart Highway to minimize traffic disruption. These works will likely involve a range of ground disturbance. It is therefore necessary to consider the cultural heritage constraints that may apply to these works under the terms of the Northern Territory *Heritage Act 2011* and the associated *Heritage Regulations 2012*.

1.1 SCOPE OF THE STUDY

As part of the SPP planning study, Remote Heritage Services has completed a desktop Preliminary Cultural Heritage Assessment to identify potential cultural heritage constraints and risks within the Project Area. The assessment covers the following Project Area elements:

1. The SPP corridor (with an assessable width of 150 m)
2. The Shenandoah Facility and Sturt Plateau Facility
3. The cathodic protection unit
4. Additional workspaces

5. The proposed construction accommodation camp

This assessment has included:

1. A summary of land ownership and native title status of the Project Area.
2. Register searches of various Commonwealth and NT Heritage Registers, including mapping of site locations in the region and within the Project Area.
3. An environmental background review to assess archaeological potential in the Project Area, analysing land systems and units, surface geology, and hydrology.
4. A background of ethnographic and archaeological assessment for the Project Area and environs.
5. The development of an archaeological predictive model and risk assessment to guide future compliance with the *NT Heritage Act 2011.*
6. The development of recommendations to guide future compliance with the *NT Heritage Act 2011.*

1.2 Project Location and Land Tenure

1.2.1 Location

As illustrated in Figure 1, the Project Area is situated on the Sturt Plateau, intersecting the Stuart Highway 3 km south of Dunmarra Roadhouse (635 km south of Darwin). The assessable pipeline Project Area spans nearly 37 km in length, which includes the Shenandoah Facility (receipt station),a cathodic protection unit and additional work space at its eastern extent and the Sturt Plateau Facility (delivery station) and an extra workspace to tie into the Amadeus Gas Pipeline to the west. This report will assess a pipeline corridor width of 150 m across the majority of its extent, noting that the constructed corridor will be 30 m wide.

The proposed construction camp will be located on the western side of the Stuart Highway, 12 km south of where the pipeline crosses the highway.

1.2.2 Land Tenure

Table 1 presents the land tenure of the Project Area[1], which is crucial for understanding the applicable heritage legislation detailed in Section 2 of this report. It's important to note that different statutes may apply in Australian jurisdictions based on land tenure. For instance, the Commonwealth List administered under the EPBC Act applies to Commonwealth-owned or leased lands.

Table 1: Land Tenure Project Area and Environs

Parcel Key	Current Occupier	Owner	Land Tenure
NT Portion 1077	Hayfield	Private	Perpetual Pastoral Lease
NT Portion 7026	Shenandoah	Private	Perpetual Pastoral Lease
NT Portion 1366	Crown	Northern Territory Government	Government
NT Portion 7513	Hayfield	Private	Perpetual Pastoral Lease

[1] Data extracted from NT Land Information System, 14 August 2024

1.2.3 Native Title

The Project Area spans two Native Title Determinations, divided by the Stuart Highway. The Native Title Determinations comprise multiple estates held by different Indigenous groups:

1. **East of Stuart Highway**: *Shenandoah Pastoral Lease Native Title Determination*
    - Federal Court Number: NTD21/2010
    - National Native Title Tribunal Number: DCD2012/007
    - Held by members of the Kinbininggu group and the Bamarrngganja group
2. **West of Stuart Highway**: *Hayfield Pastoral Lease Native Title Determination*
    - Federal Court Number: NTD26/2010
    - National Native Title Tribunal Number: DCD2012/011
    - Held by members of the Kinbininggu group, the Warranangku group, and the Marlinja group

3. **Registered Native Title Body Corporate**

The Top End (Default PBC/CLA) Aboriginal Corporation RNTBC serves as the registered native title body corporate (RNTBC) for both determinations, as per Subsection 203AD(1) of the *Native Title Act 1993*. This corporation holds the statutory obligations for the Project Area under the terms of the Act.

1.3 CONSULTATION

APA has a stakeholder engagement and participation approach to cultural heritage assessments, including the heritage assessments pertaining to this report. However, as this study represents the initial assessment phase, the consultation has been preliminary, encompassing the key stakeholders listed in Table 2 below.

Table 2: Stakeholder engagement summary

Stakeholder	**Timing**	**Discussion / Agenda Summary**
Northern Land Council	March 2024 - ongoing	Outline of project activities and location Ongoing discussions regarding Traditional owner involvement in the project.
AAPA	August 2023 - Present	Initial AAPA Abstract of records search Submission of application for Authority Certificate for the project area and immediate surrounds. Ongoing engagement regarding outcomes of the process
Heritage Branch	June 2024	Search of the NT Archaeological Database and Heritage Register.
Elliott Information Session	August 2024	Information session for the community to outline the proposed project. Attendees also included some Traditional Owners representatives.

1.4 THE AUTHORS

Project Archaeologist: Ben Keys

Ben holds a Bachelor of Archaeology with Honours from Flinders University, South Australia. He has extensive experience in cultural heritage management and community consultation, coupled with the management of largescale mining projects in the Northern Territory. Ben also has a professional background in land access management and aspects of environmental management, including mining compliance. He has been an author of several published academic archaeological journal articles and has been invited to speak at several mining industry conferences in the Northern Territory.

Project Archaeologist: Alan Hay

Alan holds a Bachelor of Archaeology with Honours from Flinders University, South Australia, and a Master of Archaeological Science from Australian National University. Alan has more than 10 years' experience in archaeology and cultural heritage management. He has a background in Geographic Information Systems, Archaeological Survey and Excavation, Mitigation, Historical Research, and Environmental Impact Assessment.

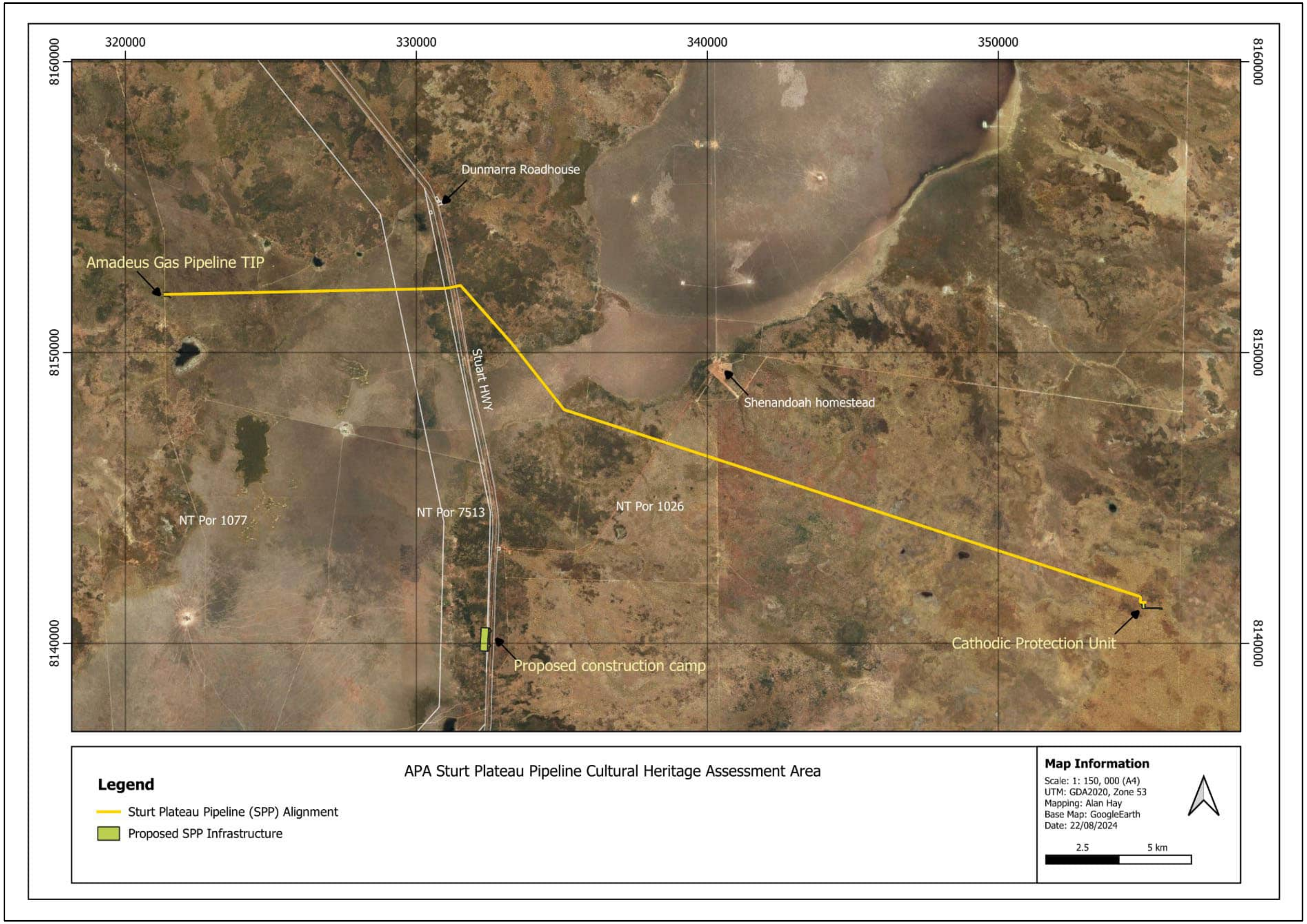


Figure 1: Project Location and Relationship to Key Cadastre

2 Legislative Context

2.1 The legislative and social basis for Cultural Heritage Protection

The significance of places and materials associated with the cultural record varies substantially, depending upon one or a combination of its aesthetic, historic, scientific, social or spiritual values for past, present or future generations (Australia ICOMOS Burra Charter, 2013). Through time, these values can change or be impacted upon by both natural mechanisms and human intervention. To ensure impacts to the potential cultural heritage values of a place or object are understood, protected or managed accordingly, a range of legislation has been enacted since the 1970s.

This legislation has occurred at the state, territory, and national level. This is the result of the evolution of the Australian constitutional framework, particularly the inclusion of new themes, such as Aboriginality, heritage and the environment into an existing regulatory framework. The result of this developmental change is that the Commonwealth retains responsibility for Indigenous issues, while the States and Territories retain control of land use and development approvals. Therefore, both Commonwealth and the Northern Territory Acts may apply in particular circumstances within the Northern Territory.

2.1.1 Commonwealth Acts

***Aboriginal Land Rights (Northern Territory) Act 1976* (ALRA).** This Act changed Aboriginal reserves within the Northern Territory to freehold title held in trust. The Act mandated the formation of Land Councils to act in the interests of Northern Territory Aboriginal people in the areas of land, access to lands, employment and the development of businesses. The Act also defined Sacred Sites as 'sites that are sacred, or otherwise significant, in the Aboriginal Tradition'. The Act protected these sites from damage, whether accidental or intentional. The NT *Aboriginal Sacred Sites Act 1989* uses this definition of sacred in its purpose of protecting these sites outside of Land Trust lands. On Pastoral Lease Lands, the general procedure is for the AAPA conduct the Sacred Site surveys with the relevant Site Custodians, then issue an Authority Certificate under the Act (see Section 2.1.2 below).

***Native Title Act 1993*.** Native Title is "the communal, group or individual rights and interests of Aboriginal people and Torres Strait Islander people in relation to land and waters, possessed under traditional law and custom, by which those people have a connection with an area which is recognised under Australian law (s 223 NTA) (NNTT 2016). The NTA establishes the processes to determine where native title exists, how future acts impacting upon native title land may be undertaken, and to provide compensation where future acts extinguish or are inconsistent with the existence or exercise of native title (DCP 2016). The Act gives Indigenous Australians who hold native title rights and interests (including native title claims) the right to access and use traditional lands, be consulted and, in some cases, to participate in decisions about activities proposed to be undertaken on the land.

***Aboriginal and Torres Strait Islander Heritage Protection Act 1984*.** This Act is a site protection Act of 'last resort', meaning that the Act is meant to provide emergency protection for Aboriginal and Torres Strait Islander heritage sites when all other avenues have been exhausted. Generally, an Aboriginal person or group of persons, must apply to the Minister to have protective covenants placed over an area or site (DEE 2016). The power to provide such protection resides in Section 51 of the Constitution giving the Commonwealth powers on Aboriginal issues. Therefore, this Act may override all State and Territory cultural heritage acts.

The *Environment Protection and Biodiversity Conservation Act* (EPBC Act) commenced on 16 July 2000. The EPBC provides for a National Heritage List of natural, historic and Indigenous places that are of outstanding significance to the nation. The EPBC also provides for a Commonwealth List that includes natural, historic and Indigenous places of significance that are owned or controlled by the Commonwealth. Ownership or control of these places allows the Commonwealth to protect or manage these places according to the significance of the place. The Commonwealth Department of Environment and Energy administers the EPBC, including administration of the heritage lists and providing support to the Australian Heritage Council established under the Australian Heritage Council Act 2003. The Department maintains the Australian Heritage Database which includes places on both Commonwealth lists, all places on state registers and other places included in the former Register of the National Estate established in the 1970s.

2.1.2 Northern Territory Acts

***Aboriginal Sacred Sites Act 1989*.** The NT *Aboriginal Sacred Sites Act 1989* protects sites that are 'sacred and otherwise of significance in the Aboriginal Tradition'. Sacred Sites are protected whether the location of the site is known or not by any person or company seeking to do work on lands. The Act is administered by the Aboriginal Areas Protection Authority. The Authority can issue a Certificate indemnifying any proponent for an area upon application and payment of a fee. The Certificate will contain conditions limiting or preventing works in and around registered and recorded Sacred Sites. The Authority Certificate will contain maps outlining any restricted work areas within the area of application.

Heritage Act 2011 and Regulations. The *NT Heritage Act 2011* (replacing *the Heritage Conservation Act 1991*) provides for the conservation of the Territory's natural and cultural heritage, including places and objects within NT waters. The aim is achieved under the Act by:

(a) declaring places and objects of heritage significance to be heritage places and objects;
(b) declaring classes of places and objects of heritage significance to be protected classes of heritage places and objects;
(c) establishing the Heritage Council;
(d) providing for heritage agreements to encourage the conservation, use and management of heritage places and objects;
(e) regulating work on heritage places and objects;
(f) establishing enforcement and offence provisions.

Under Part 2.1 of the *NT Heritage Act 2011*, all Aboriginal and Macassan archaeological places and objects are provided automatic protection under the Act, regardless of whether their existence or location is known. An Aboriginal or Macassan archaeological places is defined under the Act as a place that:

(a) relates to the past human occupation of the Territory by Aboriginal or Macassan people; and
(b) has been modified by the activity of those people.

An Aboriginal or Macassan archaeological object is defined as a relic that:

(a) relates to the past human occupation of the Territory by Aboriginal or Macassan people; and
(b) is: (i) in an Aboriginal or Macassan archaeological place; or
(ii) stored in a place in accordance with Aboriginal tradition

A relic is defined under the Act as:

(a) an artefact or thing given shape by a person; or
(b) human or animal skeletal remains; or
(c) something else prescribed by regulation.

Under Part 2.2. of the NT Heritage Act 2011, other places and objects – i.e., non-Aboriginal and non-Macassan places and objects – can be declared by the Minister as protected heritage places and objects.

A place is defined as an area of land, and includes:

(a) a building or, a part of a building, on the place; and
(b) an item historically or physically associated with the place if the primary importance of the item derives (completely or partly) from that association; and
(c) equipment, furniture, fittings and articles on, or historically or physically associated with, the place.

The process for declaring heritage places and objects involves a nomination or Heritage Council initiation for assessment of the heritage significance – including aesthetic, historical, scientific, and social significance of a place or object. The Heritage Council then considers whether the place or object is of heritage significance and make a decision whether or not to recommend that the Minister declare the place or object to be a protected heritage place or object.

Under Part 5.5 of the Act, it is an offence to knowingly engage in conduct that results in damage to a heritage place or object, removes a part of the place, or removes a heritage object from the NT, unless the conduct is carried out in accordance with a relevant heritage agreement, work approval, repair order, or exemption. A permit will generally only be issued if consultation with the relevant Traditional Owners or Custodians of the sites or their representatives has occurred. There are penalties for accidental or deliberate damage or destruction of these sites.

2.2 Regulatory Organisations

Northern Land Council (NLC). The NLC is an independent statutory authority of the Commonwealth responsible under the ALRA and *Native Title Act* for assisting Aboriginal peoples in the Top End to acquire and manage their traditional lands and seas. This includes assisting in Land Rights and Native Title Claims, managing traditional lands and protecting sites of significance in the Aboriginal Tradition. The NLC is also responsible for promoting the economic interests of Aboriginal peoples in the Top End. They do this by advocating for Traditional Owners interests in the development of resources on Land Trust and Native Title lands.

Aboriginal Areas Protection Authority (AAPA). The AAPA is an independent statutory authority established under the *Northern Territory Aboriginal Sacred Sites Act 1989*. The Authority is responsible for the protection of Aboriginal sacred sites on land and sea across the Northern Territory. The AAPA seeks to implement a practical balance between sacred site protection and economic development.

Heritage Branch, NT Department of Families, Housing and Communities. Heritage Branch is the regulatory authority responsible for administering most sections of the NT *Heritage Act 2011*. Heritage Branch is also responsible for administering the NT Heritage Register, the NT Archaeological Database and providing logistical support for the NT Heritage Council.

Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). DCCEEW is the regulatory authority responsible for the EPBC Act 1999. DCCEEW is also responsible for administering the National Heritage List, the Commonwealth Heritage List, and the Australasian Underwater Cultural Heritage Database (AUCHD).

2.3 Heritage Guidelines and Charters

A range of heritage and stakeholder engagement guidelines are published at National, State and Northern Territory Levels which contribute to the development of best practice approaches for assessing and managing cultural heritage values.

The Northern Territory Government' Department of Territory Families, Housing and Communities website[2] also host current information regarding heritage matters.

The following guidelines and charters have been considered in this desktop study and should be used to guide successive phases of this project:

1. Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999 (DCCEEW 2023)
2. Environmental impact assessment and environmental approval in the Northern Territory, Environmental impact assessment guidance (NT EPA 2020)
3. Stakeholder Engagement and Consultation, Environmental impact assessment guidance for proponents (NT EPA 2021)
4. Environmental factor guidance: Culture and heritage (DRAFT) (NT EPA 2022)
5. Ask First, A guide to respecting Indigenous heritage places and values (Australia ICOMOS 2013a)
6. Practice Notes for the Australian ICOMOS Burra Charter 2013 (Australia ICOMOS 2013)
7. Ask first: a guide to respecting Indigenous heritage places and values (Australian Heritage Commission 2002)
8. Dhawura Ngilan: A vision for Aboriginal and Torres Strait Islander heritage in Australia and the Best Practice Standards in Indigenous cultural heritage management and legislation (DCCEEW 2020)

[2] https://nt.gov.au/leisure/arts-culture-heritage/visit-a-cultural-or-heritage-site/aboriginal-heritage-information

3 Research Methodology

The following research and analysis methodology was undertaken to fulfil the requirements of this study's scope.

3.1 Comprehensive Desktop Research and Reviews

1. Environmental Contextual Research (Including Paleoenvironments).

- **Data Collection**: Climate data (temperature, precipitation patterns) was gathered from the Bureau of Meteorology; environmental information (ecological, hydrology and geological data) from Northern Territory and Commonwealth agencies; geomorphic information (soil types, landforms, paleoenvironmental data) was sourced through peer reviewed publications, coupled with Government research publications.

- **Analysis**: This information was then analysed to assess how these factors might have shaped human settlement and land use, influenced the preservation of archaeological and heritage sites, and affected the visibility cultural heritage sites.

2. Cultural Background Research

- **Ethnographic Research**: Ethnographic research was restricted to the limited reviews of previously published literature.

- **Historical Research**: The Study Areas historical archaeological heritage was investigated through archival research (NT and National Archives, Trove, South Australia Museum, and various University libraries), historical maps, military records and previous cultural heritage studies to understand site distribution patterns, historical land use and significant features and events.

3. Regulatory and Internal Database Searches

- **Northern Territory and Commonwealth Databases**: Searches were completed for heritage listings and previous cultural heritage assessments of Northern Territory and Commonwealth heritage registers and databases (including AAPA)

4. Review of Existing Reports and Literature

- **Previous Cultural Heritage Reports**: Previous regional cultural heritage assessment/survey reports were reviewed for insights into the area's heritage values, noting any identified cultural sites and their distribution patterns.

- **Other Sources**: Reviews were completed of relevant academic literature, books, and external reports to understand the broader published information, to incorporate a range of perspectives on the area's heritage.

5. Stakeholder Engagement:

- **Consultation:** Consultation was limited to community engagement completed by APA and SLR, a summary of which is presented in Section 1.3 above.

6. Site Risk Assessment

- **Risk Identification**: A broad site risk assessment was undertaken to identify potential risks associated with construction activities.

7. Gap and Limitations Analysis

- **Identification of Gaps**: A gap analysis was undertaken to understand where information is lacking, such as previous survey coverage and existing site records.

8. Recommendations

- **Management Strategies**: General management strategies were developed based on the identified risks gap analysis and future stakeholder consultation requirements.

4 PHYSICAL AND ENVIRONMENTAL SETTING

The environmental setting of a region is important in analysing past human settlement behaviour and interpreting archaeological features and site patterns. Geomorphology and geology of the study area are significant factors in understanding prehistoric archaeological patterns in the landscape. Changes in the landscape may have an influence on the types of archaeological material found. The following section outlines the environmental and physical background to the Project Area.

4.1 CLIMATE AND HYDROLOGY

The Project Area is wholly within the Sturt Plateau Bioregion but lies above an area of Mitchell Grass Plains that extends into the Sturt Plateau from the south (see Figure 2). The Sturt Plateau bioregion is characterised by a dry monsoonal climate, with a median annual rainfall of 556 mm (1890 to 2005)[3]. Precipitation is highly seasonal, with almost all rainfall occurring between November and March, creating distinct wet and dry seasons. The dry season spans from April to October. The nearest Bureau of Meteorology station that records both rainfall and temperature data is at Daly Waters Airport Station, 51km to the north of the SPP (Figure 3 and Figure 4).

Temperature data reveals consistently warm conditions. Maximum temperatures range from 30°C in July to 37-39°C from October through March. Minimum temperatures exhibit greater annual variation, from 12°C in July to 24-25°C in November through February. The diurnal temperature range is significant throughout the year.

The Project Area's hydrology is dominated by an ephemeral lake system, which is transected by the SPP corridor at its narrowest point. A first-order watercourse is mapped towards the western terminus of the corridor; however, aerial imagery suggests this may be a flood-out zone rather than a watercourse where the pipeline intersects. A number of shallow claypans and drainage depressions are transected by or lie adjacent to the SPP within the eastern 12 km of the corridor. Similar depressions are noted 1 km to the north of the western end of the SPP. All hydrological features are likely to offer freshwater during times of high rainfall, and their banks and shores may have been inviting for human occupation.

[3] Sturt Plateau bioregion factsheet (dcceew.gov.au)

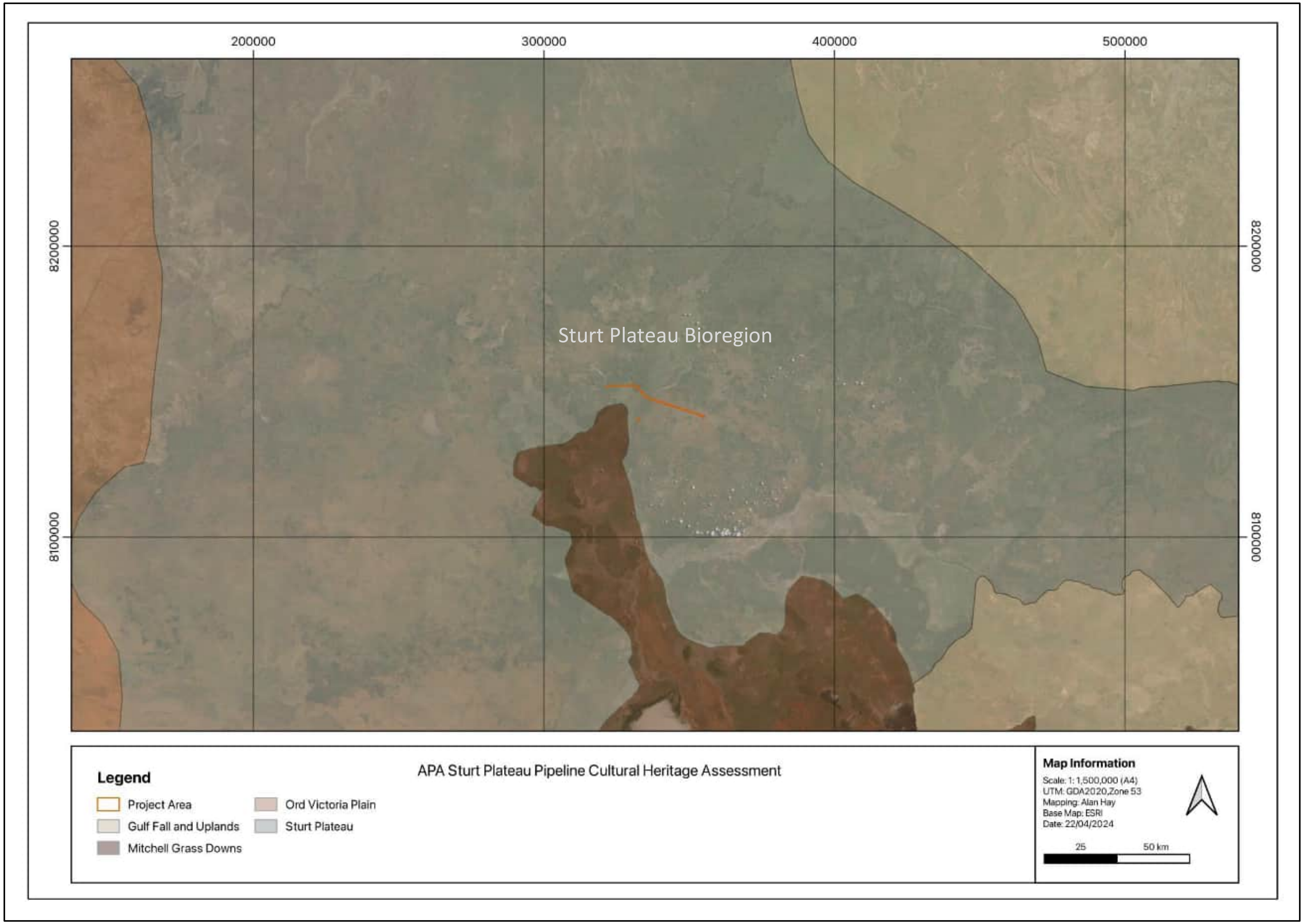


Figure 2: Project Area Bioregions.

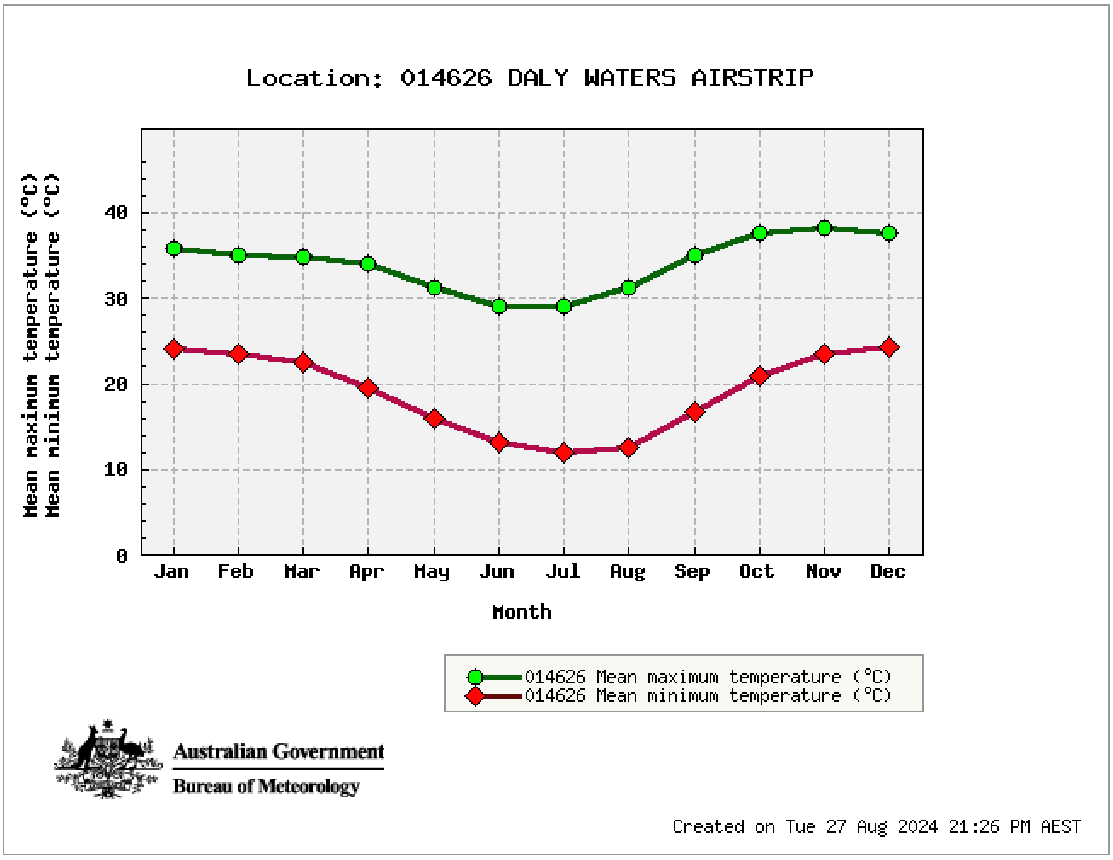


Figure 3: Mean Maximum and minimum temperatures from the Daly Waters Airport Station (BOM).

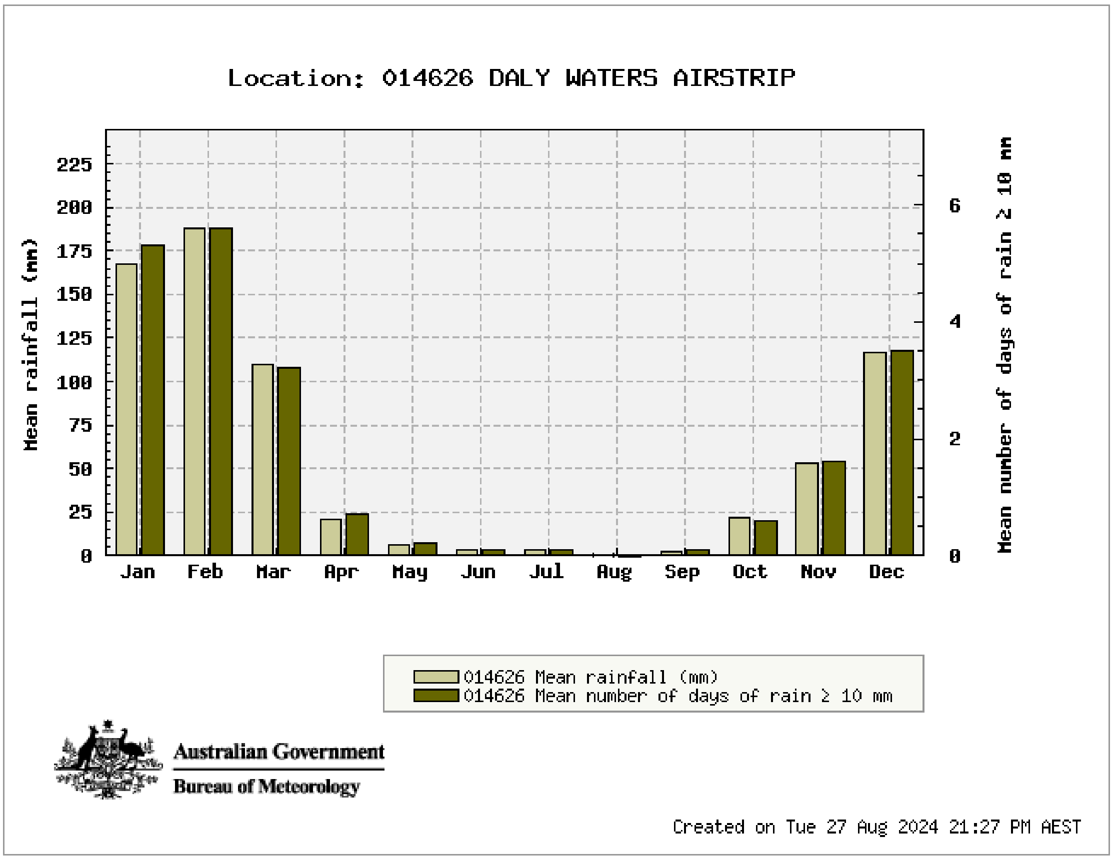


Figure 4: Mean and highest daily rainfall from the Daly Waters Airport Station (BOM).

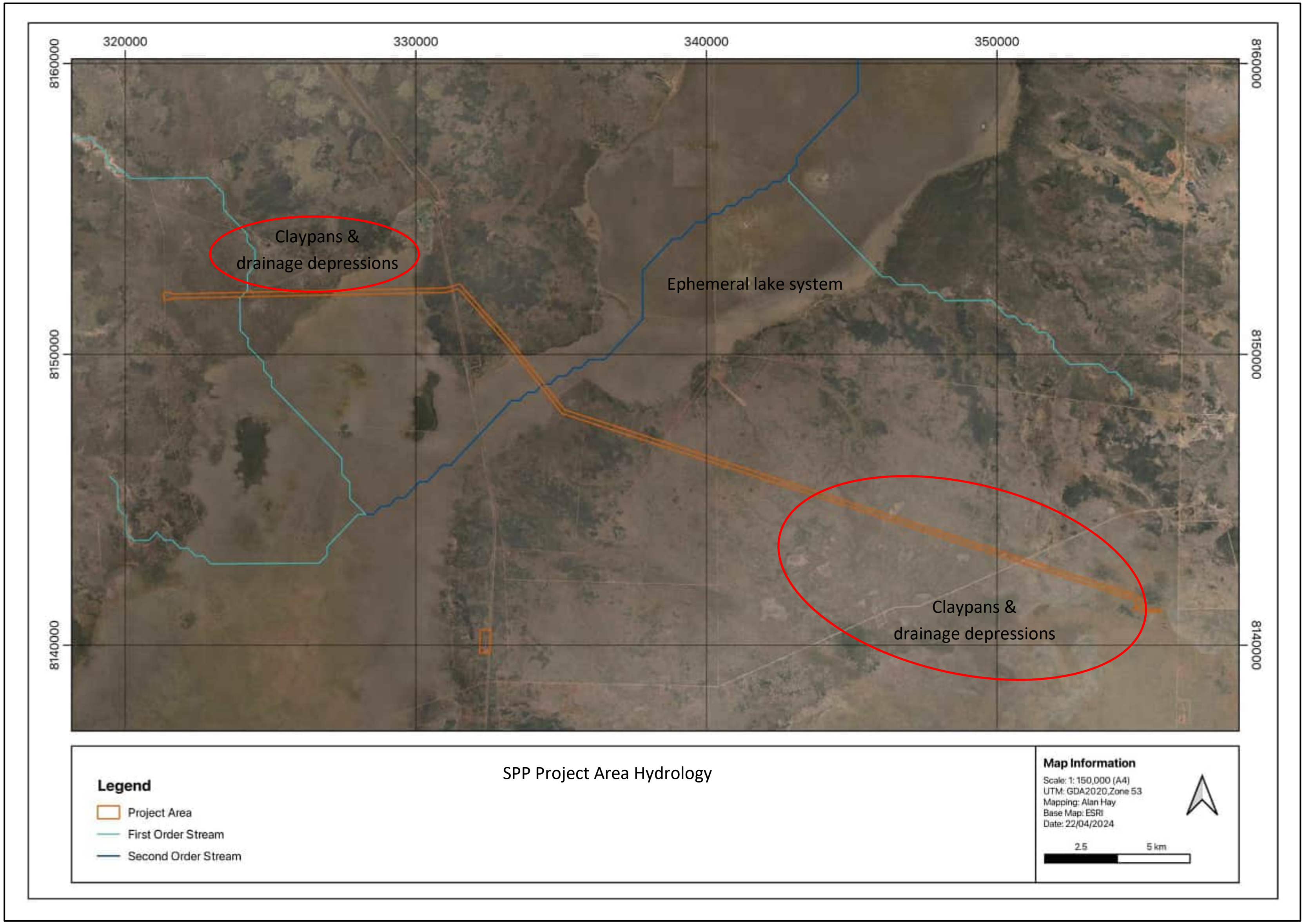


Figure 5: Watercourse in and around the Project Area, showing stream order.

4.2 GEOLOGY AND GEOMORPHOLOGY

The Land system mapping, presented in Figure 6 and Table 3, suggests limited environmental complexity along the SPP; however, there are several key geological and the topographic variations that have been considered for their archaeological potential (see Figure 7 and Table 4).

Five distinct types of surface geology are present within and around the Project Area:

1. **Alluvium**: Channel and flood plain deposits comprising gravel, sand, silt, and clay, with potential local calcrete formations. These zones are archaeologically significant as they may contain raw materials from surrounding geological strata, including lithic materials suitable for tool production.

2. **Black Soil Plain (**Atlas_II6 land system): Characterised by residual black, dark grey, or brown clayey soil. While generally unlikely to yield substantial lithic resources, areas subject to streambank overflow or flooding may accumulate raw materials from nearby geological formations, potentially including lithic materials useful for artefact production.

3. **Colluvium**: Deposits comprising sheetwash, talus, and scree, containing boulders, gravel, and sand. These may incorporate minor alluvial or sand plain deposits, calcrete, and reworked laterite. Like alluvial zones, colluvium areas have archaeological potential due to the presence of raw materials derived from surrounding geological strata.

4. **Ferruginous Duricrust**: Characterised by laterite formations that are pisolitic, nodular, and vuggy. These may include massive to pisolitic ferruginous subsoil, mottled clays, magnesite, and reworked products of ferruginous and siliceous duricrusts. Calcrete, gossan, and residual ferruginous saprolite may also be present. These areas are less likely to contain naturally occurring raw materials suitable for tool production.

5. **Sediments**: Formations consisting of sandstone, pebbly sandstone, conglomerate, mudstone, and siltstone. These Often exhibit crossbedding, ripple marks, and graded bedding, forming distinctive mesa and bench landscapes. They May be ferruginised or silicified in some instances. These zones hold significant archaeological potential, as they may contain mudstone, chert, quartz, and other fine-grained siliceous rocks commonly used in lithic assemblages.

The Beetaloo and Birrimbah land systems, with their lateritic profiles and varied depositional products, likely provided a mix of resources and landscapes that Aboriginal people could have exploited. The sandy and earth soils in these systems might have supported certain types of vegetation, potentially attracting game animals and providing plant resources.

This geological and land system diversity would have presented Aboriginal people with a range of options for resource exploitation and settlement. The varied terrain, from clay plains to lateritic rises, would have offered different habitats and resources, potentially supporting diverse prehistoric activities and settlement patterns. Consequently, some sections of the Project Area represent potentially rich landscapes for archaeological investigation.

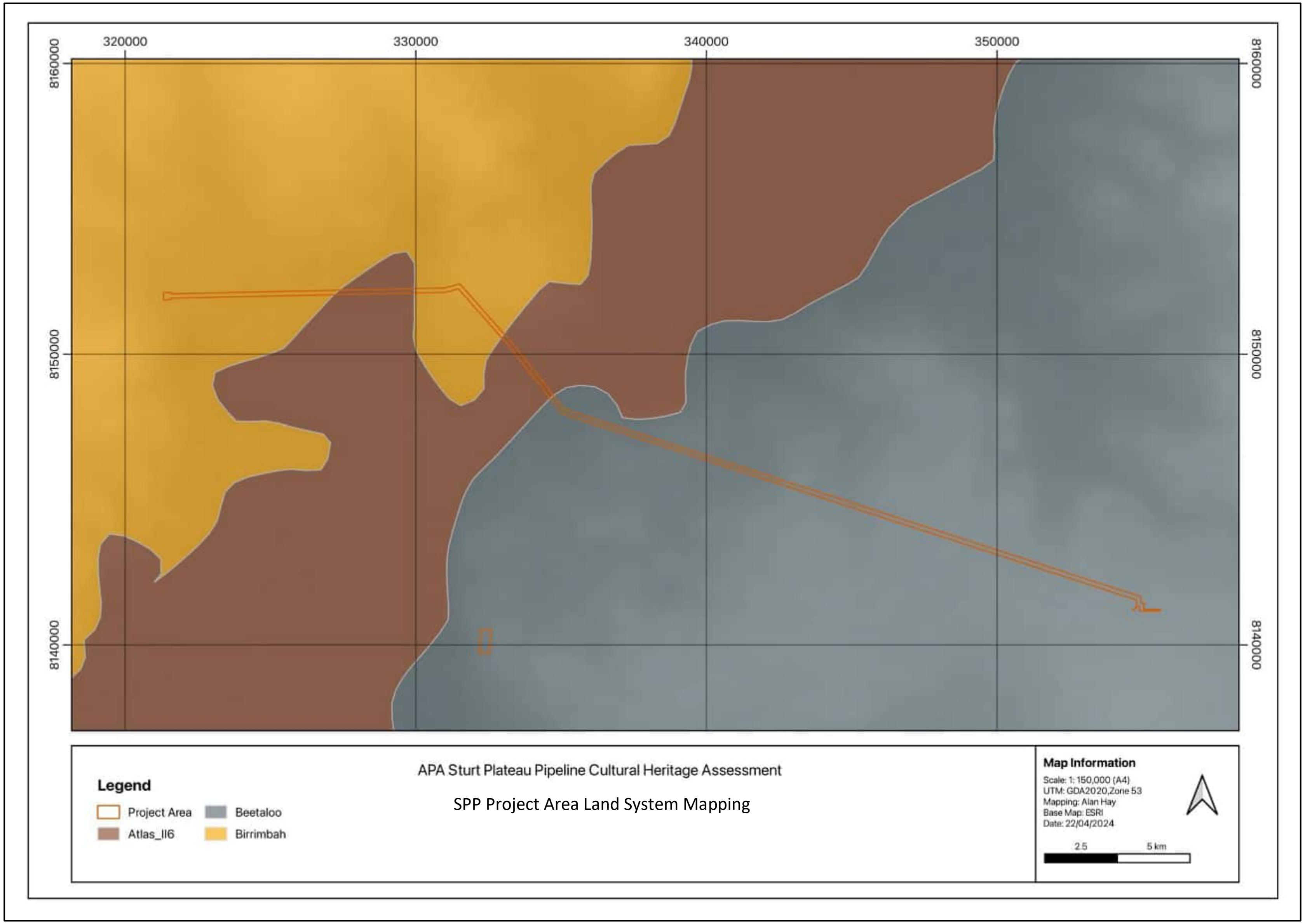


Figure 6: Landscape systems within and around the Project Area.

Table 3: Landscape systems within and around the Project Area

Land System	Landscape Description
Atlas_II6	Level to gently undulating clay plains (black soil plains); cracking clay soils
Beetaloo	Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils
Birrimbah	Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils

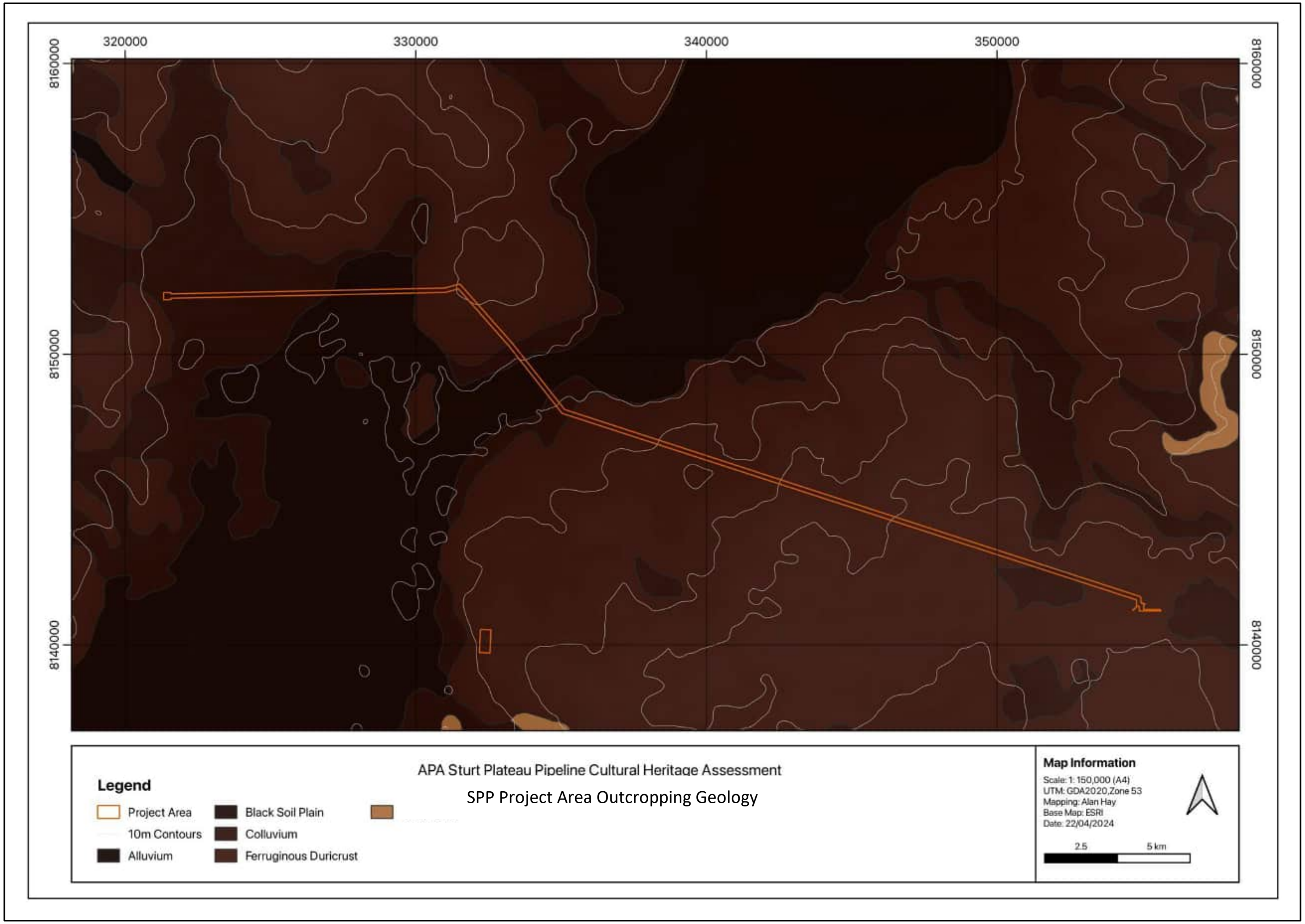


Figure 7: Outcropping Geology of Archaeological Interest within the Project Area.

Table 4: Outcropping geology table and interpretation within the Project Area.

Rock Type	Symbol	Lithic Description	Archaeological Interpretation
Alluvium	Qa	Channel and flood plain alluvium; gravel, sand, silt, clay; may be locally calcreted.	This type of surface geology may contain raw material drown from the surrounding geological strata, including lithic materials useful for the production of raw materials.
Black Soil Plain	Czrb	Residual black, dark grey or brown clayey soil	Black soil plains are unlikely to contain substantial lithic resources except in areas of streambank overflow or flooding, in which case they may contain raw material drown from the surrounding geological strata, including lithic materials useful for the production of raw materials.
Colluvium	Qrc	Colluvium and/or residual deposits, sheetwash, talus, scree; boulder, gravel, sand; may include minor alluvial or sand plain deposits, local calcrete and reworked laterite	This type of surface geology may contain raw material drown from the surrounding geological strata, including lithic materials useful for the production of raw materials.
Ferruginous Duricrust	Czl	Ferruginous duricrust, laterite; pisolitic, nodular, vuggy; may include massive to pisolitic ferruginous subsoil, mottled clays, magnesite, reworked products of ferruginous and siliceous duricrusts, calcrete, gossan; residual ferruginous saprolite	Unlikely to contain naturally occurring raw materials such as may be suitable for tool production.
Sediments	Ks	Sandstone, pebbly sandstone, conglomerate, mudstone, siltstone; crossbedded, rippled, graded; mesa and bench forming; may be ferruginised or silicified	Potential for mudstone, chert, quartz as well as other fine grained silicious rocks that are common raw material types in lithic assemblages.

4.3 ECOLOGY

While it is likely that there is some variation between broader ecological communities across different land systems within the Project Area, National Vegetation Information System mapping indicates that the pre-colonisation ecological communities within the Project Area consisted of broad groupings of forests and woodland (see Figure 8). The pre-colonisation mapping is supported, in this case, by a large amount of extant remnant woodland and forest still present within the Project Area.

Acacia low woodland, a prominent vegetation type in the project area, is characterised by Acacia species forming a low canopy with an understorey of Eragrostis low open tussock grassland. This community is typically found on well-drained soils, including gravelly lithosols and shallow red, yellow, and black earths. It occurs on lateritic sandstone outcrops, plateaux, breakaways to the north, and rises and plains to the south. The adaptation of Acacia species to these soil types and landforms suggests their resilience to the seasonal dry periods and ability to thrive in areas with good drainage.

Eucalyptus low open woodland represents another significant vegetation community, featuring Eucalyptus species forming an open canopy with an understorey of Acacia mid sparse shrubland and Astrebla low tussock grassland. This community is associated with light to heavy grey and brown clays, as well as some loamy soils, typically found in low-lying flat plains and areas fringing watercourses and swamps. The presence of this community likely indicates areas with better water retention, possibly benefiting from seasonal inundation during the wet season.

Macropteranthes (mixed) low woodland shares similar soil and landscape characteristics with the Acacia low woodland, occurring on gravelly lithosols and shallow earths in areas of lateritic sandstone outcrops and plateaux. The understorey in this community consists of Chrysopogon mid open tussock grassland. The similarity in habitat suggests that these two communities may be adapted to similar environmental conditions, potentially alternating dominance based on subtle variations in soil composition or microclimatic factors.

Melaleuca low woodland, characterised by Melaleuca species forming both the canopy and a mid-sparse shrubland layer, with an understorey of Eulalia low open tussock grassland, is typically found on plains and relict drainage fringes. While specific soil types are not mentioned for this community, its association with drainage features suggests an adaptation to periodically moist conditions, likely benefiting from the seasonal rainfall patterns and possibly indicating areas of higher water table or surface water accumulation during wet seasons.

Acacia open forest presents a taller structure compared to the Acacia low woodland, with Acacia species forming a mid-open forest and tall open shrubland, accompanied by Chrysopogon low open tussock grassland. This community is found on rises with rocky skeletal soils, extending onto shallow gravelly sands in drier areas. The more substantial vegetation structure in this community might indicate slightly more favourable moisture conditions, possibly due to the position on rises which could capture more rainfall or benefit from subsurface water movement.

Corymbia low woodland, featuring Corymbia species forming a low canopy with Terminalia mid sparse shrubland and Chrysopogon low tussock grassland, occurs on gently undulating plains with shallow red to yellow, gravelly, sandy earths or stony sands. This community's adaptation to these soil types suggests an ability to withstand the seasonal dry periods, possibly through deep root systems accessing subsurface moisture.

The distribution of these vegetation communities across the project area also reflects the complex geology, which includes Alluvium, Black Soil Plain, Colluvium, Ferruginous Duricrust, and Sediments. The varied topography, ranging from clay plains to lateritic rises, creates a mosaic of habitats that support this diverse vegetation. Hydrological features, such as the seasonal lake, claypans and drainage lines, likely play a crucial role in shaping the vegetation patterns, particularly influencing communities like the Eucalyptus and Melaleuca woodlands that are associated with watercourses and swampy areas. This ecological diversity would have provided a range of resources for prehistoric inhabitants, with areas near water sources being particularly attractive for human occupation.

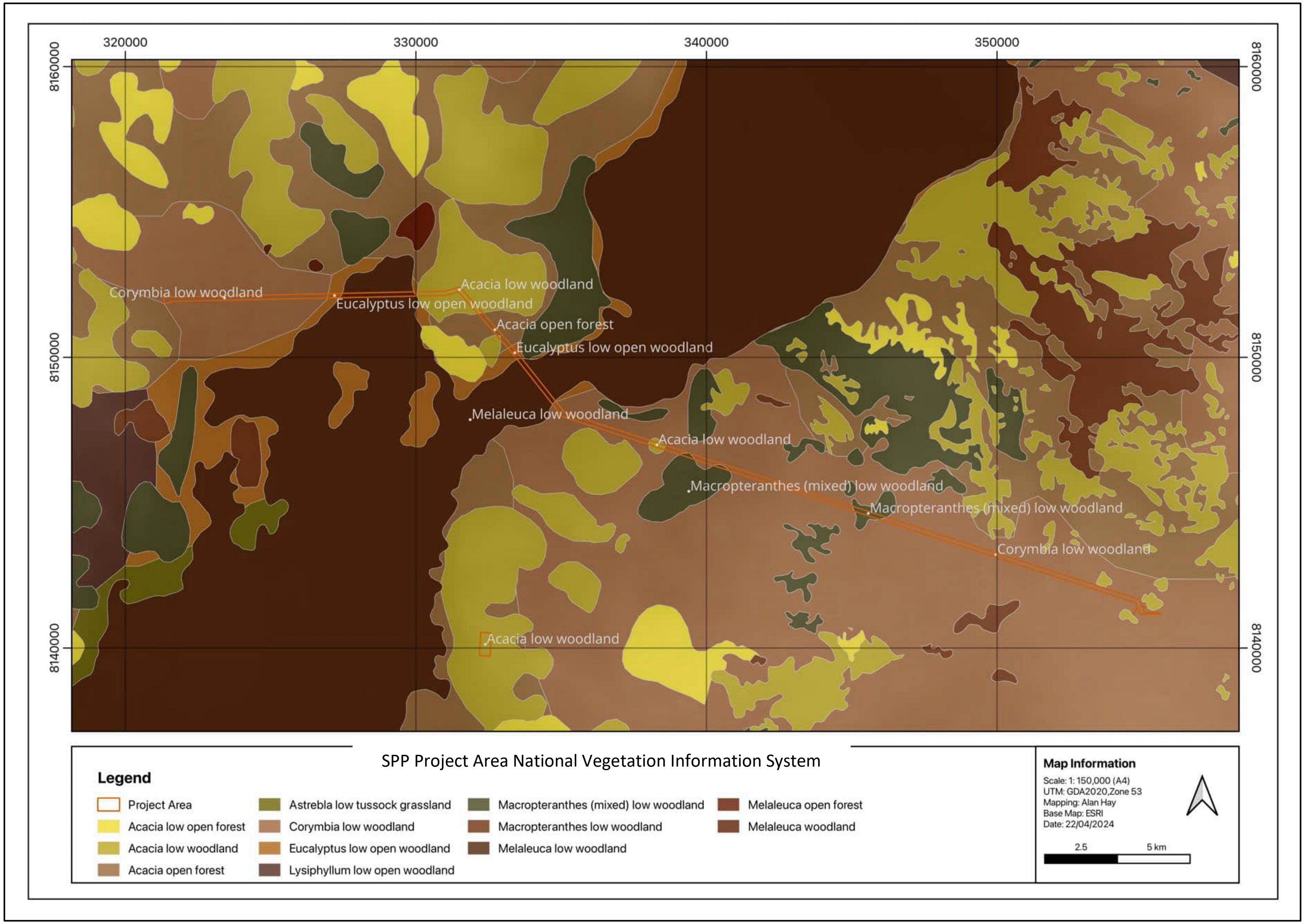


Figure 8: National Vegetation Information System estimation of the distribution of Pre-1750 vegetation with the Project Area.

Table 5: National Vegetation Information System Explanatory Table

Vegetation Community	Vegetation Description	Associated Soils
Acacia low woodland	Acacia low woodland\Eragrostis low open tussock grassland	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south. This vegetation community is associated with gravelly lithosols, some shallow red, yellow and black earths, well drained.
Eucalyptus low open woodland	Eucalyptus low open woodland\Acacia mid sparse shrubland\Astrebla low tussock grassland	Low lying flat plains, fringing water courses and swamps. Light to heavy grey and brown clays, some loamy soil.
Macropteranthes (mixed) low woodland	Macropteranthes low woodland\Chrysopogon mid open tussock grassland	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south. This vegetation community is associated with gravelly lithosols, some shallow red, yellow and black earths, well drained.
Acacia low woodland	Acacia low woodland\Eragrostis low open tussock grassland	Lateritic sandstone outcrops, plateaux, breakaways to north/rises and plains to south. This vegetation community is associated with gravelly lithosols, some shallow red, yellow and black earths, well drained.
Melaleuca low woodland	Melaleuca low woodland\Melaleuca mid sparse shrubland\Eulalia low open tussock grassland	Low woodland/open woodland, plains/relict drainage fringe.
Acacia open forest	Acacia mid open forest\Acacia tall open shrubland\Chrysopogon low open tussock grassland	Rises with rocky skeletal soils extending onto shallow gravelly sands in drier areas.
Corymbia low woodland	Corymbia low woodland\Terminalia mid sparse shrubland\Chrysopogon low tussock grassland	Gently undulating plains, shallow red to yellow, gravelly, sandy earths or stoney sands.

4.4 Historical Land Use and Disturbance in the Project Area

Significant non-Aboriginal land use in this region began in the late 19th century, primarily driven by pastoralism following John McDouall Stuart's expedition. Initially, pastoral activities resulted in concentrated but limited disturbance across the landscape. However, this disturbance intensified with the introduction of improved transportation and more intensive grazing practices. The establishment of the Stuart Highway, road and track networks, along with the construction of the Overland Telegraph Line, served as catalysts for more widespread disruption of the area.

The introduction of other non-native animals, such as pigs, camels, horses, and donkeys, in the latter half of the nineteenth century likely had a diffuse impact throughout the Project Area. Although there is no specific evidence of concentrated mining operations within the Project Area itself, the surrounding landscape features numerous mineral and/or petroleum access tracks and associated infrastructure.

The following disturbance factors have likely altered some aspects of the pre-Contact environment in the Project Area. Key factors include:

1. **Road Construction and Maintenance**: The Stuart Highway represents a significant source of concentrated disturbance within the Project Area and is the most visible today (see Figure 10). Construction activities extended beyond the road corridor, likely including set-down areas, temporary work camps, borrow pits, and spoil heaps. Developed during the mid to late 20th century using mechanical construction machinery, the highway's construction not only severely modified the ground surface within its footprint but also affected adjacent areas.

   The Stuart Highway has also undergone upgrades and maintenance throughout the mid to late twentieth century. Roads and tracks of this type tend to have been realigned multiple times, resulting in a wider area of disturbance than is immediately evident. This disturbance often destroys or distorts the archaeology of the road corridor (e.g., gravel extraction from quarries for road surfaces may contain artefacts from the extraction point, and crushed gravel can be misidentified as artefacts).

2. **Overland Telegraph Line**: The Overland Telegraph Line, extending from Port Augusta to Darwin, potentially intersects the proposed SPP corridor. However, its specific alignment through this area is not well understood.

3. **Pastoral Impacts**: While the specific pastoral impacts within the Project Area are not fully known beyond visible access tracks, it can be assumed that some land clearing for property infrastructure, intensive grazing, stock watering infrastructure, fencing, and alterations to traditional fire regimes may have occurred to varying degrees.

   Early pastoral activities also significantly impacted the traditional lifeways of Aboriginal People throughout Australia, including within the Project Area. Pastoral activities have been present in the Northern Territory for over 150 years, following John McDouall Stuart's crossing of the country from Adelaide to Point Stuart, near Darwin, in 1861–62 (Stuart 1865). The Barkly Stock Route, established in the early 1880s by Nat Buchanan, begins south of the Project Area and connects the Stuart Highway to pastoral properties, other roads, and stock routes in the eastern portion of the NT, eventually extending into Queensland (McLennan, 2020).

4. **Invasive Species**: The introduction of cattle, horses, donkeys, and camels has disturbed watercourses, introduced weed species, and induced erosion in native environments. These factors impact archaeological sites in several ways:

   a) Watercourses: Site and artefact densities are generally higher near water bodies. Erosion of creek margins can impact site integrity. Subsurface sites are often discovered due to erosion caused by cattle and feral animals.

   b) Weeds: These can alter fire regimes and sometimes change the composition of native vegetation.

   c) Feral animals, particularly camels in the Project Area, disturb archaeological sites through 'padding' and overgrazing.

5. **Petroleum, Mining, and Mineral Exploration**: The Project Area has been subject to mineral and petroleum exploration activities. Much of the associated previous ground disturbance is related to the construction of drill pads, seismic lines, and access tracks (as shown in Figure 9). These exploration endeavours have contributed to the modification of parts of the landscape within the Project Area.

   Historical exploration endeavours, particularly those conducted before the implementation of stringent environmental controls, have likely had a more substantial impact on the landscape compared to their modern counterparts. Contemporary developments, while still affecting the environment, generally operate under stricter regulations designed to minimise archaeological and environmental disturbance.

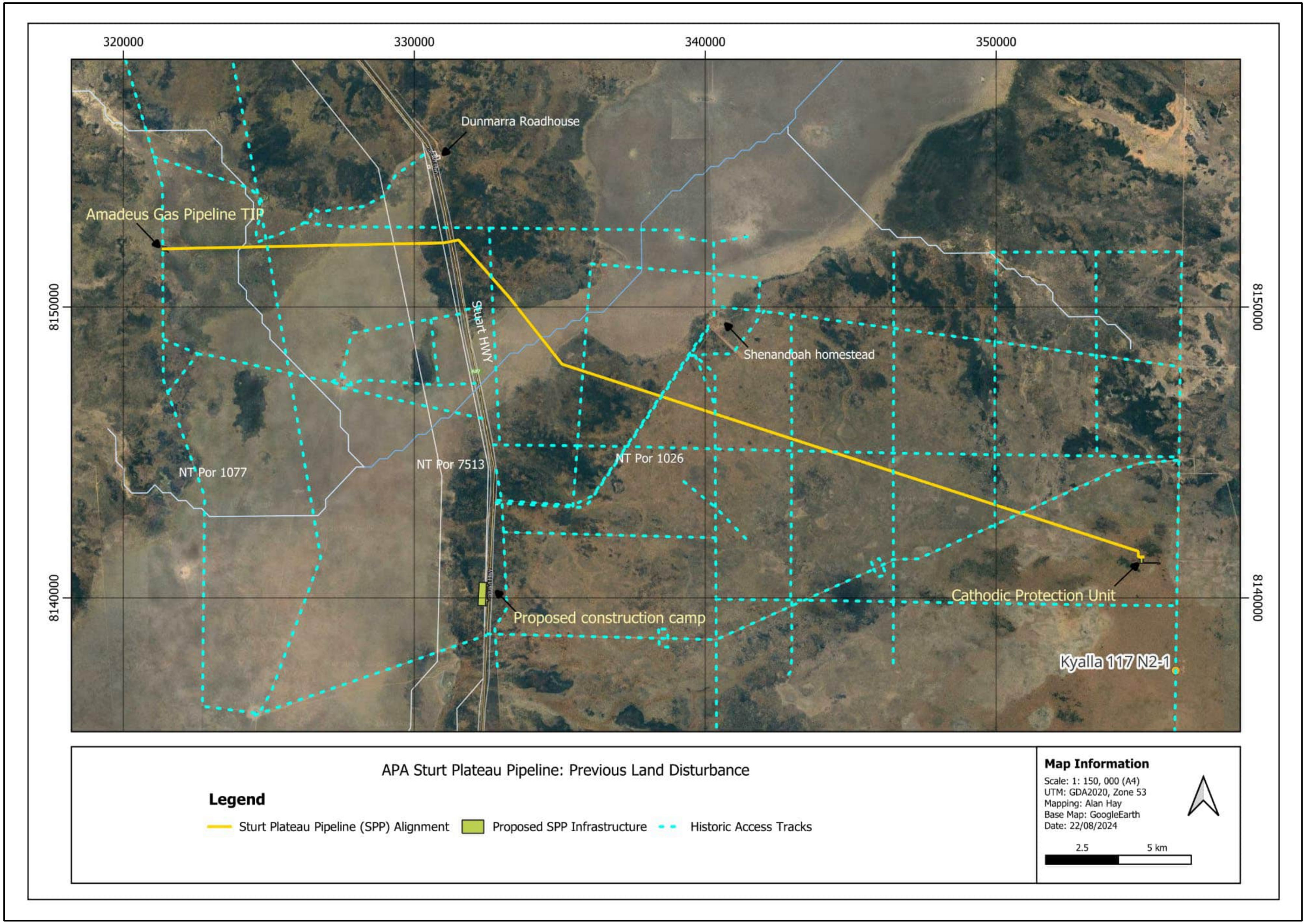


Figure 9: Mapped areas of previous ground disturbance

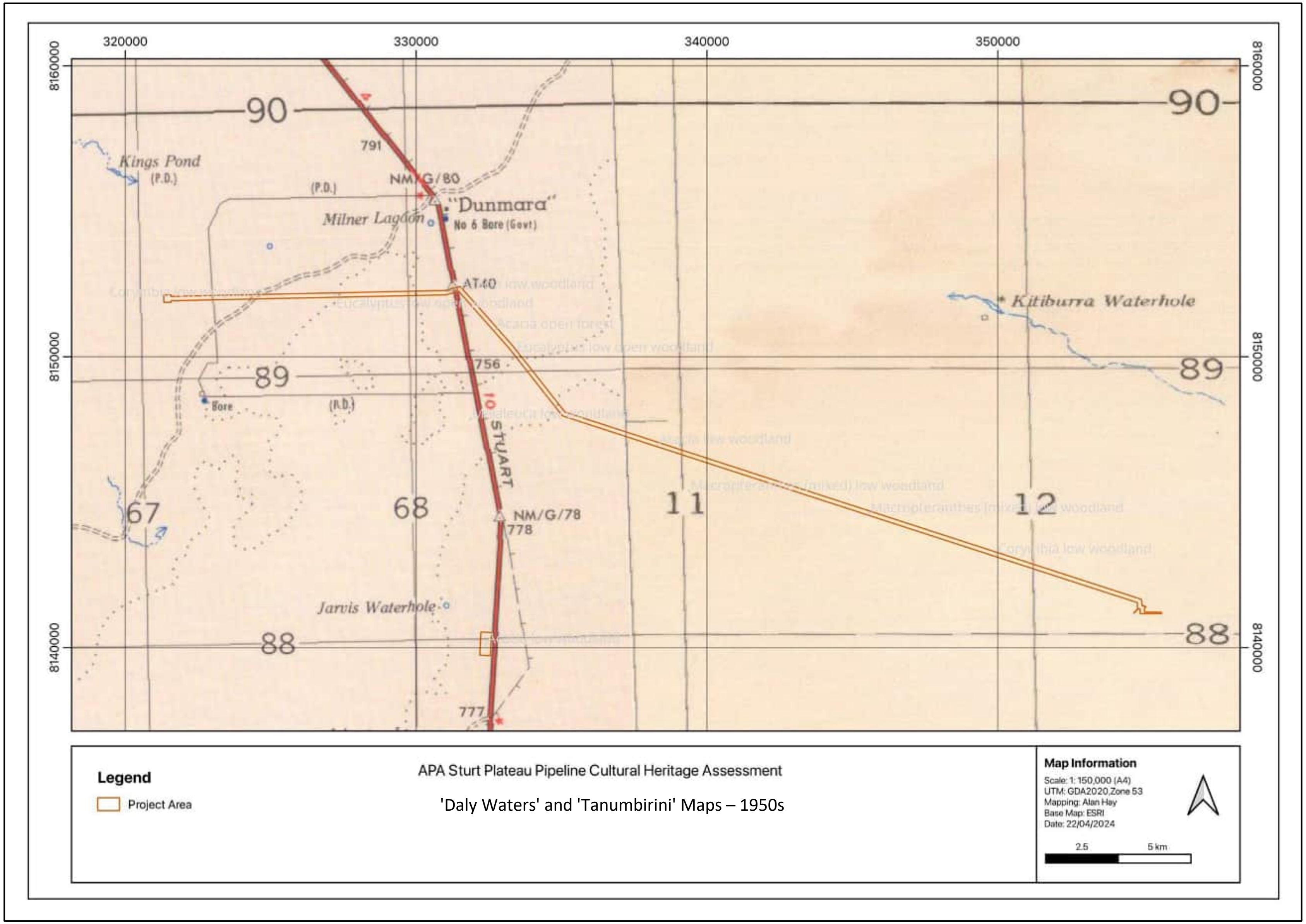


Figure 10: Overlay of the Project Area on the R502 250K Series 'Daly Waters' and 'Tanumbirini' maps produced by the Commonwealth of Australia in the early 1950s.

5 CULTURAL, ARCHAEOLOGICAL AND HERITAGE BACKGROUND

5.1 CULTURAL AND HISTORICAL BACKGROUND

A number of tangible and intangible heritage places, and objects are associated with the Sturt Plateau and the land around the study area. The sections below provide a background of Aboriginal and European history for the region.

5.1.1 Cultural Background - Land of the Kinbininggu, Bamarrngganja, Kinbininggu, Warranangku and Marlinja Peoples

Traditionally, the lands encompassing the Project Area have been inhabited and utilised by a number of Aboriginal peoples.

The lands of the Land of the Kinbininggu, Bamarrngganja, Kinbininggu, Warranangku and Marlinja Peoples span hundreds of square kilometres, occupying much of the land around the Sturt Plateau. While the boundaries between these groups are often perceived as fixed, it's important to acknowledge that they likely held more fluid characteristics in the past, evolving as a result of ongoing negotiations over land interests among Indigenous nations. Consultation has yet to occur with the Native Title holders to understand which specific estate groups, if not all, have a responsibility for the Project Areas.

Early recording of Aboriginal subsistence strategies and material culture within northern Australia was conducted by pioneering researchers such as Basedow (1907), Foelsche (1882), Thomson (1983), Spencer (1914), and Stanner (1933a, 1933b). Early accounts of Indigenous lifeways often relied on generalisations about Aboriginal social and religious structures, reflecting the values and theories of 19th-century European social, economic, and political contexts. Despite this, ethnohistoric and historical records indicate that the Indigenous communities in the greater Sturt Plateau region possessed extensive environmental knowledge. This encompassed understanding animal behaviours, migration patterns, and the utilisation of diverse technologies for hunting, fishing, and gathering. These accounts also highlight the richness of their material culture and ceremonial practices.

Resource acquisition strategies mentioned in early records from the time of European contact noted that areas such as swamps and seasonal water bodies served as vital hubs for subsistence activities. These locations offered an abundance of fish species, waterfowl, turtles, crocodiles, and shellfish. Additionally, macropods, reptiles, and other small game were hunted in areas away from water sources. A diverse range of plant-based resources were also harvested in accordance with seasonal variations. The utilisation of fire for resource procurement strategies was another aspect documented in early accounts.

AECOM (2018) have presented a number of natural resources of importance to Aboriginal people of the area Beetaloo Basin/Sturt Plateau area. These resources were identified by Traditional Owners during inspections of Origin Energy’s permit areas.

Table 6: Natural Resources of Importance (AECOM 2018).

Scientific Name	Common Name	Usage
Grewia retusifolia	Emu-berry/Dog's Balls, Turkey Bush and Diddle Diddle	Fruit eaten. Leaves can be boiled, and body bathed in the liquid for treatment of a number of ailments
Marsdenia australis	Bush Banana/Gillibi	Bush 'fruit' eaten when young, as it matures 'fruit' seeds becomes feathery for dispersal in the wind and are not eaten
Pterocaulon sp.	N/A	Used for treating flu
Acacia sp.	Acacia	Leaves boiled and used to treat the flu
Acacia holosericea	Soapbush Wattle or strap wattle	Leaves used for washing
Termite (unknown species)	N/A	Mounds pulverised and mixed with water, used to treat diarrhoea

5.1.2 Contact History

Contact history around pastoral stations in the arid centre of Australia is marked by displacement, dispossession, exploitation. Colonial impacts inflicted trauma upon Aboriginal communities, leading to cultural and land loss that persists across generations. The European presence led to population decline due to new diseases, violence, and erosion of cultural values stemming from displacement and shifting migration patterns. Indigenous individuals were forced off their lands and compelled to work on pastoral stations. changes brought about both challenges and innovative responses, with resilience and adaptation maintaining cultural traditions that persist today.

From the 1890s, European economic activities played a central role in the lives of the Aboriginal people around the Project Area. Despite the influence of European activities, the Kinbininggu, Bamarrngganja, Kinbininggu, Warranangku and Marlinja Peoples have maintained certain aspects of their traditional lifestyle up until the present day. Ceremonial activities persisted, and stone technologies remained relevant, especially for ceremonial stone spearheads and ochre production, though stone's overall relevance decreased in daily life.

The early 1970s marked a period of substantial change for Aboriginal people in the Beetaloo Basin and Sturt Plateau, comparable to the impact of colonisation. The introduction of standard wage structures led to decreased participation in the pastoral industry. The pastoral economy's incursion into the region altered mobility patterns and people's residential areas shifted to towns like Tennant Creek, Katherine, Elliot and Darwin.

Despite these many challenges, the Kinbininggu, Bamarrngganja, Kinbininggu, Warranangku and Marlinja Peoples have remained strongly connected to their land, continuing to manage land and water, safeguarding Dreamings, sacred sites, and archaeological knowledge, and participating in cultural activities.

5.1.3 European Exploration

The Stuart Highway stands as a critical transcontinental transport link within Australia, named in honour of the explorer John McDouall Stuart, whose path it traces. Emerging during World War II as a vital strategic defence road, the highway has since become an integral component of Australia's National Highway system.

In 1862, the Scottish explorer and surveyor John McDouall Stuart became the first European to complete a coast-to-coast south-north crossing through the heart of the continent. This marked Stuart's third endeavour to traverse the mainland from south to north, with his journey commencing from South Australia. His route led him north of the present-day Sturt Plateau and in early July of 1862. Stuart and his expedition eventually reached Chambers Bay, situated to the east of Port Darwin's coast, on the 24th of July, 1862.

Stuart's accomplishment was significantly aided by his navigation along traditional Indigenous trade routes, paths that Aboriginal communities had traversed for countless generations. Throughout his journey, Stuart bestowed names upon distinctive landmarks, initiating a process that would overlay the Aboriginal significance of the landscape with European interpretations.

Beyond evaluating the region's economic potential, one of Stuart's central objectives and outcomes was to chart the course for constructing the Overland Telegraph Line. This telegraph line, serving as a vital communications link between Australia and Britain, not only fulfilled this objective but also established a route for traveling stock and facilitated the expansion of pastoralism, mining, and the influx of various cultural groups into the wider region. This development concurrently laid the groundwork for the establishment of additional communication and transportation layers along the north-south inland corridor.

Sturt passed within several kilometres of the western extent of the Project Area, naming Kings Ponds to the northwest. He described the area to the east as composed of dense forest and it is likely that this included much of the current Project Area (Figure 11).

The path forged by Stuart ultimately evolved into the lifeline of the Northern Territory, serving as a conduit for supplying mining districts and pastoral stations, facilitating the transportation of cattle and goods through road trains, and catalysing the post-war era's tourism boom.

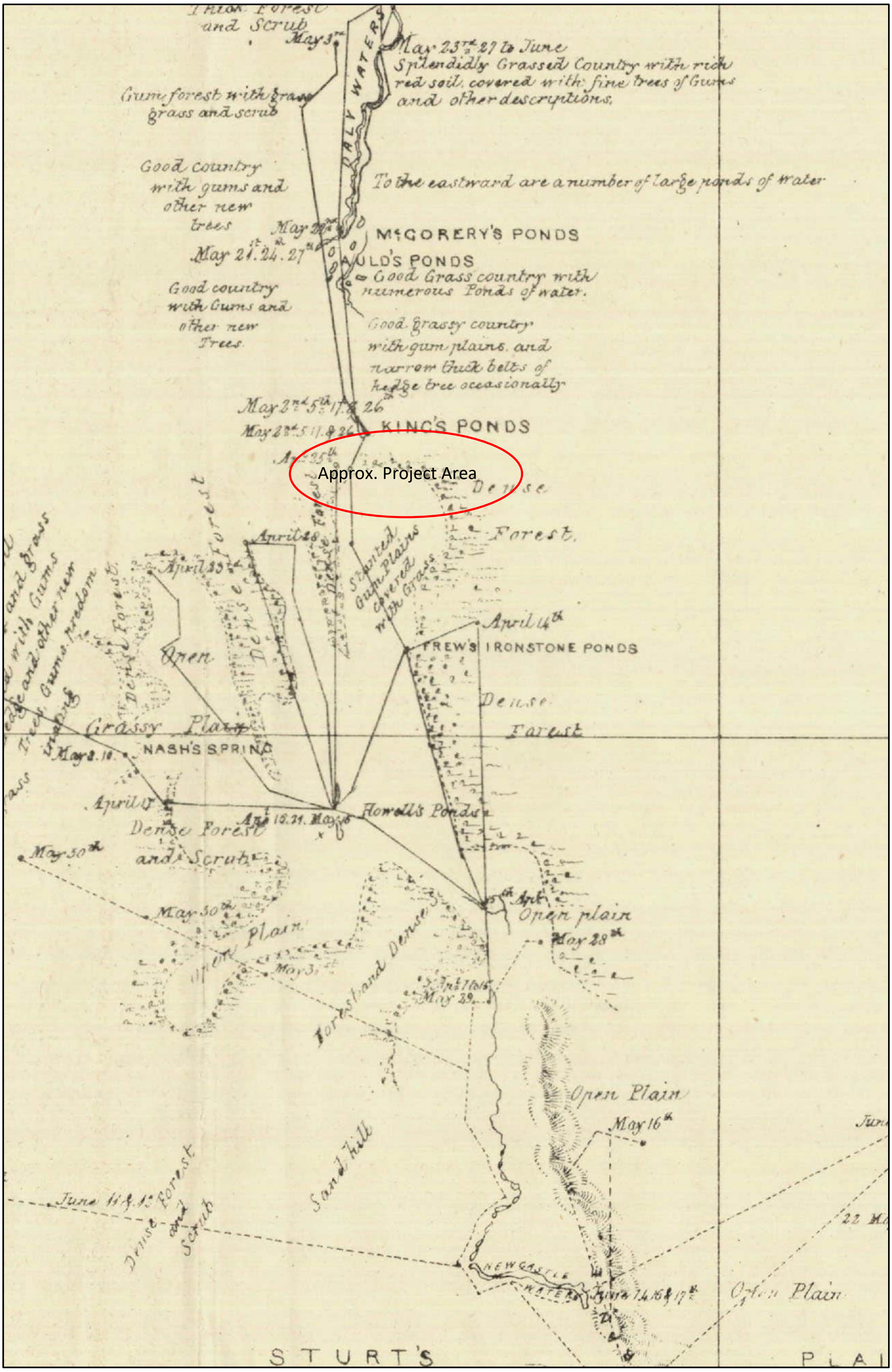


Figure 11: Map exert from Sturts Expedition, 1861 to 1862, the Project Area is in the vicinity of King's Ponds.

5.1.4 The Overland Pastoralism in the Late Nineteenth and Twentieth Century

The entry point of sustained European occupation of the land around the Project Area was the development of the Overland Telegraph Line in the early 1870s. The section of the telegraph line between Daly Waters and Powell Creek was the last to be completed in 1872 with the joining of the line at Frew Ponds (see Figure 12). This line of depots and stations across the centre of Australia served as a key access route for pastoral interest in the area that had been growing ever since McDougall-Stuart's reports or suitable grazing land in the interior.

The Murranji Stock Route, first opened in 1886 by Nat Buchannan, led to both Daly Waters and Newcastle Waters. This track contributed to the growth of pastoral stations in the area, despite the thick scrub and vegetation making the initial entry of pastoralists challenging (Origin Energy 2019:40). The coming of pastoralism in the land around the Sturt Plateau led to a greater need for roads to serve the pastoral industry alongside the stock routes and railways to nearby settlement centres that had been established during the nineteenth century (Engineers Australia n.d.:3).

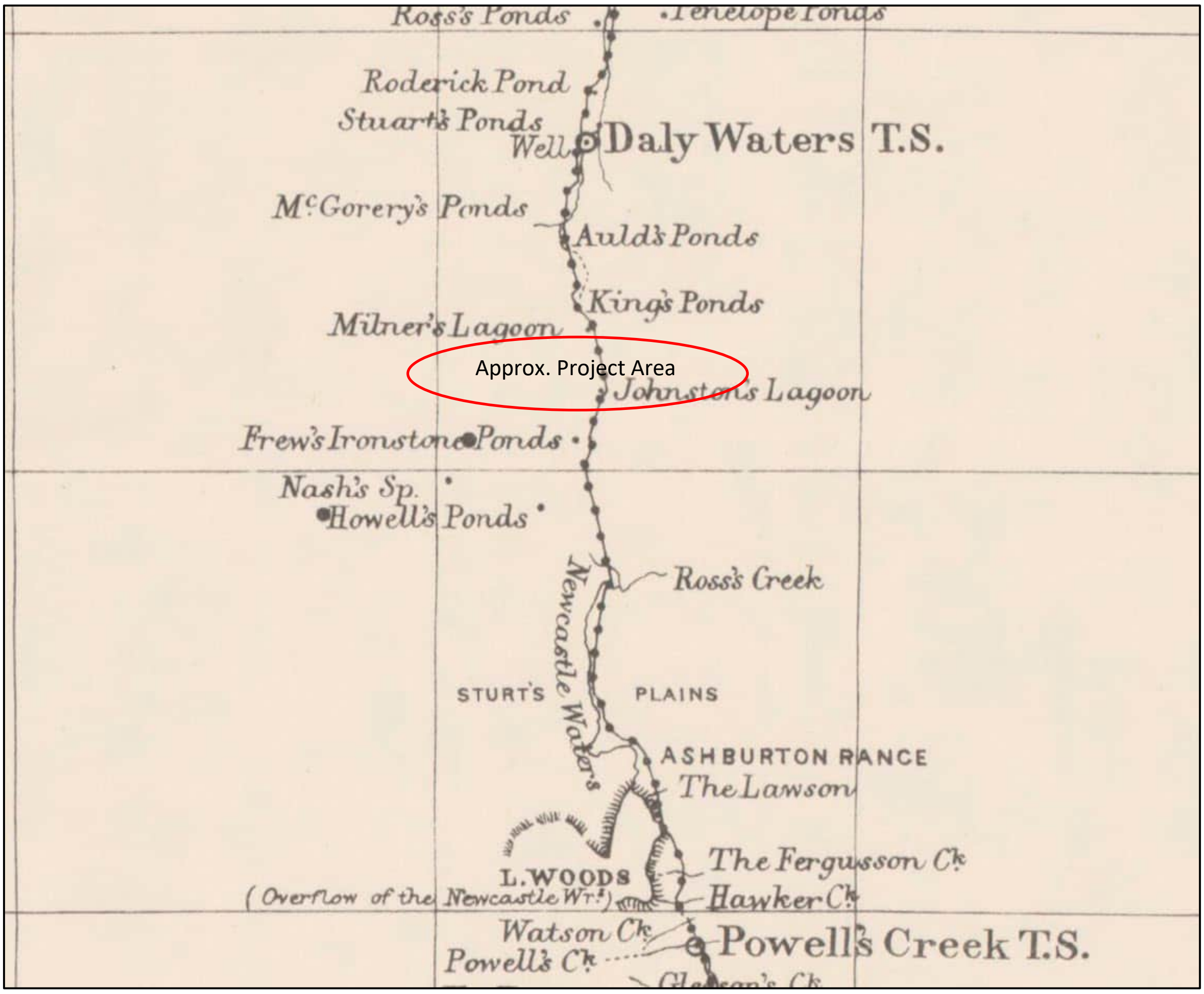


Figure 12: Map excerpt, Overland Telegraph Line 1919 (NLA 2024)

5.1.5 The Stuart Highway and Late Twentieth Century Development

Origin Energy (2019:40) succinctly summarises the late twentieth century development around the Project Area.

> It wasn't until the 1930s to 1950s, that the area saw regional economic growth with Daly Waters becoming a significant hub of air and mail services into the Territory. The wartime years saw this role increase with Daly Waters again playing a major role in cross country transport and communication. This role continued until the early 1970s when the airport was closed to commercial traffic. The town and surrounding areas subsequently reverted to a primarily agriculture-based existence following the decline of air travel, but in recent times has seen commercial interest from the exploration for gas in the Beetaloo Sub-basin and the growth of the 'grey nomad' tourism market.

The Stuart Highway constitutes the most substantial historical feature within the Project Area and it requires some further consideration. Although the first north-south crossing of the Australian interior by motorcar took place in 1908, the road that still followed closely the alignment of the Overland Telegraph Line was still little more than a rough track (Kerr 2011). A range of track surfacing, such as gravel, logs, sands and wire netting, constituted this track until the commencement of World War II (Kerr 2011). By 1941 an all-weather road had been constructed along the current alignment of the Stuart Highway and the highway had was improved throughout the latter half of the nineteenth century, being progressively sealed and bituminised, to assume its current disposition (Kerr 2011).

5.2 ARCHAEOLOGICAL BACKGROUND

5.2.1 Aboriginal Occupation of Central Australia

Aboriginal occupation of Central Australia is dated to at least 35, 000BP, through age determinations obtained at Puritjarra Rock Shelter in the Cleland Hills, 850km southwest of the SPP Project Area (Smith et al. 2017) and Kulpi Mara Rockshelter (Thorley et al. 2011) located 165 km to the east of Puritjarra. Evidence from other archaeological sites in the wider central Australian region suggest Aboriginal groups in the Pleistocene were generally small and highly mobile, using wider territories than used in the Holocene (O'Connor et al., 1998, p. 21; Smith, 1989, Smith et al., 1998; Thorley, 1998, p. 316).

Hiscock and Wallis (2005, p. 35) suggest this phase of colonisation of Central Australia most likely coincides with a period of higher rainfall, resulting in better surface water and greater abundance of resources. This notion is supported by Bowler (et al. 1998, p. 205) who suggests Lake Woods, 100 km south of the Project Area, was up to 10 times its current size during the same period (see Section 3.2.2 above). Horton (1981) proposed that paleo-drainage systems, comparable to those feeding into Lake Woods, may have acted as critical corridors allowing people to move into drying parts of Australia in the pre-Last Glacial Maximum (LGM) period. To date no Pleistocene occupational areas have been recorded in the surrounding region, however some potential has been noted at Lake Woods (Bowler et al. 1998, Shipton et al. 2021 and Smith 1986).

Increased aridity during the LGM, 20 kyr to 18 kyr BP, appears to have led to significant changes in residential mobility, territory and regional networks (Smith, 1989, Smith et al., 1998; Smith 2006; Veth, 1989, 1993, 2005b). Smith et al. (2017) argue that "over the last 12.0 kyr, there were three discrete phases of site-use at Puntutjarpa, 12.0–9.7 kyr, 8.3–6.2 kyr and ~1.1–0 kyr, each with differences in the nature and intensity of occupation". General trends across the continent appear show similar occupation patterns, with archaeological evidence also suggesting there was a strong increase in occupation activity between 9 kyr and 6 kyr, including across the arid zone (Williams et al. 2015).

During the mid-to late Holocene period of increased occupational activity (5 kyr to 3 kyr), hafted tools such as tula adzes and backed blades, along with a seed grinding economy appeared to develop in Central Australia (Smith 1986). According to Flood (1990, p. 57), more than 70 of the 140 known plant food species in Central Australia were exploited for seeds. Although a time intensive method of gaining food, the exploitation of seeds in this way is far more reliable than hunting game or gathering other plant foods. Archaeological and anthropological evidence indicates that large ceremonial gatherings were made possible because of the intensification of the exploitation of seed gathering.

Studies at Lake Woods, indicate a significant seed grind economy also existed, with grindstones being very common throughout most sites recorded (Shipton et al. 2021, p. 176). Ethnographic accounts indicate the importance of grass seed procurement and processing also existed at the time of European contact. Accounts by Ashwin (1927, p. 64 see also Shipton et al. 2021, p. 176) during his visits to Newcastle Waters, approximately 60km south of the Project Area, noted the abundance of native grass seed production:

> *There was a large mia-mia [hut], about seven feet high, in the middle and about 16 feet diameter. It was round and arched off to the ground. There were large bundles of spears stored there, and large wooden dishes four and five feet long filled with grass seed as large as rice with the husk or skin still on the seed. I think it was a species of rice which grows in the flooded country 40 or 50 miles in extent and north of Newcastle Waters. There must have been about a ton of seed stored there in 17 large dishes, full and all covered with paper-bark. The dishes were nearly all five feet long and a foot deep, scooped out of solid wood. There were more weapons and shields.*

Fluctuations in potential site use through time have not been clearly defined at Lake Woods, however in other Australian areas there appears to be a pattern of relatively rapid decline in site use around 3 kyr BP. Smith et al. (2008, p. 396) suggests this decline may represent a marked contraction of settlement and a major population crash. Others (Williams et al. 2015) support this notion, arguing the onset of El Niño - Southern Oscillation (ENSO; 4.5-2ka) may have restricted some food production, triggering population fragmentation, abandonment of marginal areas, and reduction in ranging territory. Whilst most regions recovered quickly, some evidence suggests this didn't occur in Central Australia until 1.5 cal. kyr BP. Notwithstanding a drying environment and seasonal inundations, Aboriginal occupation of Central Australia depended upon consistent access to sources of water, with evidence also suggesting readjustments in local foraging societies, in site use, economy and technology occurred through time (Smith et al. 2017, p. 10).

A number of studies (e.g. Smith 1986, 2006; Thorley 1998; Veth, 1993, 2005) suggest the last 1000 years appears to have been a period of significant change in central Australia, perhaps with shifts towards higher regional populations. Smith (2006, p. 372) and others (Smith, 1988, 1996; Thorley, 1998) have presented evidence of more intensive occupation and substantial increases in the level of site use after 1,500–1,000 B.P.; particularly in the lower reaches of catchments, in sites on sand plain and valley floors.

5.2.2 Contact Archaeology on the Stuart Plateau

The contact period refers to European-Aboriginal encounters following the colonisation of Australia by the first settlers. According to Akerman (1980:245), the main agent for contact with Europeans resulted from Aboriginal people congregating at settlements, such as pastoral stations or mining centres, where reliable water and introduced food were available. Stanner (1965:18) posits a similar scenario and suggests that people moved towards settlements and sought to monopolise their attractions.

A single likely contact site (Dunmarra Site 1 - flaked telegraph insulator) has been recorded 3 km to the north of the Project Area, although no systematic studies to understand the potential for contact features in this area has been undertaken. However, as the ethnohistorical background has indicated Aboriginal people continued to be present in this area throughout the nineteenth and twentieth centuries. As such, the potential for contact items throughout the Project Area remains a substantial possibility. Sites associated with Aboriginal people involved in the pastoral industry are likely, as are sites relating to the early period of contact during the construction of the Overland Telegraph. While some of these sites may be clearly associated with contact, such as knapping sites of ceramic or glass insulators from telegraph poles, other sites may be difficult to distinguish from other historical sites, such as stockman's camps. All historical sites may have the potential to be associated with Aboriginal people in this area with AECOM (2018) observing that such sites have the potential to occur in 'concentrations of sites nearby to old homesteads'.

5.2.3 Previous Archaeological Studies

There have been a number of academic and consultancy-based studies in arid zones across the Northern Territory, however the SPP Project Area has been subjected to limited previous known archaeological research to date. Table 7 (see also Figure 13) below, summarises the known archaeological studies which have included some adjoining land units within 25 km of the SPP.

Table 7: Summary of previous archaeological studies within 25 km of the SPP

Study Area	Previous Study Summary	Reference
Beetaloo Basin	Sampled areas across Yaroo, South Martyrs Tree, and Dunmarra to develop a preliminary regional predictive model. Potentially transected some sample areas adjacent to the SPP Project Area but survey coverage appeared to be limited.	de Rochefort and Williams 2008
Stuart Hwy Easement	Surveyed areas along the Tennant Creek to Katherine optical fibre cable route. Surveys transected associated land units within parts of the Stuart Highway easement which intersect the SPP Project area.	Coates 1991
Dunmarra	Unknow extent of previous survey, however a single isolated artefact was recorded at Dunmarra Roadhouse (2.2 km north of the SPP).	Macfarlane pre-1997
Amadeus Basin to Darwin Gas Pipeline	Survey of the Amadeus Basin to Darwin Gas Pipeline focusing on key areas of major cultural sensitivity.	Hermes 1986

	Likely transected areas near the SPP and Amadeus pipeline tie-in point.	
Origin Energy Leases	Focused on surveying proposed exploration lease areas known as Kyalla 117 N2 (3km SE of the SPP), associated access tracks and seven other lease areas more than 25 km from the SPP. The access track running north from Kyalla 117 N2 (approx. 500 m east of the SPP CPU) was also inspected. The surveys included helicopter reconnaissance, vehicle and pedestrian transects. The helicopter reconnaissance inspections flew some routes north/south across the eastern margins of the SPP Project Area.	AECOM 2019 (Surveys completed 2017)

Figure 13: Previous cultural heritage assessment areas

The abovementioned studies identified a total of seven archaeological features within a 25 km radius of the SPP. Given the limited scope of these studies, any conclusions drawn about site variability and past landscape use patterns should be approached with caution, as they are likely to be significantly influenced by the small sample size. Nevertheless, this preliminary assessment of archaeological potential serves an exploratory purpose. It aims to discern initial patterns of site distribution, laying the groundwork for targeted ground surveys and the development of a refined predictive model.

In brief, these previous archaeological studies conducted in the surrounding area suggest that isolated stone artefacts may be the most frequently encountered site type, with stone artefact scatters and contact artefacts appearing less common. This distribution could potentially indicate that the surveyed areas were used for transient activities or brief occupations, rather than long-term settlements, though further investigation would be needed to confirm this hypothesis.

A higher number of sites were recorded in the Birrimbah land system compared to the Beetaloo system. This pattern might suggest more frequent utilisation of the Birrimbah area or potentially better preservation of archaeological sites within this system, although other factors could also account for this distribution, such as survey area locations.

The vegetation communities associated with the recorded sites appear diverse, with Acacia woodland/forest seemingly present at a significant portion of the sites. Regarding surface geology, the sites appear to be fairly evenly distributed between Colluvium and Ferruginous Duricrust, with a small number of sites having unrecorded geology. This distribution might indicate that both these geological contexts played a role in prehistoric activities or site preservation, though more comprehensive surveys would be needed to draw firm conclusions.

Where site context was recorded, proximity to water resources seemed to be associated with a notable number of features. The recording timeline of the sites spans from 1986 to 2017, which could also reflect changes in survey intensities or methodologies over time, rather than necessarily indicating patterns of prehistoric landscape use.

Table 8: Previously recorded archaeological features within 25 km of the SPP

Site Name	Site Type	Year Recorded	Site Context	Land System	Vegetation Community	Surface Geology
Johnson Lagoon Site 1	Isolated stone artefact	1991	Unknown	Beetaloo	Acacia mid open forest	Colluvium
Johnson Lagoon Site 2	Stone artefact scatter	1991	Unknown	Beetaloo	Acacia low woodland	Colluvium
Dunmarra Site 1 - flaked telegraph insulator	Flaked telegraph insulator	Unknown	Unknown	Birrimbah	Acacia mid open forest	Ferruginous Duricrust
Dunmarra 1	Isolated stone artefact	2006	Creek bank	Birrimbah	Lysiphyllum low open woodland	Colluvium
Yaroo 3	Isolated stone artefact	2006	Creek bank	Birrimbah	Acacia low woodland	Ferruginous Duricrust
Yaroo 3a	Isolated stone artefact	2006	Creek bank	Birrimbah	Acacia low woodland	Ferruginous Duricrust
Yaroo 3b	Isolated stone artefact	2006	Creek bank	Birrimbah	Corymbia low woodland	Colluvium

Figure 14: Site distribution within 25km of the SPP Project Area

To assist in developing a more robust predictive model for the SPP, the following studies within the Central Australia region have also drawn upon.

Wolfe and Keys (2021) completed an assessment of the Sun Cable Australia-Asia PowerLink, Solar Precinct near Lake Woods, approximately 160km to the south of the SPP Project Area. This assessment provided a detailed archaeological background of the known archaeological record for some comparable land units to those around the Project Area e.g. watercourses and flood out systems, clay pans and drainage depressions and comparable ecological and geological units.

The survey documented 13 archaeological sites and 26 isolated artefacts. The majority of the sites were of Aboriginal origin, comprising minor lithic scatters (6 sites), minor stone quarries (3 sites), and drainage depressions/soaks (3 sites). In addition to the archaeological sites, 13 landscape features of cultural significance were recorded. These primarily consisted of watercourse and geological features such as boulders.

The artefact assemblages were predominantly composed of flaked stone materials. Raw materials included chalcedony, quartzite, silcrete, chert, and sandstone, with quartzite and chalcedony being the most common. The presence of knapped glass and ceramics at the Powell Creek Telegraph Station site indicates that stone tool manufacture continued into the 20th century in this area.

The distribution pattern of archaeological materials showed a clear correlation with water sources and suitable raw material outcrops such as quartzite and lag deposits of gravels. Water sources containing sites, included ephemeral flood out zone, watercourses/drainage lines and shallow claypans that typically only held water for very short periods of time. Some claypans show signs of potential enhancement by Aboriginal people, through digging the low points deeper to potentially exploit subsurface water and/or trap surface water for longer periods.

These site distribution patterns are consistent with observations from other arid regions of Australia, reflecting adaptations to the challenging environmental conditions. Conversely, areas lacking water sources or suitable stone materials showed a marked absence of archaeological materials.

In the wider region, Stockton (1971) recorded some of the largest site complexes in central Australia at Santa Teresa in the Ooraminna Ranges 800km southeast of the Project Area. The “Kurringke” site (Stockton 1971) consisted of extremely dense scatters stone artefacts, including more than 100 grindstones, near a waterhole. The Kurringke archaeological deposit was 35-70 cm deep, which largely consisted of aeolian sand overlain by sterile rubble. Archaeological materials included, bone, ochre, while the greatest quantities were flaked stone artefacts and millstone fragments. A C^{14} age determination suggested occupation of the site started approximately 1000 BP.

Mitchell (1996) surveyed the road reserve from Alice Springs to Hermannsburg in August 1996 for Telstra prior to the installation of an optical fibre cable. This survey located one archaeological site (near Jay Creek) and a number of isolated artefacts. Mitchell (1996, p. 9) commented that the isolated artefact density ranged from 1:1100 m2 to 1:16,000 m^2 along the section of road reserve surveyed in 1996. Thorley’s survey of the Watarrka Mereenie Road located 35 isolated artefacts. Of these, only one occurred on a sandplain. Thorley (1993, p. 10) noted that the density of isolated artefacts drops sharply away from creek lines.

Thorley’s 1991 survey of a number of Central Australian Roads locating approx. 280 archaeological sites and isolated artefacts (Thorley 1991, p. 46). Based on these surveys, Thorley calculated an average artefact or site density of 1: 136,000 m2 for the region. 72% of these sites and artefacts were within 500 metres of a permanent water source. Of the remaining 28% most were associated with quarry sites; hence the proximity of the raw material source was the main condition for location.

Earthsea Pty Ltd (Richard Woolfe) conducted archaeological surveys for a number of Central Australian road upgrades including the Mereenie Loop, along the Stuart Highway, parts of the Kintore Road and along the Plenty Highway (see discussion on this survey below). On the Palmer River south of Alice Springs, the author recorded a total of 12 stone artefact scatters. Eleven of these sites were located along the western side of a sand dune approx. 200 metres from the eastern bank of the Palmer Riverbed. Woolfe suggests while these sites were identified as individual sites for recording purposes, their location and the existence of a background scatter across the western side of the dune indicated that these sites were related. Artefact types included cores, flakes, hammer stones and manuports. Raw materials included sandstone, chert, silcrete and quartz.

Earthsea Pty Ltd undertook extended lineal surveys for two pipelines. One extending 400km across parts of the Tanami Desert north of Alice Springs and the other extending 670km from Tennant Creek through to Mt Isa. Both study areas incorporated significant expanses of desert/arid land units, with the following consistent patterns for the location and types of sites recorded.

- There was a complete absence of any artefactual material in arid land units without water.
- The density and variability of artefact types increased significantly in areas with permanent availability to water.
- The density or artefacts also increased in areas of raw material availability for the manufacture of stone artefacts.
- Sites recorded in the more arid land units away from more permanent water sources were generally small with limited diversity in raw materials and artefact types.
- Site sizes and artefact types increased significantly in areas with greater resource availability and higher annual rainfalls.

6 HERITAGE REGISTER SEARCHES

This chapter presents a detailed overview of the cultural heritage sites and objects located within and immediately adjacent to Project Area. Identification of these features has resulted from reviewing statutory registers and database listing.

6.1 NATIONAL AND COMMONWEALTH HERITAGE LISTS

According to a search of the Australian Heritage Database, maintained by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), there are no Aboriginal, historical, or natural places listed on the World Heritage List, the National Heritage List, the Commonwealth Heritage List, or the Register of the National Estate within the Project Area.

6.2 NORTHERN TERRITORY ARCHAEOLOGICAL SITE DATABASE AND NORTHERN TERRITORY HERITAGE REGISTER

A request for information from the Northern Territory Heritage Branch relating to the Project Area resulted in a response on the 25 June 2024 (Sarah Hubbard, Senior Heritage Officer, Heritage Branch *pers. comm.*):

> The search has found that there are no known Aboriginal or Macassan archaeological places within the subject site. However the likelihood of possible unrecorded Aboriginal or Macassan archaeological places has been assessed as possible or likely. The extent of pre-existing disturbance and the nature of the work itself has also been considered.
>
> Given the presence of water channels within the project footprint and archaeological material located within the immediate area the Heritage Branch recommends that an archaeological survey and cultural heritage management plan are required to identify and mitigate the impact to Aboriginal or Macassan archaeological places. Known archaeological sites within the broader area include stone artefacts found along the same water channels present within the project's footprint.

Additionally, the response to the request for information indicated that there were no declared sites on the Northern Territory Heritage Register within close proximity to the current study area.

The closest previously recorded archaeological place, Dunmara Site 1 (flaked telegraph insulator), is located 2.2 km north of the SPP corridor near the Dunmarra Roadhouse.

The nearest Declared heritage site, the 'Frew Ponds Overland Telegraph Line Memorial Reserve', lies 17 km south of the proposed SPP corridor and 10 km south of the temporary construction camp.

6.3 ABORIGINAL AREAS PROTECTION AUTHORITY (AAPA) RECORDS

APA does not currently hold an Aboriginal Areas Protection Authority (AAPA) Authority Certificate for the proposed SPP Project Area but has advised the author that a certificate is being sought prior to construction commencing.

An AAPA Abstract of Records was provided to APA on 28th August 2023, encompassing Pastoral Leases (including Hayfield and Shenandoah Stations) which are the subject of petroleum interests (See Appendix 1). The Abstract shows a number of registered and recorded sacred sites and sacred site restricted work are located within Hayfield and Shenandoah Stations and the Stuart Highway, however none lie within the proposal SPP Project Area (see Figure 15). The Abstract of Records also shows that a number of Authority Certificates have been held over the Project Area previously.

[redacted]

It should be noted that an Abstract of Records, is not an exhaustive list of sacred sites in the area. There may be other sacred sites in the parcel of land of which the Authority is not yet aware which would be identified through the Authority Certificate process.

Figure 15: AAPA Abstract of Records Extract Map (202310005)

7 ARCHAEOLOGICAL PREDICTIVE MODEL AND RISK ASSESSMENT

7.1 ARCHAEOLOGICAL PREDICTIVE MODEL

The environmental, historical, and archaeological background research conducted for this report has identified several potential patterns in the distribution of archaeological sites within the surrounding landscape. While biases in archaeological investigation, which typically align with late 20th and early 21st-century development patterns, may influence the results, significant correlations between land systems and site distribution have been observed. Although only seven archaeological sites have been previously recorded in the surrounding landscape, general site distribution patterns from broader archaeological research remain applicable to this study. Consequently, it is possible to formulate preliminary predictive statements about the landscape characteristics underlying the SPP Project Area and the probable disposition of cultural heritage materials within it:

1. The riparian zone of all water features, particularly the large seasonal lake system, the first-order stream, and claypans in the eastern margins of the SPP corridor, would have been important seasonal occupation areas for Aboriginal people.

   Therefore, Archaeological sites and artefacts are likely to be concentrated in these zone and adjacent areas up to 200 m away.

2. There may also be complete absence of artefactual material in arid land units without water.

3. The diverse geology of the Project Area offers varying potential for past land use and resource exploitation by Aboriginal People:

   a) Alluvium and colluvium zones have high potential for containing raw materials suitable for tool production, likely attracting ancient populations for resource procurement.
   b) Sediment formations, particularly those containing mudstone, chert, quartz, and other fine-grained siliceous rocks, have high potential for lithic assemblages and associated sites.
   c) Black Soil Plains generally have lower potential for lithic resources, except in areas subject to streambank overflow or flooding, where raw materials may have accumulated.
   d) Ferruginous duricrust areas have lower potential for containing suitable toolmaking materials but may have been used for other purposes or as transit zones.

4. Given the importance of seed gathering in the wider arid regions of Central Australia, areas suitable for grass growth, particularly in the Black Soil Plains (Atlas_II6 land system), have potential for containing archaeological evidence of seed processing on their margins, such as grindstones.

5. Given the general absence of outcropping rock shelves or land units with rock shelters within the SPP Project Area, it is unlikely that rock art sites or large quarry complexes will be present.

6. There is potential for archaeological deposits in land units subject to sediment accumulation, particularly in flood out zones and if sand dunes persist on the margins of the lake system.

7. Contact period archaeological sites may be present, particularly in areas associated with early European activities such as pastoralism, the Overland Telegraph Line, or along early track networks.

8. Areas of concentrated historical disturbance, such as along the Stuart Highway corridor and other constructed tracks, have lower potential for intact archaeological sites but may contain evidence of early contact period activities.

9. Diffuse disturbance from introduced animals and invasive plant species may have altered erosion patterns across the landscape, potentially affecting site preservation and visibility. This impact is likely to be intensive for riparian zones.

10. The most common site types are likely to be:

    a) Isolated stone artefacts
    b) Stone artefact scatters
    c) Quarry sites (in areas with suitable lithic materials)
    d) Grinding sites (particularly in areas suitable for seed-bearing grasses)

11. Sites recorded in land units away from more permanent water sources are likely to be small with limited diversity in raw materials and artefact types.

12. The most common raw materials for stone artefacts are likely to be quartz, chert, silcrete, and quartzite, with potential for other materials depending on local geological resources.

13. There is some potential for remnants of the Overland Telegraph Line or other historic artefacts within the SPP corridor and adjoining land units.

7.2 Archaeological Risk Assessment

7.2.1 Risk Assessment Methodology

Construction for the APA SPP will involve varying levels of ground disturbing activities, which include but are not limited to:

a) **Vegetation Clearing:** Removal of trees, shrubs, and other plant life to prepare the land for construction operations. This clearing will likely encompass a 30 m wide right-of-way (RoW) for the 37 km length of the SPP, coupled with extra workspaces, a cathodic protection unit and a temporary accommodation facility.
b) **Grading and Levelling:** Earthmoving activities to create a level surface for construction or to prepare the site for further development.
c) **Establishment of Access tracks:** Creation of temporary or permanent roads and tracks to facilitate movement of vehicles, equipment, and materials.
d) **Soil Excavation:** The initial digging or removal of topsoil to create development areas, access roads etc.
e) **Trenching and horizontal directional drilling (HDD):** Trenching activities to a depth of 1.2 m for the laying of the pipeline and horizontal boring of the Stuart Highway. Additional excavation will be required at the Sturt Plateau Facility (delivery station) and cathodic protection anode bed in the eastern end of the pipeli.

The Project therefore has potential to impact upon cultural heritage features protected under the provisions NT *Heritage Act 2011*.

Accordioning, the following risk assessment methodology considers the potential risks that archaeological features or heritage values are located within specific land units of the SPP Project Areas. The risk assessment for the SPP Project Area draws upon the background archaeological studies, surface geology, land system, topography, hydrology and ecology as presented in the predictive model above. The results of this risk assessment are presented in Figure 16 below. Recommendations to manage these risks are presented in Section 8.

Table 9: Risk Assessment Methodology

Likelihood Rating	Descriptors (Probability Level Descriptors)	Potential Archaeological Site types
Certain or Almost Certain	Expected to occur in most circumstances.	• Stone artefact scatters • Isolated artefacts • Hearth features • Quarries • Other features associated with occupation sites and/or cultural practices
Likely	Probably occur in most circumstances.	
Possible	Could occur sometime.	• Isolated artefacts • Low density artefact scatters
Unlikely	Not expected to occur.	• No archaeological feature likely

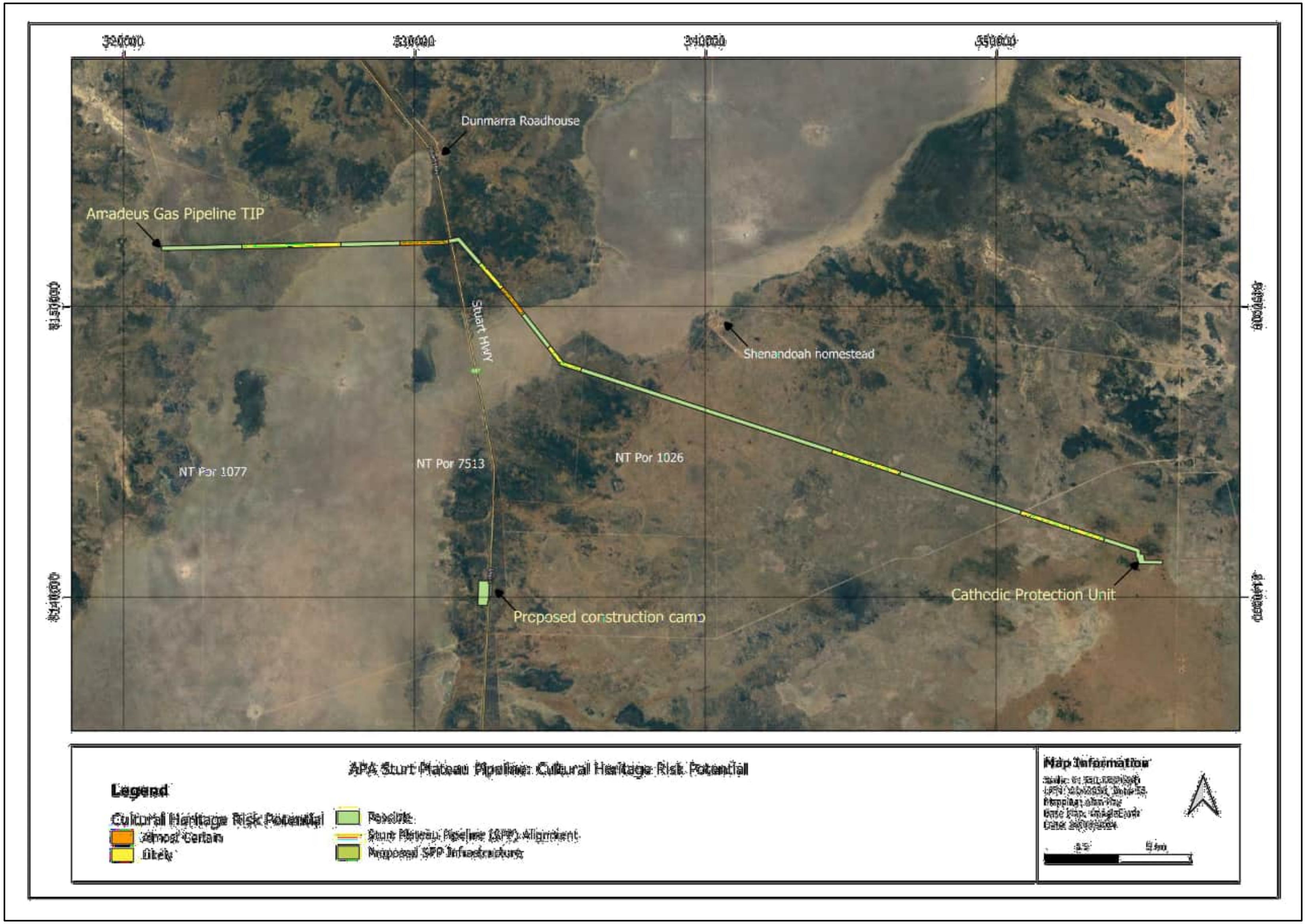


Figure 16: Comparative gradings of risk within the Project Area.

8 PROJECT RECOMMENDATIONS

Based on the above risk assessment and predictive models, the following recommendations are made for the identification and management of sacred sites and archaeological features within the SPP Project Areas:

1. To minimise potential impacts to Sacred Sites, it is recommended that APA obtain a Sacred Sites Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989* (NT) prior to construction activities. It is noted that APA has applied to AAPA for a Sacred Sites Authority Certificate.

   The location of sacred site Restricted Works Areas and their conditions should be made available to all authorised personnel to ensure compliance with the Certificate.

    a) In the interim, all recorded and registered sacred site should be avoided, including those that encompass pastoral access tracks.

2. APA should aim to avoid impacts to heritage places, protected by the *NT Heritage Act 2011* where practicable. To ensure compliance with the *Heritage Act* the following process should implemented:
    a) Undertake an archaeological field assessment of the SPP Project Areas prior to final SPP alignment and construction activities. It is noted that these assessments have been scheduled by APA, with the outcomes informing the SPP's final alignment. APA have committed to site avoidance as a priority where possible.

    b) The archaeological field assessment coverage of the SPP Project Areas should be undertaken as per the following risk ratings[4]:

        i) Areas with "Almost Certain Risk" should be surveyed at 100% coverage.

        ii) Areas with "Likely Risk" should be surveyed at 100% coverage.

        iii) Areas of "Possible Risk" should be sampled at least 50% coverage to improve the predictive model for those areas.

    c) Following the field assessment, a short report and associated constraints mapping should be developed to present the outcomes of the field assessment. This report should also include a series of recommendations for the management of cultural heritage features in accordance with best practice and Traditional Owner consultation.

    d) APA should develop measures to protect, manage and report inadvertent discoveries of cultural heritage finds, such as:
        i) Discovery of Aboriginal archaeological sites and objects, and
        ii) Discovery of human remains.

3. APA should ensure Traditional Owners/Site Custodians are engaged in heritage management decision making.

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[4] It is noted that infield observations may conflict with the desktop assessment. The field archaeologist should always adapt their survey coverage to the field conditions.

4. APA should implement workforce training and inductions for all staff and contractors working on the SPP, which include:
    a. Cultural awareness.
    b. Cultural heritage protection.
    c. Protocols for the management of Aboriginal archaeological Sites.
    d. Identification of Aboriginal archaeological Sites.

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APPENDIX 1: AAPA ABSTRACT OF RECORDS

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Attachment 10 – Heritage Field Assessment (CONFIDENTIAL)

Disclaimer: This report is not publicly available because it contains culturally sensitive information and third-party personal information.

Attachment 11 – Pre-referral Screening Tool

Stuart Plateau Pipeline

Pre-Referral Screening

APA SPP Pty Ltd

Level 12, 80 Ann Street,
Brisbane
QLD 4000

Prepared by:

SLR Consulting Australia

Unit 5, 21 Parap Road, Parap NT 0820, Australia

SLR Project No.: 680.030274.00001

17 October 2024

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0.1	27 September 2024	Natalie Calder	Jill Woodworth	
1.0	17 October 2024	Natalie Calder	Jill Woodworth	Craig Smith

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with APA Group Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

APA SPP Pty Ltd (APA) proposes to construct and operate the Sturt Plateau Pipeline (the Project). The Project will receive gas from Tamboran B2 Pty Ltd's (Tamboran's) approved Beetaloo Basin Shenandoah South Exploration and Appraisal Program and transport it to the AGP. The Project is located approximately 50 km south of Daly Waters, and 80 km north of Elliott, in the Roper Gulf Region of the NT.

The AGP, APA Group's existing bidirectional gas pipeline, extends from the south of the NT to Darwin (in the north), transporting natural gas to Darwin, Alice Springs, and regional centres, primarily for power generation.

The Disturbance Footprint for the project is defined as the Project's combined construction footprint and is approximately 146 hectares (ha) comprising:

- the construction right of way (CROW) for the Sturt Plateau Pipeline.
- construction footprints for the Shenandoah Facility and Sturt Plateau Facility.
- the temporary construction camp, and
- additional work areas (including truck turnarounds, vegetation storage, horizontal bore entry and exit locations, and line pipe storage areas) required to facilitate construction.

The Disturbance Footprint is located within the larger Project Area comprising a 500 m wide corridor for the proposed pipeline, land for surface facilities at the start and end of the pipeline and the temporary construction camp.

2.0 Purpose

In accordance with the Northern Territory (NT) *Environment Protection Act* 2019 (EP Act) and the *Environment Protection Regulations 2020* (EP Regulations) an activity must be referred to the NT Environment Protection Authority (EPA) if the activity is inherently hazardous or has to the potential have a significant impact on the environment. The potential for a significant impact is assessed by the context and intensity of the proposed activity's impact and the sensitivity value and quality of the environment proposed to be impacted (considering the duration, magnitude and geographic extent) by s 5 of the EP Act. The impact may be direct, indirect or cumulative (s 10 of the EP Act).

The NT EPA pre-referral screening tool as Appendix 1 to the *Environmental Impact Assessment Guideline for Proponents; Referring a Proposal to the NT EPA* (NT EPA 2022a) has been completed. In completing the pre-referral screening tool the *NT EPA Environmental Factors and Objectives* (NT EPA 2022b) have been considered.

3.0 Pre-Referral Screening

3.1 Part 1 – General Screening Questions

The pre-screening questions that inform the screening tool are provided in **Figure 1** (NT EPA 2022a) are summarised below:

- Question 1: Is the industry type or activity inherently dangerous?
- Question 2: Does the site have or is likely to have environmental values that can be impacted (directly, indirectly or cumulatively)?

- Question 3: Will the activity directly impact the area of influence and the region's environmental values through construction and operation from scheduling, inputs and outputs?
- Question 4: Following completion of the activity will ongoing impacts or residual impacts occur to environmental values?
- Question 5: Is there potential for cumulative impacts to environmental values with other proposals and actions?

3.2 Part 2 – Checklist

The NT EPA Pre-referral screening tool checklist (NT EPA 2022a) has been completed in **Table 1** considering the context and framework of the NT EPA's environmental factors and objectives (NT EPA 2022b).

Figure 1 Pre-referral screening tool Part 1 Screening questions for the Project (NT EPA 2022)

1	Is the industry type or activity proposed inherently hazardous with the potential to give rise to multiple or major impact sources and environmental stressors with the potential to impact on the environment? If so, does the nature of the industry preclude impact sources and stressors being substantively reduced?	Yes	Refer action
		No	
2	**Site selection:** Are any *environmental values* present, or likely to be present within the site/area that has the potential to be impacted by the proposal (either directly, indirectly, or cumulatively)? If so, is it considered impractical to change the locations or design of the action to avoid the *environmental value/s*?	Yes	Refer action
		No	
3	**Construction and operation:** Are any *environmental values* or sensitivities within the area of influence and the region in which the proposal is located likely to be impacted by methods of construction and operation, timing, or inputs (water, raw materials, machinery, chemicals, staff) and outputs (product, emissions, discharges, wastes) of the proposal?	Yes	Refer action
		No	
4	**End of life:** Are any *environmental values or sensitivities* likely to be impacted when the proposal finishes its functional life and closes? If so does the action have the potential to cause ongoing environmental impacts, or residual impacts?	Yes	Refer action
		No	
5	**Cumulative impacts:** At any stage of the life of the proposal, on its own or cumulatively with other proposals and actions, does the proposal have the potential to impact an *environmental value*? If so, referral is likely to be required.	No	Refer may no be required

Table 1: Pre-referral screening tool Part 2 – Checklist for the Project (adapted from NT EPA 2022a)

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
Is the industry type or activity proposed inherently hazardous with the potential to give rise to multiple or major impact sources and environmental stressors with the potential to impact on the environment?				Q1		Q2	Q3	Q4	Q5	
				Yes No	☐ ☒					
Land	**Landforms** <u>Objective</u>: Conserve the variety and integrity of distinctive physical landforms.	There are no know craters, gorges, ranges, caves, massifs, escarpments, plateau's, monuments or tourism related to landforms within the Project area.	The Project is located within the Sturt Plateau Bioregion in the Carpentaria Basin. The bioregion comprises flat to gently undulating plains, with little local relief.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	The topography of the project area is relatively flat without distinctive physical landforms. The Project will therefore not have a significant impact on the variety and integrity of distinctive landforms. No further assessment is required.
	Terrestrial Environmental Quality <u>Objective</u>: Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	• The Project is located within an area of low to moderate erosion risk. • The Project area is generally moderately well to well drained with moderately to highly permeable soils. • Slopes across the Project area are generally less than 2% with generally slow to very slow run off. • Soils in the project area are generally categorised as: ○ Czs: Red, yellow and brown clayey soil; residual sand; some ferruginous rubble. ○ Czb: Dark grey and brown clayey soil. • The pH, salinity and sodicity of topsoil is within the optimal range to promote revegetation. • Historic land use is primarily pastoral with low risk of contamination. • The Project is a linear infrastructure Project with a total disturbance footprint of approximately 150 ha. • Construction will be staged with works commencing at one end of the pipeline and progressing in one direction to the other end of the pipeline. • The construction methodology involves the selective stripping of soils with stockpiles of topsoil and sub-soils to be separated to prevent mixing. Sub-soils will be reinstated in the pipeline trench and covered with topsoil to ensure adequate depth of top soils is achieved to promote revegetation. • Disturbed areas will be rehabilitated progressively as works progress from one end of the pipeline to the other end. • Construction of the Project is planned to occur during July-November when rainfall in the region is generally low. • There is low risk of acid sulfate soils.	Sections of the Project area intersect habitat units (i.e. seasonally inundated black soil plains) that are characteristic of the Mitchell Grass Downs bioregion. The majority of the Project area is relatively undisturbed with no history of potentially soil contaminating activities. The surrounding land is used for pastoral purposes to support cattle grazing.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Inherent impacts: • Clearing of vegetation providing stabilising surface cover increasing the risk of erosion • Excavation of soils • Potential accidental spills/loss of containment of fuels and chemicals resulting in hot spots of contamination. The impact to the quality and integrity of land and soils from the Project is not considered to be significant because: • The Project is not located within an area of high erosion risk • Soil properties are within the optimal range for revegetation success • The Project is linear in nature with a discrete disturbance footprint that traverses a range of land units • Climatic conditions at the time of construction will reduce the potential for soil loss due to rainfall • Construction methodology will reduce the risk of adversely impacting soil quality and integrity • The Project is not an inherently contaminating activity • Accidental spills or loss of containment of fuels or chemicals will not result in significant environmental harm. The Project will therefore not have a significant impact on the quality and integrity of the land and soils. No further assessment is required.

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
	Terrestrial Ecosystems <u>Objective</u>: Protect terrestrial habitats to maintain environmental values including diversity, ecological integrity ecological functioning.	• No TPWC Act or EPBC Act threatened or migratory species were identified during the 2024 ecology survey. Three threatened species were observed incidentally in the Project area. Eight species have been determined to have a moderate or high likelihood of occurring within the Project area. • No TPWC Act or EPBC Act listed threatened flora or ecological communities occur within the Project area. • No groundwater-dependent ecosystems (GDEs) are present within the Project Area, or likely to be impacted by the works. • 158 native flora species and 119 native fauna species were observed during field assessment of the Project Area in May/June 2024. • Introduced flora species occur within the Project area commensurate with those occurring with the surrounding land use (cattle grazing) isolated to existing tracks and areas of prior surface disturbance. • One introduced animal species (feral cat) was observed in Survey Area. • A desktop search returned nine declared weeds (under the *Weeds Management Act 2001*) as potentially being present on site. • The Project area intersects a low potential groundwater dependent ecosystem. • Frew Ponds Historical Reserve is the only park or reserve that occurs within 30 km of the Project area. The Project is ~9.6 km from the Reserve and as such the Project will not impact the Reserve. • There are no Sites of Conservation Significance or Sites of Botanical Significance within 30 km of the Project area. • An estimated 70 ML of water is required for construction and will be sourced from existing and new bores within the Project area and from outside of the Project area from bores owned by Tamboran. • The high-level fauna noise assessment indicated that fauna (including domesticated mammals) exposed to the predicted construction noise are unlikely to experience adverse impacts.	The Project area is located within the Sturt Plateau Bioregion. TPWC Act and EPBC Act listed threatened species occur within the vicinity of the Project area but were not observed within the Project area itself. Habitat potentially supporting threatened species occurs within the Project area. Sensitive and/or significant vegetation (wetlands and riparian vegetation) are present within and adjacent to the Project area.	Yes No Uncertain N/A		☐ ☐ ☒ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Inherent impacts: • Direct removal of native vegetation and fauna habitat • Mortality of fauna species and impacts to threatened species breeding places. • Introduction of pest flora and fauna species. The impact to terrestrial ecosystems from the Project is considered to be significant because: • Up to 22 ha of sensitive and/or significant vegetation (riparian vegetation) will be cleared during construction of the Project. The terrestrial ecosystems environmental factor requires further consideration because there will be unavoidable impact to sensitive or significant vegetation.
Water	**Hydrological Processes** <u>Objective</u>: Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land	• Project area topography is slightly undulating and drainage paths are undefined. Surface runoff typically occurs as shallow overland flow with ponding observed along minor drainage paths.	The implementation of effective control measures on stormwater runoff or receiving water quality will ensure that the potential water quality impacts of the Project will be adequately managed during the Project's construction and decommissioning phases.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Inherent impacts: • Diversion of stormwater flows by backfilled pipeline trench • Surface facilities are flooded or divert existing surface water flows

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
	uses and the welfare and amenity of people are maintained	• The SPP crosses the southern end of an ephemeral waterbody in the Newcastle Creek catchment, with a surface area of 500km² at overflow levels. • Flood assessments for the Project area (1% AEP) indicate flood depths up to 2 to 3 m where the pipeline crosses the large ephemeral waterbody upstream of the Stuart Highway and flood depths up to 2 m at a backwater area downstream of the Stuart Highway. • Surface facilities are located outside of the deeper areas of flooding along the pipeline route. However, modelling shows that the Shenandoah facility will be most impacted by a 1% AEP flood event, with relatively low flood depths of 0.4 m and velocities of 0.4 m/s. • The Project will have a negligible impact on groundwater-surface water interactions as trenches for pipeline construction are generally shallow (of the order of 1.2 m to 1.5 m) and will be backfilled and compacted after installation of the pipeline. • The use of trench breakers will prevent the backfilled trench from becoming a preferential pathway for sub-surface flow. • The Project occurs within the area of the Georgina Wiso water allocation plan.	The Project has been assessed against the significant impact criteria presented in the DCCEEW guideline (DCCEEW, 2022). Due to the relatively small and temporary surface disturbance caused by the Project, it will not have a significant impact on water resources.							• Surface movement due to pipeline buoyancy in inundated areas The impact to hydrological processes from the Project is not considered to be significant because: • The construction method aims to restore existing surface levels after the pipeline is buried • The pipeline will have no measurable impact on flooding or stormwater flows • Impacts to surface water flows can be readily addressed through engineering and design • The Project has been assessed against the significant impact criteria presented in the DCCEEW guideline (DCCEEW, 2022). Due to the relatively small and temporary surface disturbance caused by the Project, it will not have a significant impact on water resources. The Project will therefore not have a significant impact on hydrological processes. No further assessment is required.
	Inland Water Environmental Quality Objective: Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	• The Project crosses a large ephemeral water body within the Newcastle Creek catchment. • The Project area intersects one first and one second order mapped minor watercourse. Riparian vegetation in this watercourse provides instream ecological processes and physical stability of the waterway. • The Project's construction is scheduled for the dry season when the monthly average rainfall ranges from 0 mm – 30 mm from April to October. • Trenching of the pipeline will not impact on water quality within the identified waterways or the ephemeral water body during this period. • Risk of spills of fuel, lubricants, or sewage from construction activities, which could degrade surface water quality, however this risk is addressed in the CEMP.	The Project area intersects one first and one second order mapped minor watercourse and is located near the edge of an ephemeral water body within the Newcastle Creek catchment.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Inherent impacts: • Potential to adversely impact surface water quality due to sediment in surface water run off • Potential accidental spills/loss of containment of fuels and chemicals resulting in hot spots of contamination. The impact to hydrological processes from the Project is not considered to be significant because: • The Project's construction is scheduled for the dry season when the monthly average rainfall ranges from 0 mm – 30 mm from April to October. • Trenching of the pipeline will not impact on water quality within the identified waterways or the ephemeral water body during this period. The Project will therefore not have a significant impact on inland water environmental quality. No further assessment is required.

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
	Aquatic Ecosystems Objective: Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning	• The Project crosses a large ephemeral water body within the Newcastle Creek catchment. • The Project area intersects one first and one second order DEPWS mapped minor watercourses. Riparian vegetation in these watercourses provides instream ecological processes and physical stability of the waterway. • The Project area does not overlap with any RAMSAR wetlands or wetlands identified in the directory of important wetlands.	• The Project area intersects one first and one second order mapped minor watercourse and is located near the edge of an ephemeral water body within the Newcastle Creek catchment.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Inherent impacts: • Direct removal of riparian vegetation • Potential introduction of weeds. The impact to aquatic ecosystems from the Project is not considered to be significant because: • The works are short in duration (approximately 6 months) and will occur mostly in the dry season. • Works will be staged to avoid ground disturbing works when the ground is saturated or during the wet season. • Rehabilitation or disturbed areas will occur prior to the onset of the wet season. • Much of the disturbed areas will be returned to pre-disturbance conditions as part of the rehabilitation works.
Sea	**Coastal Processes** Objective: Protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained.	No disturbance will be required within the marine or coastal environment. Pipe for the Project will be delivered by ship to the Port of Darwin. Existing hardstand at the Marine Industry Park CUF is proposed to be used as a temporary laydown are for pipes. The CUF does not form part of the Project Area.	The Project will not impact coastal processes, marine environmental quality or marine ecosystems.	Yes No Uncertain N/A		☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	Not applicable.
	Marine Environmental Quality Objective: Protect the quality and productivity of water, sediment and biota so that environmental values are maintained			Yes No Uncertain N/A		☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	
	Marine Ecosystems Objective: Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.			Yes No Uncertain N/A		☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	☐ ☐ ☐ ☒	
Air	**Air Quality** Objective: Protect air quality and minimise emissions and their impact so that environmental values are maintained.	The Project is located in generally flat terrain, with no significant topographical features or complex terrain that would affect the dispersion of air pollutants from the Project site. There are no significant potential anthropogenic dust emission sources in Project area. The area is sparsely populated. The closest human sensitive receptors not associated with construction activities in the immediate vicinity of the Project are Dunmarra roadhouse and Hayfield Station homestead which are greater than 3 km from the Project Area. The Project area experiences hot summers and warm winters. Rainfall is very low during the dry season (May to September), with most rainfall originating from monsoonal systems that approach from the north during the wet season (November to March). The inter-annual variability of rainfall (variation of rainfall from one year to the next) is high. Wind direction influenced by the seasons is predominantly from the east to southeast in the	• Human health and wellbeing • Aesthetics of the environment • Health and biodiversity of ecosystems • Agricultural use of the environment.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	The following construction activities may create air quality impacts for the Project: • Land clearing, earthworks and construction of infrastructure associated with the pipeline. • Haulage of material for construction from areas of excavation (trench and borrow pits) to work areas and spoil dumps, including unloading and grading. • Horizontal boring under the Stuart Highway. • Construction of ancillary infrastructure (i.e., camps, laydowns). The impact to air quality from the Project is not considered to be significant because: • The Project is located in generally flat terrain, with no significant topographical features or complex terrain that would affect the dispersion of air pollutants from the Project site. • There are no significant potential anthropogenic dust emission sources in Project Area. The area is sparsely populated. • The closest human sensitive receptors not associated with construction activities in the immediate vicinity of the Project are Dunmarra roadhouse and Hayfield Station homestead which are greater than 3 km from the Project Area.

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
		dry season and variable during the wet seasons. The wet season predominantly has wind from the northeast in the morning to the east to southeast in the afternoon. Pollutant of concerns identified are: • Localised particulate matter from construction (fugitive dust) and fine particulate matter emitted from locomotives and other diesel-fuelled mobile plant and machinery. • Gaseous products of combustion. • VOCs from the storage and handling of diesel.								• The potential for any adverse air quality impacts at surrounding sensitive areas will be minimal, and air emissions during operations have not been considered further. The air quality impacts from the Project's operation are expected to be negligible. The Project will therefore not have a significant impact on air quality. No further assessment is required.
	Atmospheric Processes <u>Objective</u>: Minimise greenhouse gas emissions so as to contribute to the NT Government's goal of achieving net zero greenhouse gas emissions by 2050.	Greenhouse gas (GHG) Scope 1 emissions from land clearing, diesel consumption from the operation of construction equipment and generators with use of petroleum based oil and grease results in a Scope 1 GHG estimate of 17,040 tCO2-e per year. The combined Scope 1 emissions for the Project's construction are less than the trigger for: • 100 000 tCO2-e scope 1 emissions per year not counting emissions generated from land clearing. • 500 000 tCO2-e scope 1 emissions from single or cumulative land clearing actions. For the 2022 reporting year, which is the most recent available data available at time of writing, Australia's total Paris Inventory GHG emissions were reported to be 432.62 Mt CO2-e, with 16.73 Mt CO2-e contributed by the NT. Once operational, GHG emissions from the Project will be negligible. For the year of construction, the contribution of the Project to national and NT GHG emissions is estimated at 0.004% and 0.10% respectively.	• Net zero GHG emissions by 2050.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	The following construction activities will generate Scope 1 GHG emissions: • land clearing • diesel consumption from the operation of construction equipment • generators with use of petroleum based oil. The impact to atmospheric processes from the Project is not considered to be significant because: • No significant Scope 1, 2 or 3 greenhouse gas (GHG) emission sources have been identified for the Project's operation. • The contribution of the Project construction emissions to annual national and NT GHG emissions is estimated at 0.004% and 0.10% respectively. • Scope 1 GHG emissions for the 6 month construction period from land clearing, diesel consumption from the operation of construction equipment and generators, and use of petroleum based oils and greases, are estimated to be 17,040 tCO2-e. • Scope 1 GHG emissions from construction and operation of the Project are well below the relevant threshold in the Large Emitter's Policy and the National Greenhouse and Energy Reporting (NGER) scheme reporting threshold. • Once operational, GHG emissions from the Project will be negligible. The Project will therefore not have a significant impact on atmospheric processes. No further assessment is required.

People	**Community and Economy**
	<u>Objective</u>: Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.
		The Project's location within an isolated region across two large pastoral stations has a limited population. A cluster of houses and outbuildings occur on the host station. The nearest settlement is the small homeland family outstation of Jingaloo, approximately 30km directly south of the eastern end of the pipeline. The nearest town is Daly Waters, approximately 50km north along the Stuart Highway.
		Several remote Aboriginal communities and homeland family outstations are located in the study area, including Jingaloo, Lily Hole, Murranji, as well as Marlinja, next to the
			• The Project area includes the following land uses:
			  ○ Pastoral land
			  ○ Petroleum exploration and appraisal
			  ○ Public infrastructure.
			• There are no sensitive receptors within 3km of the Project area. Heyfield station, Dunmurra roadhouse and the Tamboran camp are the nearest sensitive receptors and are all > 3 km from the Project area.
			• The Project Area intersects two Native Title Determination areas.
				Yes
				No
				Uncertain
				N/A
						☐
						☐
						☒
						☐
							☐
							☒
							☐
							☐
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									☐
									☐
										The Project's location is largely isolated from existing settlements. The construction of the Project will limit strains on community through the operation of a temporary accommodation village, with the exception of health services.
										However, the impact to community and economy could be considered significant, owing to community division over project benefits and impacts and uncertainty regarding the impact to the rights and interest of Native Title Holders. This could have a noticeable and significant effect on community cohesion and social dynamics. This requires further assessment.

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
		historically significant Newcastle Waters pastoral station and historic township. The nearest community with local-level community services, such as health, education, and police, is the town of Elliott, approximately 70km south. Residents wishing to access higher-level social infrastructure and services such as hospitals, tertiary education, and civic services would need to travel either 280km north of the project to Kathrine or 330km south of the project to Tennant Creek. The Study Area has a usual resident population of 567 people, primarily clustered in the settlements of Daly Waters (55 residents), Newcastle Waters (Marlinja) (122 residents) and Elliott (287 residents). Aboriginal people make up 59.1% of the population A relatively balanced gender occurs within the study area. The study area's population differs significantly from the NT in terms of Indigenous status. While 26.3% of the NT population identifies as Aboriginal, the Study Area has a much higher proportion at 59.1%. Educational attainment in the Study Area is generally lower than the NT average. The income distribution in the Study Area skews lower than the NT average.								
	Culture and Heritage Objective: Protect culture and heritage.	• An Abstract of Records indicated Authority Certificates have previously been issued over the Project area and that the closest registered or recorded sacred site or restricted work area is located >1.5km from the Project. • A search of the Heritage Branch database showed there are no declared heritage places and no previously recorded Aboriginal archaeological sites located within the Project area. • The Project crosses two areas with native title determinations: the Shenandoah Pastoral Lease (Native Title Tribunal file no. DCD2012/007) and Hayfield Pastoral Lease (Native Title Tribunal file no. DCD2012/011). • An archaeological survey of the Project area with NLC nominated Traditional Owner representatives determined that there is generally low risk to heritage across the Project area. No archaeological features were recorded during the survey, which targeted high-risk land units.	Parts of the Project area are subject to Native Title interests. A sacred site restricted work area is located >1.5km to the north of the Project area. There is generally low risk to heritage across the Project area.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Culture and heritage may be impacted by: • Disturbance or damage to archaeological objects inadvertently encountered during construction (chance/unexpected finds) • Construction impacting on sacred sites. The impact to culture and heritage from the Project is not considered to be significant because: • Abstract of Records indicates that AAPA has previously consulted over and issued Authority Certificates over the area and there is no registered or recorded sacred sites or restricted work areas within ~1 km of the Project Area. • Archaeological survey of the site determined that there is low risk of impact to European or Aboriginal heritage for the majority of the Project Area. • APA has applied for an Authority Certificate under the NT Aboriginal Sacred Sites Act 1989. The Subject Land for the Authority Certificate covers the entire Project Area. Construction and operation of the Project will comply with the conditions of the Authority Certificate. The Project will therefore not have a significant impact on European or Aboriginal culture and heritage. No further assessment is required.

Theme	Environmental factor and objective	Background information	Summary of key environmental values and sensitivities of relevance to the Project	Proponent's answer to screening questions 1-5. If answer is 'yes' referral is required						Inherent Impacts without mitigation
	Human Health Objective: Protect the health of the Northern Territory population.	• Hazardous chemicals will be stored, handled and used in accordance with the Material Safety Data Sheet and Work Health and Safety (National Uniform Legislation) Act 2011. • Aside from construction workers engaged to work on the Project or construction projects in the immediate vicinity of the Project, isolated receptors are not located near the Project Area. • The Project is not an inherently contaminating activity.	Distance of the Project's site to sensitive receptors reduces the impact to residents health.	Yes No Uncertain N/A		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	☐ ☒ ☐ ☐	Following consideration to surface water, groundwater, diseases, air quality, visual amenity, noise and vibration and land capability. The impact to human health from the Project is not considered to be significant because: • The Project's location is isolated from populated areas. Isolated receptors are not located near the Project Area. • Modelling has determined that no exceedances of the most stringent night-time noise level limit have been predicted. • Modelling has determined that, at Hayfield Homestead, cumulative noise impact is not predicted. The Project will therefore not have a significant impact on human health. No further assessment is required.

4.0 Preparation and Declaration

4.1 Preparation

The pre-referral screening has been conducted by:

Name	Email	Qualification/ Experience	Signature	Date
Natalie Calder	Natalie.calder@slrconsulting.com.au	Master of Science		17/10/2024

4.2 Declaration

I, Natalie Calder declare that I am authorised to verify the pre-referral screening of this proposed action/strategic proposal on behalf of APA SPP Pty Ltd, and further declare that:

- the attached environmental impact assessment documents (including attachments) are true; and
- the attached environmental impact assessment documents do not provide false or misleading information and I know it is an offence to provide false and misleading information, noting the penalties under section 260 of the EP Act, and section 119 of the *Criminal Code Act 1983*.

5.0 References

Northern Territory Environment Protection Authority (2022a). *Referring a Proposal to the NT EPA: Environmental impact assessment, Guidance for proponents (Version 2.0)*

Northern Territory Environment Protection Authority (2022b). *NT EPA Environmental Factors and Objectives: Environmental Impact assessment General Technical Guidance*

Making Sustainability Happen

Attachment 12 – Surface Water Assessment

STURT PLATEAU PIPELINE

Surface Water Impact Assessment

APA Group Limited

28 August 2024

2026-01-B1

DETAILS

Report Title	Sturt Plateau Pipeline, Surface Water Impact Assessment
Client	APA Group Limited

THIS REVISION

Report Number	2026-01-B1
Date	28 August 2024
Author	DN
Reviewer	JO

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FIGURES

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1 INTRODUCTION

APA Group Limited (APA) are investigating the development of a standalone pipeline (the Sturt Plateau Pipeline or the Project) to transport appraisal gas from the Tamboran Gas Plant in the Northern Territory's Beetaloo Basin to the Amadeus Gas Pipeline (AGP). The pipeline crosses the Stuart Highway about 50 km south of Daly Waters. The proposed pipeline location is shown in Figure 1.1.

The key feature of the Project is a 37.1 km pipeline of 12-inch (323.9 mm) diameter steel pipe. The pipeline will be buried to a typical depth of 750 mm, with higher cover at track and floodplain crossings and bored crossings. The pipeline will be laid within a 30 m easement.

This surface water assessment considers the potential impacts of the Project and associated infrastructure on surface water resources.

The following sections of this report provide:

- An overview of the drainage network in the Project area (Section 2);
- A description of key features of the Project (Section 3);
- An assessment of surface water impacts of the Project (Section 4);
- Proposed mitigation and management measures to limit the surface water impacts of the Project (Section 5);
- An assessment of the Project against the DCCEEW Water Trigger (Section 6);
- The conclusions of the surface water impact assessment (Section 7);
- A list of references (Section 8).

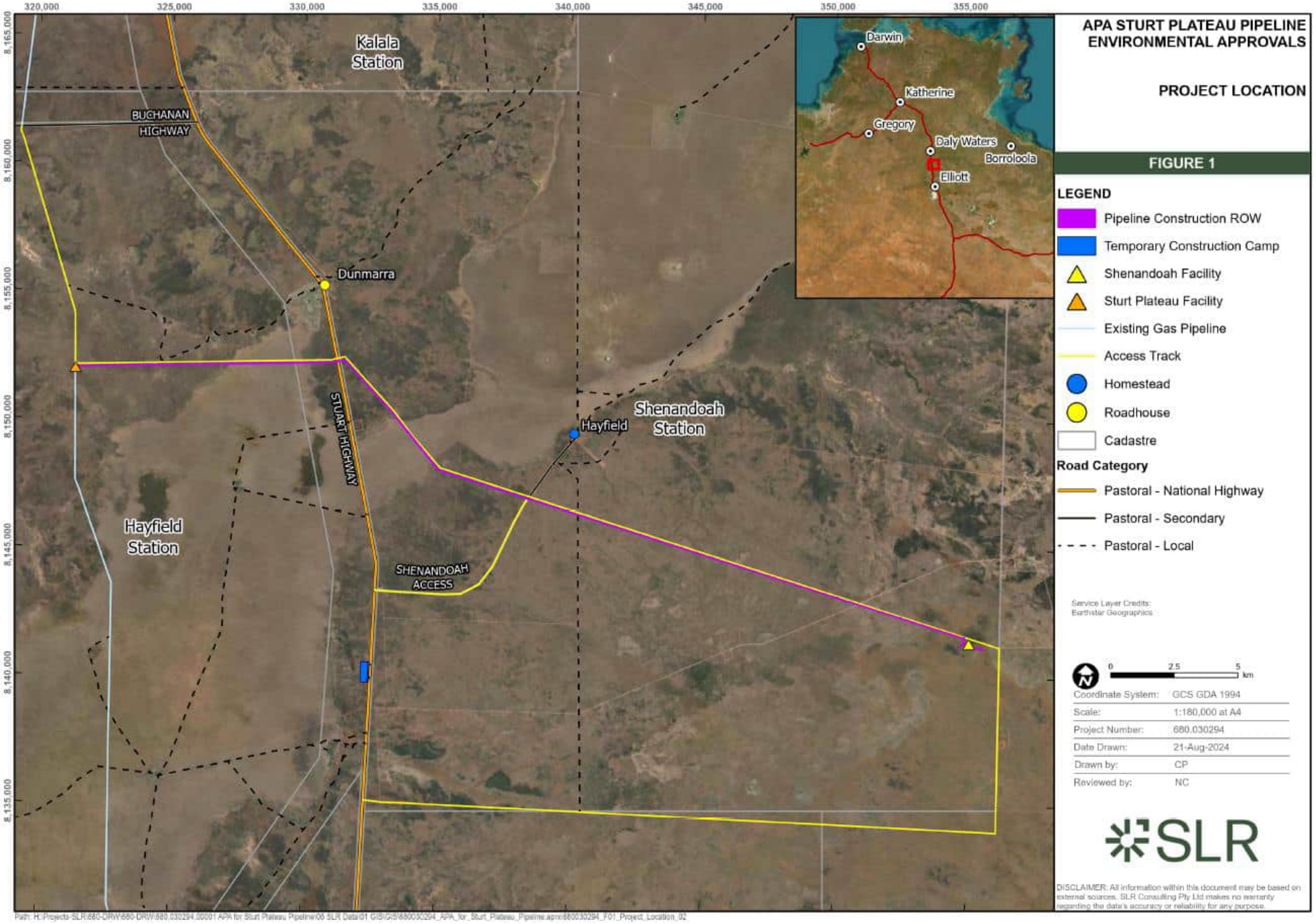

Figure 1.1 Sturt Plateau Pipeline project location

2 EXISTING SURFACE WATER ENVIRONMENT

2.1 TOPOGRAPHY AND DRAINAGE NETWORK

Variations in ground level across the project area, based on satellite data, are shown in Figure 2.1. Topography in the region is slightly undulating with low surface gradients. Drainage paths in the project area are poorly defined with no identifiable bed or banks. Surface runoff typically moves as shallow overland flow with ponding observed at numerous locations along the minor drainage paths (see Figure 2.2 and Figure 2.3).

The SPP crosses the southern end of a large ephemeral waterbody within the Newcastle Creek catchment. The ephemeral waterbody overflows to the southwest at a level of about 228 m AHD near the Stuart Highway. The ephemeral waterbody has a surface area of about 500 km^2 at its overflow level and a catchment area of about 3,200 km^2 upstream of the Stuart Highway. An additional catchment area of about 400 km^2 joins the main drainage path a short distance downstream of the Stuart Highway, as shown in Figure 2.4.

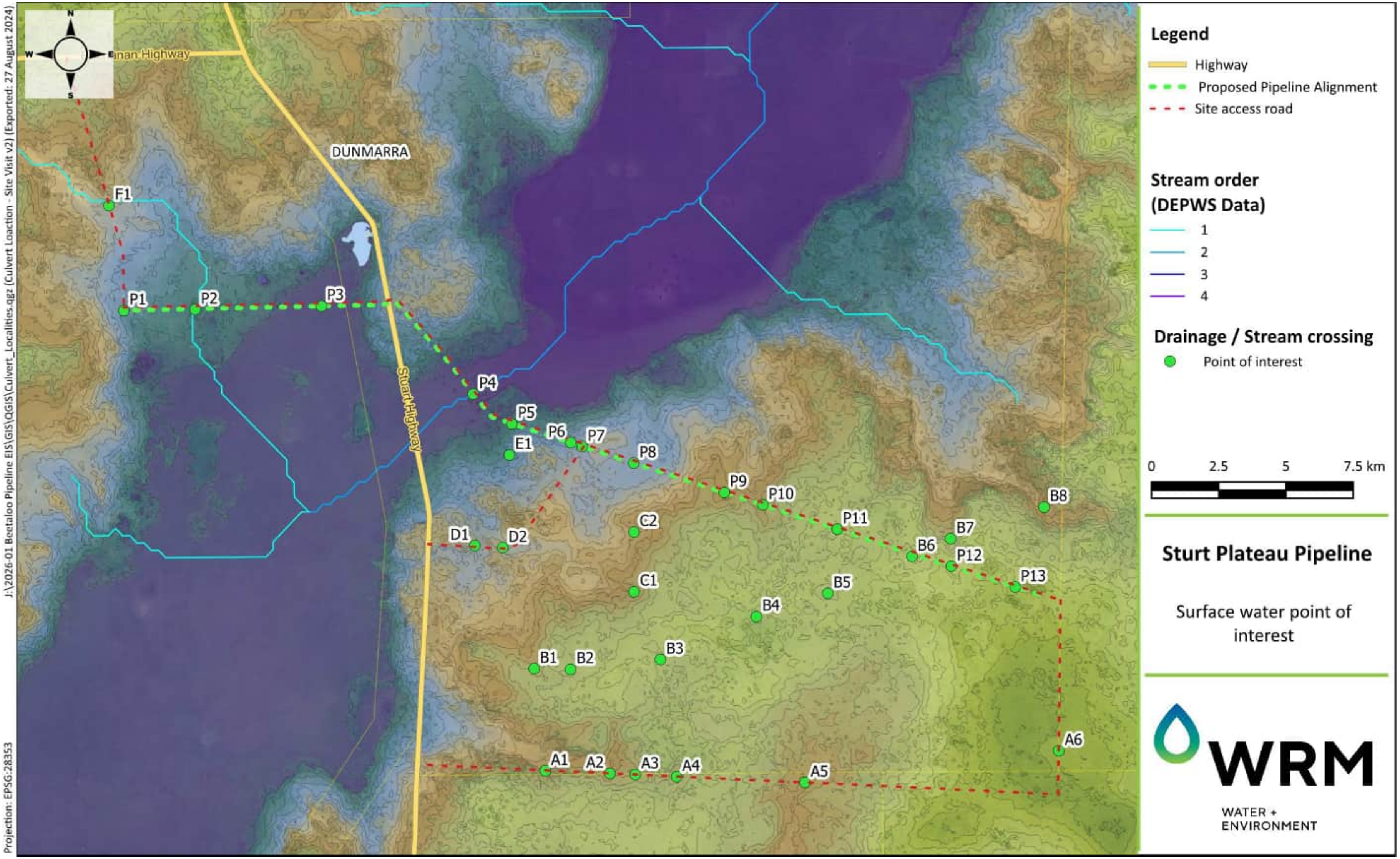

Figure 2.1 Local topography and surface water points of interest

Figure 2.2 Example of ponded surface water, Photograph P5290068.JPG, Location B5 (see Figure 2.1)

Figure 2.3 Example of ponded surface water, Photograph P5300235.JPG, Location A4 (see Figure 2.1)

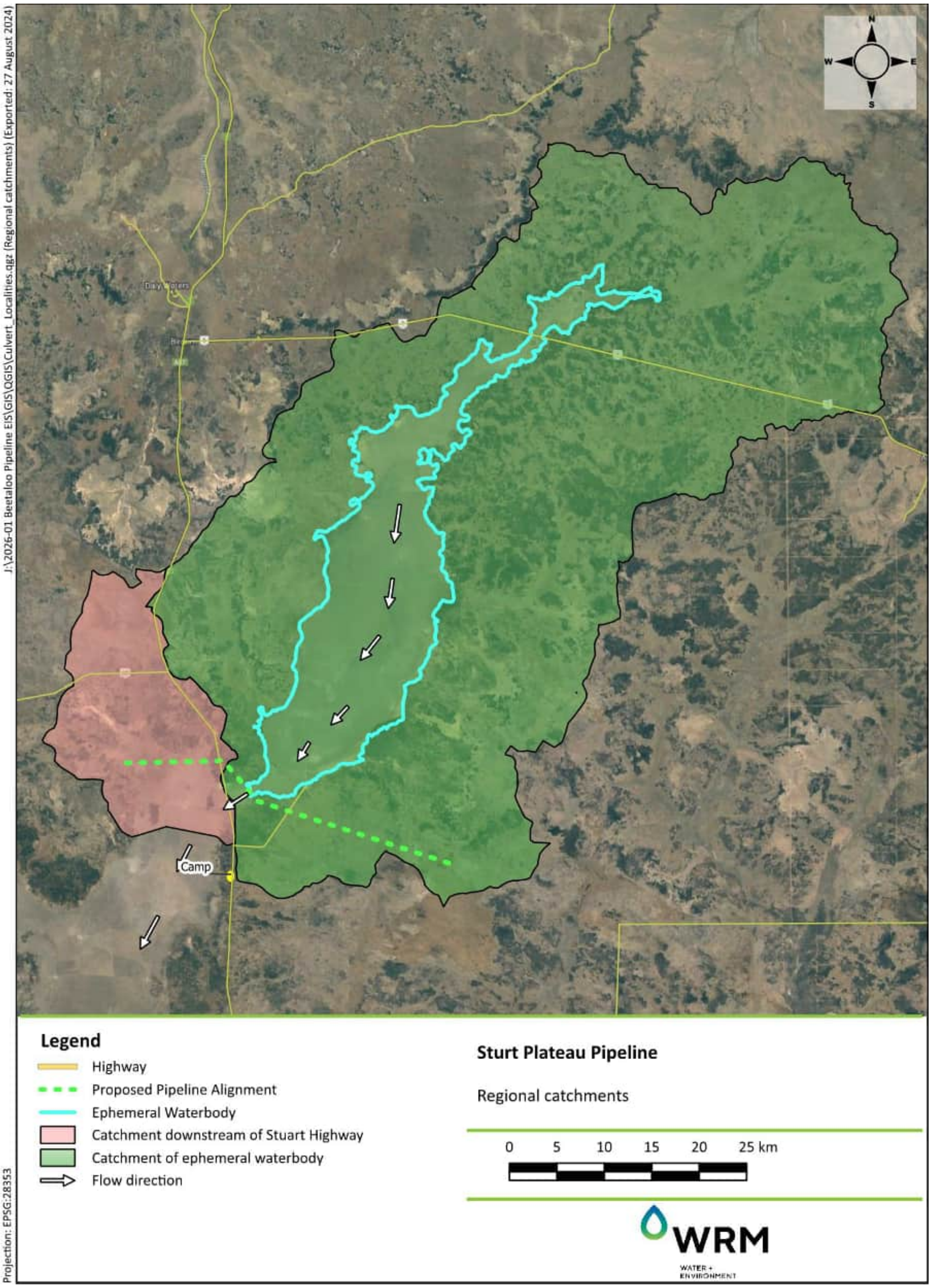

Figure 2.4 Regional catchments

2.2 FLOODING

A flood assessment for the project area has been completed by AECOM (2024). Figure 2.5 shows the depth and extent of flooding in the Project area for the 1% AEP flood event. Flood depths along minor drainage paths crossing the pipeline alignment are generally shallow (less than about 0.75 m), apart from:

- where the pipeline crosses the large ephemeral waterbody upstream of the Stuart Highway (depths up to 2 to 3 m); and
- a backwater area downstream of the Stuart Highway (depths up to 1.5 to 2 m).

Flow velocities for the 1% AEP flood event are shown in Figure 2.6. Velocities are very low (less than 0.5 m/s) in the areas of deepest flooding areas. Higher velocities occur along some of the smaller drainage paths, but are still relatively low (typically less than 1 m/s).

Figure 2.7 shows the 1% AEP flood surface profile along the pipeline alignment, illustrating the shallow depth of flow along most of the pipeline length, apart from the two deeper areas as noted above.

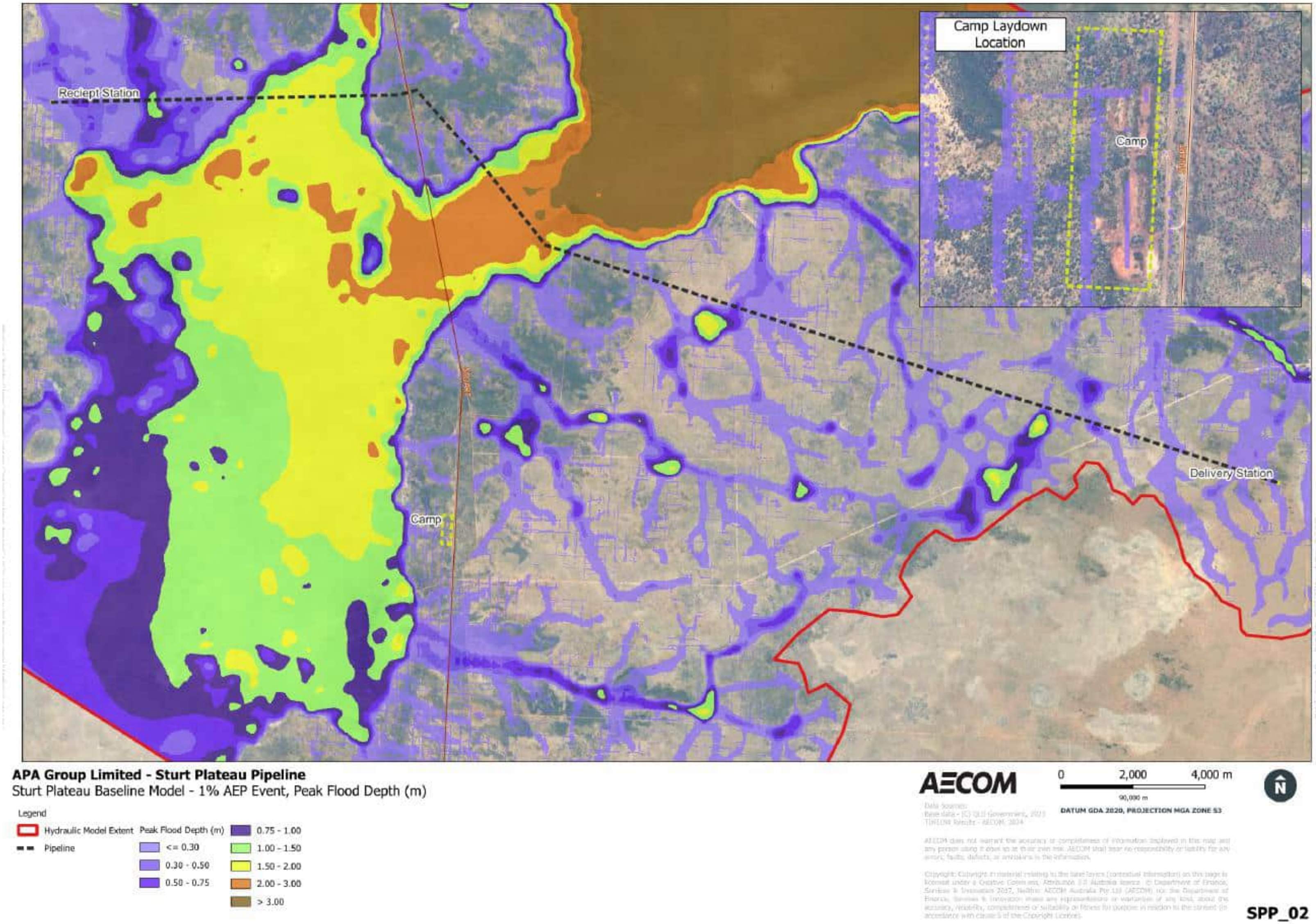

Figure 2.5 Flood extent and depth, 1% AEP event (source: AECOM, 2024)

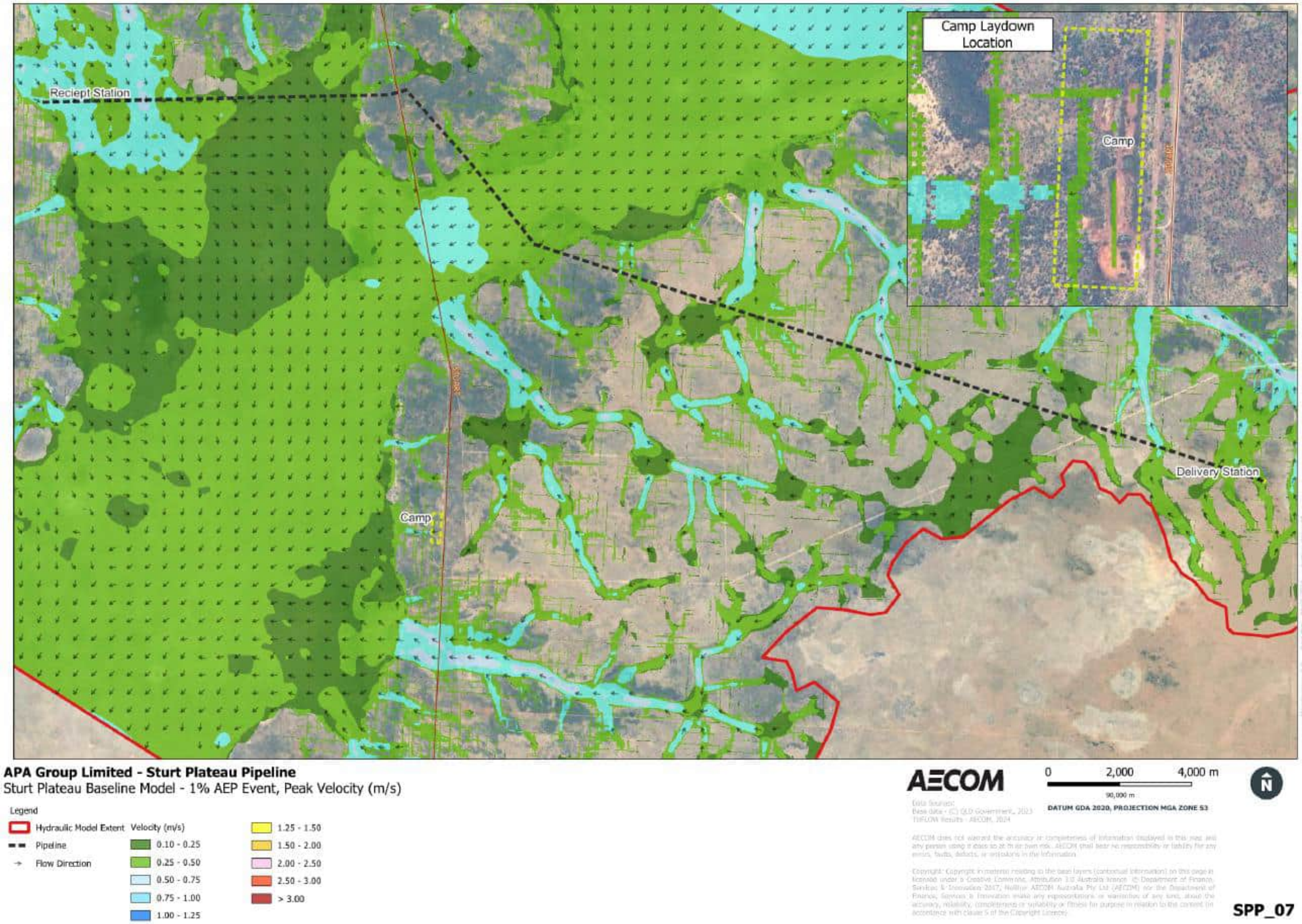

Figure 2.6 Flood velocity, 1% AEP event (source: AECOM, 2024)

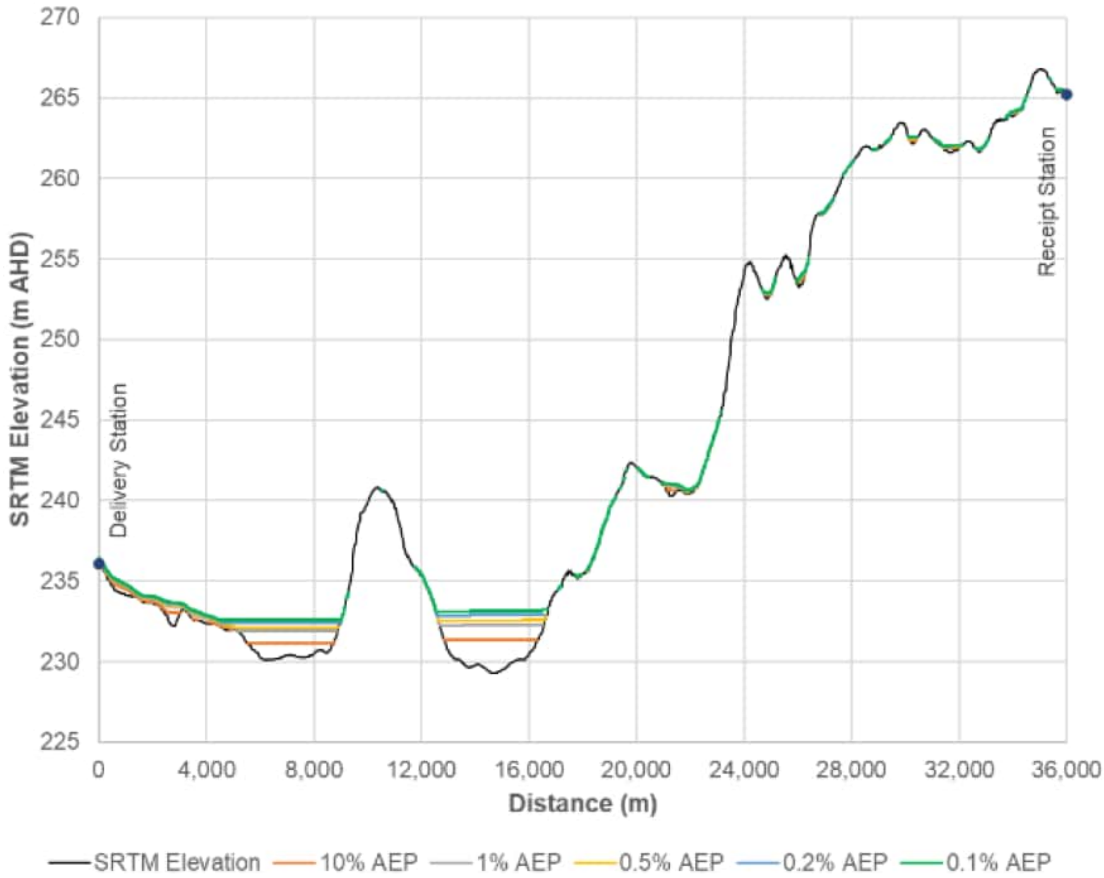

Figure 2.7 Flood surface profile along SPP alignment (source: AECOM, 2024)

3 PROJECT DESCRIPTION

This section describes the layout, location, and function of all infrastructure to be constructed and operated as part of the Project. Descriptions of the construction, operation and decommissioning phases of the Project are also provided.

3.1 PROJECT SUMMARY

Table 3.1 provides a summary of the key Project elements. These are expanded further in the following sections.

Table 3.1 Project Summary

Project element	Summary
The Project	The Project will involve the construction, operation and maintenance of: • a buried, medium diameter (DN300), gas transmission pipeline (up to 9.6 MPaG) of approximately 37 km in length • surface facilities including, Shenandoah Facility (receipt station) and Sturt Plateau Facility (delivery station).
Location	The Project is in the locality of Birdum, approximately 50 km south of Daly Waters, and 80 km north of Elliott, in the Northern Territory.
The Project area	The Project area, defined as the Project's combined construction footprint, is located over approximately 150 ha comprising:: • the construction right of way (ROW) for the transmission pipeline • construction footprints for the Shenandoah Facility and Sturt Plateau Facility • the temporary construction camp • additional workspaces required to facilitate construction.
Operational footprint	Approximately 109.2 ha for the transmission pipeline easement, Shenandoah Facility and Sturt Plateau Facility. The direction of construction, from the Shenandoah Facility to the Sturt Plateau Facility or in the reverse direction, will move the boundaries of the disturbance area by about 10 m, but will not affect the total disturbance area.
Land tenure	The Project is located across: 1. NT Portion 1077 – Shenandoah Perpetual Pastoral Lease (PPL) 2. NT Portion 7026 – Hayfield PPL 3. NT Portion 7513 – Hayfield PPL 4. The Stuart Highway Road reserve
Construction water use and supply	The Project's estimated total water usage is 70 Mega Litres (ML). Approximately 30 ML of non-potable water for dust control and hydrotesting will be sourced from Tamboran Resources (under groundwater extraction licence GRF10285) and new bores will be constructed to source 40ML for the Project under proposed new groundwater extraction licences.
Off-site supporting infrastructure	• Existing road network • Waste disposal facility • Pipe laydown area
Construction hours	6 am to 6 pm seven days per week. Nominal construction cycle being 21 days on and 7 days off. Some limited 24 hours works will be required during hydrotesting activities.
Construction workforce	Approximately 133 personnel during peak construction with 40 – 100 personnel over the remainder of the 6-month construction period.
Construction duration	Approximately 6 months

Project element	Summary
Commencement of operation	Anticipated in Q4 2025.
Operational workforce	Approximately 2 personnel
Project life	40 years
Capital Investment Value	Approximately $57 million

3.2 PROJECT AREA AND LOCATION

The Project area is situated in the Birdum region of the Northern Territory within the Roper Gulf Local Government Area (LGA) and bordering the Barkly LGA.

The Project area encompasses an area of approximately 150 ha, spanning NT Portion 7026 (Shenandoah PPL), NT Portion 7513 (Hayfield PPL), 1077 (Hayfield PPL) and the Stuart Highway Road reserve (Figure 1.1).

The Stuart Highway runs between Shenandoah PPL and Hayfield PPL. The highway has an approximate 200 m wide road corridor (100 m either side of the road centreline) in the vicinity of where the Project is proposed to cross. The pipeline is proposed to be bored horizontally under the Stuart Highway.

The Project area considered for this referral comprises:

- The construction footprint for the right of way (ROW) for the transmission pipeline
- Construction footprints for the Shenandoah Facility and Sturt Plateau Facility
- Construction footprint for the cathodic protection anode bed
- A temporary construction camp and associated facilities
- Extra workspaces required for construction of the transmission pipeline for truck turnarounds, vegetation storage, horizontal bore entry and exit locations and plant and equipment storage areas.

A map series showing the proposed location of the transmission pipeline, the Shenandoah Facility and Sturt Plateau Facility and cathodic protection anode bed is provided in Figure 3.1 to Figure 3.4. The start of transmission pipeline (KP 0) will connect to the Shenandoah Facility on NT Portion 7026 and the end of the transmission pipeline (KP 37) will connect to the Sturt Plateau Facility on NT Portion 1077.

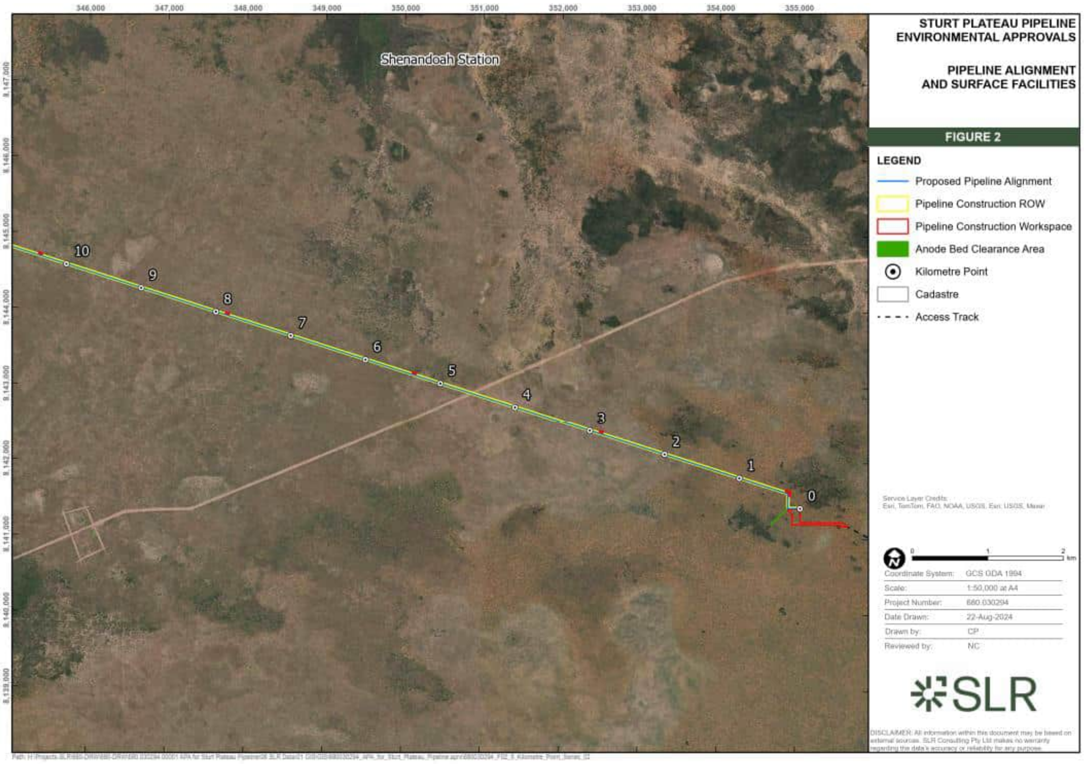

Figure 3.1 KP 0 – KP 10

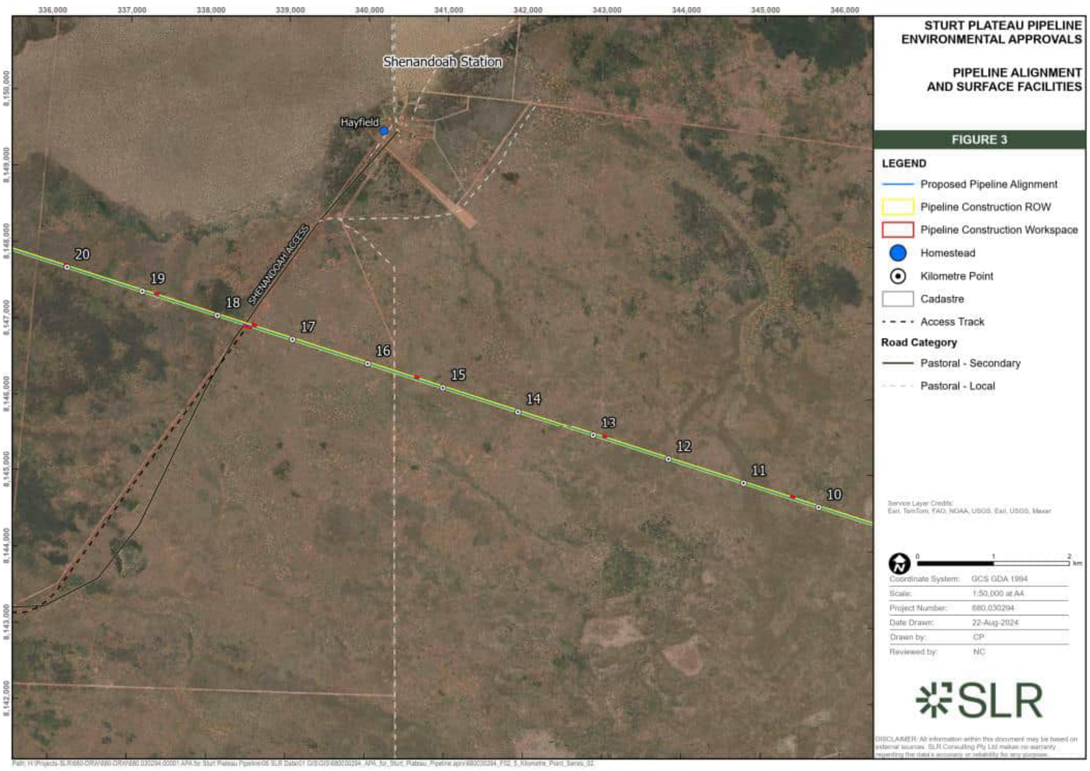

Figure 3.2 KP10 – KP 20

Figure 3.3 KP20 – KP 30

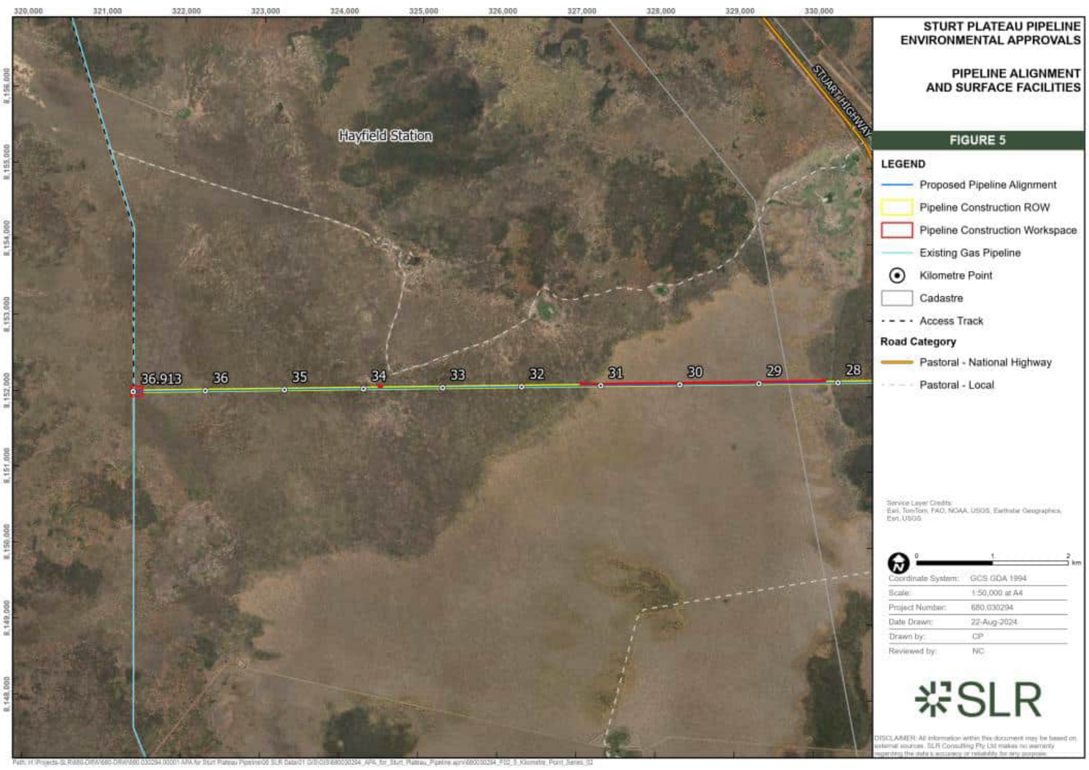

Figure 3.4 KP30 – KP 37

3.2.1 Pipeline alignment

The alignment of the transmission pipeline is approximately 37 km in length. The preferred pipeline alignment extends from NT Portion 7026 (Shenandoah PPL) west across the Stuart Highway Road reserve, NT Portion 7513 (Hayfield PPL) and NT Portion 1077 (Hayfield PPL) where it would connect to the Amadeus Gas Pipeline (AGP).

The pipeline alignment was selected based on a desktop assessment of the known constraints within the area, together with high level engagement with key project stakeholders and operational constraints such as access to the pipeline during wet weather conditions. An Abstract of Records from the Aboriginal Areas Protection Authority informed selection of a 500m wide target corridor and an environmental assessment of a 150m wide corridor provided relative assessment to minimise potential environmental impacts. As part of the selection process, three additional alternatives were considered with design refinements introduced to minimise impacts. The preferred alignment is shown in Figure 3.1 to Figure 3.4.

3.2.2 Surface facilities

The proposed locations of associated surface facilities are as follows:

- The Shenandoah Facility is located on NT Portion 7026 (Figure 3.1)
- The Sturt Plateau Facility is located on NT Portion 1077 (Figure 3.4).

3.2.3 Land Tenure

The Project commences on NT Portion 7026 (Shenandoah PPL) and extends west, across the Stuart Highway Road corridor and NT Portion 7513, to the AGP located on NT Portion 1077 (both Hayfield PPL).

3.3 PROJECT COMPONENTS

The Project comprises three key operational components:

- An approximately 37 km long transmission pipeline
- The above ground Shenandoah Facility, immediately adjacent to the proposed Tamboran Resources Sturt Plateau Compression Facility (SPCF)
- The above ground Sturt Plateau Facility where the proposed pipeline connects into the existing AGP.

3.3.1 Transmission pipeline

The proposed pipeline would be approximately 37 km in length and buried to a minimum of 750 mm, with a 30 m wide construction ROW (see Table 3.2).

The pipeline will typically be constructed from 18 m individual pipe lengths. The pipe lengths will be factory coated with fusion bonded epoxy or similar for corrosion protection purposes except at each end to allow welding. Post welding, the uncoated weld margins will be grit blasted and coated with hand or spray applied epoxy.

Table 3.2 Pipeline Specifications

Component	Description
Length	37 km
Material	High strength steel with fusion bonded epoxy external coating
Nominal diameter	300 mm (12 inches)
Nominal capacity	Max 50 TJ/day
Pipe wall thickness	6.4 mm
Pipe segment length	18 m (some 12 m)
Depth of cover	Minimum 750 mm
Easement / ROW	Nominally 30 m wide (approximately 37km)
Design principles	In accordance with latest version of AS2885 Pipelines – Gas and liquid petroleum
Design life	40 years

3.3.2 Depth of cover

The pipeline will be buried for its entire length other than at surface facility locations. All surface facilities will be bounded by security fencing. Minimum depths of cover (measured from top of pipe to natural ground level), based on AS 2885 requirements, will be generally 750 mm.

At locations where the pipeline is potentially exposed to increased erosional forces, such as floodplains, additional protection will be provided by increased depth of cover. The pipeline will also be buried deeper beneath roads and associated drainage lines, details shown in Table 3.3.

Table 3.3 Minimum depth of cover

Location	Depth of Cover (mm)
Typical	750
Sealed road crossings	3,000
Unsealed road crossings, drainage lines and floodplains	1,200

3.3.3 Surface facilities

The Project will require the construction of the following surface facilities to support the operation of the pipeline:

- Shenandoah Facility – immediately adjacent to the proposed Tamboran Resources SPCF
- Sturt Plateau Facility – adjacent to the existing AGP easement.

Figure 3.5 provides an example of an above ground facility. The Project facilities may have a different layout to the one pictured.

Figure 3.5 General photo showing an above ground facility

3.3.3.1 Shenandoah Facility

The Shenandoah Facility is an above ground facility that will provide a connection for natural gas from Tamboran Resource's SPCF into the Sturt Plateau Pipeline. The facility includes a pig launcher, pipeline isolation facility and also SCADA signal to APA's Integrated Operations Centre (IOC).

Infrastructure at the Shenandoah Facility will include the following:

- Pig launcher assembly
- Actuated shutdown valve
- Station Remote Terminal Unit (RTU) and Associated communications
- Separate pipeline vent fenced compound.

The facility would be automated and designed so that it is capable of operating unmanned under normal operating conditions.

Lighting would be provided for security and emergencies at the facility as required.

The facility will require a construction disturbance footprint of up to 1 ha and an operational area of up to 0.1 ha. A schematic depicting the typical layout of the facility is provided in Figure 3.6.

3.3.3.2 Sturt Plateau Facility

The above ground Sturt Plateau Facility will provide a connection for natural gas from the Sturt Plateau Pipeline into the AGP. The station includes a pig receiver assembly, pipeline isolation, and also a hot-tap connection into the AGP.

The Sturt Plateau Facility will require a construction disturbance footprint and an operational area of approximately 0.1 ha. A schematic depicting the typical layout of the Sturt Plateau Facility is provided in Figure 3.7.

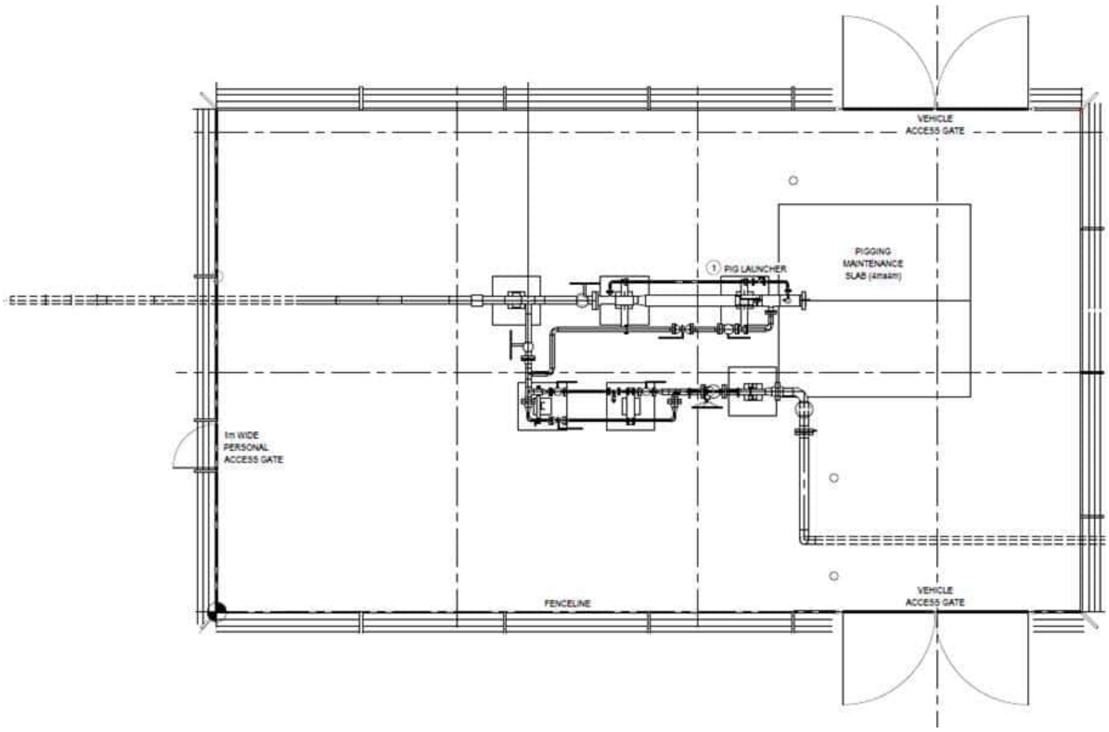

Figure 3.6 Typical Layout Schematic for the Shenandoah Facility

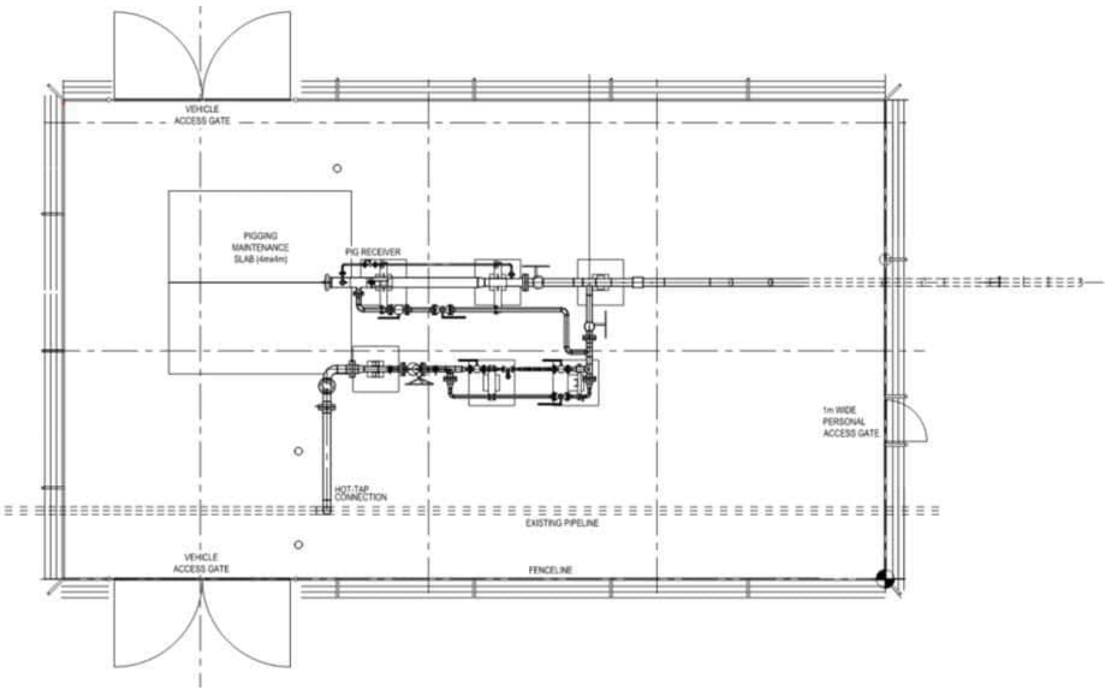

Figure 3.7 Typical Layout Schematic of the Sturt Plateau Facility

3.3.4 Stormwater management

Equipment and machinery at associated surface facilities that contain potential contaminants (such as fuel, oil, grease and chemicals) will be covered and/or bunded in accordance with relevant

Australian Standards to prevent contaminated runoff leaving the site. Runoff captured in bunded areas will be disposed offsite at appropriately licenced facilities.

The hardstand footprint of associated surface facilities outside of covered and bunded areas will be designed to appropriately manage stormwater runoff in accordance with Best Practice Erosion and Sediment Control (IECA 2008).

Typically, these hardstand areas will comprise an appropriately graded and stabilised sub-base covered with gravel sheeting. The size of the hardstand will be minimised as far as practicable and be designed that water will runoff the hardstand area. The batters of the hardstand will be treated to minimise scour and erosion. Erosion and pollution control principles that will be applied to hardstand areas will follow the "treatment train" approach and seek to avoid the additional disturbance and risks to shallow groundwater associated with sediment control basins, wherever practicable.

Basic stormwater control principles will include:

- avoid changes to existing flow paths wherever practicable
- divert upslope runoff around hardstand areas
- minimise hardstand footprint
- minimise sediment generation by appropriately stabilising and sheeting hardstand areas
- implement scour protection where flow concentrations cannot be avoided

3.3.5 Temporary Construction Facilities

Temporary facilities will be required during the construction phase of the Project, as described in the following sections.

3.3.5.1 Temporary construction camp and laydown facility

The construction workforce will likely be accommodated in a temporary construction camp (approximately 24 ha) during the construction phase of the Project (see Figure 3.8). A 150 person construction camp will be located to the west of the Stuart Highway on Hayfield PPL (NT Portion 7513). The construction camp is expected to house a total of 133 people at its peak.

The construction camp will provide the following facilities and services:

- Accommodation
- Offices and first aid facilities
- Kitchen and dining
- Laundry and ablution blocks
- Recreational areas
- Water supply and use
- Power supply
- Diesel / fuel storage and use
- Vehicle and plant wash-down facilities (biosecurity)
- General laydown area
- Wastewater treatment and management
- Waste management facilities.

Figure 3.8 Example of temporary workers construction camp

3.3.5.2 Access tracks

Equipment and personnel will require daily access to the ROW and worksites throughout construction. Access to the ROW will be achieved via existing access tracks through the pastoralist property, the existing service track adjacent to the AGP and the ROW itself as a throughfare.

Three existing access tracks are proposed for the construction phase of works:

- Shenandoah Access
- AGP easement operations service track
- Unnamed pastoral property access.

APA will maintain the Shenandoah Access and AGP easement operations service track. Tamboran Resources will maintain the unnamed pastoral property access.

Maintenance or upgrade of the above access tracks will be undertaken to a suitable all-weather standard for heavy vehicles with typically a 6 m wide surface and where required gravel sheeting, such as in areas subject to ponding. Design of access tracks will be undertaken as necessary in consultation with the relevant landholder. APA will seek agreement from landholders to grant suitable access rights to these tracks for construction access and ongoing operational access where required.

3.3.5.3 Pipe Laydown Areas

The Common User Facility (CUF) in the Marine Industry Park, located at East Arm Wharf (Figure 3.9) will likely be used as a temporary pipe storage yard following delivery of Project coated line pipe to the Port of Darwin and prior to delivery to the Project site. The CUF has 9 ha of existing hardstand for temporary storage. A 1.4 ha area will be required for the pipe yard. Pipe will be delivered from the pipe yard direct to the ROW for pipe stringing and subsequent welding.

Source: Land Development Corporation

Figure 3.9 Proposed Pipe Yard at the Common User Facility in the Marine Industry Park, East Arm Wharf

3.3.5.4 Additional work areas

3.3.5.4.1 Construction laydown area adjacent to surface facilities

A construction laydown area of up to 1 ha will be required adjacent to the Shenandoah Facility and up to 1.3 ha will be required adjacent to the Sturt Plateau Facility for the storage of equipment and materials.

3.3.5.4.1 Cleared Vegetation Stockpiles

Cleared vegetation will be stockpiled within the ROW. Cleared vegetation stockpiles that cannot be accommodated within the ROW will be stockpiled within construction laydown areas adjacent to surface facilities, truck turnarounds and additional work areas associated with trenched/bored crossings.

3.3.5.4.1 Truck Turnarounds

Truck turnarounds are turning bays that are required along the ROW to allow trucks delivering pipe and other materials to be able to turn around and return to an appropriate exit point. Fifteen truck turnarounds are proposed to be located approximately every 2.5 km along the alignment. Indicative locations for turn arounds are shown in Figure 3.10. The locations may be subject to change to reduce clearing of mature trees or based on site conditions at the time of construction. Truck turnarounds will be an additional 20 m width to the ROW for a length of about 50 m on one side of the ROW only.

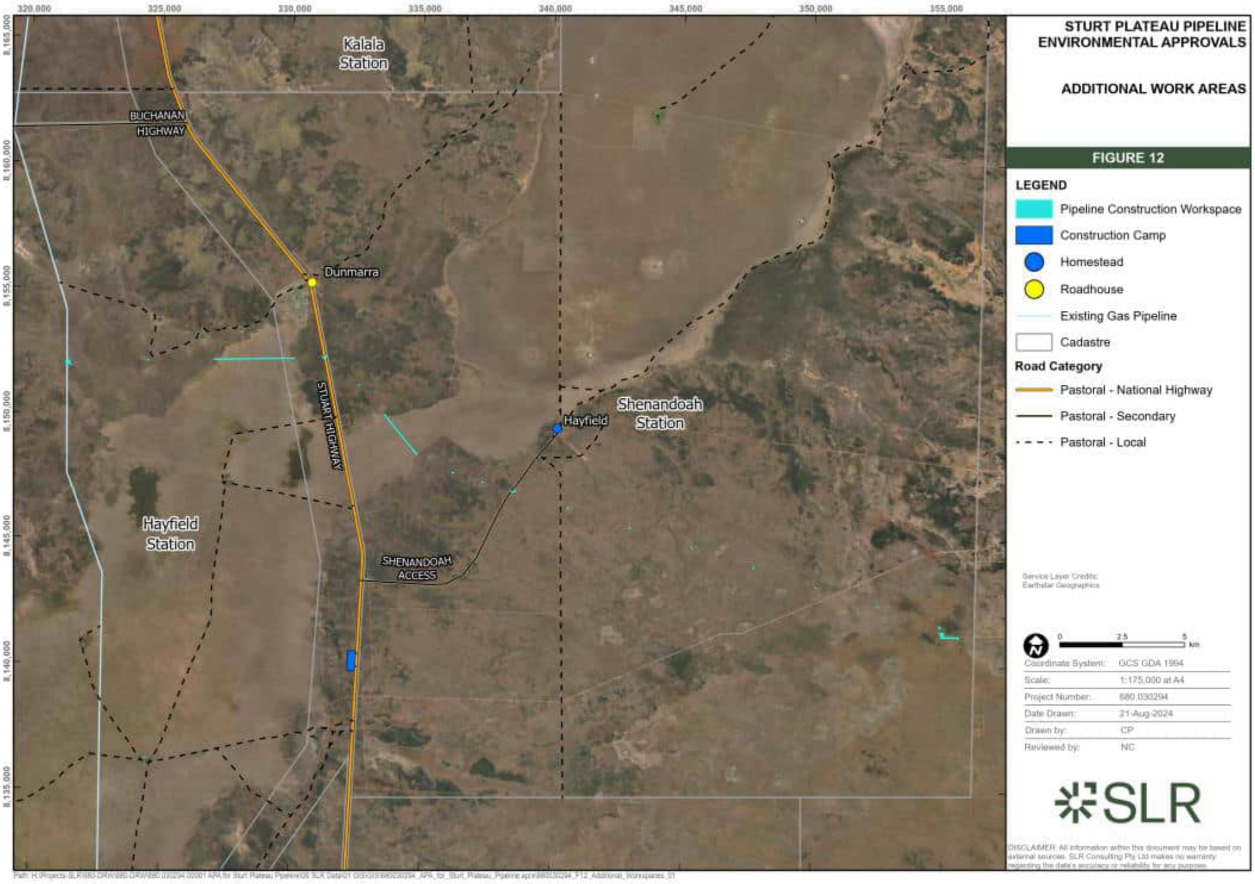

Figure 3.10 **Additional work areas**

3.3.5.4.1 Trenched/Bored Crossings

Unsealed roads and minor watercourses will typically be crossed using open cut trenching. The Stuart Highway will be crossed by horizontal boring.

Horizontal boring involves construction of a bell hole either side of the crossing with a horizontal bore hole for installation of the pipeline beneath sensitive surface features. The additional disturbance footprint required for horizontal bored crossings would generally be an area of approximately 5 m x 50 m adjoining each side of the ROW.

3.3.5.4.1 Hydrostatic Testing

Hydrostatic testing of the pipeline will require water storages to be constructed near the break point of each hydrotest section.

3.3.5.4.1 Water Bores and Storage

The water takes will be used to support potable uses at the accommodation, dust suppression, trench compaction and for hydrostatic testing. A minimum of two new bores are proposed. These being located within the footprint of the temporary construction campsite.

Hardstand and associated piping infrastructure will be required at water offtakes. Water storages are likely to be turkeys nests located at the construction camp and at KP 0. The turkeys nest dam may be retained following construction. The estimated area required for each turkeys nest storage is 50 m X

50 m. A temporary turkeys nest will be constructed adjacent to the Shenandoah Facility to store water provided by Tamboran and camp site water bores.

3.3.5.4.1 Borrow pit for gravel material

A 50 m x 50 m borrow pit for gravel material is proposed within the footprint of the Sturt Plateau station temporary laydown area. Additional gravel material may be extracted from within the site nominated for the camp area. Gravel material may be extracted from a number of discrete areas within the nominated footprint of the camp. The locations of these areas are not yet known as goetechnical assessment has not occurred. For the purpose of this assessment, it has been assumed that the total footprint of the camp area will be disturbed.

3.4 LAND REQUIREMENTS

Construction of the Project would require an estimated 150 ha of land, comprising:

- Approximately 111 ha for ROW and surface facilities
- Approximately 13 ha for additional workspaces
- Approximately 25 ha for the temporary construction camp
- Approximately 0.3 ha for the cathodic protection anode bed.

During operations the Project would require an estimated 111.3 ha of land.

3.5 PROJECT SCHEDULE

An indicative project schedule is presented in Table 3.4. APA anticipates construction commencing in July 2025, and the pipeline being operational by the end of Q4 2025. Thus, construction is expected to take 6 months. This schedule is subject to ongoing adjustments and will be subject to the grant of all relevant regulatory approvals.

Table 3.4 Indicative project schedule

Element	2024			2025			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Approvals and Access							
Front End Engineering Design							
Detailed Engineering Completion							
Long-Lead Item procurement							
Site Mobilization (late July - Late August)							
Construction (late July - November 25)							
Commissioning (November / December 25)							

3.6 CONSTRUCTION METHOD

This section describes the construction phase of the Project, encompassing the construction areas, construction activities and respective methodologies and sequences.

3.6.1 Transmission pipeline

Construction of the pipeline will use typical construction methods for modern gas pipelines. The construction sequence is shown in Figure 3.11 and will involve the following key steps, which are described in greater detail in subsequent sections:

- Preliminary survey works (including geotechnical surveys, installation of temporary gates in fences)
- Clearing of vegetation and grading the ROW
- Stripping and stockpiling of topsoil
- Delivery of 18 m pipe lengths to the ROW and welding into ‘pipe strings’
- Non-destructive testing (NDT) and coating
- Excavating a trench and any necessary bell holes in which to lay the pipe
- Lowering the pipeline strings into the trench and welding strings together
- Backfilling the trench with excavated material
- Crossing watercourses, roads by open cut trench, horizontal boring or HDD methods
- Installing pipeline markers at fences, road crossings and other locations as required by AS 2885
- Testing the structural integrity of the pipeline by hydrostatic testing
- Installing permanent gates in fences, where required
- Rehabilitating the ROW.

A typical layout for the construction ROW is shown in Figure 3.12, consisting of the pipeline trench, working space, vehicle access track and stockpile areas either side of the alignment.

The construction corridor will follow the preferred alignment of the pipeline. The construction corridor will be nominally 30m in width for its entirety, including an approximately 20 m wide working side and approximately 10 m wide spoil side as per Figure 3.12. Most construction activity will take place within this corridor. Construction activities will occur either from KP 0 to KP 37 or KP 37 to KP 0. Consequently, the working side of the ROW will be located to the north of the pipeline alignment if pipelaying commences at KP 0 or to the south of the pipeline alignment if pipelaying commences at KP 37. The direction of pipelaying will be dependent upon weather and site conditions at the commencement of construction.

1. Clear and grade

2. Pipe stringing

3. Pipe bending

4. Welding of pipe joints

5. Trench excavation

6. Lowering-in

7. Backfilling

8. Rehabilitation

Figure 3.11 Pipeline construction sequence

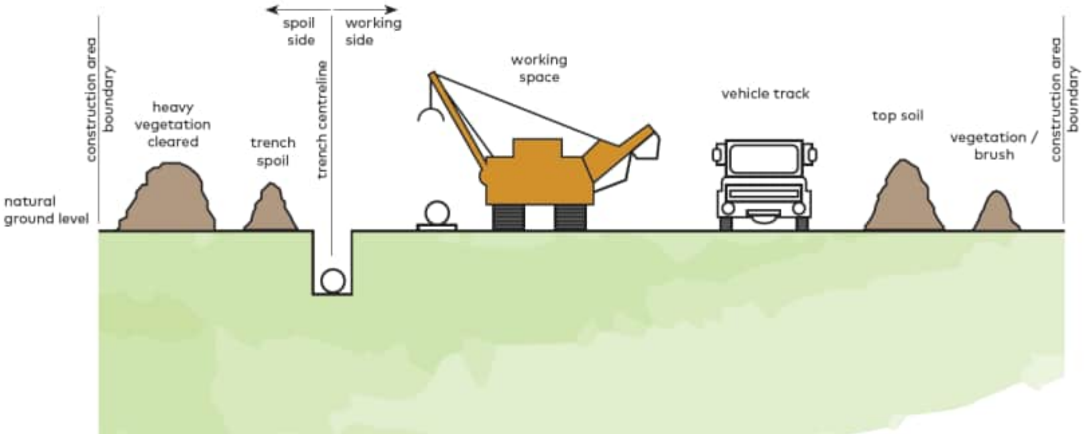

Figure 3.12 Typical layout for a pipeline construction corridor.

3.6.1.1 Preliminary Survey Works

Preliminary survey works will be undertaken to mark the extent of approved work areas. Markers will be placed along the alignment to identify the pipeline centreline, the boundaries of the ROW, any additional workspaces and access roads, if required.

Fencing crossing the ROW will be strained and cut and temporary gates and fencing will be installed.

3.6.1.2 Clearing and Grading

Clearing and grading of the ROW is undertaken to provide a safe and efficient area for construction activities. Clearing will be required to remove trees, shrubs and groundcover vegetation. Graders, bulldozers and excavators are generally used to clear and level the ROW. A ROW width of 30 m will generally be cleared and graded.

In areas of woody vegetation, trees and shrubs will be mulched or stockpiled as cleared. The method will depend upon the type and density of the vegetation. Rootstock of trees will generally be removed.

Cleared vegetation will be stockpiled on one or both sides of the ROW, as in Figure 3.12. Breaks will be left in stockpiled vegetation at fence lines, tracks and drainage lines and at locations to allow continued access for stock to water points.

Topsoil will be stripped to depths defined by soil surveys, typically over the full width of the ROW. In soil types with topsoil depth of 30cm or greater, the stripping depth may be reduced to ensure stockpiles can be accommodated within the 30m ROW width. Stripped topsoil will be stockpiled on one side of the ROW adjacent to vegetation stockpiles.

3.6.1.3 Pipe Stringing and Bending

Stringing involves distributing pipe lengths along the ROW in preparation for welding.

Pipe lengths will generally be transported to the ROW from laydown areas by extendable semi-trailers. Pipe lengths will be lifted from trucks by excavators fitted with vacuum lifters, side-booms or cranes fitted with lifting hooks and laid adjacent to the marked trench location in a defined order. Pipe lengths will be positioned on wooden skids and sandbags to protect the pipe coating from damage.

Where required, pipe lengths will be bent using a hydraulic bending machine to match changes in either elevation or direction of the alignment.

3.6.1.4 Welding

Specialised construction crews will weld pipe lengths together manually. Pipe lengths will be welded into “strings” of up to approximately 1,200 m in length, allowing for stock and landholder access breaks where required.

All welds will be subjected to one hundred percent x-ray analysis, ultrasonic testing or other methods to check structural integrity. Non-compliant welds will either be repaired or replaced.

Following welding, the weld joints will be cleaned by grit blasting with garnet. An external coating (compatible with the factory applied external coating) will be applied to the weld to prevent corrosion.

3.6.1.5 Trench Excavation

Specialised trenching machines and excavators will excavate to a minimum depth of 1200 mm to achieve the minimum depth of cover of 750 mm, and a minimum of 1650 mm to achieve the 1200 mm depth of cover for open cut crossings. Spoil generated during excavation would be stockpiled on the non-working side of the ROW, separately from vegetation and topsoil stockpiled earlier in the construction program (see Figure 3.12).

Breaks in the open trench will be included to facilitate stock and wildlife crossings and agricultural vehicle movements. Breaks will also be included at fences and drainage lines as required.

For areas where rock is present, trench excavation will be undertaken by rock saw machines or by excavators with rock hammer attachments. Blasting of rock will only occur in circumstances where a rock saw/rock hammer is found to be ineffective. This is considered unlikely to occur due to favourable geology across most of the alignment. Where blasting of rock is necessary, an operational procedure will be developed in accordance with Australian Standards detailing the blasting method.

3.6.1.6 Horizontal Boring

Horizontal boring involves the excavation of a hole either side of the feature to be bored for installation of the pipeline beneath the surface feature which cannot be open cut, such as sealed roads. The additional disturbance footprint required for the horizontal bored crossings would generally be an area of 5 m x 50 m adjoining each side of the ROW.

Since traffic will need to continue to flow on the Stuart Highway this technique will be employed to ensure the pipeline crossing beneath the highway and adjacent table drains can be achieved at this location. This is the only location where a horizontal bored crossing will be needed for the Project. Figure 3.13 provides a typical set-up for a horizontal bored crossing.

Horizontal boring is proposed to be undertaken at approximate KP 27.1.

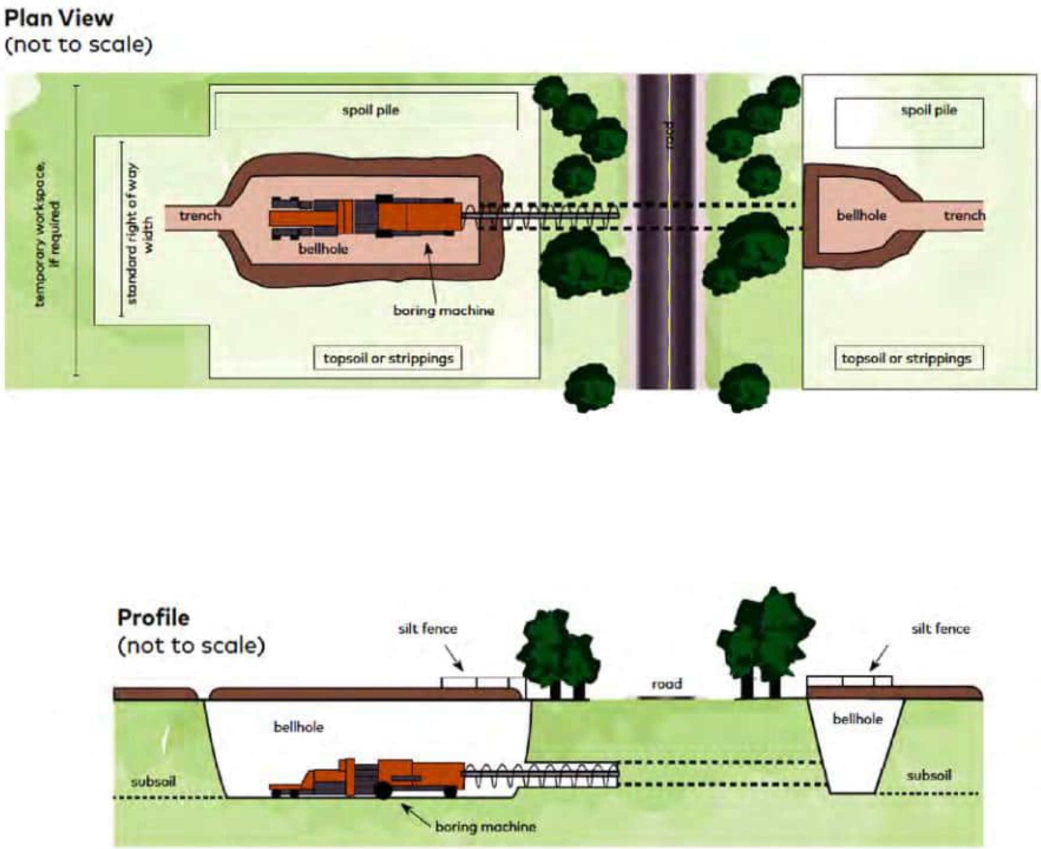

Figure 3.13 **Typical horizontal boring schematic**

3.6.1.7 Road/Tracks

The pipeline alignment will cross one unsealed private road and 3 minor tracks. These crossings will be constructed by open cut trenching. Open cut trenching is proposed at the following locations:

- Approximate KP 4.750 Minor track
- Approximate KP 15.820 Minor track
- Approximate KP 17.700 Unsealed road to homestead
- Approximate KP 20.850 Minor track.

3.6.1.8 Lowering and Trench Backfilling

Following trench excavation, the welded pipe strings will be lifted off skids and lowered into the trench using side-boom tractors. The pipe coating is inspected and tested for defects as each welded pipe string is lifted. After lowering-in, the strings are welded together (a 'tie-in') in the trench.

In some areas, it may be necessary to protect the pipe coating from abrasion damage by placing a layer of padding material in the trench prior to lowering in of the pipeline as well as to cover the pipeline (shading). Padding machines are used to generate padding material by sieving the excavated trench subsoil to remove rocks and coarse materials and depositing the fine material in the base of the trench and over the pipe. This method minimises, but may not eliminate, the need for importing padding material from other locations.

Care will be taken to ensure separation of topsoil and subsoil throughout this process. Subsoils will be compacted to reduce the settlement of the trench over the operational life of the pipeline.

Where required, trench blocks (also known as trench or sack breakers) will be installed prior to backfilling of the trench to control lateral water movement along the trench. Trench breakers are commonly installed in a number of environmental conditions, such as adjacent to watercourses and wetlands, on steep slopes or where drainage patterns change. Trench breakers are constructed typically from sacks of soil or sand, stabilised sand or spray applied polyurethane foam (Figure 3.14).

Figure 3.14 Example of trench breakers

3.6.1.9 Reinstatement and Rehabilitation of Footprint

Rehabilitation of the construction footprint will be undertaken in accordance with the project Construction Environmental Management Plan (CEMP) and the latest APGA Code of Environmental Practice. It will be a progressive process with an aim to restore the land back to its prior productivity within a reasonable timeframe, subject to seasonal constraints.

Key activities would include:

- Removal of all temporary structures and buried infrastructure
- Removal of all waste
- Re-establishing topsoil cover
- Returning all land and waterways to a stable condition
- Ameliorating construction impacts to soil texture, structure and chemical composition, where required
- Reinstating natural drainage patterns
- Reinstating roadways and road reserves in accordance with the requirements of the relevant authority
- Reinstating fencing and access tracks in accordance with the requirements of landowners
- Spreading of mulch or timber, where appropriate
- Application of seed and/or vegetation, where appropriate
- Installing permanent erosion control measures (such as contour banks, filter strips) in erosion prone areas
- Ensuring the pre-construction environment is reinstated and disturbed habitats recreated where they do not affect pipeline operation and integrity (trees and shrubs are discouraged over and near the pipeline to maintain integrity of the pipe coatings) and to enable operational access.

Figure 3.15 and Figure 3.16 show an example of a ROW during construction and after construction.

Figure 3.15 ROW during construction

Figure 3.16 ROW approximately 7 months after construction

3.6.2 Surface facilities

Construction of the Shenandoah Facility and Sturt Plateau Facility will be undertaken by a specialist facilities contractor across several stages of works. These stages broadly comprise site set up, earthworks and civil construction, mechanical, electrical and instrumentation works and testing and commissioning.

Site set up within the construction footprint of each associated surface facility is required to provide a safe and efficient area for construction activities. This includes constructing temporary access to the construction sites, clearing vegetation, installation of temporary fencing and site offices, set up of lay down areas, and relocating existing services if required.

A construction laydown area of up to 1 ha will be required adjacent to the Shenandoah Facility and 1.3 ha adjacent to the Sturt Plateau Facility during the construction of these facilities for storage of materials and equipment.

Earthworks will then be undertaken to modify existing ground levels to the required design levels. The topsoil will be required to be replaced with engineered fill during the construction of the facilities hardstand area and pilings may be installed as well to minimise ground settlement. Steel reinforced concrete foundations or piled concrete footings will then be installed for fixing surface facility equipment and supports on to.

Following installation of foundations and footings, work to install structural, mechanical, piping, electrical and instrumentation (SMPEI) components can be undertaken. Specialist crews will install structural supports, mechanical equipment, piping spools, electrical equipment, cabinets and panels, cabling and instrumentation.

The majority of major equipment and SMPEI components will be manufactured outside of Australia, although fabrication of skids and installation of equipment will be undertaken within Australia where equipment is shipped as separate components. The completed fabricated skids, major equipment and SMPEI components will be transported to site by semi-trailer to the relevant associated surface facility site for installation.

Testing and commissioning of the associated surface facilities may involve hydrostatic testing of pipework, as well as testing of mechanical and electrical equipment to make sure they have been installed correctly and are ready for commissioning. Commissioning involves fine tuning of equipment and instrumentation by running the facilities through various operating ranges. Once each facility passes all checks following a commissioning plan, it is ready to commence operations.

Construction and commissioning of the associated surface facilities to completion is estimated to take approximately six months and one month respectively. Note that commissioning will occur sequentially and overlap with the construction phase, such that construction and commissioning of associated surface facilities is estimated to require six months in total.

3.6.3 Water Use and Supply

Water will be required during the construction phase. Non-potable water will be required for dust control of the construction ROW and access tracks (with the quantity dependent on conditions and proximity to sensitive receivers), as well as for hydrostatic testing of the pipeline during construction. Water supply will be obtained from a combination of new and existing bores.

An estimated 70 ML of water will be required for dust suppression, trench compaction, hydrostatic testing and for potable water to service the campsite. It is likely that 30 ML will be sourced from Tamboran Resources under groundwater extraction licence GRF10285. The additional 40 ML of water will be sourced from new bores drilled for the Project.

3.6.4 Energy Use and Supply

Electricity for construction activities such as welding and horizontal boring equipment and for the construction campsite would be supplied by diesel generators.

Based on similar scale projects undertaken by APA, approximately 500 kL of diesel (including vehicle and equipment fuel) is estimated to be required for the construction of both pipelines and associated surface facilities. Approximately 160 kL of diesel is estimated to be required for the construction camp.

A fuel tank of approximately 60 kL capacity will be installed at the construction laydown site, likely to be near the construction camp, and used for the duration of the construction period. Fuel trucks will transport diesel from the 60 kL fuel tank to work crews and construction machinery on the transmission pipeline and surface facility construction sites.

3.6.5 Waste management

The Project would generate a range of wastes, mainly through the construction phase.

3.6.5.1 Construction waste management

A range of wastes would be generated during construction activities for the Project, mainly during pipeline construction, which include:

- General wastes from transportation and storage of pipe (packaging, pallets, ropes, bevel protectors)
- Wastes from clearing the construction area (vegetation)
- Pipeline coating waste
- Waste from temporary construction accommodation
- Laying, welding and grinding waste (for example, scrap metal, spent welding rods)
- Water from dewatering
- Machinery waste.

Cleared vegetation, topsoil and subsoil would be generated during construction of the transmission pipeline and surface facilities. Subsoil materials generated during pipeline construction are returned to the trench while topsoil is respread and used to assist rehabilitation of the construction footprint and are not considered to be wastes.

Excavated sub-soils would be stockpiled to be re-used in backfilling. The volume of material reused would vary location to location based on soil profile and quality. In the event that the excavated material cannot be reused, the spoil would be disposed of according to the requirements of the CEMP.

Project construction wastes would be reused or recycled where practicable or collected and transported by licensed waste contractors for disposal at appropriately licensed facilities. Any contaminated or hazard materials identified on site would be disposed in accordance with NT EPA waste classification and transport requirements.

Dewatering of trenches and bellholes due to rainfall or groundwater ingress would be collected and treated, if required, prior to discharge to land or reused where appropriate such as for dust suppression.

Dewatering of excavated trenches or bellholes would be managed to minimise sedimentation, including the use of sediment control devices to remove suspended solids and dissipate flow. Sediment control devices would be listed in the CEMP.

3.6.5.2 Operation waste management

During operation of the Project, wastes would include:

- Small volumes of waste oils and grease
- Dust and mill scale (steel flakes) from infrequent maintenance or pigging activities.

Waste generated from pigging is typically dust and mill scale from inside the pipe and volumes are expected to be less than one cubic metre for the transmission pipeline. This waste would be collected at scraper station locations approximately every 10 years as part of maintenance activities. Pigging waste would be tested for waste classification before disposal at a suitable general solid waste or hazardous waste management facility. Pigging waste management would be undertaken in accordance with EPA waste classification and transport requirements in place at the time of generation.

Project operation wastes would be reused or recycled where practicable or collected and transported by licensed waste contractors for disposal at appropriately licensed facilities in accordance with NT EPA waste classification and transport requirements.

3.7 OPERATION AND MAINTENANCE

The Project is expected to have an operational life of up to 40 years. A limited range of activities will be required to operate the Project, as described in the following sections.

3.7.1 Pipeline Inspections and Maintenance

A routine inspection and maintenance program will be implemented during pipeline operation. Inspection of the easement for issues such as erosion, weeds, subsidence, revegetation and unauthorised third-party activity will be undertaken on a regular basis by ground and aerial patrols.

Aerial patrols will typically be undertaken monthly with ground patrols conducted annually. Frequency of inspections may vary depending upon the particular issue being inspected, or in response to specific conditions such as major rainfall events. Ground patrols of the easement will be generally undertaken by travelling along accessible sections of the easement in light vehicles. Landholder issues will be factored into planning and scheduling of ground patrols.

Ongoing activities to maintain pipeline integrity will include cathodic protection surveys and scheduled internal pipeline inspections.

Inspection of the CP system will typically be undertaken annually in accordance with AS 2832.

Pigging of the transmission pipeline will be undertaken at a low frequency of approximately every 10 years. Minor amounts of gas will be vented during pigging activities to depressurise the PIG launcher/receiver.

Regular contact will be maintained with landholders of all properties traversed by the transmission pipeline during operation in accordance with the requirements of AS 2885.

3.7.2 Surface Facilities Inspections and Maintenance

The Shenandoah Facility is designed to be automated and will be operated unmanned under normal operating conditions. It is unlikely that the Sturt Plateau Facility will be automated. This will be confirmed during detailed design. Site inspections would typically be undertaken on a monthly basis.

3.8 DECOMMISSIONING

The pipeline has a design life of 40 years though this could be exceeded depending on the pipeline integrity. At the end of this life span, and when the pipeline and associated facilities are no longer required, decommissioning of the Project will occur. This will be undertaken in accordance with

AS2885, relevant legislative requirements and best practice guidelines, inclusive of the latest APGA code (APGA, 2022).

A decommissioning plan and rehabilitation program will be prepared and implemented in consultation with landowners, applicable regulators, and any relevant broader stakeholders.

Decommissioning of the Project will occur at the end of its useful life. A decommissioning plan for the Project and associated infrastructure will be prepared in advance of decommissioning in consultation with the relevant regulatory authorities and landholders. The basis of the plan will be that the Project and associated infrastructure are to be decommissioned in line with the applicable legislative requirements and best practice guidelines existing at that time, including any current version of the APGA Code.

The following options for the transmission pipeline will be considered as part of this process, although other options may also be identified:

- Suspension – The transmission pipeline would be depressurised, capped and filled with an inert gas such as nitrogen, or water with corrosion inhibitors. The cathodic protection system would be maintained to prevent the pipeline corroding. Surface facilities would be removed or left in place if further service is envisaged.
- Abandonment – The pipeline would be disconnected from all sources of hydrocarbons and surface facilities. All remaining natural gas would be purged from the pipelines with a non-flammable liquid. Sections of the pipelines may then be filled with water, filled with cementitious mud, or removed. All surface facilities would be removed.

Both identified decommissioning options would result in small scale disturbance and environmental impacts. It is anticipated that relinquishment of the applicable Pipeline Licence (and associated easement) would not be possible until such time as any decommissioning issues are resolved.

Removal of the pipelines as part of abandonment would result in significant disturbance and environmental impacts and is therefore not preferred.

4 SURFACE WATER IMPACT ASSESSMENT

4.1 OVERVIEW

Surface civil works in the Project area have the potential to impact the quality and quantity of surface water resources. However, potential impacts are significantly ameliorated by adopting a buried pipeline. The potential impacts on surface water quality and quantity are discussed in the following sections. Proposed mitigation and management measures to limit surface water impacts are discussed in Section 5.

4.2 STORMWATER AND FLOODING

4.2.1 Pipeline

The proposed construction method aims to restore existing surface levels after the pipeline is buried. Provided this objective is achieved, the pipeline will have no measurable impact on flooding or stormwater flows.

Minimising surface water impacts will require careful control of backfilling and compaction to ensure that finished surface levels are not higher or lower than surrounding ground levels. Finished surface levels that are too low could allow stormwater to pond or flow along the backfilled trench alignment, potentially diverting the natural drainage path of surface water flows. Similarly, finished surface levels that are too high could divert the natural drainage path of surface water flows. Ongoing monitoring of the pipeline, including a visual check for potential settlement of backfill, will be undertaken to confirm surface levels along the pipeline route are consistent with existing conditions.

Design of the pipeline will also need to consider buoyancy effects, particularly in areas subject to high inundation depths and durations such as the ephemeral waterbody.

4.2.2 Surface facilities

Surface facilities are located outside of the deeper areas of flooding along the pipeline route.

Design flood depths and velocities at the Shenandoah Facility and Sturt Plateau Facility, based on the results of the AECOM (2024) modelling, are shown in Table 4.1. Results at the Camp Laydown location are shown in Table 4.2 and Figure 2.7. Flood depths and velocities in the wider Project area are shown in Figure 2.5 and Figure 2.6.

The model results show that the Shenandoah facility is the most significantly impacted by flooding, however flood depths and velocities for the 1% AEP event are still relatively low (0.4 m depth and 0.4 m/s velocity).

Due to the relatively flat topography, detailed local ground survey should be obtained to support detailed design of earthworks associated with surface facilities. The detailed design will consider existing local stormwater flow paths and will aim to ensure that:

- Stormwater runoff is effectively diverted around proposed surface facilities to provide adequate flood immunity;
- Diverted stormwater flows are conveyed at non-erosive velocities; and
- Diverted stormwater flows are returned to existing flow paths as quickly as possible downstream of disturbance areas.

Table 4.1 Flood depths and velocity at the Sturt Plateau and Shenandoah facilities (source: AECOM, 2024)

AEP (%)	Depth (m)		Velocity (m/s)	
	Delivery Station	Receipt Station	Delivery Station	Receipt Station
10%	0.1	0.2	0.1	0.3
1%	0.1	0.3	0.1	0.3
0.5%	0.1	0.3	0.1	0.4
0.2%	0.1	0.4	0.2	0.4
0.1%	0.1	0.4	0.2	0.4

Table 4.2 Flood depths and velocity at the Camp Laydown location (source: AECOM, 2024)

AEP (%)	Depth (m)	Velocity (m/s)
10%	0.1	0.2
1%	0.1	0.2
0.5%	0.1	0.3
0.2%	0.2	0.3
0.1%	0.2	0.3

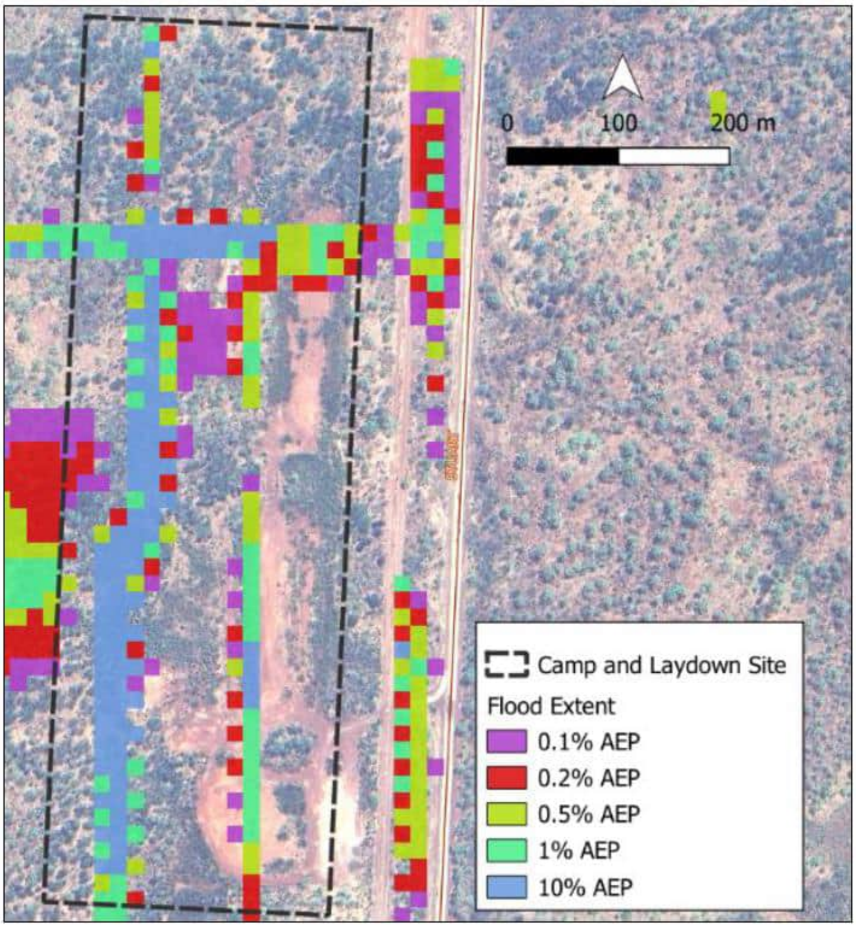

Figure 4.1 Flood extents at proposed Camp Laydown location (source: AECOM, 2024)

4.3 WATER QUALITY

Potential impacts of the Project on surface water quality are primarily related to land disturbance. Therefore, effective erosion and sediment control of disturbed areas will be a key objective during construction and operational phases of the Project. Key principles of erosion and sediment control include:

- Diverting surface runoff from disturbed areas around areas of active land disturbance;
- Minimising the extent and duration of land disturbance;
- Undertaking land-disturbing activities in the dry season where possible;
- Effective control of erosion and runoff from disturbed areas; and
- Rehabilitation of disturbed areas to reestablish vegetation cover as soon as possible after construction activities are completed.

Water quality impacts could also potentially occur due to:

- spills of fuel and lubricants from machinery or storage areas; and
- spills of sewage effluent from the construction camp.

4.3.1 Construction

During construction of the Project, soils would be subject to disturbance during the removal of vegetation, trench excavation and stockpiling of materials, potentially leading to sediments and/or pollutants being entrained in rainfall runoff and entering local watercourses. Discharge of polluted stormwater from disturbed areas has the potential to affect receiving water quality.

A Construction Environmental Management Plan will be prepared to document proposed management measures for erosion and sediment control in accordance with best practice guidelines (APGA, 2022), as well as hazardous substances.

Engineering design for the construction camp will include suitable collection and treatment of domestic wastewater with on-site disposal to comply with DoH health requirements for mining and construction camps [1].

With the implementation of effective control measures, the potential water quality impacts of the Project will be adequately managed during the Project's construction phase to ensure no impact on stormwater runoff or receiving water quality.

4.3.2 Operation

The risks of water quality impacts from the Project are substantially reduced during the operational phase of the Project once disturbance areas have been rehabilitated. Ongoing risks will include management of runoff from hardstand areas, as well as storage and handling of fuel and oils.

The potential for ongoing erosion post construction is considered to be low provided appropriate rehabilitation of disturbed areas is undertaken and any areas identified as exhibiting signs of erosion above expected background levels are addressed.

All hazardous materials and chemicals will be stored in accordance with relevant Australian standards. However, day-to-day operation of the pipeline will require minimal movement of machinery and expected quantities of hazardous materials are expected to be low.

[1] https://nt.gov.au/property/building/health-and-safety/health-requirements-mining-construction-projects

With the proposed control measures in place, water quality impacts during the operational phase of the Project are expected to be negligible.

4.4 WATER SUPPLY

As presented in the Project description (see Section 3.6.3), the estimated total water usage for construction of the Project is 70 ML. Approximately 30 ML of non-potable water for dust control and hydrotesting will be sourced from Tamboran Resources (under groundwater extraction licence GRF10285). APA will obtain a groundwater extraction licence and construct new bores to source 40 ML for the Project.

Water supply requirements for the ongoing operation of the Project are nil because normal pipeline operations do not consume water.

As water used by the Project will be obtained under groundwater extraction licences (existing licence GRF10285 and new licences to be obtained for an additional 40 ML), no impacts to surface water or groundwater availability in the vicinity of the Project are anticipated.

Loss of catchment yield associated with containment of runoff from disturbed areas is expected to be negligible and will be temporary during the construction phase. Impacts on surface water availability to downstream water users are expected to be negligible.

5 MITIGATION AND MANAGEMENT MEASURES

Table 5.1 summarises the proposed mitigation and management measures to address potential surface water impacts of the Project across the key risk areas of:

- Stormwater and flooding;
- Water quality; and
- Water supply.

Table 5.1 Proposed mitigation measures to address surface water impacts

Risk Issue	Potential impact	Proposed mitigation & management measures
Stormwater & flooding	Diversion of stormwater flows by backfilled pipeline trench	Careful control of backfilling and compaction to ensure that finished surface levels are not higher or lower than surrounding ground levels
		Ongoing monitoring of the pipeline, including a visual check for potential settlement of backfill, to confirm surface levels along the pipeline route are consistent with existing conditions.
	Surface facilities are flooded or divert existing surface water flows	Detailed design of earthworks based on local ground survey to ensure that: • Stormwater runoff is effectively diverted around proposed surface facilities to provide adequate flood immunity; • Diverted stormwater flows are conveyed at non-erosive velocities; • Diverted stormwater flows are returned to existing flow paths as quickly as possible downstream of disturbance areas.
	Surface movement due to pipeline buoyancy in inundated areas	Engineering design to consider buoyancy effects, particularly in areas subject to high inundation depths and durations such as the ephemeral waterbody.
Water quality	Discharge of stormwater with high sediment concentrations from disturbed and hardstand areas, or spills of fuel and lubricants from machinery or storage areas	Prepare & implement a Construction Environmental Management Plan to describe proposed management measures for: • erosion and sediment control in accordance with best practice guidelines (APGA, 2022); • rehabilitation of disturbed areas to reestablish vegetation cover as soon as possible after construction activities are completed; and • storage and transport of hazardous substances.
	Spills of sewage effluent from the construction camp	Engineering design for the construction camp includes suitable collection and treatment of domestic wastewater with either on-site or off-site disposal.
Water supply	Water taken by the Project reduces surface water or groundwater availability for other water users	All water used by the Project to be obtained from licensed sources.

6 DCCEEW WATER TRIGGER ASSESSMENT

6.1 OVERVIEW

Under the *Environment Protection and Biodiversity Conservation Amendment Act 2013* (EPBC Act), water resources are a matter of national environmental significance in relation to coal seam gas (CSG) and large coal mining development (the Water Trigger). If a Coal Seam Gas (CSG) or large coal mining development has, or is likely to have, a significant impact on a water resource, the proponent must submit a referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a decision by the minister on whether assessment and approval is required under the EPBC Act.

On 15 December 2023, the EPBC Act Water Trigger was amended to include consideration of likely significant impacts on water resources in relation to all types of unconventional gas. DCCEEW has published a guideline (DCCEEW, 2022) to assist proponents of a CSG or large coal mining development to decide whether the action has, or is likely to have, a significant impact on a water resource.

The following section provides an assessment of the Project against the significant impact criteria presented in the DCCEEW guideline (DCCEEW, 2022) as covering all forms of unconventional gas.

6.2 IMPACTED WATER RESOURCE

The Project is located within the Daly Roper Beetaloo Water Control District, which has a total area of 329,783 km^2. Water Control Districts are declared in areas where there is a high level of competition for water and/or require closer management of the water resources.

The Project area is covered by the Georgina Wiso Water Allocation Plan (WAP) which applies to groundwater within the Cambrian Limestone Aquifer. The estimated sustainable yield under the WAP is 210,000 ML (DEPWS, 2023), which is the volume allocated for consumptive use. There is no allocation of surface water within the WAP.

6.3 ASSESSMENT AGAINST SIGNIFICANT IMPACT CRITERIA

The DCCEEW guideline states that an action is likely to have a significant impact on a water resource if there is a real or not remote chance or possibility that it will directly or indirectly result in a change to:

- the hydrology of a water resource; and/or
- the water quality of a water resource

An assessment of changes in hydrological characteristics and water quality based on the aspects listed in the DCCEEW guideline is provided in Table 6.1. Due to the relatively small and temporary surface disturbance caused by the Project, it will not have a significant impact on water resources.

Table 6.1 Assessment of Project against significant impact criteria

HYDROLOGY	Impact of Project	Significant impact?
changes in the water quantity, including the timing of variations in water quantity	The Project does not store, use or divert significant volumes of water	No
changes in the integrity of hydrological or hydrogeological connections, including structural damage (for example, large scale subsidence)	The Project will not cause subsidence or other major ground disturbance	No
changes in the area or extent of a water resource.	The Project will have no impact on the area of extent of the Daly Roper Beetaloo Water Control District	No
flow regimes (volume, timing, duration and frequency of surface water flows)	The Project will not affect the volume, timing, duration or frequency of surface water flows	No
recharge rates to groundwater	See groundwater impact assessment	-
aquifer pressure or pressure relationships between aquifers	See groundwater impact assessment	-
groundwater table and potentiometric surface levels	See groundwater impact assessment	-
groundwater-surface water interactions	The Project will have a negligible impact on groundwater-surface water interactions. Trenches for pipeline construction are generally shallow (of the order of 1 m to 1.5 m) and will be backfilled and compacted after installation of the pipeline. The use of trench breakers (see Section 3.6.1.8) will also prevent the backfilled trench becoming a preferential pathway for sub-surface flow.	No
river-floodplain connectivity	The Project will not alter surface levels and will have no impact on river-floodplain connectivity	No
inter-aquifer connectivity	See groundwater impact assessment	-
coastal processes including changes to sediment movement or accretion, water circulation patterns, permanent alterations in tidal patterns, or substantial changes to water flows or water quality in estuaries.	The Project is not located near the coast.	No
WATER QUALITY	**Impact of Project**	**Significant impact?**
there is a risk that the ability to achieve relevant local or regional water quality objectives would be materially compromised, and as a result the action:	The primary water demand of the Project is for construction. The Project does not use, store or discharge significant volumes of water in its operation.	No

HYDROLOGY	Impact of Project	Significant impact?
– creates risks to human or animal health or to the condition of the natural environment as a result of the change in water quality		
– substantially reduces the amount of water available for human consumptive uses or for other uses, including environmental uses, which are dependent on water of the appropriate quality	Water used by the Project will be obtained under existing or proposed new licenses. Therefore, no impacts to surface water or groundwater availability in the vicinity of the Project will occur.	No
– causes persistent organic chemicals, heavy metals, salt or other potentially harmful substances to accumulate in the environment	The Project does not use or produce significant volumes of persistent organic chemicals, heavy metals, salt or other potentially harmful substances. Storage and handling procedures for hazardous substances will be in accordance with relevant Australian standards.	No
– seriously affects the habitat or lifecycle of a native species dependent on a water resource, or	The Project will have no measurable impact on a water resource.	No
– causes the establishment of an invasive species (or the spread of an existing invasive species) that is harmful to the ecosystem function of the water resource, or	A Construction Environmental Management Plan will be developed and implemented for the Project to set out management measures to prevent the spread of invasive species.	No
there is a significant worsening of local water quality (where current local water quality is superior to local or regional water quality objectives), or	Stormwater will be managed in accordance with erosion and sediment control best practice guidelines (APGA, 2022).	No
high quality water is released into an ecosystem which is adapted to a lower quality of water.	The Project does not release water.	No

7 CONCLUSIONS

The potential surface water impacts of the Project are minimal because the pipeline is routed beneath the ground surface level. The proposed construction method will restore existing surface levels after the pipeline is buried, ensuring no measurable impact on flooding or stormwater flows.

The detailed design of surface facilities shall consider existing local stormwater flow paths and will aim to ensure that:

- Stormwater runoff is effectively diverted around proposed surface facilities to provide adequate flood immunity;
- Diverted stormwater flows are conveyed at non-erosive velocities; and
- Diverted stormwater flows are returned to existing flow paths as quickly as possible downstream of disturbance areas.

Potential impacts of the Project on surface water quality are primarily related to land disturbance. Therefore, effective erosion and sediment control of disturbed areas will be a key objective during construction and operational phases of the Project.

A Construction Environmental Management Plan will be prepared to document proposed management measures for erosion and sediment control in accordance with best practice guidelines (APGA, 2022), as well as hazardous substances.

Engineering design for the construction camp will include suitable collection and treatment of domestic wastewater with on-site disposal to comply with DoH health requirements for mining and construction camps [2].

With the implementation of effective control measures, the potential water quality impacts of the Project will be adequately managed during the Project's construction and decommissioning phases to ensure no impact on stormwater runoff or receiving water quality.

The risks of water quality impacts from the Project are substantially reduced during the operational phase of the Project once disturbance areas have been rehabilitated. Ongoing risks will include management of runoff from hardstand areas, as well as storage and handling of fuel and oils.

The potential for ongoing erosion post construction is considered to be low provided appropriate rehabilitation of disturbed areas is undertaken and any areas identified as exhibiting signs of erosion above expected background levels are addressed.

Suitable mitigation and management measures have been proposed to address potential surface water impacts of the Project across the key risk areas of:

- Stormwater and flooding;
- Water quality; and
- Water supply.

The Project has been assessed against the significant impact criteria presented in the DCCEEW guideline (DCCEEW, 2022). Due to the relatively small and temporary surface disturbance caused by the Project, it will not have a significant impact on water resources.

[2] https://nt.gov.au/property/building/health-and-safety/health-requirements-mining-construction-projects

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Level 1, 369 Ann Street Brisbane
PO Box 10703 Brisbane Adelaide Street Qld 4000
07 3225 0200

Level 5, 93 Mitchell Street Darwin
GPO Box 43348 Casuarina NT 0811
08 8911 0060

wrm@wrmwater.com.au
wrmwater.com.au

ABN 96 107 404 544

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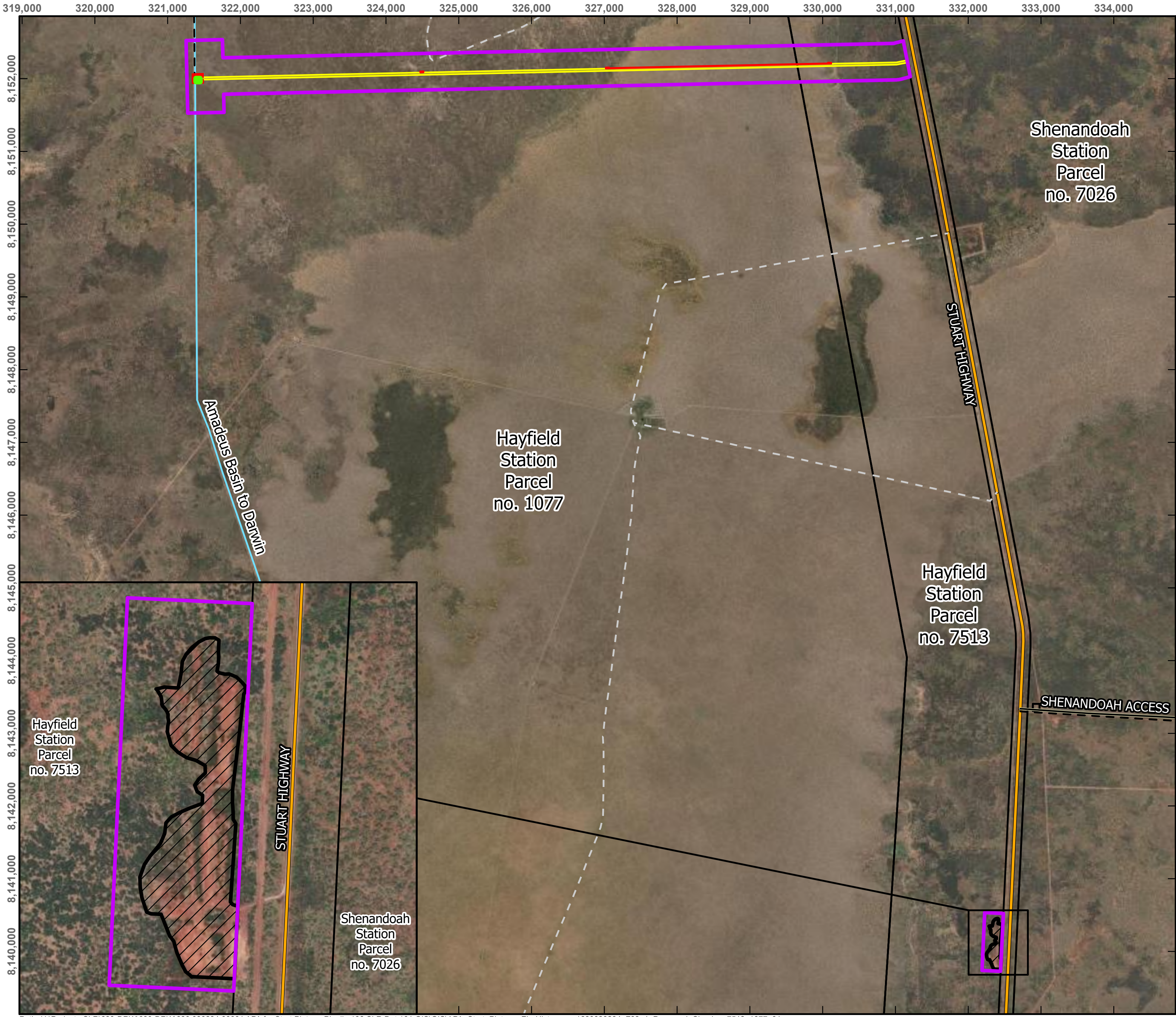
APA STURT PLATEAU PIPELINE ENVIRONMENTAL APPROVALS

MAP OF PROPOSED CLEARING - NT PORTIONS 7513 AND 1077

FIGURE 3-1



LEGEND

- Project Area
- Pipeline CROW
- Additional Workspaces
- Sturt Plateau Facility
- Previously Cleared Land
- Access Track
- Existing Gas Pipeline
- Cadastre

Road Category

- National Highway
- Secondary
- Local

Service Layer Credits:
Earthstar Geographics, Maxar

0 1 2 km

Coordinate System:	GDA 1994 MGA Zone 53
Scale:	1:70,000 at A4
Project Number:	680.030294.000010
Date Drawn:	16-Dec-2024
Drawn by:	CP
Reviewed by:	NC

SLR

Path: H:\Projects-SLR\680-DRW\680-DRW\680.030294.00001 APA for Sturt Plateau Pipeline\06 SLR Data\01 GIS\GIS\APA_Sturt_Plateau_FireHistory.aprx\680030294_F03_1_Proposed_Clearing_7513_1077_01