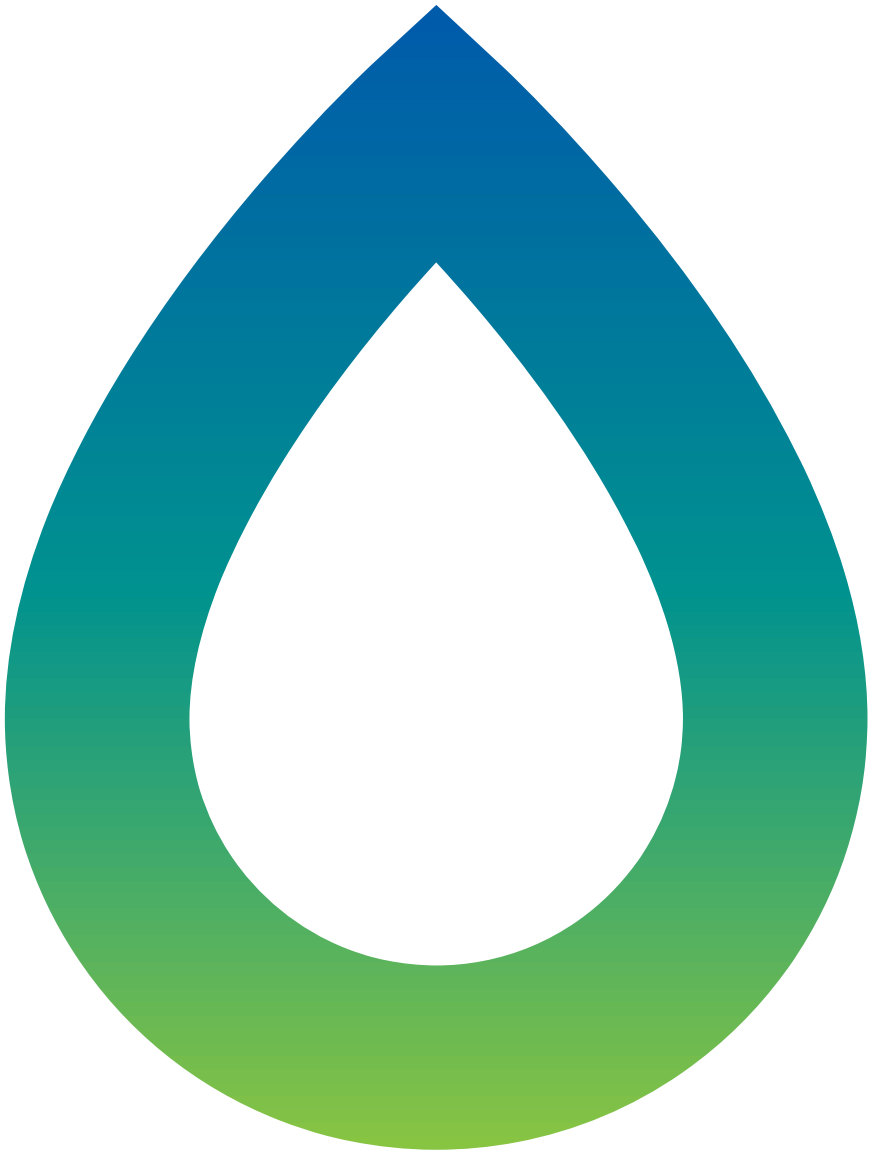
STURT PLATEAU PIPELINE

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
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Author	DN
Reviewer	JO

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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).

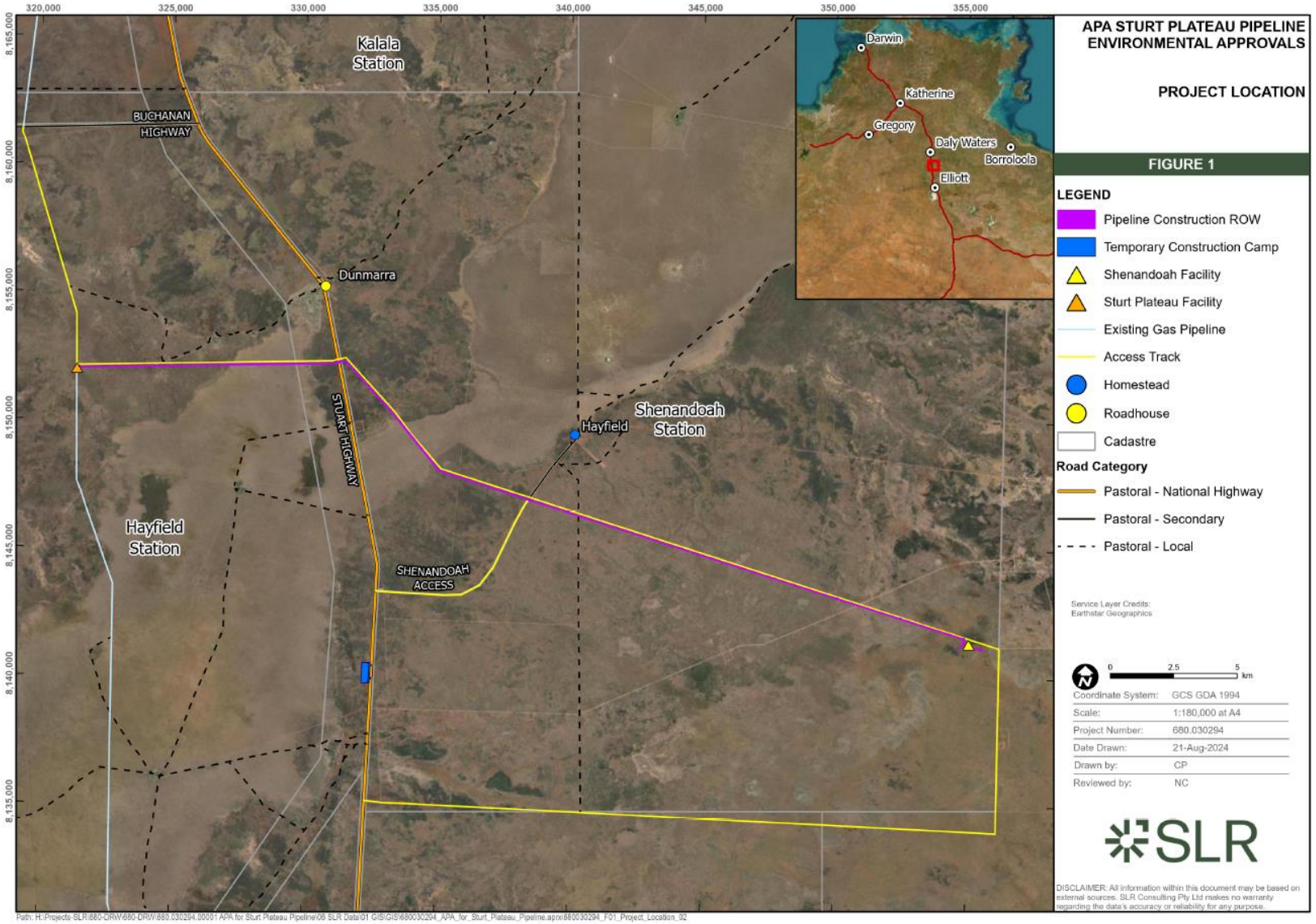

Figure 1.1 Sturt Plateau Pipeline project location

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.

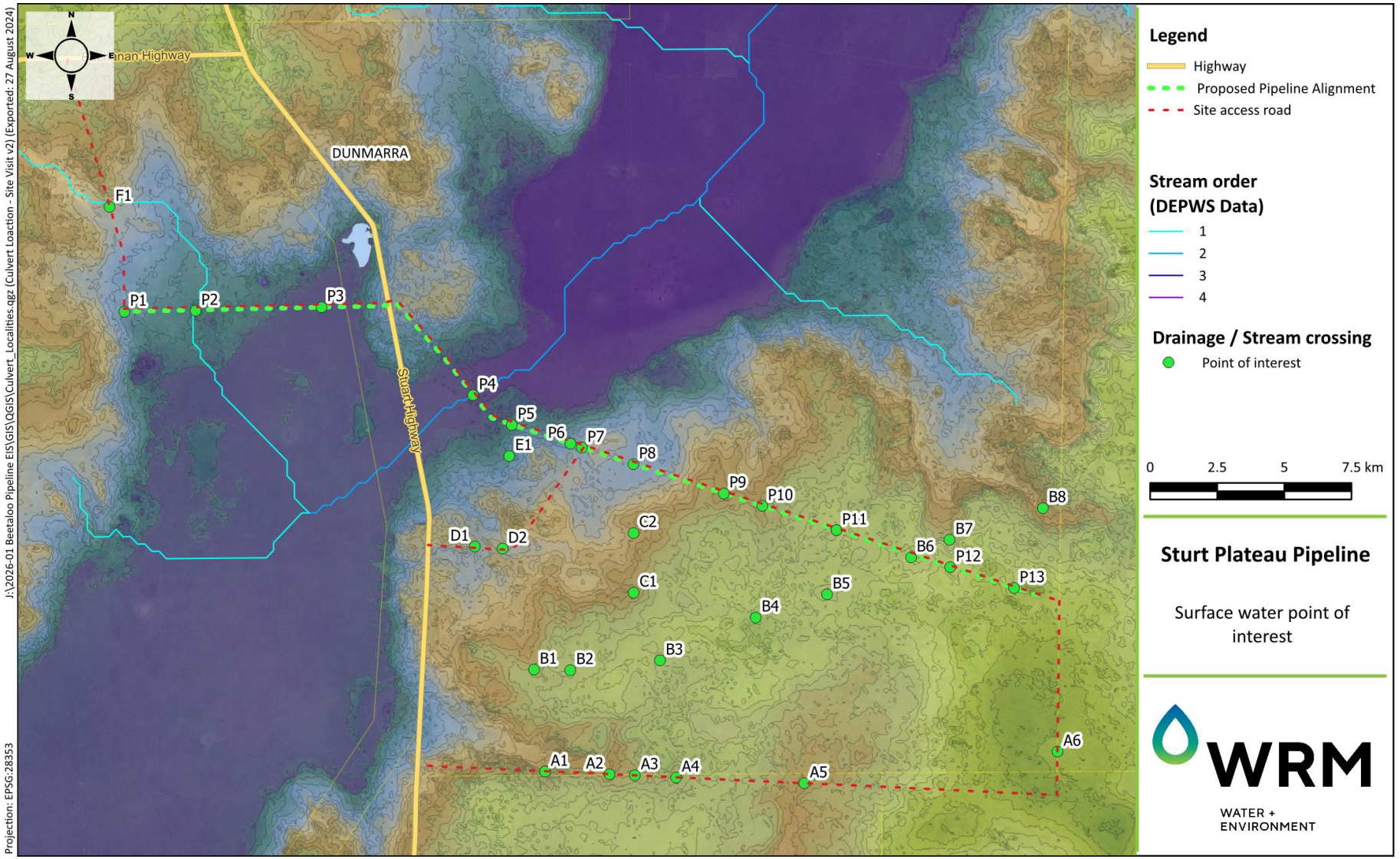

Figure 2.1 Local topography and surface water points of interest

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)

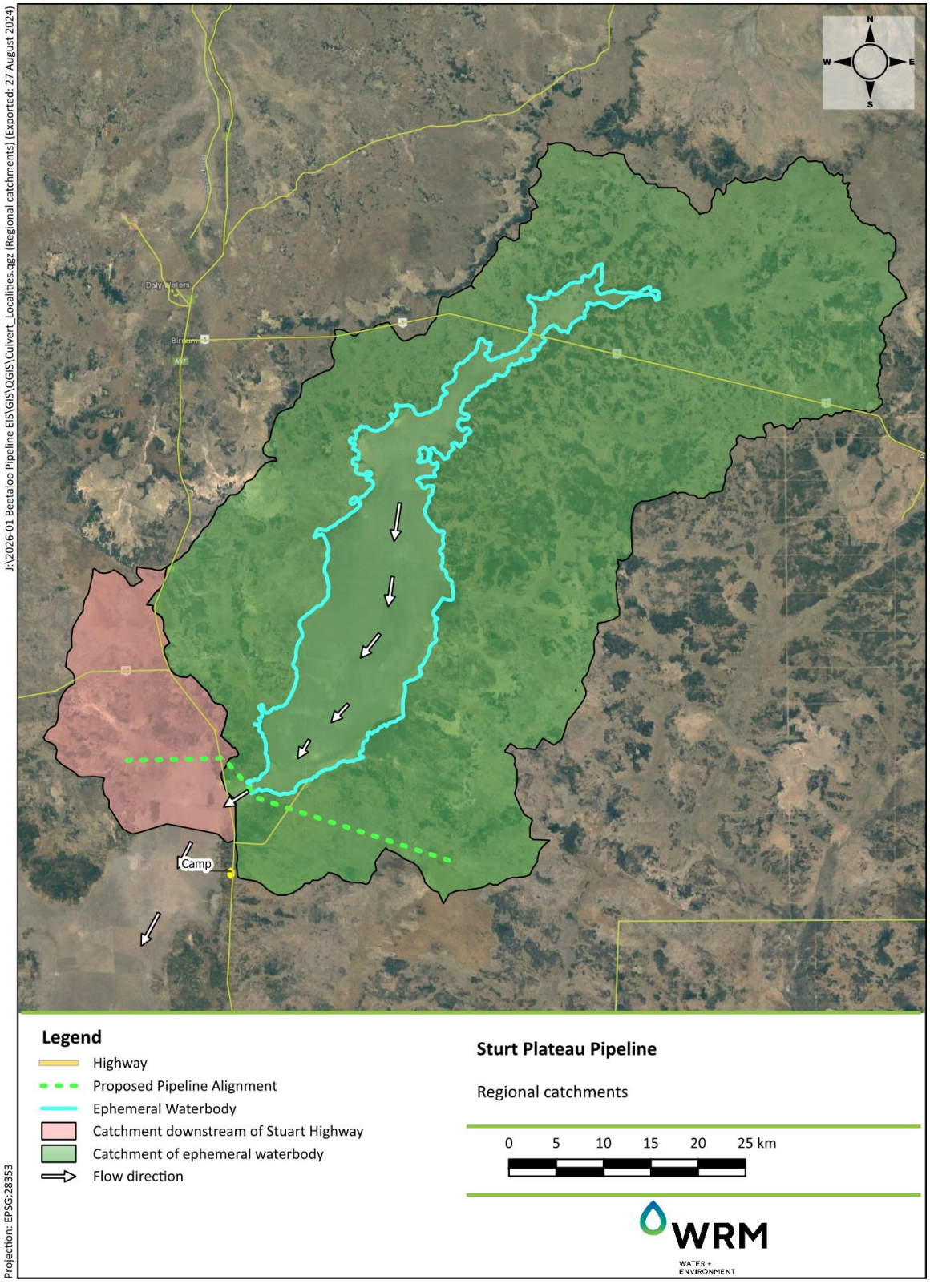

Figure 2.4 Regional catchments

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.

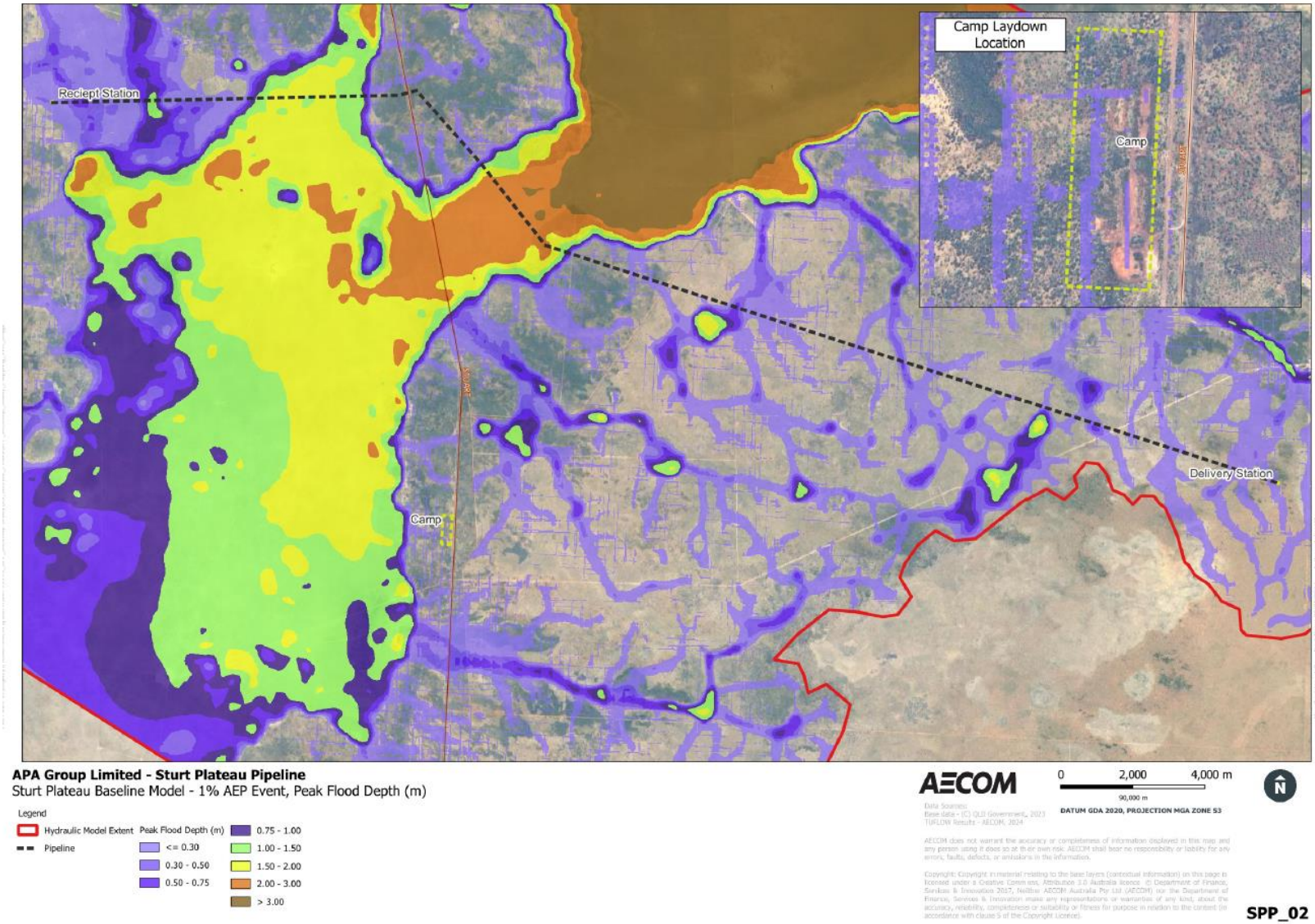

Figure 2.5 Flood extent and depth, 1% AEP event (source: AECOM, 2024)

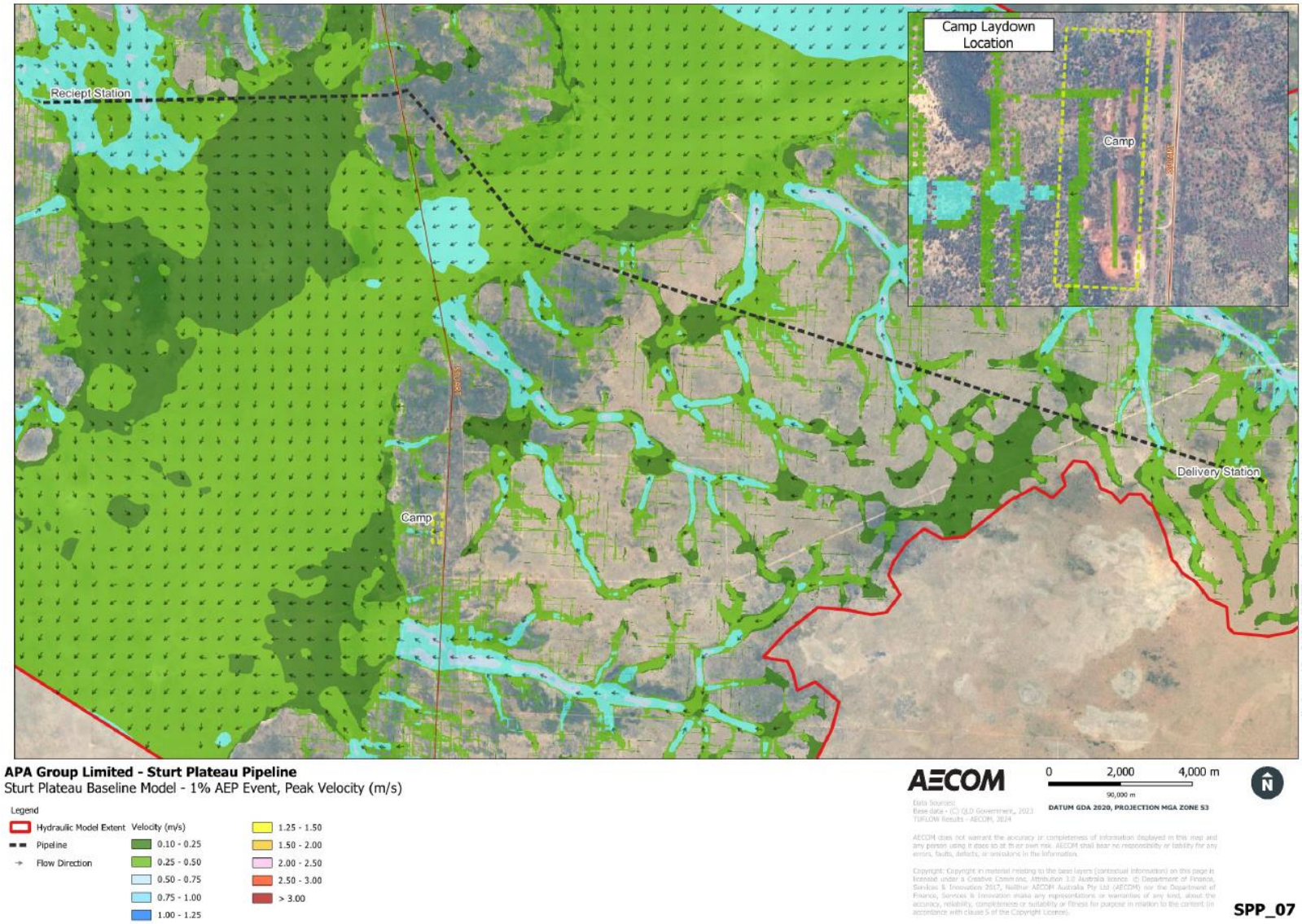

Figure 2.6 Flood velocity, 1% AEP event (source: AECOM, 2024)

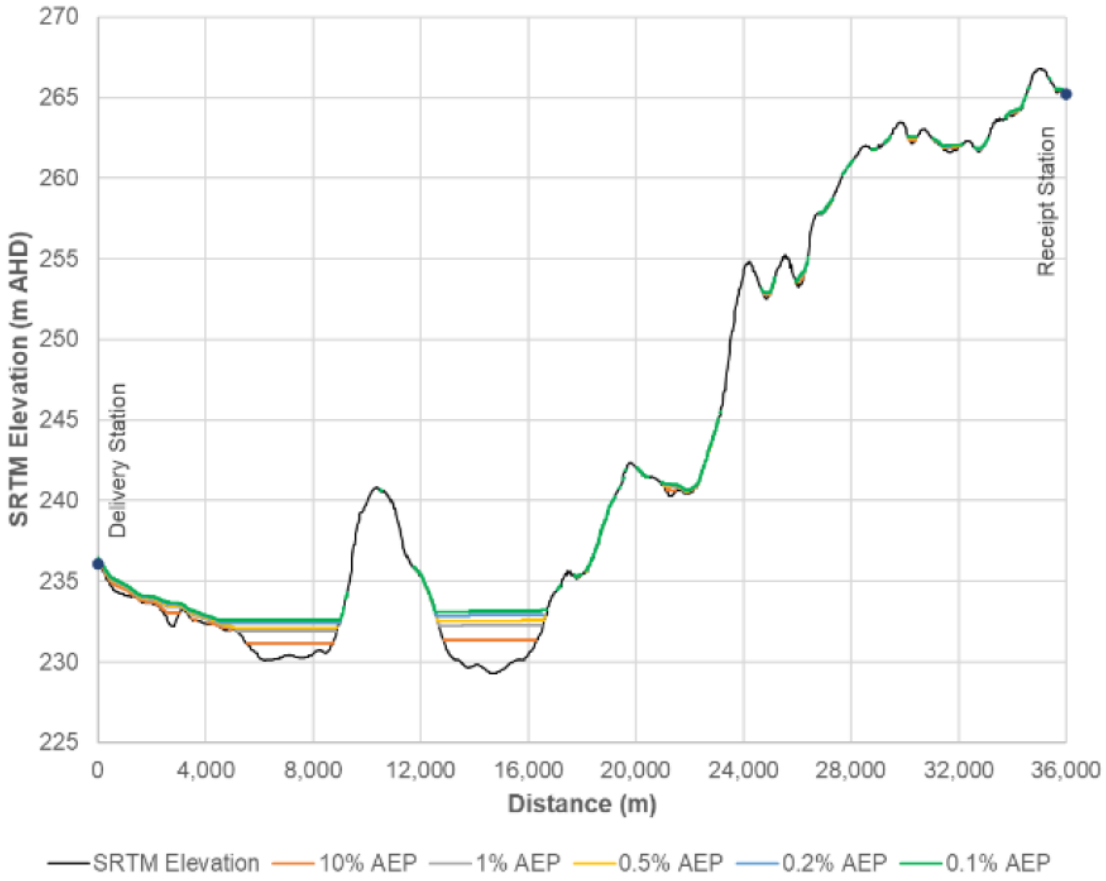

Figure 2.7 Flood surface profile along SPP alignment (source: AECOM, 2024)

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.

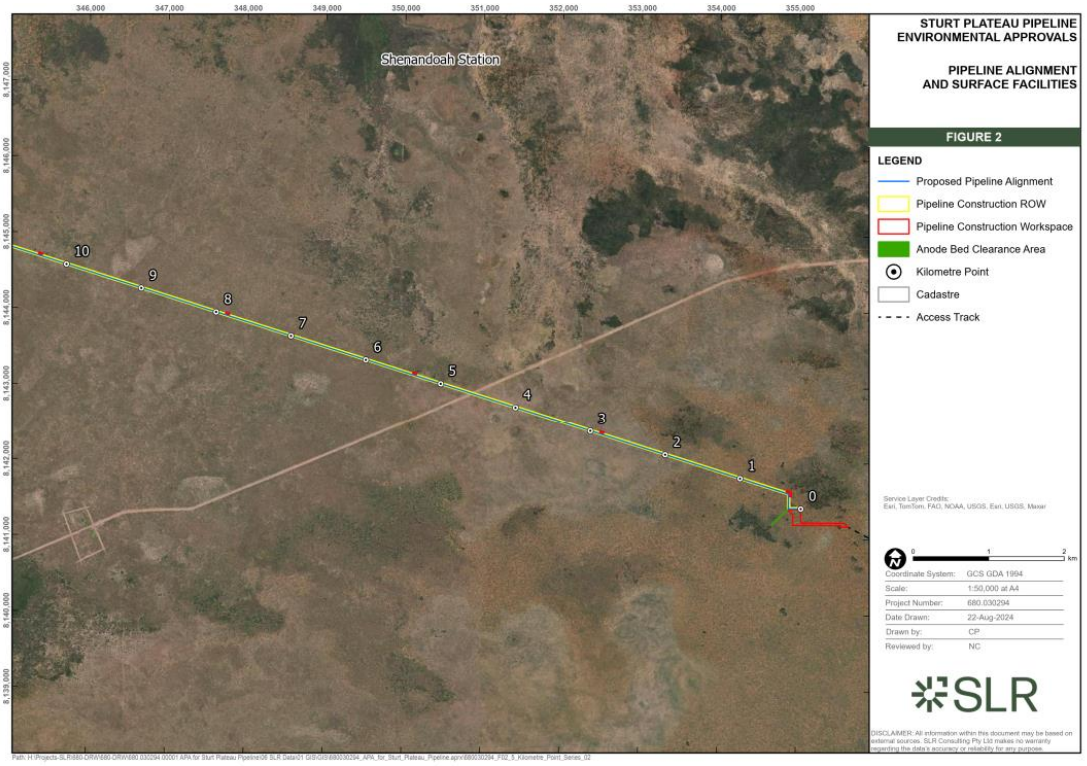

Figure 3.1 KP 0 – KP 10

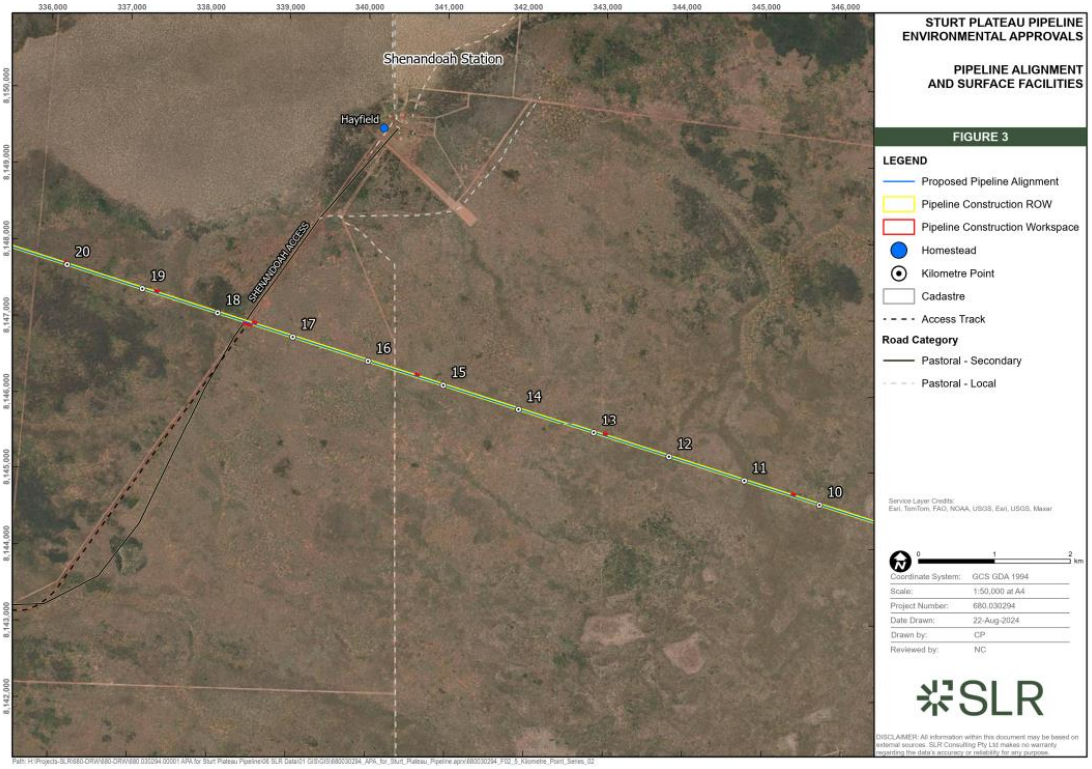

Figure 3.2 KP10 – KP 20

Figure 3.3 KP20 – KP 30

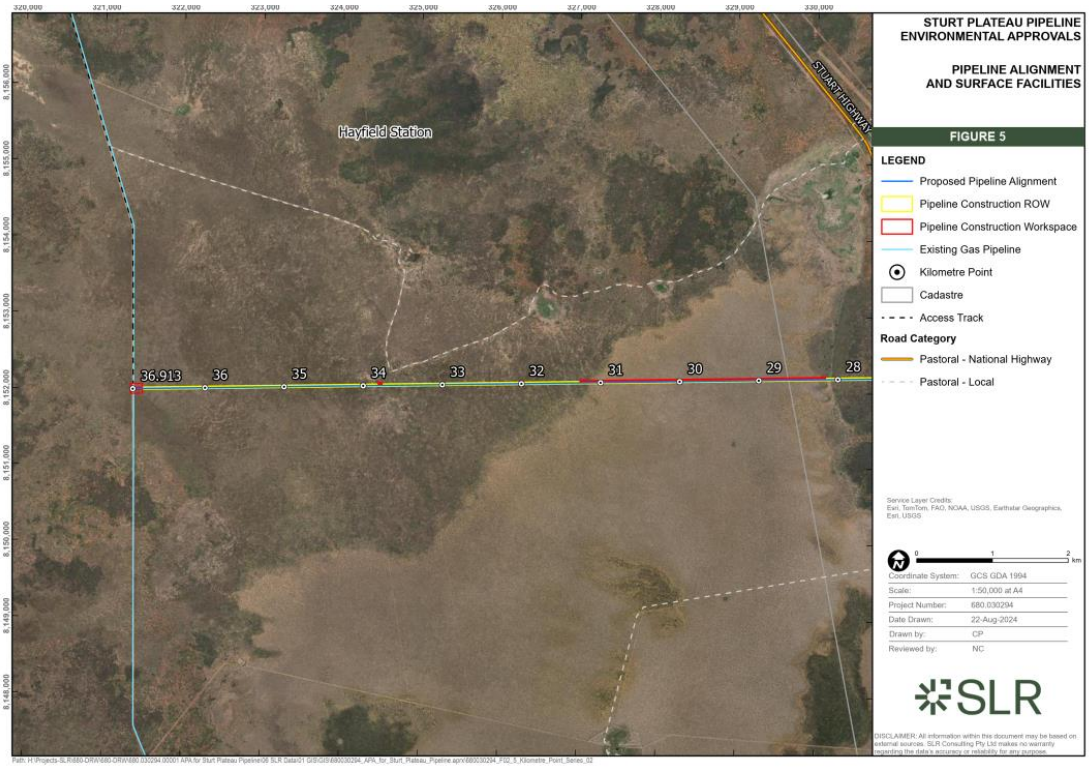

Figure 3.4 KP30 – KP 37

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.

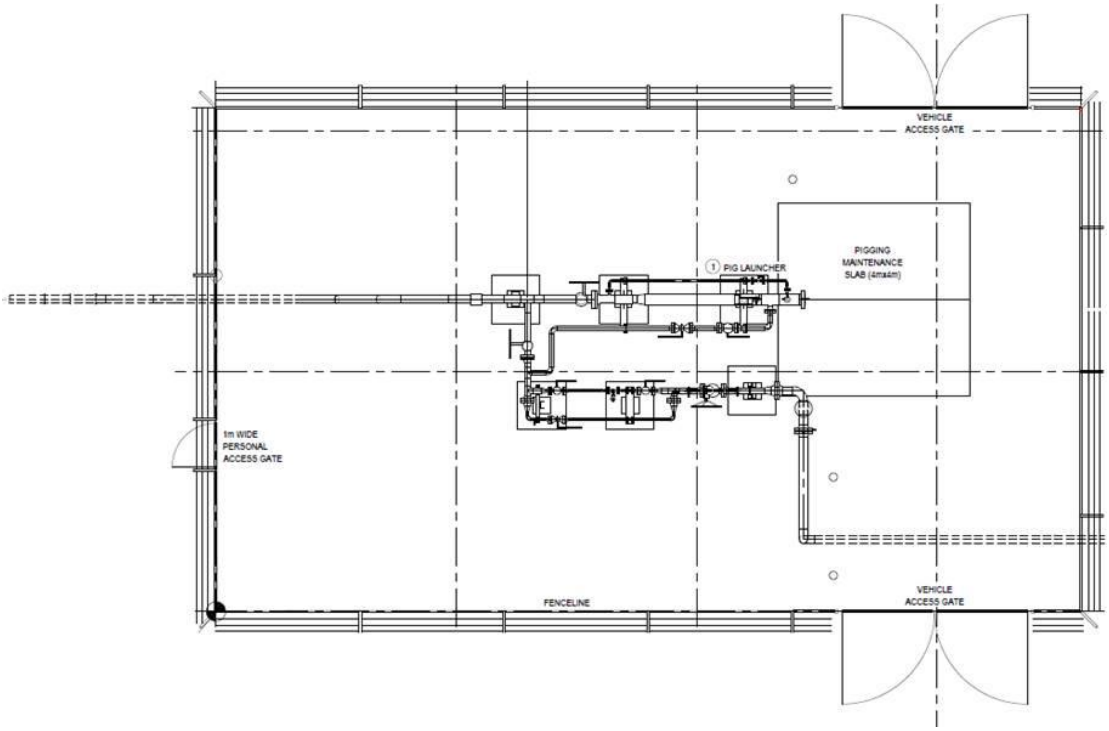

Figure 3.6 Typical Layout Schematic for the Shenandoah Facility

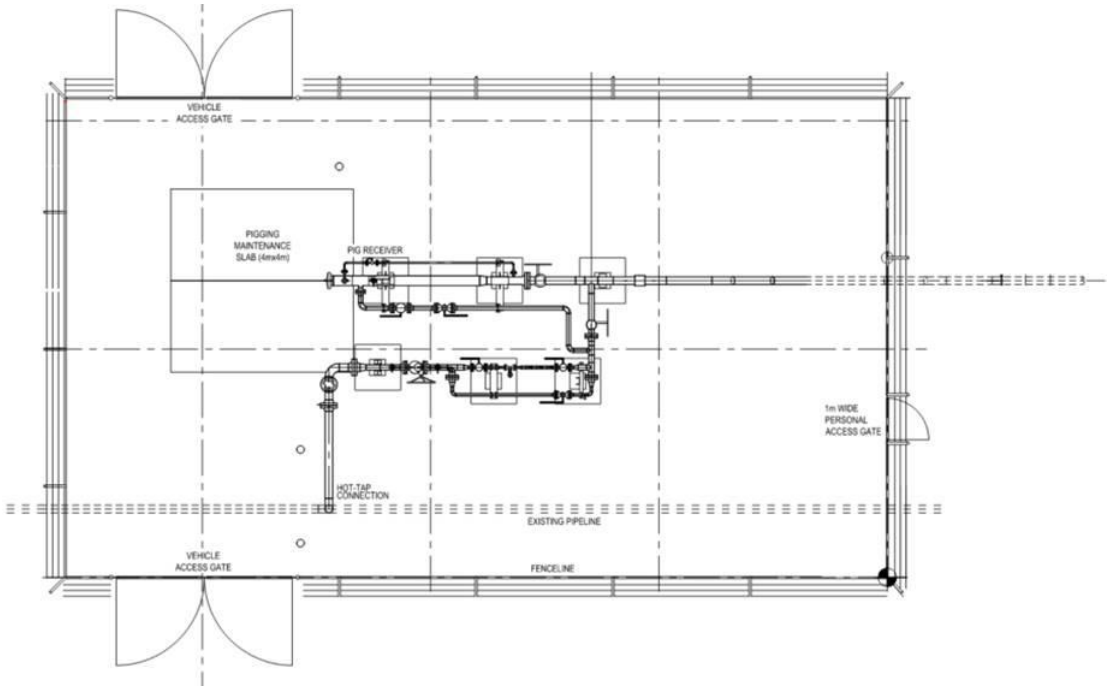

Figure 3.7 Typical Layout Schematic of the Sturt Plateau Facility

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.

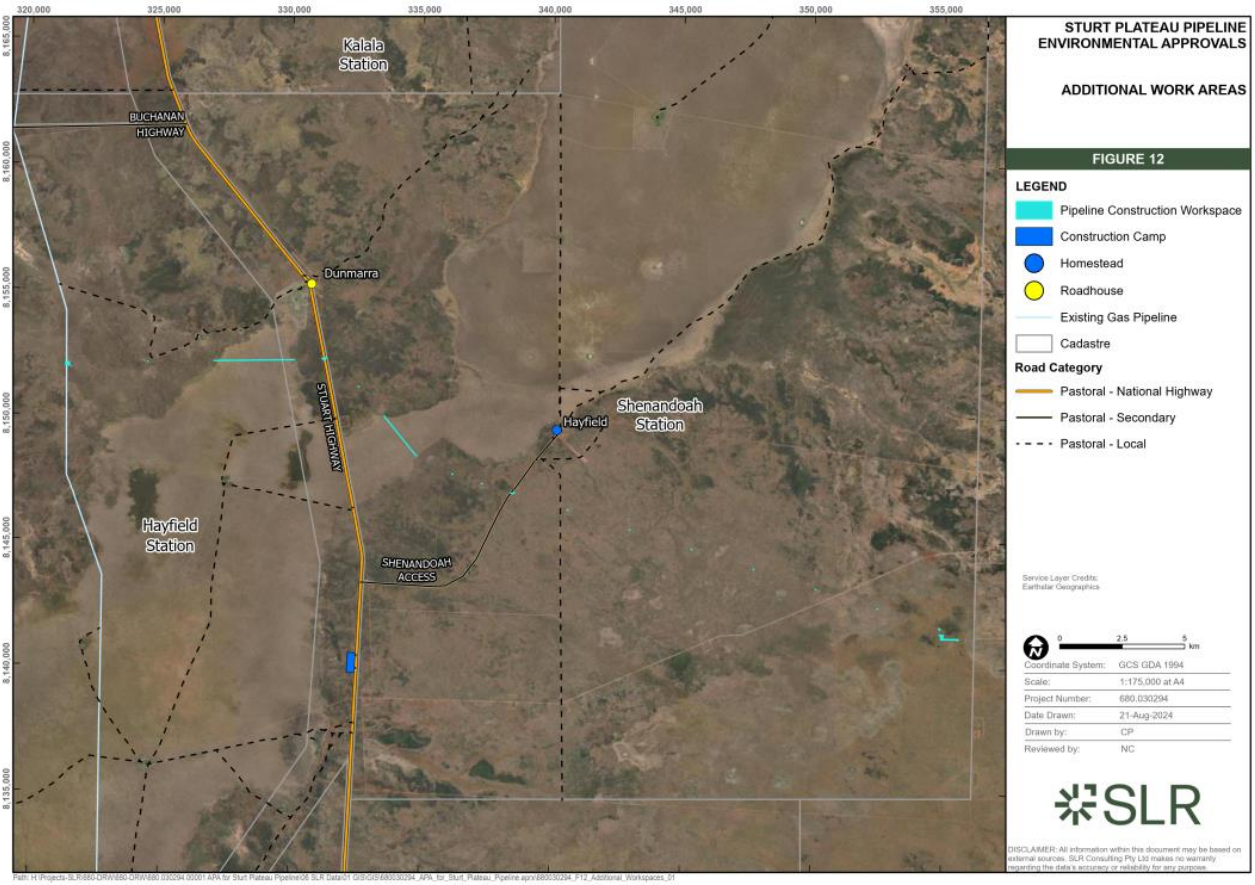

Figure 3.10 Additional work areas

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**

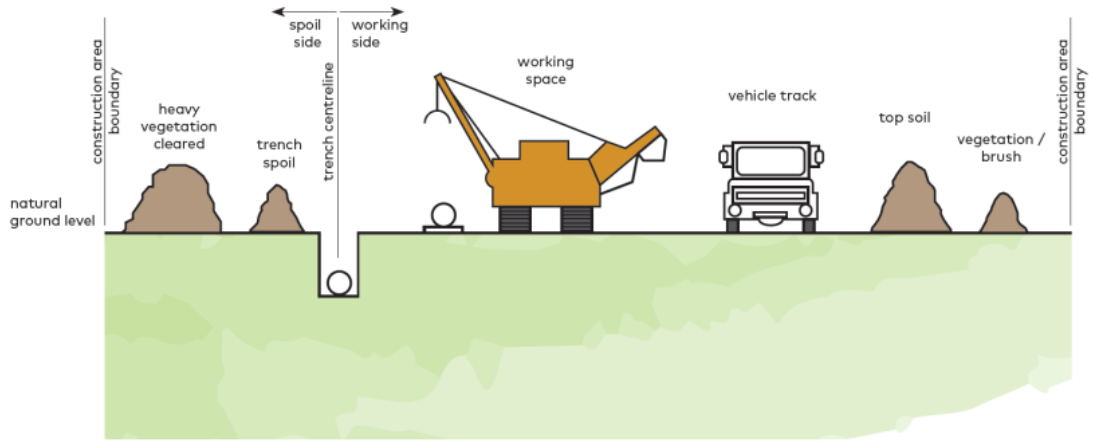

Figure 3.12 **Typical layout for a pipeline construction corridor.**

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.

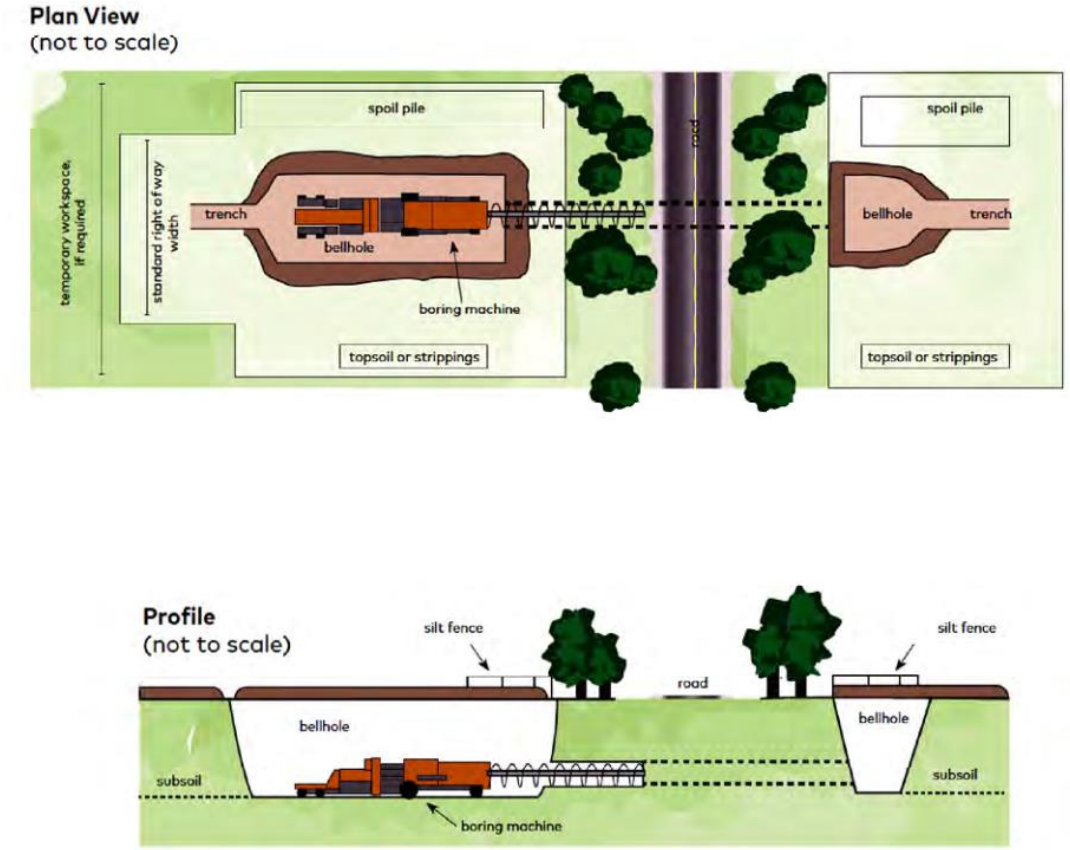

Figure 3.13 Typical horizontal boring schematic

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

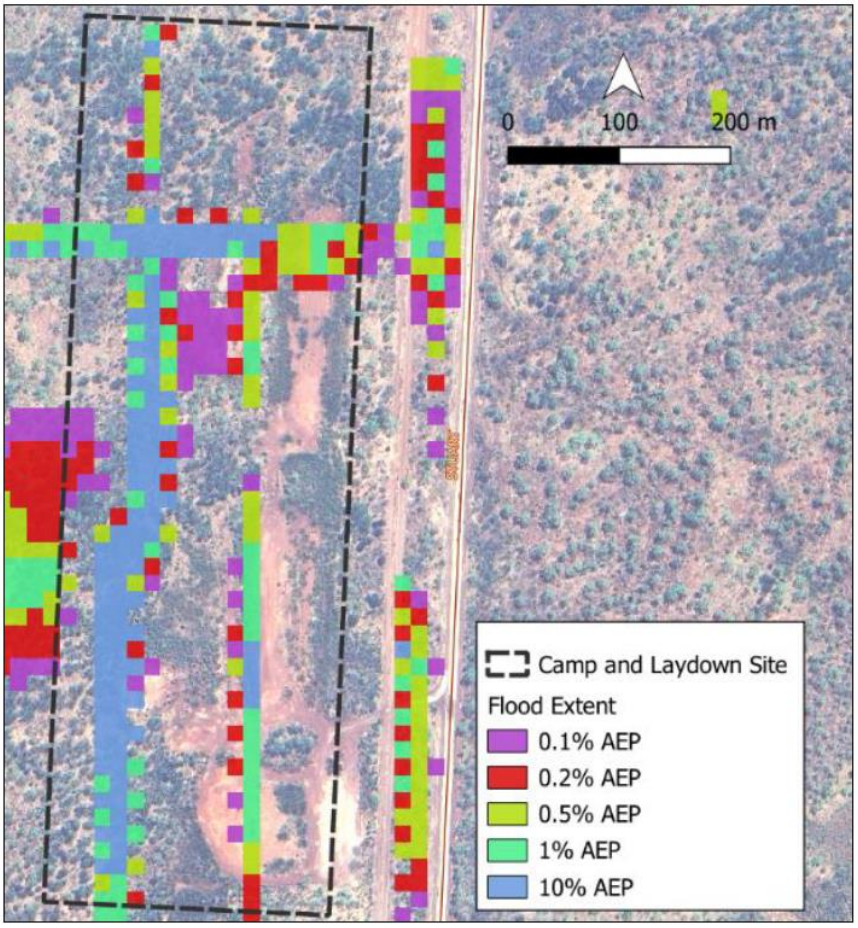

Figure 4.1 Flood extents at proposed Camp Laydown location (source: AECOM, 2024)

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

8 REFERENCES

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