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New South Wales

Review of Environmental Factors

Clarence Correctional Centre
132kV Transmission Line

Infrastructure NSW
April 2019

Clarence Correctional Centre 132kV Transmission Line

Review of Environmental Factors

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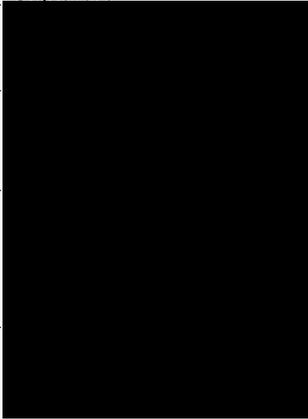
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Prepared by Nicola Gibson

Reviewed by Helen Mulcahy

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			Name/Position	Signature
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Abbreviations

Activity	The Clarence Correctional Centre 132kV Transmission Line, the subject of this Review of Environmental Factors
Activity area	The area directly affected by the proposed Activity (i.e. works associated with installation of poles and OPGW) (refer Section 1.4)
AEI	Area of Environmental Interest
AHIP	Aboriginal Heritage Impact Permit
ASS	Acid sulfate soils
CCC	Clarence Correctional Centre
CEMP	Construction Environmental Management Plan
DD	Aboriginal Heritage Due Diligence Assessment Report
EMF	electromagnetic fields
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EWP	Elevated work platform
ha	hectare
hv	high voltage
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
Investigation area	Includes the Activity area plus the broader area around the transmission line easement likely to be indirectly affected by the proposed activity (refer Section 1.4)
km	kilometre
kV	kilovolt
LEP	Local Environmental Plan
LCVIA	Landscape Character and Visual Impact Assessment (provided at Appendix L)
LGA	Local Government Area
m	metres
MVA	Mega Volt Amp
OEH	Office of Environment and Heritage
OLS	Obstacle Limitation Surface
OPGW	Optical Groundwire
PSI	Stage 1 Preliminary Site Investigation (provided at Appendix E)
RAP	Registered Aboriginal Party
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
SEPP	State Environmental Planning Policy
SSDA	State Significant Development Application

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Executive Summary

This document is a Review of Environmental Factors (REF) for the proposed 'Clarence Correctional Centre 132kV Transmission Line' required under Part 5 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail the protective measures (safeguards) that would be implemented when building and operating the proposal.

The Activity

Infrastructure NSW is acting on behalf of Corrective Services NSW to deliver the Clarence Correctional Centre (CCC) which will be a major multifunctional, regional correctional facility servicing the northern part of NSW. The CCC is located approximately 12.5km southeast of Grafton.

A new electricity transmission line (the Activity) will be required to provide electricity to the proposed CCC. The Activity involves the construction, operation and maintenance of a new 12.5km long 132kV electricity line to be established between the existing TransGrid transmission line to the west of the Pacific Highway and the Correctional Centre's new substation to the east. More specifically, the Activity comprises:

- Approximately 12.5km of 132kV double circuit transmission line strung with single lemon conductor and Optical Ground Wire (OPGW) from the existing 96H transmission line Structure 339 to the new substation, including approximately 54 new structures
- New easement clearing, construction pads, access gates, and new access tracks
- OPGW works, including re-stringing OPGW on the existing 96H Koolkhan-Coffs Harbour 132kV Transmission Line from existing Structure 328 to the new Transmission Line cut-in location
- Removal of trees and vegetation within the 30 m wide easement to enable installation of the new transmission line.
- Removal of 'danger trees' outside the easement which have the potential to fall onto or come in contact with the transmission line.

Ancillary works to facilitate the above works would also be required, and would involve:

- Establishment of temporary construction work sites at each structure
- Establishment of laydown areas for the offloading and temporary storage of plant, equipment and materials
- Construction of work benches adjacent to structures located on uneven topography. The work benches would provide a safe and level work surface for elevated work platforms (EWPs), cranes and other equipment
- Guy wire installation on structures to provide additional structural support
- Repair or upgrade of existing access tracks and development of new access tracks (including possible watercourse crossings and installation of gates) as required for construction vehicles to gain safe access to structures.

Need for the Activity

Investigations undertaken as part of the state significant development application (SSD 8368) for the construction and operation of the CCC confirmed that new electricity infrastructure would be required to service the facility. INSW and TransGrid are parties to a Consultation Services Agreement for the delivery of that infrastructure.

The Activity is required to provide a reliable electricity supply to the new CCC. Specifically, this requires the construction of a new 132kV transmission line that will deliver electricity from the existing Transmission Line 96H to the proposed new substation.

Construction of the CCC is scheduled for completion by 30 March 2020 and commissioning of the facility, including all systems operations requiring electricity, will commence 30 June 2020. It is imperative that the electricity supply be available to meet these program milestones.

Statutory and planning framework

Clause 41 of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) permits development on any land for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of a public authority without consent. As the proposal is for an electricity transmission line and is to be carried out on behalf of Infrastructure NSW, development consent from Clarence Valley Council is not required. The proposal needs to be assessed under Part 5 of the EP&A Act. This REF has been prepared as part of the assessment process.

Community and stakeholder consultation

Consultation with affected property owners, local Aboriginal groups, Clarence Valley Council and relevant government agencies has been carried out.

Consultation has occurred during the design process with the landholders where infrastructure is proposed to occur on their lands. Consultation has focused on determining the most acceptable route and infrastructure locations for all parties with an objective of minimising the significance of adverse land use impacts.

Local Aboriginal groups have been consulted both informally and formally in accordance with Office of Environment and Heritage Guidelines. This consultation is ongoing.

Infrastructure NSW will continue to liaise with property owners and other stakeholders throughout development of the project.

Environmental Assessment

This REF provides an assessment of the Activity that takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the Activity as is required under the EP&A Act. Potential environmental impacts of the Activity (both adverse and positive) include minor / temporary impacts and permanent impacts, as follows:

Minor/temporary impacts:

- Erosion and sedimentation from excavations associated with the construction of footings for the structures
- Minor, temporary noise impacts generated from construction activities.
- Minor increase in traffic movements on the surrounding road network, however the level of the increase is not expected to impact the safety and function of the road network
- Minor amounts of dust and emissions from earthworks during construction.

The adverse impacts associated with the Activity are considered to be low in significance and would be managed with the implementation of the mitigation measures and safeguards prescribed in this REF.

Permanent impacts

- Minor removal of vegetation.
- Visual impact of the new transmission line
- Provision of a reliable electricity supply to the new CCC.

Operational impacts have been assessed and are determined to be minor or acceptable.

Justification and Conclusion

Having regard to the assessment of the impacts detailed in this REF, it is concluded that the proposed Activity is not likely to have a significant impact on the environment, therefore, an environmental impact statement under section 5.7(1) of the EP&A Act is not required, and Division 5.2 of the Act is not triggered. Furthermore, the proposed Activity would not impact any threatened species or communities listed under the *Biodiversity Conservation Act 2016* or the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). As such, a Species Impact Statement is not required and referral to the Commonwealth Environment Minister is not necessary.

1. Introduction

1.1 Activity overview

Infrastructure NSW is acting on behalf of Corrective Services NSW to deliver the Clarence Correctional Centre (CCC) which will be a major multifunctional, regional correctional facility servicing the northern part of NSW. The CCC is located approximately 12.5km southeast of Grafton.

A new electricity transmission line (the Activity) would be required to provide electricity to the proposed CCC. The Activity involves the construction, operation and maintenance of a new 12.5km long 132kV electricity line to be established between the existing TransGrid transmission line to the west of the Pacific Highway and the Correctional Centre's new substation to the east. More specifically, the Activity would comprise:

- Approximately 12.5km of 132kV double circuit transmission line strung with single lemon conductor and Optical Ground Wire (OPGW) from the existing 96H transmission line Structure 339 to the new substation, including approximately 55 new structures
- New easement clearing, construction pads, access gates, and new access tracks
- OPGW works
- Removal of trees and vegetation to enable installation of the new transmission line.

Ancillary works to facilitate the above works would also be required, and would involve:

- Establishment of temporary construction work sites at each structure
- Establishment of laydown areas for the offloading and temporary storage of plant, equipment and materials
- Construction of work benches adjacent to structures located on uneven topography. The work benches would provide a safe and level work surface for elevated work platforms (EWPs), cranes and other equipment
- Guy wire installation on structures to provide additional structural support
- Repair or upgrade of existing access tracks and development of new access tracks (including possible watercourse crossings and installation of gates) as required for construction vehicles to gain safe access to structures.

1.2 Purpose of the Review of Environmental Factors

The purpose of this Review of Environmental Factors (REF) is to determine if the proposed activity would have a significant impact on the environment or significantly affect threatened species, ecological communities or their habitats. This REF documents the proposed activity, assesses the potential environmental impacts and provides environmental management measures to be implemented to minimise the risk of adverse environmental impacts during construction and operation.

This REF has been prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For the purposes of the Activity, Infrastructure NSW is the proponent and the determining authority under Part 5 of the EP&A Act. The aim of the REF is to satisfy the requirements of Section 5.5 of the EP&A Act so that Infrastructure NSW examines, and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of this activity. The environmental impacts have been considered in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and other environmental legislation such as the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Approval process

The Activity is considered to be 'development without consent' under clause 41 of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) which provides that development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of a public authority without consent on any land. Under clause 40 of the Infrastructure SEPP, an electricity transmission or distribution network is defined as including above or below ground electricity transmission or distribution lines (including

related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, access structures, access tracks and ventilation structures) and telecommunication facilities that are related to the functioning of the network.

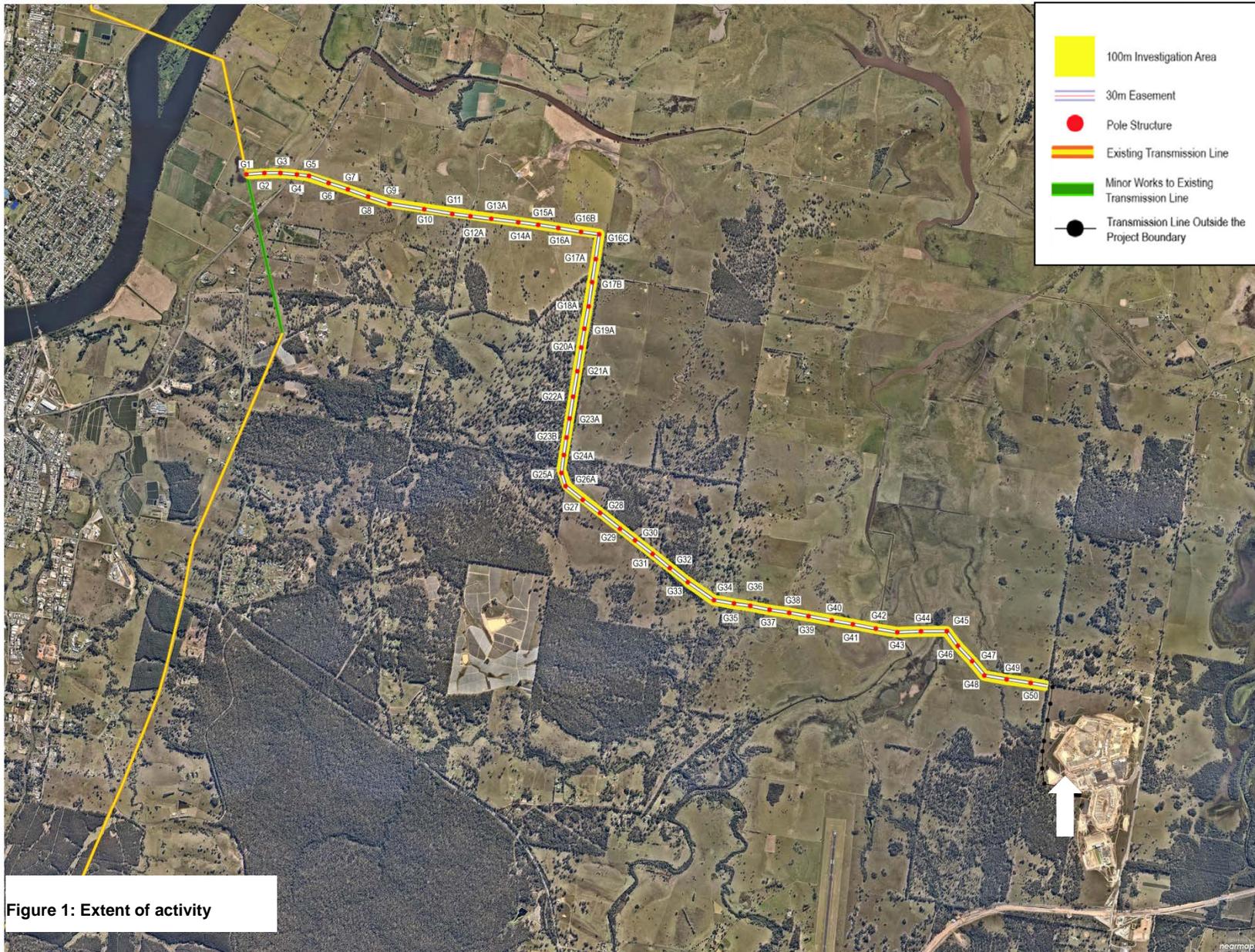
Where an activity is identified as 'development without consent' it is assessed under Part 5 of the EP&A Act. This REF has been prepared to meet this obligation in accordance with the relevant provisions of the EP&A Act and EP&A Regulation.

This REF has been prepared by MG Planning on behalf of Infrastructure NSW.

1.4 Key terms

A series of key terms are used throughout this REF. A summary of these terms is provided below:

- **The Activity** – construction, operation and maintenance of a new 132kV transmission line between the existing TransGrid transmission line to the west of the Pacific Highway and the Correctional Centre's new substation to the east (refer to Figure 1 for location and Chapter 3 for details). The Activity is called the Clarence Correctional Centre (CCC) 132kV Transmission Line.
- **Activity area** - the area directly affected by the proposed Activity (i.e. works associated with installation of poles and OPGW). The Activity area is generally located within the proposed 30 metre easement but also includes access tracks and laydown areas. The plans at Appendix A show the 30 metre easement as a white line within two blue lines, while the access routes are shown pink and laydown areas as blue dots. The minor works to the existing line, as shown green on the plans at Appendix A, are also included in the Activity area.
- **Investigation area** - includes the Activity area plus the broader area around the transmission line easement likely to be indirectly affected by the proposed activity. The maximum extent of the investigation area for the proposed activity comprises a 100m buffer around the centre line of the new transmission line between the existing Line 96H Structure 339 and the proposed CCC substation. The 100m buffer is shown shaded yellow on the plans at Appendix A and in Figure 1 below.
- **CCC substation** – the proposed substation for the CCC as described in Section 1.4.



1.5 CCC Substation

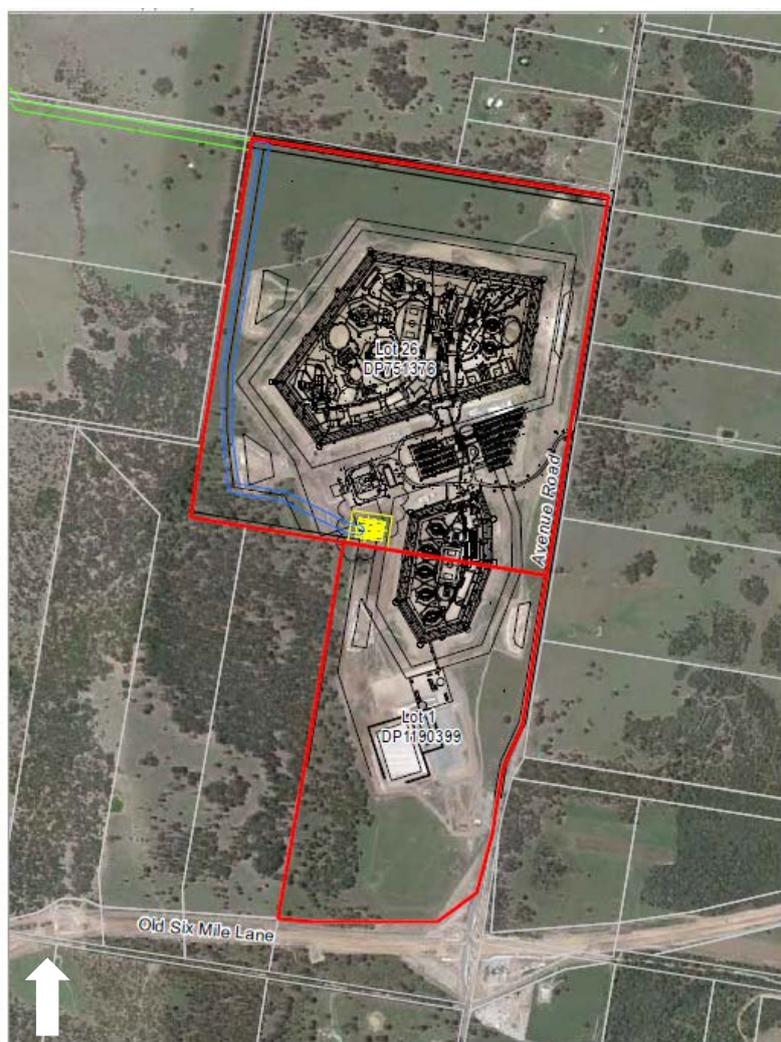
A high voltage substation is proposed to be constructed to service the CCC, located approximately 12 km east of Grafton, NSW. The substation would be contained wholly within the CCC site. Key elements of the substation include:

- Power transformers – 2 x 12.5MVA 132/11kV power transformers
- HV plant and equipment – auxiliary and instrument transformers, circuit breakers, busbars and conductors
- Auxiliary services building.

Power to the substation would be provided by the Activity however that part of the transmission line contained within the substation site is not included in this REF. It comprises 12 concrete power poles supporting the 132kV line.

The location of the proposed substation and associated transmission line is shown in Figure 2.

A separate REF has been prepared which assesses the impact of the substation as well as additional transmission line contained within the CCC site.



LEGEND

- ▭ Clarence Correctional Centre
- ▭ Proposed transmission line (30 m easement)
- ▭ Proposed transmission line (subject to separate assessment)
- ▭ Cadastre
- ▭ Proposed HV substation
- CCC layout

Figure 2: Substation (shown coloured yellow) and transmission line (shown coloured blue) within the CCC site subject to separate REF (Source: Geolink 2018)

2. Consideration of options

2.1 Purpose and need of proposed activity

Investigations undertaken as part of the state significant development application (SSD 8368) for the construction and operation of the CCC confirmed that new electricity infrastructure would be required to service the facility. Infrastructure NSW and TransGrid are parties to a Consultation Services Agreement for the delivery of that infrastructure.

The Activity is required to provide a reliable electricity supply to the new CCC. Specifically, this requires the construction of a new 132kV transmission line which would deliver electricity from the existing Transmission Line 96H to the proposed new substation.

Construction of the CCC is scheduled for completion by 30 March 2020 and commissioning of the facility, including all systems operations requiring electricity, will commence 30 June 2020. It is imperative that the electricity supply be available to meet these program milestones.

2.2 Alternative options considered

Infrastructure NSW (INSW) initially assessed a number of alternatives in the route selection for the Clarence Correctional Centre high voltage transmission line. Commencing in November 2016, INSW undertook consultation with TransGrid and Clarence Valley Council in respect of the provision of electricity infrastructure to service the CCC. INSW and TransGrid are parties to a Consultation Services Agreement dated 27 March 2017 in respect of the delivery of that infrastructure.

The options initially assessed by INSW are from the south - west and west of the CCC as the closest possible existing line with sufficient capacity is located along the existing Pacific Highway. Assessment of the alternatives for the transmission line route has considered the following factors:

- **Residential amenity-** the land use to the west of the CCC is a mix of farmland and rural-residential housing. Block sizes vary significantly, thus the ability to impact existing residential dwellings also varies significantly. Emphasis has been placed on minimising the number of impacted residences in terms of proximity to dwellings for both easements through property and visual impact caused by the transmission line. Consideration has also been given to the number of trees and vegetation required to be removed and their proximity to residences in terms of providing a rural amenity.
- **Land ownership-** there are significant parcels of land that are designated Crown Land to the west of the CCC. Use of Crown Land would minimise the creation of easements (and therefore encumbrances) on private property.
- **Ecology-** there is a mix of bushland, rural-residential housing and farmland to the west of the CCC. The majority of land has been used extensively for farming over a long period of time. Analysis of the ecological values of areas to the west of the CCC was utilised to inform route mapping and assist in assessing alternatives. Ecological values cover both flora and fauna.
- **Access-** whilst there are significant amounts of land to the west of the CCC, access to all of this land is not readily available. Alternatives were assessed on their accessibility either currently or with minimal intervention. Whilst some route options may appear acceptable on plan, some would require significant access tracks to be created during both construction and operation to enable access to the easement.
- **Cost-** the connection of high voltage power to the CCC is being funded by NSW Government. Cost was a factor in the assessment of all alternatives, to ensure the least impacts but closest connection point to reduce overall capital expenditure.
- **Proximity to airport-** the Grafton Regional Airport is located approximately 3km from the CCC. The Obstacle Limitation Surface (OLS) was a factor in determining the route options for the transmission line. Options that encroached on the OLS were not considered.
- **Flood-** areas surrounding the CCC are prone to flooding. Flood affected areas could not be avoided in any option for connections from the west, however the level of flood affectation and alternative access points has been considered in the alternatives assessment.

2.2.1 Alternative 1 – Preliminary options

TransGrid was engaged by INSW to undertake route feasibility investigations for the CCC project. Routes nominated by TransGrid were outlined in the Stage 2 State Significant Development Application (SSDA) for the Correctional Centre (SSD17_8368). The route identification process included both desktop and field site visits to allow for consideration of options via a multi-criteria analysis workshop with INSW. Whilst a number of routes were explored, three were considered potentially feasible.

Within these routes, options 1a was favoured as it utilised an existing corridor and would potentially minimise property acquisition. This option was only for the western part of the corridor and would potentially require an increase of the existing easement. Whilst it avoided a large number of residential properties, and minimised ecological impact by relying on the existing corridor, it was also reliant on option 2b for the remainder of the route.

Option 2b largely follows the alignment of the existing Reilley’s Lane. Whilst this would reduce the need for easements on private property, it would have significant residential impacts. Reilley’s Lane is a narrow rural road lined by mature trees with relatively small lot rural-residential subdivision. In order to construct the line the majority of these trees would be removed. This was considered to create significant impacts habitat loss and to the residential amenity of this area and this option was discounted.

Option 4 traversed largely uninhabited land. It was further north than options 1a and 2b and as such did not result in as significant residential amenity impacts. As it was through largely undeveloped land it would require new easements to be created and resulting acquisition. The majority of the option was within private land and there were questions regarding the environmental impacts and access. Whilst there were no known highly sensitive ecological features, the undisturbed nature of the land may have included pockets of ecology.

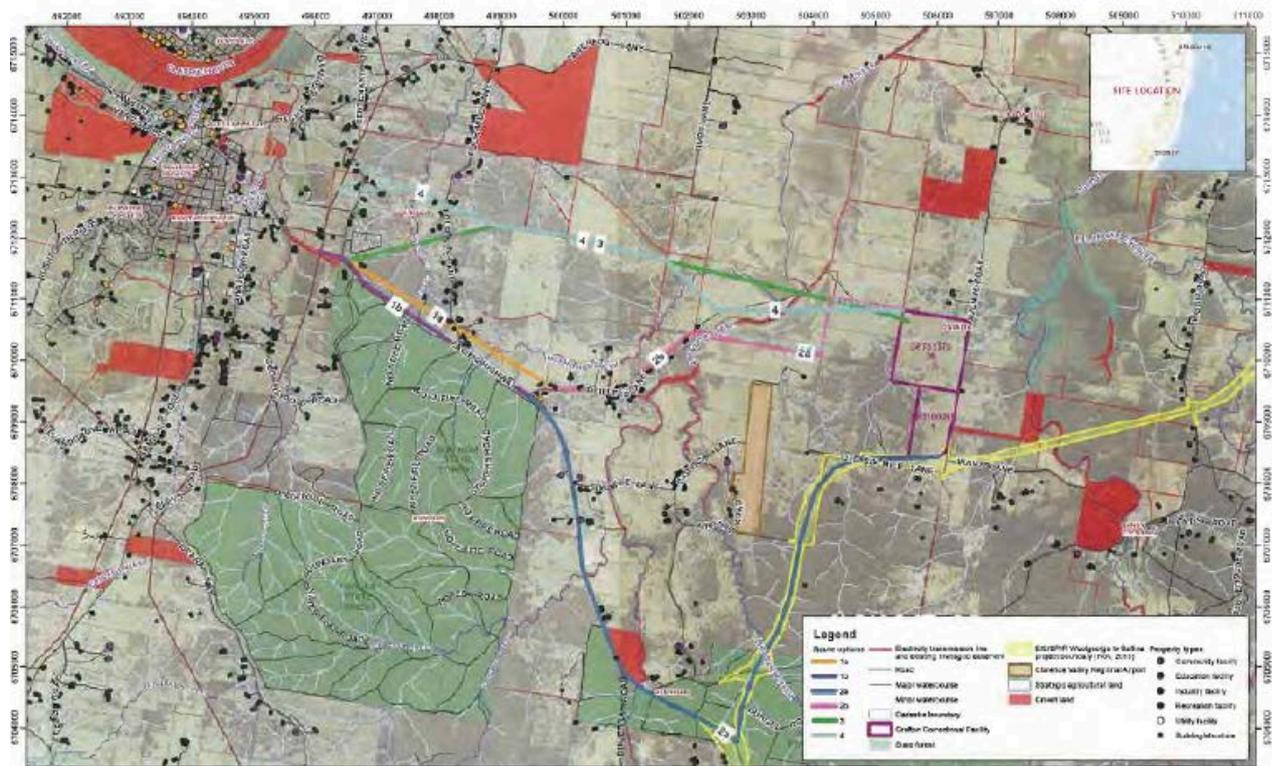


Figure 3: Alternative 1

2.2.2 Alternative 2- Detailed options

Following the nomination of routes detailed in 2.2.1, Infrastructure NSW undertook further analysis to develop alternatives for the transmission line. These alternatives were developed through a combination of desktop and field surveys. Key attributes including minimisation of private property acquisition, ecological impacts and residential amenity were included in the assessment. Three options were investigated that were all north of the options identified in 2.2.1.

Option 1 connected into the existing high voltage power line at the Pacific Highway and travelled south east. This option traversed 13 properties including Crown Land and had two residential dwellings within 100m of the line. Approximately five hectares of woodland/forest would be required to be cleared and the line would traverse wetland areas deemed to have significance. This option was ultimately discarded due to the ecological impacts it would create.

Option 2 connected to the existing transmission lines further south than option 1 and would follow largely the same route as Option 1, however it would connect into the CCC site further south. The connection in the west to the existing transmission lines would increase the number of properties impacted compared to option 1 and place four residential dwellings within 100m of the line. More woodland/forest (5.5ha) would be required to be cleared compared to Option 1, however the line would not traverse significant wetlands.

Option 3 was a combination of Options 1 and 2, following largely the same route as Option 1 in the west and option 2 in the east. This option reduced the number of properties impacted (12) and the amount of woodland/forest to be cleared (4.2ha). This was considered the most appropriate option of this set of alternatives.

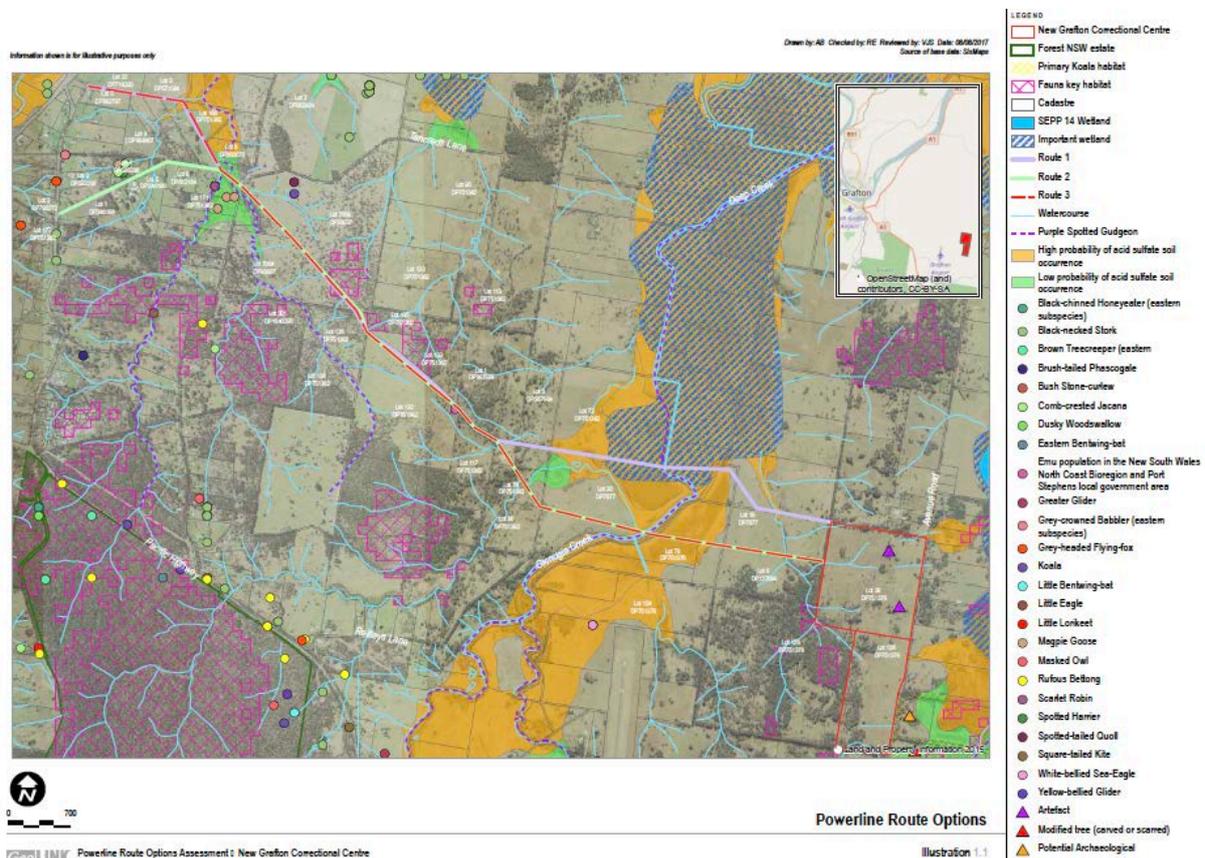


Figure 4: Alternative 2

2.2.3 Alternative 3 – Initial Preferred Option

The Preferred Option that was selected by INSW was a variation of option 3 from the alternative options described in 2.2.2. This line commenced further north at its western extent where it connected to the existing transmission line. By placing the line further north, fewer residential properties were impacted owing to the larger lot sizes compared with the connection point of Option 3. The line was placed along boundaries where possible which reduced the impact to residential properties and improved access for both construction and operation.

For the majority of its length, this option largely traversed disturbed terrain. This reduced the amount of clearing that would be required minimising impacts on habitats and other sensitive areas. Whilst this option followed the line of Option 1 (described in 2.2.2) in the eastern reaches, this was considered to be beneficial in relation to property impacts. Whilst the line traversed wetland, it reduced the impact on properties in the western reaches by relying on a significant area of Crown Land.



Figure 5: Alternative 3 (western section)



Figure 6: Alternative 3 (eastern section).
NB: Transmission line within CCC site not assessed as part of this REF

2.3 Revised Preferred Option

A Draft REF was prepared in 2018 which assessed the Initial Preferred Option and was the subject of consultation with affected landowners. Concurrently, an Aboriginal archaeological field survey of the initial Preferred Option was undertaken by representatives from each of the project Registered Aboriginal Parties (RAPs) and Curio archaeologists. The survey resulted in the identification of eight potential archaeological deposit (PAD) sites for investigation during test excavation, three scarred/modified trees, six artefact sites, two potential burial/grave sites, two ceremonial sites, and one ceremonial site/potential burial complex site.

A supplementary field survey was undertaken in early December 2018 to identify the most appropriate orientation for the revised route. The supplementary survey was undertaken by representatives from all project RAPs, and Curio archaeologists, and successfully identified an alternate route that was preferable and acceptable to all project RAPs, that would avoid impact to identified sites in this location.

In response to these findings, INSW proposed that the route of the transmission line be reoriented and relocated in order to avoid sites and PADs where possible.

A comparison of the initial preferred option and the revised preferred option is shown in Figure 7 and Figure 8.



Figure 7: Route of initial preferred option



Figure 8: Route of revised preferred option

2.4 Revised preferred option

The Revised Preferred Option best considers the varying factors as follows:

- **Aboriginal archaeology** – the option ensures protection of sensitive Aboriginal sites
- **Residential amenity**- the option is considered to present the best possible alternative to placing the transmission line furthest away from residential dwellings.
- **Land ownership**- this option utilises a significant land holding controlled by Crown Lands and is accessible via a network of existing Crown Roads thereby minimising access over privately held land.
- **Ecology**- this option best balances impacts to ecologically sensitive flora and fauna, utilising a significant amount of previously cleared land as opposed to re growth areas and natural woodland/forest. Impacts on wetland areas are not considered significant.
- **Access**- the placement of this option along property boundaries will improve access for construction, reducing the need to create temporary access ways. Furthermore, during operation ease of access will be maintained through the proposed placement.
- **Cost**- considering all other factors, this option is considered the most efficient route in terms of an east-west connection, thereby containing the overall project cost.
- **Proximity to airport**- this option is sufficiently north of the airport and does not encroach OLS limitations.
- **Flood**- this option traverses only a small portion of flood affected land, and access during times of flood is considered to be manageable.

3. Activity details

3.1 Activity location

The Activity is located in northern NSW within the Clarence Valley Local Government Area (LGA). The location of the Activity is shown in Figure 9. The transmission line would start around 500 metres to the west of the Pacific Highway and extend 1.6 kilometres to the east across the Pacific Highway and Washpen Creek to Four Mile Lane. From here the transmission would orientate south-east towards Clarenza, before crossing the McPhillips and Glenugie Creeks and tying in with the CCC.

The investigation area traverses a low gradient, mildly undulating landscape made up of predominantly agricultural (grazing) and rural residential land uses.

To the west of the transmission line is the city of Grafton, which is the administrative centre of the Clarence Valley Council and the largest settlement, with over 18,000 people (2016 census). The proposed CCC is located to the east.

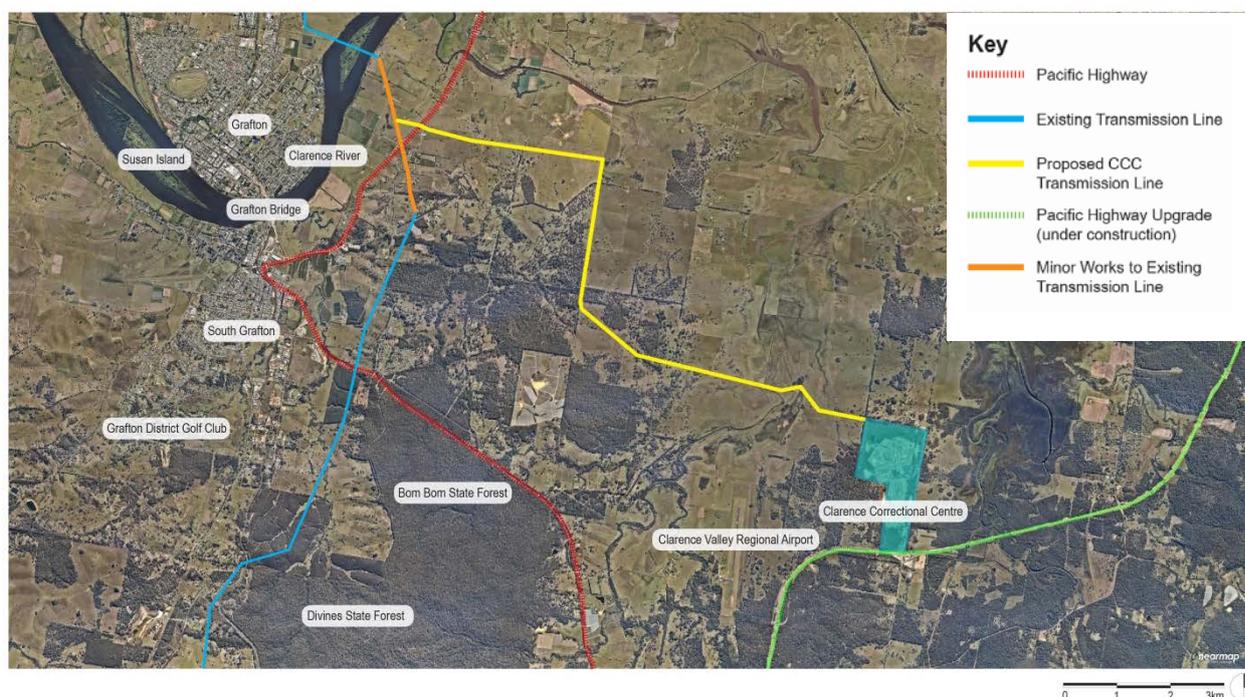


Figure 9: Transmission line and surrounds (Source: Clouston, February 2019)

3.2 Investigation area

The investigation area is broadly characterised by plains and low undulating hills predominantly used for grazing and small landholdings/hobby farms.

There is no significant infrastructure or facilities within the investigation area.

The investigation area lies within the Clarence River Valley catchment area which is made up of undulating floodplain and swampland. To the west lies the Clarence River, a fourth order body of water, although the proposed development area does not reach these bounds. There are a number of other first and second order water sources associated with the river. The investigation area crosses the Deep and Glenugie Creeks, and also continues through swamplands associated with these creeks. As the majority of the investigation area and surrounds is part of the floodplain, ephemeral/non-permanent water sources are likely to be present throughout the investigation area itself. In addition to these ephemeral streams and smaller drainage lines, there are also a number of artificial ponds located throughout the area mainly associated with the surrounding agricultural land.

There are small areas of native vegetation across the investigation area although most of the area has been cleared for agriculture.

3.3 Property identification

The proposed activity would be located on the land parcels identified in Table 1.

Table 1: Properties affected by the transmission line

Lot	Deposited plan	Ownership
19, 20	DP7877	Private
7	DP127096	Private
1, 2, 3	DP367684	Private
2	DP562924	Private
2	DP571684	Private
17	DP665777	Private
22, 23	DP716220	Private
5	DP728239	Private
55, 56, 72, 74, 75, 78, 95, 117, 120, 128, 132, 133, 134, 135	DP751362	Private
1176	DP810935	Private
1	DP1113608	Private
1	DP1126945	Council road reserve
1, 2	DP1201636	Private
3	DP1217671	Private
4	DP 728239	Private
1	DP 799588	Private
7004	DP93037	Crown land (reserve)
No title		Crown land (within Lot 1 DP1113608)
No title		Crown land (abuts southern boundary of Lot 7004 DP93037)
No title		Crown land (abuts southern boundary of Lots 1, 2 & 3 DP367684)

3.4 Easements

Easements would be required for the transmission line. Apart from four lots which are Crown land and one lot which is a Council road reserve, all other properties are in private ownership.

The following easements would apply for the Activity:

- A 30m wide easement for the final transmission line route
- Easements over any access track which will be used to gain access to the Easements.

The NSW Government is in the process of acquiring the easements needed to accommodate the transmission line. Upon acquisition, the easement would be transferred to TransGrid.

3.5 Detailed activity description

3.5.1 Transmission line and structures

A new 132 kV transmission line and associated poles would be constructed to the west of the proposed CCC substation. The line would travel in a generally west direction, before continuing north then west again. At its westernmost extent it would connect into the existing 96H 132kV line that runs from Koolkhan to Coffs Harbour.

The Activity would be located within a 30 metre wide easement.

The new transmission line would require approximately 55 new pole structures as follows:

- 14 x 132kV double circuit pole tension structures
- 37 x 132kV double circuit pole suspension structures

The poles would be a combination of steel and concrete poles generally 25 to 30 metres in height. Steel poles may be used in lieu of concrete poles depending on the geotechnical conditions encountered along the line.

The new transmission line would include connections to both the existing 132 kV TransGrid transmission line and proposed CCC substation.

Transmission line plans are provided at Appendix B. A plan showing the standard design of the poles are provided at Appendix C.

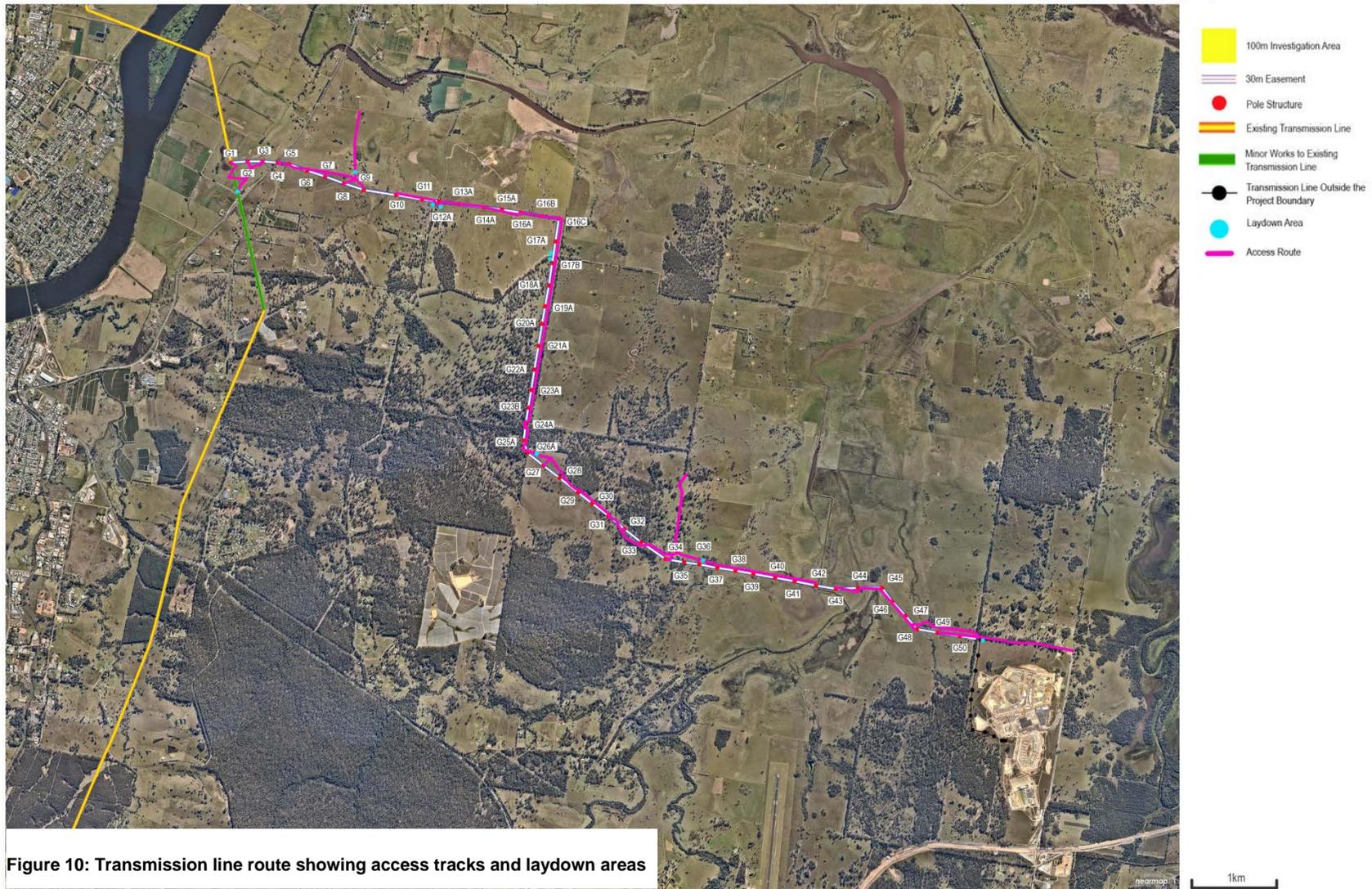
3.5.2 Optical ground wires

As part of the installation of the new transmission line, OPGW would be strung as the line is constructed. The OPGW is a cable that combines the functions of electrical grounding and communications. The OPGW cable would comprise a tubular structure with one or more optical fibres, surrounded by layers of steel and aluminium wiring. The OPGW cable would be strung between the top of each of the electricity poles. The conductive part of the cable would serve to earth adjacent towers and shield the high-voltage conductors from lightning strikes. The optical fibres within the cable would be used for data and communications transmission as part of TransGrid's eventual operation and control of the transmission line.

3.5.3 Transmission line access

Where possible, existing access tracks would be used to access the transmission line easement. However, some additional access points to each of the transmission line pole structures would be required (approximately 4-6 metres wide). These tracks would typically consist of unsealed surface roads and would allow for ongoing access during the operation of the proposed activity for maintenance purposes. As required the surfaces would have aggregate placed on them in order to minimise erosion. Track boundaries and routes would be delineated with markings. The tracks would be established such that they do not impact on existing trees as far as possible. These tracks would be built in accordance with the *Managing Urban Stormwater - Soils and Construction Vol 2C Unsealed Roads* (NSW Department of Environment and Climate Change, 2008).

The proposed access tracks are shown in Figure 10.



3.6 Pre-commissioning, commissioning and operation

3.6.1 Pre-commissioning and commissioning phases

This phase of works would link the substation and transmission line construction activities to the operational activities. Key activities that would be undertaken during the pre-commissioning phase would include:

- point to point testing of substation and transmission line equipment (including end to end testing from the existing Koolkhan and Coffs Harbour substations to the new CCC)
- earthing testing
- high voltage testing

Once all high voltage and low voltage testing is completed, the electrical protection systems have been set and all Quality Assurance documentation has been completed, commissioning would proceed. The key activities involved in the main commissioning process would include:

- transmission line cut in and connection to the electrical network
- high voltage phase out and energisation
- in service protection, control, and metering checks
- EMF (electromagnetic fields) testing.

Depending on the staging of the construction works, the new transmission line may be cut into the existing 96H line and energised prior to the completion of the substation. In this scenario, the transmission line would be energised without the substation until the pre-commissioning of the substation is completed.

3.6.2 Operation phase

During the operational phase, access by field staff would be on a regular basis to complete routine inspection and maintenance works including:

- inspection and maintenance of transmission lines, structures and poles
- vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines.

Typically, maintenance activities would only require light to medium sized plant and vehicles to access the transmission line. Additional measures, plant and equipment may be required in response to emergencies.

3.7 Construction activities

3.7.1 Construction footprint and ancillary sites

The construction impact footprint represents the construction impact boundary or the area within which construction activities would occur. Construction works would take place along the full length of the proposed activity and would include:

- construction of the proposed transmission line alignment
- the access points and access tracks for construction vehicles.

The construction impact footprint is generally located within the investigation area although additional land is required for access. This is shown by the 100m investigation area and access routes on Figure 10. The impact footprint which has been assessed as part of the proposed activity represents the blocks of land which would potentially be impacted by the construction (and operation) of the transmission line.

It should be noted that the final location of access tracks and construction laydown areas would be determined in consultation with the landholders in order to coordinate with landholder activities and to minimise impacts.

3.7.2 Construction methodology

The construction methodology for the electricity line would consist of the following key activities:

- site establishment, early works and set out works including:
 - site surveys for pole locations and identification of any existing services/utilities
 - installation of environmental controls

- vegetation clearing/tree trimming along transmission line easement
- clearing of identified danger trees outside the easement
- establishment of access tracks to structures for construction of poles
- construction of the transmission line , including:
 - establishment of flat benches at each of the structure sites for the construction of the transmission line structures.. This would include the construction of 2 off flat working areas (or benches) within a 40m x 40m area around the base of each structure. These benches would provide a flat stable working platform for the set up cranes and EWPs
 - excavation and installation of pole foundations (concrete foundation supports)
 - dressing and erection of concrete and steel poles
 - stringing of conductors and OPGW along new transmission line
 - connection of new transmission line to the existing TransGrid 96H transmission line and the new Clarence Correctional Centre substation.

Access tracks

In order to access the transmission line structure sites, access tracks would need to be constructed to facilitate the movement of plant and machinery. Access tracks would typically be a minimum 4m wide up to approximately 6m wide.

Depending on the terrain, the extent of access track construction may vary from:

- Slashing long grass only
- Excavating and grading to level natural ground
- Import and placement of gravel and/or road base onto natural ground
- Boxing out the natural ground, importing gravel and/or road base and compacting
- Site specific solution depending on the conditions encountered.

Culverts and/or causeways may be required to cross erosion gullies and/or creek crossings.

Appropriate drainage and erosion and sediment control measure would be implemented

Benching

Benching would be established around each transmission line structure. Benching is required to make a flat, stable working surface on which EWPs and cranes can be safely set and operated.

Each transmission line structure would require 2 off 20m x 20m (approximately) benched areas. The extent of benching at each structure site would vary depending on the conditions at each structure. Depending on the terrain, constructing a bench may consist of:

- Slashing long grass only
- Excavating and grading to level the natural ground. This may include batters when excavating into a sloping site
- Import and placement of gravel/road base to level out the ground
- Site specific solution depending on the conditions encountered

A 40m x 40m area around the base of each structure would be disturbed for the purpose of constructing the bench.

Sediment control measures would be implemented depending on the extent of benching constructed and the requirements of the Construction Environmental Management Plan (CEMP).

Footings

Footings for the poles will vary depending on soil conditions. In the majority of cases, a single bore hole would be excavated and the concrete pole placed into the bore hole and back- filled with concrete. Boreholes may be up to approximately 1100mm wide and approximately 6m deep with exact dimensions to vary slightly from structure to structure following detailed design. Alternatively footings may also be constructed using driven piles. This would involve driving a pile into the ground to the design depth leaving a butt protruding from the ground. The top of the pole would then be bolted onto the driven pile butt.

Where structures are required to be placed in poor soils, a base mount footing may be required. A base mount footing involves multiple piles with a pile cap. The piles may be bored piles, screwed piles or driven piles. The pole is then bolted to the top of the concrete pile cap. A typical base mount footing is detailed in Drawing TLCD-SK-018, provided at Appendix D. The exact footing, pole and structure dimensions will vary slightly from structure to structure following detailed design.

The transmission line poles would be a combination of steel and concrete poles.

Guy anchors may also be installed on certain structures to provide additional structural support. Standard guy anchor construction would consist of a single bore hole with a steel anchor concrete into the bore hole. A guy wire would then run between the steel anchor and the transmission line pole to provide mechanical support to the pole. In normal soil conditions the guy anchor bore hole would be approximately 600mm in diameter and approximately 6m deep. Similarly to the footing foundation, the size and design of the guy anchor would change to suit poor soils or special structure arrangements.

Wherever possible, spoil from the bore excavation would be spread locally around the source once the pole is installed.

Stringing

Once the structures have been erected, pulleys (or rollers) would be hung off each of the transmission line insulators (for the conductors) and from the top of the poles (for the OPGW).

Using a draw wire, the conductors and OPGW would be pulled through the pulleys, sagged to correct height and clipped into their final position.

Brake and winch equipment used to pull through the conductor and OPGW would be set up at locations within the established and cleared easement so as to avoid any areas of environmental sensitivity.

3.7.3 Construction plant and equipment

An indicative list of construction plant and equipment likely to be required for the key construction elements is provided below. Not all the equipment identified below would be required for all phases of the proposed construction of the transmission line.

Typical plant and equipment may include:

- Light Vehicles
- Air Compressors
- Bulldozers
- Brake and winch
- Concrete agitator
- Concrete pump
- Cranes (various sizes up to 200 tonnes)
- Dumper trucks
- Elevated working platforms
- Excavators (various sizes)
- Flatbed Hi-ab truck
- Generators
- Graders
- Mulchers and chippers
- Piling rig
- Pneumatic jackhammers
- Tipper trucks
- Rollers

- Semi-trailers
- Tilt tray trucks
- Transport trucks
- Watercarts.

3.7.4 Construction traffic

The number of vehicle movements would fluctuate throughout the construction of the transmission line with the maximum daily heavy vehicle movements occurring during the pole delivery and pole erection stages of construction. The number of construction vehicle movements is estimated as follows:

- Average Light Vehicle Movements (typical day): 35
- Average Heavy Vehicle Movements (typical day): 20

3.7.5 Site facilities

The transmission line alignment would accommodate some minor site facilities and storage. These areas would store small quantities of materials for day-to-day use. These would be established for short periods of time and would typically be used as storage areas for transmission line construction.

Upon completion of works, these minor compound sites would be cleared of any temporary infrastructure and equipment. The land would be reinstated and handed back to the owner where applicable.

Equipment storage and stockpiling of construction materials and spoil would also occur anywhere within the construction footprint. These stockpiles would store excavated materials such as spoil, stripped topsoil, excavated materials and construction materials associated with transmission line tower/pole construction. They would be located on relatively level ground and away from areas of ecological or heritage value or from drainage lines.

The amount of spoil material from the installation of the poles is estimated at 900m³ over the length of the transmission line. If poor or special soil conditions are encountered the amount of spoil would increase.

As far as possible, spoil would be spread locally around the structure and not removed from site.

3.7.6 Hazardous materials and chemicals

During construction various hazardous materials and chemicals would be required to be used and/or stored on site. During construction, a range of materials would be utilised for, and determined by, the various construction methods required to construct the proposed activity. Typically, hazardous materials and chemicals which would be utilised during construction would include (but not limited to):

- acetylene
- adhesives, glues, epoxies, etc
- concrete and other mortar products
- contact cleaners
- cold-galvanising spray
- fuels, oils and lubricants (such as diesel, unleaded petrol, thinners, etc.)
- paints and other paint markers.

3.7.7 Site clean-up and landscaping

Site-clean up would occur progressively at transmission line pole installation sites when construction at these sites is completed. The disturbed areas would be stabilised. This phase would occur following the completion of construction and involve the removal of all materials not required during the operation of the transmission line. This would primarily be the removal/remediation of the construction area, removal of any construction materials and temporary environmental controls.

Landscaping (consisting of reinstating of some grassed areas) would also be undertaken following the completion of the works to assist with stabilisation of the site.

3.7.8 Workforce and working hours

The average daily construction workforce is estimated at 30 staff.

Noise generating works would be limited to the recommended standard hours for construction work being:

- Monday to Friday 7:00 am to 6:00 pm
- Saturday 8:00 am to 1:00 pm
- No works on Sundays or Public Holidays.

Work outside standard hours is anticipated to only comprise of the following:

- transmission line cutover and commissioning
- the delivery of materials outside standard hours requested by police or other authorities for safety reasons
- emergency work to avoid the loss of lives and/or property
- work timed to correlate with system planning outages.

If additional noise generating works outside standard construction hours are needed, they would require justification in accordance with the Interim Construction Noise Guideline (DECC, 2009) and the formal written consent of INSW prior to occurring.

3.8 Activity timeframe

Once construction works have commenced, the proposed activity is estimated to take approximately 12 months to construct, commencing in the second half of 2018 (subject to Infrastructure NSW approval of the REF and any other statutory approvals required). The transmission line is expected to be commissioned (i.e. become operational) in 2019. This program is based on the current design and preliminary construction staging. Therefore, the program is indicative and may be refined as part of the detailed construction programming.

Table 2 presents an indicative implementation program for the Activity (subject to planning approval).

Table 2: Indicative Implementation Program

Indicative Date	Proposed Activity
April 2019	Site establishment and mobilise to site
May to June 2019	Construction of access tracks
June to August 2019	Footing and structure construction
September 2019	Stringing, cut-in and energisation

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4. Community and stakeholder consultation

Infrastructure NSW has been working to determine a fair and preferable transmission line route for provision of high voltage power supply to the new Clarence Correctional Centre since early 2017. This section outlines consultation activities conducted between April 2018 and February 2019 in relation to planning for and finalising the transmission line easement route.

4.1 Consultation approach

Infrastructure NSW's approach is people-focused and proactive, with an emphasis on:

- establishing and maintaining clear lines of communication
- providing accurate, easy to understand, relevant and timely information
- consulting early and often to ensure 'no surprises' for key stakeholders and the community
- providing prompt issues resolution
- identifying and considering a diverse range of views and interests presented by key stakeholders and impacted landowners.

To date, consultation has included notifying and consulting key stakeholders on proposed transmission route options and draft REF, as well as the formal easement acquisition process with easement landowners.

Infrastructure NSW will continue to ensure key stakeholders are engaged throughout construction of the transmission line.

4.2 Key stakeholders

Key stakeholders for this Activity include:

- Directly impacted landowners and residents (i.e. those with easement on their property)
- Local Aboriginal groups
- Landowners within 200 metres of the easement
- Clarence Valley Council
- Department of Industry (Crown Land)
- Office of Environment and Heritage (OEH)

4.3 Consultation activities

4.3.1 Prior to and during preparation of the draft REF

Consultation with directly impacted landowners and residents

Formal consultation with landowners and residents with an easement proposed on their property began in April 2018 with distribution of the Commencement of Acquisition Notice. At this time, Infrastructure NSW and Property NSW also met with each landowner to discuss the proposal and acquisition process. Subsequent meetings, phone conversations and correspondence have been undertaken with landowners as the process has progressed, as required.

The transmission line route has evolved over time, having regard to particular issues raised by affected landowners. Wherever possible, Infrastructure NSW has worked with individual landowners to find a mutually agreeable outcome.

Consultation with local Aboriginal groups

A process of Aboriginal community consultation in accordance with OEH guidelines was undertaken for the CCC SSDA, commencing in 2016. This process identified two Registered Aboriginal Parties (RAPs) for the CCC project: Yaegl Local Aboriginal Land Council; and Yaegl Traditional Owners Aboriginal Corporation. Additional Aboriginal community consultation was undertaken for the CCC project as part of the Stage 2 EIS for the project, and through the preparation of the Aboriginal Heritage Management Plan for the CCC site.

As the transmission line commences at, and is directly related to, the CCC site, it was considered appropriate to continue consultation with the Aboriginal community interest groups who have been consulted with for the CCC project to date. However, considering that the path of the transmission line extends over a distance of c.13km from the CCC, as well as requiring a separate approval process which is likely to require an Aboriginal Heritage Impact Permit (AHIP), a revised process of Aboriginal consultation has been initiated in accordance with OEH guidelines for the proposed transmission line.

The RAPs for the current Activity include:

- Garby Elders Aboriginal Corporation
- Grafton-Ngerrie Local Aboriginal Land Council
- Jagun Elders
- Yaegl Local Aboriginal Land Council
- Yaegl Traditional Owners Corporation
- Muurrbay Bundani Aboriginal Corporation (MBAC).

Curio Projects formally initiated a process of Aboriginal Community Consultation for the transmission line on behalf of Infrastructure NSW and in accordance with OEH guidelines in June 2018. Letters have been sent to relevant statutory bodies requesting names of Aboriginal people who may have an interest in the proposed Activity area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and places relevant to the transmission line investigation area. A public notice advising of the Activity location and proposed development, and inviting registration from local Aboriginal people was placed in both the Coffs Coast Advocate and the Grafton Daily Examiner on 30 June 2018.

Initial meetings between Curio Projects and project RAPs (to meet in person and introduce Curio and the Transmission Line project) were undertaken on the 20th September 2018. A RAP project start-up meeting was held on 18 October 2018 at the Grafton-Ngerrie LALC, to which all project RAPs were invited. The project background, overall methodology and path forward for the archaeological field survey were discussed at this meeting, with draft minutes taken, and circulated to all project RAPs post meeting for review.

Curio Projects has continued to work closely with the RAPs during the archaeological field survey and test excavations. A summary of RAP meetings to date is provided in Table 3.

Table 3: RAP meetings to date

Date	Location	Purpose
20.9.18	Maclean at John Holland Yarning Circle for CCC	Meet Yaegl RAPs
20.9.18	GNLALC Offices	Meet Gumbaynggirr RAPs
18.10.18	GNLALC Offices	Discuss project background and methodology
6.11.18	GNLALC Offices	Field survey start up meeting
4.12.18	GNLALC Offices	Additional survey – meeting
9.1.19	GNLALC Offices	Test excavation start up meeting

Consultation with local Aboriginal community groups is ongoing in accordance with OEH guidelines. Further detail on consultation to date is provided in the Aboriginal Heritage Due Diligence Assessment Report, a copy of which is provided at Appendix H.

Consultation with government and agency stakeholders

Government and agency stakeholders have been consulted as follows:

- Clarence Valley Council has been kept up to date through meetings and regular strategy and route selection updates, particularly in relation to Grafton Airport and easements over local roads
- Department of Industry (Crown Land) has been consulted in relation to easements over land under its control.

4.3.2 Notifications for the draft REF

Although formal exhibition of the draft REF is not mandated, the draft REF was available via the Clarence Correctional Centre webpage (insw.com.au/projects-nsw/ngcc) from 6 November 2018 to 27 November 2018. Key stakeholders were notified.

Website notice

The draft REF was available via the Clarence Correctional Centre webpage (insw.com.au/projects-nsw/ngcc) from 6 November 2018 to 27 November 2018.

The following project team contact details were provided to impacted landowners and residents:

- Phone: 02 8016 0100
- Email: ngcc@infrastructure.nsw.gov.au

Letter to key stakeholders

Letters detailing the purpose of the draft REF and where to go for further information were sent (via mail or email) to:

- Directly impacted landowners
- Landowners within 200 metres of the easement
- Clarence Valley Council
- Chairperson of the Trust responsible for the management of the parcel of Crown Land

4.4 Issues raised during consultation

Table 4 provides a consolidated summary of the key issues raised in relation to the Draft REF, including where these matters are addressed in the final REF.

A number of adjustments have been made to the proposed activity to address issues raised by landowners. The final route selection as well as location of access tracks and laydown areas have been determined having regard to issues raised by landowners.

No further changes are recommended to the REF proposal arising from issues raised in submissions.

4.5 Construction and operation of the transmission line

Infrastructure NSW will continue to liaise with property owners and other stakeholders throughout development of the project.

Landowners will be notified prior to the commencement of any proposed activity on their property.

Table 4: Summary of issues raised and actions in response to consultation

Issue	Issue detail	Response	Addressed in REF
Dust pollution along dirt road portion of Four Mile Lane	<p>Concern that removal of trees along the easement and increased traffic due to construction will increase the amount of dust settling on the house that sits on Lot 7 DP 850072.</p> <p>Request to mitigate this impact project through sealing the remaining section of Four Mile Lane, some 400 metre.</p>	<p>While it is acknowledged that the proposed activity would result in some short-term amenity impacts during construction, including dust generation, these issues are expected to be minor in nature. Appropriate mitigation measures will be put in place to ensure dust is minimised. In particular, if necessary, dust suppression techniques would be implemented and incorporated into the Erosion and Sediment Control Plan, such as water spraying of surfaces and covering stockpiles.</p> <p>Given the minor nature of the impact, sealing of the lane is not considered necessary.</p>	Section 6.11 Air Quality
Location of access point and laydown area for construction at Lot 2 DP 562924	Request to not use gate directly opposite entrance to neighbouring property (and house) on Lot 7 DP 850072.	The gate directly opposite the entrance to Lot 7 DP 850072 is not proposed to be used for access.	
Construction traffic turning into Swan Lane from the Pacific Highway	Safety concerns regarding construction traffic turning into Swan Lane from the Pacific Highway, given this portion of the Pacific Highway is only one lane.	A Traffic Impact Assessment of the proposed activity has been prepared by traffic consultants, Arup (refer Appendix J). The report included an assessment of traffic turning into Swan Lane from Pacific Highway. No safety issues were identified.	<p>Section 6.9 Traffic and Access</p> <p>Traffic Impact Assessment, Appendix J.</p>
Hazards	<p>Need to consider the 70-80 of flooding on the floodplain on Lots 2 & 3 DP 367684 which come from flash flooding. This flash flooding comes from fast flowing water down the hills in times of extreme rainfall and creates two major channels on these two lots.</p> <p>Tearing up the flood plain may be an issue when maintenance is required in storm periods.</p> <p>There is also a fire risk and accident safety risks caused by such a large current, along the line's whole length.</p>	<p>A Flood Assessment of the proposed activity has been prepared by Jacobs Consulting. The report has considered the risk of Clarence River flooding along the full length of the study corridor up to the Probable Maximum Flood (PMF). While local creek flood risk has not been quantified in the report, the depths of flooding associated with local creek flood events are unlikely to come close to the substantial flood depths that can occur in the tributaries of the Clarence River during large river flood events (such as the 1% AEP flood event). Short duration local creek flood events will not impact on the electrical clearance requirements stated in the flood report.</p> <p>In relation to safety risks associated with the transmission line, TransGrid's has an Electrical Network Safety Management System (ENSMS) in place which addresses:</p> <ul style="list-style-type: none"> • The safety of the public, and persons near or working on electricity transmission network assets • The protection of property and network assets • Safety aspects arising from the protection of the environment, including protection from ignition of fires by network assets • Safety aspects arising from the loss of electricity supply. 	<p>Section 6.4 Flooding</p> <p>Flood Assessment, Appendix F.</p> <p>Section 6.10 Bushfire</p> <p>Bushfire Assessment, Appendix K.</p>

Issue	Issue detail	Response	Addressed in REF
		<p>TransGrid's Bush Fire Risk Management Plan outlines how TransGrid responsibly manages the bush fire risk associated with its electricity transmission network assets. The plan identifies a number of hazardous events the organisation is concerned about, and describes how the risk associated with these is managed.</p> <p>In relation to the CCC transmission line, a bushfire assessment has been undertaken and is provided at Appendix K. It indicates that the bushfire risk from the activity can be appropriately managed through the implementation of recommended mitigation measures. Further, any work on site will comply with Transgrid's Controlled Document – Hot Risk and Fire Risk Work (5.11.18). The document identifies and controls the risks associated with Hot Work and Fire Risk Work conducted by TransGrid employees and contractors. It also identifies TransGrid's obligations during a Total Fire Ban.</p>	
Increasingly high winds and their impact after repeated flooding	Significance of increasingly high winds and their impact after repeated flooding	Increasingly high winds and their impact after repeated flooding is not considered to be a flood related issue. The design team will take into account soil saturation and wind loadings in the design calculations for the transmission line structures.	
Significance of climate change	<p>Landowner noted:</p> <ul style="list-style-type: none"> • the impact of the large electricity requirements of the facility on increasing climate change gasses • the large increase in intense weather events causing increased flooding and destruction from wind events which with continued change could impact on the line • the changes to the timing of climate events which can now occur year round and which previously were essentially summer/autumn events • increased size and longevity of floods. 	<p>Section 4.1.3 of the Flood Assessment (Appendix F) covers climate change, increase in rainfall intensity and projected sea level rises.</p> <ul style="list-style-type: none"> • The report has conservatively approached climate change by considering the flood extents and depths associated with the Probable Maximum Flood (PMF) which is an extreme flood event. As detailed in Section 4.1.3, "The probable maximum flood is the largest statistically probable precipitation coupled with the worst flood-producing catchment conditions. By definition, the probable maximum flood cannot increase in magnitude even under climate change conditions". • The report has also provided reference to sea level rise. As detailed in Section 4.1.3, "The sea level rise modelling carried out for the Woolgoolga to Ballina Highway Upgrade Environmental Impact Statement (EIS) showed that a 0.6 metres rise in sea levels would not impact on the smaller upper catchments rivers and creeks crossed by the Pacific Highway Upgrade (which would be adjacent to the Project Site)." 	Flood Assessment at Appendix F. Section 6.15 of REF.

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5. Planning context

5.1 Environmental Planning and Assessment Act 1979

The EP&A Act and the EP&A Regulation provide the framework for development and environmental assessment in NSW.

The EP&A Act contains a number of different planning approval pathways for the assessment of development proposals in NSW, including Part 4 (development with consent), Division 4.1 of Part 4 (State Significant Developments), Part 5 (development without consent, typically public infrastructure developments), and Part 5.1 (State Significant Infrastructure). The approval pathway that applies to a proposed activity is determined by relevant environmental planning instruments such as Local Environmental Plans and State Environmental Planning Policies (SEPPs).

Pursuant to the Infrastructure SEPP (refer to Section 5.2.1), this proposed activity does not require development consent from a local council, and is therefore subject to Part 5 of the EP&A Act.

Under Section 5.5 of the EP&A Act for Part 5 activities, the determining authority is required to consider the potential environmental impacts of the proposed activity to the fullest extent possible.

Infrastructure NSW is a public authority and as such, is a determining authority for the purposes of Section 5.6 of the EP&A Act. Accordingly, Infrastructure NSW is the proponent and determining authority for this proposed activity. In accordance with Section 5.5 of the EP&A Act, this environmental impact assessment has been prepared to satisfy Infrastructure NSW requirements as a determining authority. In addition, Clause 228 of the EP&A Regulation identifies factors which must be taken into account when considering the likely impact of an activity on the environment. These factors have been considered in Section 7.2.

5.2 State Environmental Planning Policies

5.2.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP aims to facilitate the delivery of infrastructure across NSW.

Clause 41 of the Infrastructure SEPP provides that development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of a public authority without development consent on any land. Under clause 40 of the Infrastructure SEPP, an electricity transmission or distribution network is defined as including above or below ground electricity transmission or distribution lines (including related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, access structures, access tracks and ventilation structures) and telecommunication facilities that are related to the functioning of the network.

As the Activity falls within the definition of electricity transmission or distribution network and is to be carried out by or on behalf of Infrastructure NSW which is a public authority, it is considered to be “development without consent” and can be assessed under Part 5 of the EP&A Act. Development consent from the Clarence Valley Council is not required.

Clauses 13 to 16 of the Infrastructure SEPP specify the requirements for consultation with councils and other public authorities for infrastructure development carried out by or on behalf of a public authority. Consultation is required in relation to an activity that has a substantial impact on:

- Council related infrastructure or services (Clause 13)
- Local heritage (Clause 14)
- Flood liable land (Clause 15)

In this instance, it is considered that impacts on Council related infrastructure, local heritage and flood liable land as a result of the Activity will be minor and inconsequential. Accordingly, formal consultation with Clarence Valley Council under the Infrastructure SEPP is not required.

Clause 16 of the Infrastructure SEPP identifies the circumstances under which consultation with other public authorities is required. None of these circumstances are applicable in relation to the Activity.

5.2.2 State Environmental Planning Policy No 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) provides a State-wide planning approach to the remediation of contaminated land by considering whether the land is contaminated and, if it is contaminated, whether it can be made suitable for the proposed purpose.

Infrastructure NSW commissioned Jacobs Group (Australia) Pty Ltd to undertake a Stage 1 Preliminary Site Investigation (copy provided at Appendix E). The primary aims of the assessment were to identify past or present potentially contaminating activities at the site, identify the potential for site contamination, assess the need for further investigation, and make a preliminary assessment of the suitability of the site for the proposed development.

Based on the tasks undertaken as part of the Preliminary Site Investigation process, and in accordance with SEPP 55 and Clarence Valley Council's contaminated land policy, the report concludes that the Activity area is suitable, from a contamination perspective, for the proposed construction and operation of a transmission line to the CCC. The report also concludes that further contamination investigation is not required.

Further detail regarding the Stage 1 Preliminary Site Investigation is provided in Section 6.2.

5.2.3 State Environmental Planning Policy No 44 – Koala Habitat

SEPP 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for Koalas, to ensure permanent free-living populations would be maintained over their present range. SEPP 44 applies to all local government areas (LGAs) listed under Schedule 1, which includes Clarence Valley LGA. The policy applies to areas of land at least one hectare in size and may include adjoining land under the same ownership.

SEPP 44 listed Schedule 2 Koala feed tree species are as follows:

- Bimble Box (*Eucalyptus populnea*)
- Broad-leaved Scribbly Gum (*Eucalyptus haemastoma*)
- Forest Red Gum (*Eucalyptus tereticornis*)
- Large-fruited Grey Gum (*Eucalyptus punctata*)
- Ribbon Gum (*Eucalyptus viminalis*)
- River Red Gum (*Eucalyptus camaldulensis*)
- Scribbly Gum (*Eucalyptus signata*)
- Swamp Mahogany (*Eucalyptus robusta*)
- Tallowwood (*Eucalyptus microcorys*)
- White Box (*Eucalyptus albens*).

The policy defines potential Koala habitat as areas of native vegetation where Schedule 2 trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Two Schedule 2 tree species occur at the site (Forest Red Gum, Tallowwood); however these trees occur infrequently and do not constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. On this basis potential Koala habitat does not occur and the policy does not apply.

5.2.4 State Environmental Planning Policy (Rural Lands) 2008

State Environmental Planning Policy (Rural Lands) 2008 (Rural Lands SEPP) aims to, among other objectives, facilitate the orderly and economic use and development of rural lands for rural and related purposes, to identify rural planning principles so as to assist the proper management of rural lands, reduce land use conflicts and identify State significant agricultural land to ensure its ongoing viability.

Clause 7 of the Rural Lands SEPP identifies rural planning principles as follows:

- (a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas
- (b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State
- (c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development

- (d) in planning for rural lands, to balance the social, economic and environmental interests of the community
- (e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land
- (f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities
- (g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing
- (h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The Activity is considered to be an orderly use of the rural lands encompassed by the site, for the reasons outlined in Section 6.1. Potential impacts to biodiversity, heritage and land use are considered in Chapter 6.

Clause 13 of the Rural Lands SEPP identifies land as being State significant agricultural land if it is listed in Schedule 2. Schedule 2 does not identify any land as State significant agricultural land at this time. However, the NSW Government has identified and mapped Biophysical Strategic Agricultural Land (BSAL) in the Clarence Valley LGA. BSAL land is land that has been identified as having high quality soil and water resources capable of sustaining high levels of productivity. The subject site and study impact area are not located within BSAL land.

There are no other relevant provisions in the Rural Lands SEPP pertaining to the proposed activity.

5.3 Clarence Valley Local Environmental Plan 2011

The Clarence Valley Local Environmental Plan 2011 (the LEP) applies to land within the Clarence Valley local government area. The Activity is located within land zoned RU2 Rural Landscape under the LEP.

The objectives of the RU2 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*
- *To provide land for less intensive agricultural production.*
- *To prevent dispersed rural settlement.*
- *To minimise conflict between land uses within the zone and with adjoining zones.*
- *To ensure that development does not unreasonably increase the demand for public services or public facilities.*
- *To ensure development is not adversely impacted by environmental hazards.*

The Activity will not impact on the agricultural use of the land and, as discussed in Section 6.1, will have minimal impact on its rural landscape character. The other objectives are not relevant to the Activity.

Clause 5.12 of the LEP states that '*...this Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under State Environmental Planning Policy (Infrastructure) 2007.*' As the Activity is permitted without consent under the Infrastructure SEPP (refer Section 5.2.1), the consent requirements of the LEP do not apply.

5.4 Other relevant legislation

Other relevant Commonwealth and NSW legislative requirements and their applicability to the Activity have been considered in Table 5.

Table 5: Other relevant legislation

Legislation	Relevant to Activity
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	<p>The BC Act provides the legislative framework for biodiversity conservation.</p> <p>The proposed activity would not significantly affect critical habitat, threatened species or endangered ecological communities (EECs). See Section 6.5 for further detail.</p>
<i>Biosecurity Act 2015</i>	<p>The objects of the <i>Biosecurity Act 2015</i> are, amongst other matters, to reduce the negative impact of weeds by establishing control mechanisms and to provide for monitoring and reporting of the effectiveness of the management of weeds in NSW.</p> <p>The presence and management of noxious weeds during construction works are addressed in Section 6.5.</p>
<i>Contaminated Land Management Act 1997 (CLM Act)</i>	<p>The general object of the CLM Act is to establish a process for investigating and (where appropriate) remediating land that the Environment Protection Authority (EPA) considers significantly contaminated to require regulation.</p> <p>Under Clause 60 of the CLM Act, a person whose activities have contaminated land or an owner of land whose land has been contaminated above certain levels (as outlined in the Guidelines on the Duty to Report Contamination, EPA 2015) is required to notify the EPA in writing as soon as they become aware of the contamination.</p> <p>There is a low possibility that the Activity would involve excavating soil that is contaminated. Should soils be found to be contaminated or soils accidentally become contaminated on-site during works, and this contamination is considered significant enough to trigger the CLM Act, Infrastructure NSW would consult with the EPA immediately.</p> <p>Further discussion on contamination is provided in Section 6.2.</p>
<i>Crown Land Management Act 2016</i>	<p>Infrastructure NSW has liaised directly with the Trustee for the Crown Land who has confirmed that no access permits or licenses are required. The Trustee has given approval for Infrastructure NSW and its agents to enter the land for the purpose of the Activity.</p>
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	<p>The proposed activity is unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance (MNES) (refer to Section 6.5). Commonwealth approval is therefore not required under the EPBC Act.</p>
<i>Heritage Act 1977</i>	<p>The <i>Heritage Act 1977</i> provides the statutory framework for the protection and conservation of non-Aboriginal heritage in NSW.</p> <p>A non-Aboriginal heritage impact assessment was undertaken for the proposed activity. The assessment concludes that no non-Aboriginal heritage sites would be impacted. Refer Section 6.7 and Appendix I for further detail.</p>
<i>National Parks and Wildlife Act 1974</i>	<p>The NPW Act is the primary legislation that provides statutory protection for all 'Aboriginal objects' and</p>

(NP&W Act)	<p>'Aboriginal places' within NSW.</p> <p>An Aboriginal Due Diligence Heritage Assessment was undertaken for the Activity. It concludes that the as the Activity will disturb the ground surface and has the potential to impact Aboriginal objects and sites, an Aboriginal Heritage Impact Permit (AHIP) will likely be required for the investigation area prior to commencement of development works. Refer Section 6.6 and Appendix H for further detail.</p>
<i>Protection of the Environment Operations Act 1997 (POEO Act) and Regulations</i>	<p>The proposed activity is not a scheduled development or a scheduled activity under Schedule 1 of the POEO Act and therefore does not require an Environment Protection Licence.</p> <p>Under Section 148 of this Act, the EPA must be notified of any pollution incidents that cause or threaten material harm to the environment.</p>
<i>Roads Act 1993</i>	<p>Under Section 138 of the Roads Act, Infrastructure NSW requires consent from the roads authority for works in, on or over a classified road. As works are proposed over the Pacific Highway, approval from the Roads and Maritime Services as the relevant roads authority is required.</p> <p>Under Clause 5 of Schedule 2 to the Roads Act, Infrastructure NSW as a public authority does not require consent for works in, on or over an unclassified road.</p>
<i>Road Transport Act 2013</i>	<p>Under the <i>Road Transport (Mass, Loading and Access) Regulation 2005</i>, approval is required for oversized vehicles and loads.</p> <p>Oversized deliveries may be required for the delivery of the transmission poles. Consent would be required from the relevant roads authority for transport of oversized loads.</p>
<i>Water Management Act 2000</i>	<p>The Water Management Act regulates works in, on or under waterfront land.</p> <p>Under Clause 41 of the Water Management (General) Regulation 2018, a public authority is exempt from section 91E (1) of the Act in relation to all controlled activities that it carries out in, on or under waterfront land. A controlled activity includes the carrying out of works.</p>

5.5 Other environmental approvals or permits required

Following consideration of the Activity and the applicable environmental legislation, the environmental approvals, permits, licences and/or other notifications for the Activity are set out in Table 6.

Table 6: Other environmental approvals/permits required

Legislation	Requirement	Timing/Comment
<i>National Parks and Wildlife Act 1974</i>	The Activity has the potential to impact Aboriginal objects and sites. Investigations indicate that an Aboriginal Heritage Impact Permit (AHIP) may be required for the investigation area.	Prior to the commencement of works
<i>Road Transport Act 2013</i>	Oversize and / or overmass (OSOM) vehicles are defined as Class 1 vehicles under the Heavy Vehicle National Law and require permits for use. A vehicle or vehicle combination is considered to	Prior to use of OSOM vehicles. Note, some councils require up to six weeks to consider an application.

Legislation	Requirement	Timing/Comment
	<p>be OSOM if it exceeds any general access mass or dimension limits.</p> <p>Applications to classified roads are made to RMS: https://myrta.com/osp/</p> <p>Applications for local roads should be made through Clarence Valley Council.</p>	
<i>Crown Lands Management Act 2016</i>	<p>Section 5.21 of the Crown Lands Management Act requires a licence to use or occupy Crown Land. It is proposed to seek approval for the re-burial of Aboriginal heritage artefacts retrieved during the construction of the CCC transmission line.</p>	Prior to construction.
<i>Roads Act 1993</i>	<p>The proposed activity involves work over the Pacific Highway (an RMS classified road) between Structures G3 and G4 and, therefore, a consent under Section 138 is required.</p> <p>There is also a number of RMS paper roads located on Crown Land within the activity area. If re-burial of Aboriginal heritage artefacts is to occur on these paper roads (refer discussion above relating to Crown Lands Management Act), then approval to do so under section 138 of the Roads Act will be required.</p> <p>Applications are made though RMS: http://www.rms.nsw.gov.au/documents/about/forms/road_occupancy_manual.pdf</p>	<p>Prior to commencement of works within the road corridor between Structures G3 and G4.</p> <p>Prior to construction.</p>

5.6 Confirmation of statutory position

An assessment of the relevant statutory provisions and planning instruments has concluded that the Activity can be carried out as development without consent under clause 41 of the Infrastructure SEPP and can be assessed under Part 5 of the EP&A Act.

6. Environmental assessment

6.1 Land use

6.1.1 Existing environment

The existing land use of the investigation area is mapped as predominantly agricultural and grazing land, with roads and patches of woodlands. The Activity would be predominantly confined to the proposed electricity transmission line easement and associated access tracks. Outside the easement, there may be some construction activity within the 100m buffer (investigation area) but this would occur in areas that have been subject to agriculture practices (including grazing) for many years.

The land is zoned RU2 Rural Landscape under Clarence Valley LEP 2011 and there is no land zoned for environment conservation purposes. One threatened flora species occurs - a small population of Weeping Paperbark in the east of the investigation area. None of these trees will be impacted.

6.1.2 Impact Assessment

Consultation has occurred during the design process with the landholders where infrastructure is proposed to occur on their lands. Consultation has focused on determining the most acceptable route and infrastructure locations for all parties with an objective of minimising the significance of adverse land use impacts.

The creation of transmission line easements over private land results in certain restrictions over land use. In particular, the construction of certain buildings, the stockpiling of soil, the construction of dam walls, the laying of metal pipes, inundation of poles or anything else that might impinge on statutory electrical safety requirements is restricted. Access rights for future maintenance by TransGrid, including the slashing of regrowth vegetation, and the inspection of the transmission line infrastructure must also be allowed. Grazing of cattle, horses and other livestock would be able to continue within the easements.

Construction

The works are anticipated to cause minor temporary impacts to land use due to the presence of construction equipment and machinery and ground disturbance activities (construction benches, access track works, installation of structures and guy wires).

Construction benching would be required at approximately 54 locations to create a suitable, safe surface for use of EWPs. These works would be largely confined to the proposed easement. The proposed easement has been determined having regard to existing and future land use requirements as well as the need to protect sensitive areas. The proposed construction works in the easement would therefore have minimal impact on current or future land uses. Any construction works, materials and machinery storage, soil stockpiling and the like that may need to be undertaken outside the easement would occur within the 100m buffer and located away from sensitive areas.

In relation to new access tracks, these would largely be located on the surrounding agricultural/grazing lands. The location of the tracks is shown on Figure 10 and the works described in Section 3.5. The exact locations would be determined during detailed design and in consultation with landowners to avoid impact on future farming practices, minimise the need for clearing of mature vegetation and reduce the need for earthworks where possible. As such impacts on land use of surrounding lands would be minimal.

Operation

During the operational phase, activities undertaken by TransGrid would comprise:

- inspection and maintenance of transmission lines, structures and poles
- vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines.

Typically, maintenance activities would only require light to medium sized plant and vehicles to access the transmission line. Additional measures, plant and equipment may be required in response to emergencies.

Any impacts associated with operation of the transmission line would be minor.

6.1.3 Mitigation measures

Mitigation measures to minimise land use impacts will include the following:

1. Landowners will be notified at least seven days prior to the commencement of the proposed activity on their property
2. As far as practicable, any activities undertaken outside the easement but within the 100m buffer will be located to avoid tree removal.

6.2 Geology and soils

Jacobs Group (Australia) Pty Ltd was commissioned by Infrastructure NSW to prepare a Stage 1 Preliminary Site Investigation (PSI) for the Activity. A copy of the PSI report is provided at Appendix E and the key findings are detailed below.

6.2.1 Existing environment

Topography

The topography of the Activity area is typically gently undulating with natural depressions occurring throughout. The gradients of the Activity area typically head down towards natural drainage lines and channels. Where the Activity would cross over public roads, drainage lines slope parallel with the gradient of the road. With the exception of the Pacific Highway, all roads (public or private) typically follow the natural landform.

Consistent with the topography of the Activity area, the surrounding topography is gently undulating, sloping towards drainage channels which feed into Glenugie and McPhillips Creek located in the east of the proposal area, Washpen Creek located in the north-west and Swan Creek located to the north.

Geology

The regional geology of the area comprises sedimentary rocks of the Clarence – Moreton sedimentary basin which spans from the Middle Triassic at the base to late Jurassic.

Reference to the Maclean-250K-Geological-Sheet (H5607-1) and Bare Point 1:100K Geological sheet indicates the Activity to be underlain by the Grafton Formation from the late Jurassic period which represents the upper most unit within the basin. The Grafton formation consists of dark grey-green sandstone fine to coarse grained, thinly to thickly bedded and shale and minor coal. The Grafton Formation typically forms low, rounded undulating hills due to their reduced resistance to weathering.

Soils

There are limited data on the soils of the Grafton region and no existing land systems, soil landscapes or land resource mapping are available for the proposal area. In the western most section, adjacent to the Clarence River, Tenosols (an alluvial soil type) was identified before transitioning into Kandosols the further east and south-east from the Clarence River. Kandosols are the most prominent soil type within the proposal.

The soils of the Activity area have been described as Earths and Podzolics. These soils are described as soils that lack strong texture-contrast, have massive or only weakly structured B horizons, and are not calcareous throughout.

Acid Sulfate Soils

Acid Sulfate Soil (ASS) Risk Maps from the Australian Soil Resource Information System (ASRIS) database were reviewed to ascertain the potential ASS risk within the Activity area. Based on this information, the risk of encountering ASS within the Activity area varies. In the west there is a 'High Probability' with an 'unknown confidence' level of ASS around Swan Creek and its tributaries including Washpen Creek as well immediately east of the Clarence River. Additionally, there is a 'High Probability' of ASS also present in the east around Glenugie Creek and McPhillips Creek as well as their tributaries. East of the Pacific Highway, with the exception of Washpen Creek, a 'Low Probability' with a 'low confidence' level was identified before transitioning to 'Extremely Low Probability' with 'low confidence' level in the majority and the remainder of the Activity area.

Contamination

A review of historical records pertaining to the Activity area indicated a low potential to be contaminated. In accordance with the Clarence Valley Council's contaminated land policy and based on the historic and current zoning of the property as a rural landscape, it was determined that the likely source of any contamination on site would stem from the use of pesticides and herbicides. However, investigations indicate that agricultural use of the properties has been limited to the grazing of livestock. As such it is unlikely that the Activity area would have been exposed to activities that would have used quantities of pesticides and herbicides sufficient to cause contamination.

There are no NSW EPA contaminated site notices for the Activity area or land within a one kilometre radius.

Some minor surface disturbances were observed around artificially constructed dams (i.e. stockpiled soils, soil bunds), however these disturbances were largely minor and no potential contamination sources were observed within these disturbances.

During the detailed site inspection of the proposal area, minor occurrences of fly-tipped waste were observed at locations within two properties. These wastes included scrap metal, corrugated tin sheeting, discarded timber (fence posts), tyres and concrete. However, no above or below ground tanks, fill material or stains were identified during the site inspection. Further, no signs of the use or mass storage hazardous chemicals were noted across areas of the proposal area.

In July 2017 a licence (EPL 20960) was issued for the CCC construction site. In October 2017, a clean-up notice was issued to the facility, relating to the release of highly turbid water into the surrounding environment, and a 'Penalty Notice' was issued in December 2017. Part of Glenugie Creek immediately west of the CCC construction site was impacted by this incident. In February 2018, a Licence Variation was issued to the CCC construction site, detailing revised erosion and sediment control measures required for the site.

With the exception of agricultural land use and the one off uncontrolled release of turbid water discussed above, the Stage 1 PSI identified no other land use activities which could have potentially led to the contamination of the Activity area or adjacent land uses.

6.2.2 Impact assessment

Soils

The Activity would have the potential to cause erosion and sedimentation impacts, particularly associated with excavation for construction benches and pole foundations. Erosion and sedimentation impacts may also occur in association with the construction of new access tracks and track upgrades.

Earthworks on steeper slopes or in watercourses would have a greater potential for erosion due to the velocity and volume of surface water runoff. Earthworks would be required at watercourse crossings to provide a stable, trafficable crossing for construction plant and equipment. Once established, access across all watercourses would be restricted to designated stable crossings, therefore minimising the risk of bed erosion and any resulting water quality impacts. Disturbed areas would be rehabilitated as soon as possible after construction.

No significant modification of the existing landform of the Activity area is anticipated to be required for the Activity.

Acid Sulfate Soils

With the exception of natural surface water bodies and low lying areas around water bodies, the Activity area is considered a low to extremely low probability of ASS being encountered.

Contamination

Based on the available site information and information gathered during an on-site inspection and in particular the lack of evidence indicating contamination risk, there is a low risk that contaminants are present and likely to be disturbed if present, at a quantity that would trigger the need for an intrusive investigation.

Given the likelihood that contaminants are not present on-site, a low risk rating has been applied to potential Areas of Environmental Interest (AEIs) within the Activity area from a contamination perspective.

Any potential contamination risks can be managed under a Construction Environmental Management Plan (CEMP). Considering uncertainties around the use of herbicides or pesticides within the Activity area, where excavation works are required within or in proximity to AEIs, the CEMP would detail contingency measures to address unexpected finds of contaminated material.

Based on the tasks undertaken as part of the PSI process, and in accordance with SEPP 55 and Clarence Valley Council's contaminated land policy, it is concluded that the Activity area is suitable, from a contamination

perspective, for the proposed construction and operation of a transmission line to the CCC. No further contamination investigation is required.

6.2.3 Mitigation measures

The following mitigation measures will be implemented to manage potential soils and contamination impacts associated with the Activity:

3. An Erosion and Sediment Control Plan (ESCP) will be prepared as part of the construction environmental management plan. All erosion and sediment control measures will be designed, implemented and maintained in accordance with relevant sections of "Managing Urban Stormwater: Soil and Construction Volume 1" (Landcom, 2004) (the Blue Book) (particularly Section 2.2) and "Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services" (DECC, 2008)". The ESCP will apply to stockpiles, site boundaries, access tracks and laydown areas. Exposed surfaces will be kept to a minimum to limit the potential for erosion.
4. The ESCP will include contingencies for flood management and protocols for establishment (and if relevant, removal) of temporary access roads on the floodplain.
5. Any unsuitable excavated material/ waste will be classified and managed appropriately in accordance with the CEMP, including placement in approved stockpile locations or approved landfill facilities as appropriate.
6. In the event that unexpected contaminated land is encountered during the works, works will stop immediately and relevant procedures outlined in a CEMP will be followed.
7. On completion of the work, disturbed areas will be stabilised and returned to as close to original condition or as otherwise agreed with the landowner subject to noting that any revegetation of disturbed areas will be with non-invasive species.
8. Should acid sulphate soils be encountered, the soil will be treated on site and depending upon individual land owner preferences, either spread on site or removed to an approved location.
9. Vehicles and equipment entering and exiting the site will be washed down to avoid the spread of material.

6.3 Water quality

6.3.1 Existing environment

Surface water

The investigation area is located within the Clarence catchment in the far north coast of NSW. The catchment has an area of 22,716 square kilometres. Generally the catchment is characterised in its western extremities by tableland areas which fall away to the relatively large, flat coastal floodplain.

The catchment's main land and water user is beef cattle production. Sugar cane, the dominant crop, is grown intensively on the lower Clarence. Other water use is by local councils and water utilities, forestry, dryland agriculture, aquaculture, prawn trawling, fishing and tourism.

Due to a high density of rural settlement, the region's rivers and estuaries tend to be affected by changed run-off conditions caused by land clearing, agricultural use, human settlement and recreation. Key issues include riverbank erosion, gully erosion, invasive weeds, fire management practices and acid sulphate soils.

In addition to Glenugie, McPhillips, Washpen and Swan Creeks, other predominant surface water features located within a one kilometre radius of the proposal area include Deep Creek which is fed by Glenugie Creek (located approximately one kilometre north of western section of the proposal), Little Swan Creek (located less than 100 metres from the western end of the proposal) and the Clarence River (located approximately 600 metres west of the western end of the proposal). On-site there are multiple tributaries heading off-site which feed into the Glenugie, McPhillips, Washpen or Swan Creeks and Clarence River. These drainage channels appear to form a natural low point in the topography. Additionally, there are multiple artificial dams in close proximity to the proposal area which have been located at natural depressions to capture overland flows.

The majority of rain falling onto the site would fall onto unsealed (cleared and vegetated) surfaces, and is expected to infiltrate into sub-soils and/or run off into the natural drainage channels and/or creeks as well as to the artificially constructed dams present within or in close proximity to the proposal area. Rain falling onto surrounding areas is expected to infiltrate into sub-soils, fall onto unsealed (cleared and vegetated) surfaces or run off across sealed surfaces (Pacific Highway) into formalised storm water drains.

Groundwater

Based on the regional and surrounding topography, as well as the location of the natural surface water bodies within and around the proposal area, localised groundwater would be expected to flow in a north westerly and westerly direction towards the Clarence River in the west of the proposal area, and north towards Swan Creek, which feeds into the Clarence River, to the north of the proposal. In the eastern portion of the proposal area, groundwater is expected to flow east towards Glenugie Creek.

A search of the Department of Primary Industries Groundwater Database was undertaken for the Stage 1 PSI to identify the presence of registered groundwater bores within one kilometre radius of the Activity area. Based on a review of the All Groundwater Map, one groundwater bore (GW305355) was located within a one kilometre radius of the proposal area. The depth to the standing water level was listed as 8.200 metres and total depth of the monitoring bore was 15 metres.

6.3.2 Impact assessment

Construction impacts

The Activity would present minimal risks to waterways with the adoption of appropriate sedimentation and erosion controls. However, there remains the potential for chemical spills from construction work, refuelling activities or plant failure. With appropriate mitigation measures in place during construction, the Activity is considered unlikely to present significant risk to waterways in the area.

While vegetation clearing would be required along the transmission line alignment, the extent is relatively small and is unlikely to influence surface flows and drainage patterns.

As there are no registered abstraction bores located within the construction corridor, it is very unlikely that private bores would be destroyed during construction. Minor dewatering of excavations may be required during construction, although this would be unlikely to involve enough water to cause impacts to a groundwater aquifer, including its quality (contamination of) groundwater or its quantity (change groundwater flows or volumes).

Operational impacts

Post construction, the Activity would not have any potential to negatively impact water quality above or beyond the current situation.

6.3.3 Mitigation measures

The following measures will be implemented to prevent adverse impacts relating to water quality:

10. A spill containment kit will be available at all times. All personnel will be made aware of the location of the kit and trained in its effective deployment.
11. Any required fuels and other liquids will be stored in self-safe chemical storage containers.
12. All refuelling of plant and equipment will be undertaken in appropriately designated areas.
13. Cleaning of tools and equipment will occur off site.
14. All equipment will be maintained in good working order and operated according to manufacturer's specification.
15. No waste and/or wastewater will be discharged directly or indirectly in drains or waterways.
16. The NSW EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the POEO Act (via EPA Environment Line on 131 555).

6.4 Flooding

Jacobs Group was commissioned by Infrastructure NSW to prepare a Flood Assessment for the Activity. A copy of the Flood Assessment is provided at Appendix F.

6.4.1 Existing environment

The Activity area passes through three flood prone areas:

- Clarence River floodplain: Three pole structures (G1 – G3) are located within the Clarence River floodplain where the proposed transmission line ties into the existing 96H Koolkhan-Coffs Harbour 132 kilovolt Transmission Line.

- Washpen Creek floodplain: Three pole structures (G8 – G10) are located within the Washpen Creek floodplain, where the route crosses a defined channel (width approximately 15 metres) and an area of swampy meadow. No pole structures are proposed to be located within the swampy meadow.
- Glenugie Creek floodplain: Thirteen pole structures (G37 – G49) are located within the Glenugie Creek floodplain. Approximately 3 kilometres of the route is located within the Glenugie Creek floodplain.

The flood affected areas within the site are shown in Figure 11 and Figure 12.

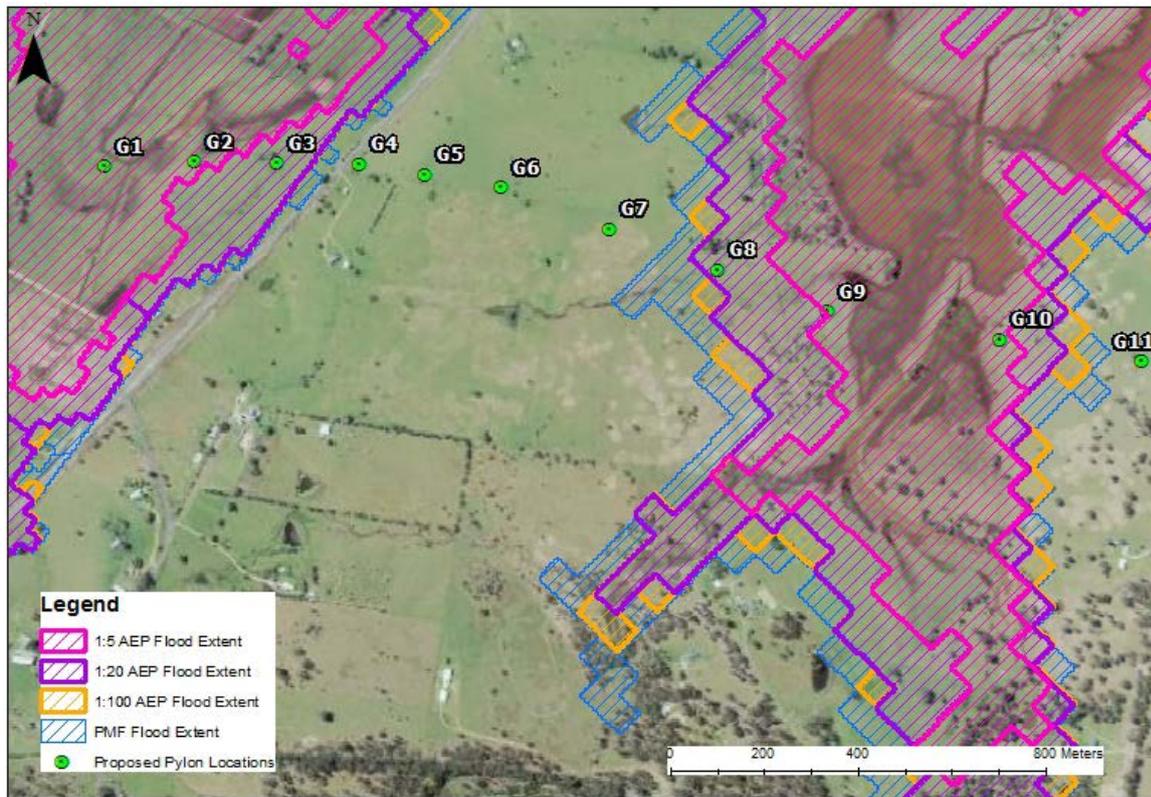


Figure 11: Flood extents in the vicinity of the Activity area – Clarence River and Washpen Creek

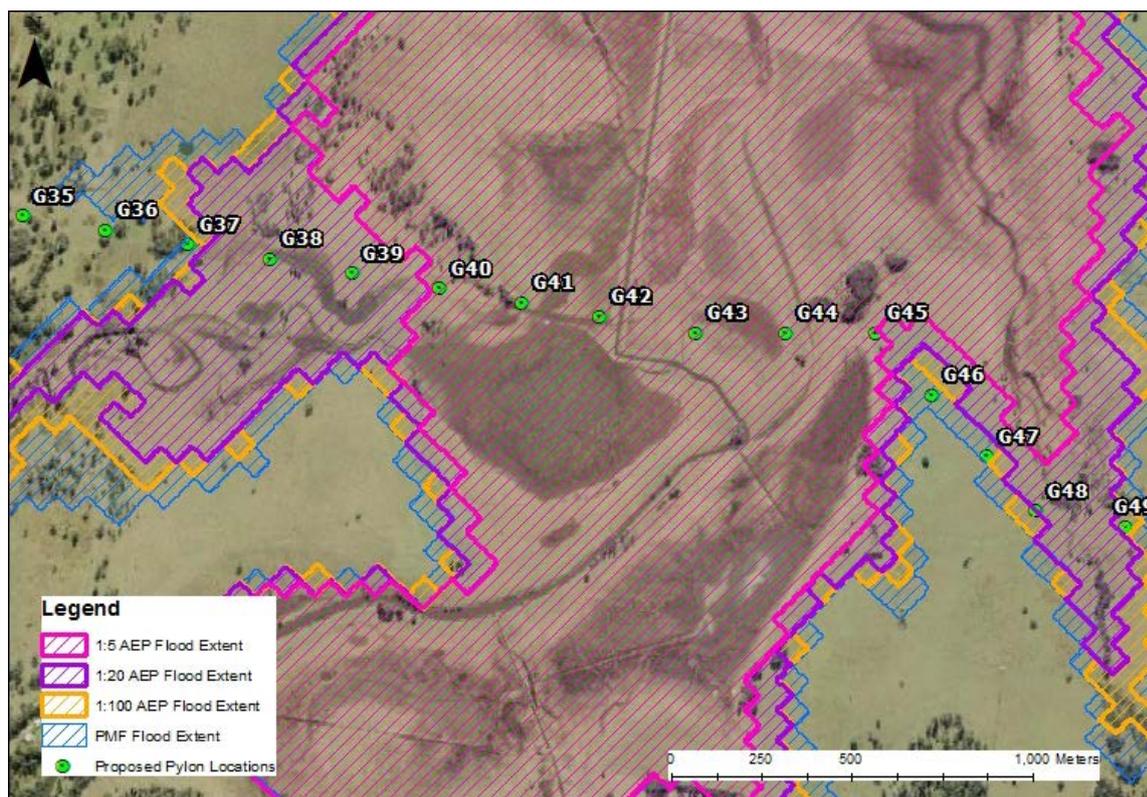


Figure 12: Flood extents in the vicinity of the Activity area – Glenugie Creek

6.4.2 Investigations

The flood risk for the Activity was determined based on the *Clarence River Flood Study 2013* prepared by Clarence Valley Council (2016). No additional modelling was considered necessary to determine the effect and impact of the proposal on flood behaviour. Flood results were not available for the 1:200 AEP or 1:500 AEP flood events therefore PMF flood depths were used to provide guidance on the range of flood depths than may be expected as a result of climate change. In addition, only depth contours were available for analysis and a qualitative assessment of flood velocities has been provided.

6.4.3 Impact assessment

Three sections of the proposal are flood prone, where the proposal crosses the Clarence River, Washpen Creek and Glenugie Creek floodplains. In total, 19 of 54 proposed pole structures lie within the PMF flood extent. The depths of flooding in flood prone areas are significant, with maximum 1:100 AEP flood depths of 5.81 metres, 4.30 metres and 4.79 metres occurring at pole structures in the Clarence River, Washpen Creek and Glenugie Creek floodplains respectively. PMF flood depths are considerably greater, exceeding seven metres at several pole structures.

Flood velocities within Washpen and Glenugie Creek during large flood events are likely to be low, given that the flood mechanisms leading to flooding of these areas are dominated by backwater flows entering from the wider Clarence River floodplain. High intensity rainfall events in local catchments could create localised high velocity flow events but these are likely to result in low depth sheet flooding restricted to the channels and adjacent floodplain areas.

The development of construction pads, and new access tracks would be unlikely to affect flooding behaviour.

Given the small volume of displaced flood storage resulting from the installation of the pole structures, as well as the low risk of obstruction created by the poles, there would not be any impact on the hydraulic functions of the floodplain resulting from their installation.

A risk posed by the Activity would be reduced electrical clearance to watercraft and persons during flood events. Hence, the risks associated with reduced clearance need to be managed accordingly. The Flooding Assessment recommends that flood heights and minimum distances to power lines required in the 1:100 AEP flood event and the PMF be addressed during the detailed design.

It is concluded that the Activity complies with the requirements of the *NSW Floodplain Development Manual 2005*.

6.4.3 Mitigation measures

17. Flood heights and minimum distances to power lines required in the 1:100 AEP flood event and the PMF will be addressed during the detailed design, having regard to the requirements of Industry code ENA NENS 04-2006 and Australian Standards AS6947 *Crossing of waterways by electricity infrastructure* and AS7000 *Overhead line design*.
18. If determined during detailed design, appropriate signage will be installed in accordance with AS6947.
19. The installation of access gates, fencing and other associated features within the PMF flood extent will be avoided where possible.

6.5 Biodiversity

A Biodiversity Assessment of the Activity was undertaken by Geolink on behalf of Infrastructure NSW. A copy of the report is provided in Appendix G.

6.5.1 Existing environment

Due to an extensive history of disturbance and modification (clearing, burning, logging, thinning and under scrubbing), the transmission line corridor does not support any intact areas of remnant vegetation, but rather comprises a patchwork of infrequent mature trees ('paddock trees'), unevenly aged forest, sub-mature regrowth and improved pasture, typically containing several native grasses. Woody vegetation shows a low level of species diversity, a lack of structural diversity and is typically homogenous between properties.

On elevated land, woody vegetation comprises dry sclerophyll forest principally dominated by Spotted Gum (*Corymbia henryi*) and/ or Grey Box (*Eucalyptus moluccana*), with occasional Grey Ironbark (*Eucalyptus siderophloia*) and infrequent Pink Bloodwood (*Corymbia intermedia*) and/ or Forest Red Gum (*Eucalyptus tereticornis*). On the floodplain and adjoining transitional areas, floodplain forest featuring Forest Red Gum, Swamp Box (*Lophostemon confertus*) and Broad-leaved Apple (*Angophora subvelutina*) occurs, along with swamp forest dominated by Swamp Oak (*Casuarina glauca*).

Formerly cleared areas on the floodplain typically comprise seasonally inundated grasslands dominated by Couch (*Cynodon dactylon*) with a range of other water tolerant species. Areas of sedgeland dominated by Pin Rush (*Juncus usitatus*) also occur. It is likely these areas would formerly have been occupied by a mosaic of swamp forest and wetland communities.

Results of field assessment are as follows:

- One threatened flora species occurs - a small population of Weeping Paperbark in the east of the transmission line corridor. None of these trees will be impacted.
- Vegetation characteristic of Threatened Ecological Communities (TECs) occurs:
 1. *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions.*
 2. *Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion.*
 3. *Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions.*
 4. *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions.*

Some *Swamp Oak Floodplain Forest* and *Freshwater Wetlands* will be affected by the works.

- Four threatened fauna species were recorded during field surveys:
 - Dusky Woodswallow;
 - Grey-crowned Babbler;
 - Little Lorikeet; and
 - Black-necked Stork.

6.5.2 Impact assessment

Construction

As noted, much of the site has been highly modified, but nevertheless retains areas of biodiversity value. Potential biodiversity impacts from construction of the Activity include:

- Loss of native vegetation
- Loss of habitat features (dead trees and stags, active nests or dreys)
- Injury or mortality of native fauna during vegetation/ habitat removal
- Noise and disturbance to locally occurring fauna during the construction period
- Reduced water quality where works occur within wetland areas
- Potential impacts to downstream riparian environments from sedimentation and stormwater flows
- Potential for the spread or introduction of weed propagules.

Native woody vegetation would be impacted from clearing of the easement, including removing any adjacent danger trees (as identified by TransGrid). There is potential to retain native vegetation where shrubs are less than 3 m in height. This has particular relevance to isolated thickets of Cockspur (*Maclura cochinchinensis*) which have value to farmers as a shelter for calves.

Within the 30 m wide easement, approximately 6.55 ha of woody vegetation would require removal for the works and up to 4.5 ha of disturbed freshwater wetlands may be disturbed. Select removal of infrequent scattered paddock trees (including danger trees) would also be required at strategic locations. Up to 1.43 ha of danger trees may require additional removal adjacent to the easement in areas of woody vegetation. This area is likely to be an over estimation due to overlapping polygons based on crown cover and represents scattered individual trees in the field.

In total, woody vegetation loss for the works is estimated as being approximately 8 hectares.

Use of public roads, road reserves and internal farm access tracks would not require any native vegetation loss. All these areas either comprise formed unsealed roads or established single vehicle tracks.

The transmission line and associated impacts would require the removal of stags (dead trees without hollows) and hollow-bearing trees ('habitat trees') within the easement and where they have been identified as danger trees. Up to 24 hollow-bearing trees/ habitat trees are likely to require removal for the works. Woody debris would require removal and relocation on unmanaged land (road reserves and the Crown Reserve).

Impacts of the Activity on aquatic habitat are largely limited to:

- Disturbance to wet meadows by plant/ vehicles
- Construction of any temporary access roads (if required) at Glenugie Creek floodplain
- Minor loss of vegetation for excavation works associated with pole installation and working pads on the Glenugie Creek floodplain
- Potential for soil mobilisation and erosion/ sedimentation during flood events.

Given the extensive floodplain associated with Glenugie Creek, these impacts are likely to be minor in a local context, particularly due to the poor quality and highly disturbed nature of this environment.

There is potential for injury or mortality to native fauna during several aspects of the construction works during initial site preparation (establishment and implementation of environmental controls), from clearance of vegetation/ habitat and from movement of vehicles and plant. It is expected these impacts would be relatively minor given that affected areas are highly disturbed and that general disturbance during the construction period would cause mobile fauna (e.g. birds, macropods) to vacate affected areas.

The construction process would result in vehicles, plant and personnel accessing all parts of the alignment, in addition to access tracks and laydown areas. This would result in low levels of noise and disturbance (e.g. dust) in all these environments over the duration of the works period. Given the open and disturbed nature of the environment it is not anticipated that any significant disturbance to fauna foraging or breeding activities would occur from the construction process.

Works within the floodplain have potential for disturbance or reduction to water quality (e.g. sedimentation, turbidity, vehicle access) during the construction process. Such impacts have potential for reducing the quality of

foraging habitat within wetland environments on a short-term basis. Adoption of strict erosion and sediment controls would minimise risks to aquatic environments.

Due to the mobilisation of plant and vehicles during construction, there is potential for weed propagules to be introduced into the site or transferred between properties. This is a serious risk given the local occurrence of Tropical Soda Apple (*Solanum viarum*). The *Biosecurity Act 2015* states that:

Owners and occupiers of land on which there is tropical soda apple must notify the local control authority of new infestations; destroy the plants including the fruit; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of tropical soda apple must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on the land, or on or in a carrier.

Adoption of strict weed hygiene controls would minimise the risks of weed introduction or spread.

Operation

Once operational, biodiversity impacts of the transmission line are largely limited to the risk of flying fauna colliding with the new cabling. This is a known risk for larger, less able waterbirds (e.g. Blacknecked Stork, Brolga), raptors, owls and flying-foxes (including the threatened Grey-headed Flyingfox). Appropriate mitigation measures would be put in place to manage this risk.

During the operational phase, the transmission line would not require any significant servicing other than annual maintenance, with minor disturbance to fauna generated by the presence of vehicles; this is unlikely to be significant in a local context.

Conclusion on significance of impacts

The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the *Biodiversity Conservation Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required.

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*.

Environmental impact assessments under Part 5 of the EP&A Act do not have any mandatory requirements for offsets, as the Biodiversity Offsets Scheme only applies in respect of Part 5 assessment if a proponent elects to apply it. On this basis, no compensation or offsets are proposed.

6.5.3 Mitigation measures

To minimise biodiversity impacts which may result from the Activity, the mitigation measures below will be undertaken. All mitigation measures will be included within the project Construction Environmental Management Plan (CEMP) and that and all project personnel are inducted in the requirements of the CEMP.

20. A project ecologist will be appointed to manage biodiversity issues relating to the project during the construction phase.
21. Clearing of native vegetation will not be undertaken outside of the 30 metre easement and laydown areas, with the exception of the removal of identified 'danger trees'. The limit of vegetation clearing will be clearly delineated on site prior to works commencing.
22. Areas of low shrubs (e.g. Cockspur thickets) will be retained wherever possible.
23. The extent of laydown areas will be defined by 'no go' fencing with any native trees within these areas retained in-situ and protected by temporary fencing. The project ecologist will provide guidance on the location of 'no go' fencing.
24. Temporary fencing will be placed around the closest patch of Weeping Paperbark to the works and this area will be defined as a 'no go' zone. The location of fencing will be determined in conjunction with the project ecologist.
25. Plant and vehicles will utilise existing public roads and farm access tracks wherever possible to minimise vegetation disturbance.
26. Prior to commencement, the project ecologist will clearly mark all habitat trees affected by the works with flagging tape (these trees are already marked with white spray-paint) for the attention of spotter catchers during vegetation clearing. During this process:

- a. Any 'new' habitat trees (eg. trees with recently constructed nests or dreys) will be marked during this process and GPS records taken and supplied to the contractor/project supervisor.
 - b. The raptor nest in a Swamp Box in the east of Lot 2 DP562924 will be inspected to determine if the nest is occupied. If occupied the contractor/project supervisor must be informed promptly so that contingencies can be planned for.
27. A pre-clearing survey by the project ecologist will be completed prior to the clearing of any vegetation. If arboreal fauna are detected, a 10 m clearing buffer area will be established around trees with non-threatened fauna, while a 40 m buffer area will be established around significant fauna (e.g. Koala) and 24 hours given for the animal to move of its own volition. In the unlikely event that fauna remain following the 24 hour period, the project ecologist will advise alternative solutions.
 28. If during pre-clearing surveys any 'unexpected finds' are recorded by the ecologist (eg. Additional fauna features, threatened flora), these will be marked in the field, recorded by GPS and details promptly reported to the contractor/project supervisor.
 29. As the Crown Reserve provides potential refuge habitat for Rufous Bettong, vegetation clearing in these areas will be preceded by flush surveys completed by the project ecologist. This will prevent the potential for any sheltering bettongs to be hit by falling trees. As a guide, flush surveys should be completed between poles G22A and G24A.
 30. Vegetation clearing will be completed in a staged process whereby non-habitat trees are cleared first (stage 1) and habitat trees are felled a minimum of two nights after initial stage clearing (stage 2). The project ecologist will be in attendance during the clearing of any habitat trees.
 31. Woody debris (larger logs, branches) on the ground within the transmission line corridor or laydown areas will be relocated into adjacent land where they will not be subject to impact. Woody vegetation requiring removal will be chipped and retained on site for use in erosion control with larger logs placed into areas of adjacent habitat to provide fauna refuge. Millable logs will be salvaged where possible. A landowner register will be established by INSW and salvaged timber managed in accordance with landowner wishes.
 32. Where hollow-bearing trees are removed, compensatory nest boxes will be established, with one nest box installed for every habitat tree removed. Nest box compensation will be confirmed with NSW Crown Lands (or other individual landowners) and detailed in a separate Nest Box Compensation Assessment. Nest boxes will be installed within 4 weeks of the completion of works within the various sections of the alignment
 33. A Weed Hygiene Protocol will be established and included in the CEMP prior to works commencing to ensure the potential for the introduction of weed propagules to the site is minimised. The Weed Hygiene Protocol must include consultation with affected landowners and include a targeted survey of all areas likely to be affected by the construction footprint. Any areas of Tropical Soda Apple will be notified in accordance with requirements of the Biosecurity Act 2015.
 34. All areas of exposed soil (including tracks access pads etc) created by the works will be seeded with non-invasive grasses (e.g. Japanese Millet) immediately following construction to prevent soil erosion.
 35. Transmission line-marking techniques such as aerial marker spheres, spirals and suspended devices (swinging, flapping, and fixed) will be included within the final detailed design. These markers will be attached to earth wires to increase their visibility over wetland areas likely to be utilised by waterbirds and raptors. These spans include G8 – G11 and G38 – G49.
 36. Prior to clearing, protocols will be developed with the Clarence Native Bees Landcare group regarding the identification and salvage of any native stingless bees that are found in trees to be removed (as identified by project ecologist during pre-clearing inspections). In the event that native stingless bees are within any trees to be removed, protocols for removal will be observed.

6.6 Aboriginal cultural heritage

Curio Projects Pty Ltd was commissioned by Infrastructure NSW to prepare an Aboriginal Heritage Due Diligence Assessment Report (DD) for the Activity. A copy of the DD report is provided at Appendix H.

The purpose of the DD is to identify whether or not Aboriginal objects are, or are likely to be present within the investigation area, and whether or not the installation of the new transmission line would be likely to harm Aboriginal objects (if present), and therefore to determine whether the proposed activities would require consent in the form of an Aboriginal Heritage Impact Permit (AHIP), or not.

The DD report has been prepared with reference to the following documents:

- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*
- *Australia ICOMOS, Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013.*

Since the preparation of the initial Due Diligence heritage assessment, archaeological field survey of the transmission line, as well as the first stage of the archaeological test excavation has taken place for the CCC Transmission Line project. The results of this fieldwork are also discussed below.

6.6.1 Existing environment

The Activity area is located across undulating floodplains where there have been high levels of clearing and surface disturbance for agricultural purposes. This would affect the area's ability to retain surface scatters of Aboriginal objects.

An extensive Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 20 July 2018 and returned 29 results. It centred on the transmission line area (including all associated works, including access tracks, and the existing transmission line), with an additional buffer of 50m.

The 29 results from the current AHIMS search included seven different site types, some in combination with each other. These sites, including a description of site features, are summarised in Table 7.

Table 7: AHIMS sites in the vicinity of the investigation area

Site Feature	Description	No. of sites
Artefact Site (Open Camp Sites/Artefact scatters/isolated finds)	Artefact sites consist of objects such as stone tools, and associated flaked material, spears, manuports, grindstones, discarded stone flakes, modified glass or shell demonstrating physical evidence of use of the area by Aboriginal people. Registered artefact sites can range from isolated finds, to large extensive open camp sites and artefact scatters. Artefacts can be located either on the ground surface or in a subsurface archaeological context.	9
Habitation structure	Habitation structure - structures constructed by Aboriginal people for short or long term shelter. More temporary structures are commonly preserved away from the NSW coastline, may include historic camps of contemporary significance. Smaller structures may make use of natural materials such as branches, logs and bark sheets or manufactured materials such as corrugated iron to form shelters. Archaeological remains of a former structure such as chimney/fireplace, raised earth building platform, excavated pits, rubble mounds etc.	1
Habitation Structure and Potential Archaeological Deposit (PAD)	Habitation structure – as above PAD - An area where Aboriginal cultural material such as stone artefacts, hearths, middens etc, may be present in a subsurface capacity. Evidence for Aboriginal cultural material may not be present on the ground surface, but still may be present at a location.	2
Potential Archaeological Deposit (PAD)	PAD - As above	2
Potential Archaeological Deposit (PAD) and Art Site	PAD – as above Art site - Art is located in shelters, overhangs and across rock formations. Techniques include painting, drawing, scratching, carving, engraving, pitting, conjoining, abrading and the use of a range of binding agents and the use of natural pigments obtained from clays, charcoal and plants.	1
Burial	Burial - A traditional or contemporary (post-contact) burial of an Aboriginal person, which may occur outside designated cemeteries and may not be marked, e.g. in caves, marked by stone cairns, in sand areas, along creek banks etc.	2
Modified tree	Modified trees - Trees which show the marks of modification as a result of cutting of bark from the trunk for use in the production of shields, canoes, boomerangs, burials shrouds, for medicinal purposes, foot holds etc, or alternately intentional carving of the heartwood of the tree to form a permanent marker to indicate ceremonial use/significance of a nearby area, again these carvings may also act as territorial or burial markers.	7

Site Feature	Description	No. of sites
Ceremonial ring	Ceremonial ring - Raised earth ring(s) associated with ceremony	2
Restricted site		3

The AHIMS search showed no sites directly within the Activity area however due to development being the major factor pushing archaeological work in the area, the AHIMS results cannot be used as a sole representation and indication of potential Aboriginal sites and archaeology in the area.

In the area surrounding the Activity area, the Coastal Range to the east and elevated areas in proximity to the Clarence River were identified as having moderate to high archaeological sensitivity. Particular to the Activity area, the swampland surrounding the Deep/Glenugie creek region would have moderate to high sensitivity/ Aboriginal potential.

In areas of low disturbance within the Activity area, there would be low to moderate potential for Aboriginal stone artefacts to be present either on the surface or sub-surface. In areas of moderate to high disturbance, there would be low to no potential for Aboriginal stone artefact to occur.

The soil profiles that hold the most potential to hold archaeological material are those of Quaternary alluvial or colluvial deposits, which are found throughout the Clarence River Valley.

6.6.2 Archaeological fieldwork

Field survey

The Aboriginal archaeological field survey of the CCC Transmission Line study area was undertaken by representatives from each of the project RAPs and Curio archaeologists, and resulted in the identification of eight PAD sites for investigation during test excavation, three scarred/modified trees, six artefact sites, two potential burial/grave sites, two ceremonial sites, and one ceremonial site/potential burial complex site.

Upon completion of the first stage of the field survey (November 2018), Curio Projects archaeologists met with INSW to present the survey results, and to highlight key impact zones within the study area where the proposed works would potentially impact a newly identified Aboriginal site, as well as to review the location of all identified PADs.

As a result of this discussion, the following alterations were made to the path of the transmission line and proposed access routes, in order to avoid sites and PADs where possible:

- Re-orientation/relocation of the transmission line in order to avoid impact to a number of identified significant Aboriginal cultural sites.
- Revised construction methodology for works in proximity to a ceremonial site in the centre of the line, to include protection of site (management measures to be identified, possibly including temporary fencing during construction).
- Relocation of one laydown area to minimise potential impact to a PAD and reducing the need for test excavation in this location.
- Relocation of an access road to avoid potential impact to identified sites in the proximity.

Following from this discussion, a supplementary field survey was undertaken in early December 2018, to identify the most appropriate orientation for the revised route. The supplementary survey was undertaken by representatives from all project RAPs, and Curio archaeologists, and successfully identified an alternate route that was preferable and acceptable to all project RAPs, that would avoid impact to identified sites in this location. The REF has been revised to assess the impact of the alternate transmission line route.

Test excavation

Following on from the results of the field survey, in consultation with the project RAPs, and in consideration of archaeological predictive modelling and landscape analysis for the study area, an Aboriginal archaeological test excavation methodology, sampling strategy and research design was developed for the CCC Transmission Line study area, with the aim to investigate the nature and extent of any subsurface Aboriginal archaeological potential within the impact zones of the proposed development. The Aboriginal archaeological test excavation within the study area is being undertaken in accordance with the requirements and conditions of the OEH statutory guidelines Code of Practice.

The methodology document was provided as a draft to the project RAPs for their review and comment with a minimum 28 day review period provided. The document was then revised and updated in response to RAP review.

Archaeological excavation within the study area commenced on 9 January 2019, continuing over a period of 12 days, until 24 January, at which time a pause in the excavation was called in order to allow time for additional land access to be negotiated. At time of writing, results from the Stage 1 test excavation of the study area remain under analysis, while Stage 2 of the test excavation is anticipated to recommence shortly.

Test excavation results will be presented within the Aboriginal Archaeological Technical Report, once complete. This report will accompany the application for the AHIP, as discussed below.

6.6.3 AHIP

Through the course of the impact assessment, INSW has demonstrated a commitment to avoiding Aboriginal cultural heritage values where possible, evident through the relocation of a section of the transmission line route to avoid significant Aboriginal cultural sites identified during the archaeological field survey. While INSW is committed to avoiding impacts on sensitive Aboriginal archaeology, there will be instances where Aboriginal archaeological artefacts will need to be removed and therefore an application for an AHIP will be required.

Due to the length of the CCC Transmission line and the nature of the route extending through a number of different privately-owned properties, property access for archaeological test excavation and survey has been variable, with some properties still awaiting access approval for the RAP and archaeological field team. Access negotiations have caused time delays in the assessment process. As a result, approval was acquired from the OEH to apply for the AHIP in several variations if necessary, with one main application for the properties that have been able to be accessed at test excavated, with subsequent variations to include additional areas of the line, as access and assessment is able to be undertaken.

An Aboriginal Cultural Heritage Assessment Report (ACHAR) and Aboriginal Archaeological Technical Report (ATR) detailing the results of the consultation to date, cultural heritage assessment, significance assessment, and results of the test excavation program are being prepared in support of the application for the main AHIP application.

Once finalised, the ACHAR and ATR will be submitted to the OEH with an AHIP application for the first stage of the transmission line study area. Once the access to remaining properties is available, test excavation will be completed across the remaining areas of the study area. Should test excavation demonstrate that Aboriginal objects are present within the remaining properties that must be unavoidably impacted by the proposed transmission line, a variation to the AHIP application will be submitted to include the relevant areas.

6.6.3 Impact assessment

The proposed construction, operation and maintenance of a new electrical transmission and associated works would disturb the ground surface. This disturbance could be caused by the excavation of boreholes for poles, upgrading of existing access and creation of new access tracks and infrastructure, creation of compounds, and the construction of systems to facilitate this construction. Furthermore, there would be land clearing carried out over a significant distance.

Environmental and archaeological context assessment has identified landforms within the general area of the subject site that would have the greatest Aboriginal archaeological sensitivity. These would most likely be in association with creek lines, along raised flats and ridgelines between water sources, and potentially across advantageously placed open flats.

The majority of the Activity area is likely to have been historically subject to some level of disturbance, notably land clearing for agricultural uses. While there are currently no recorded sites within the investigation area, the nature of the recording, which follows development, is not exhaustive. Furthermore, recent excavations, which have yielded Aboriginal cultural material, as well as burial, ceremonial and habitation sites and modified trees, indicate that there may be impact that cannot be avoided in the current proposed works.

Overall, the DD report has assessed that even though the proposed development would be in an area that has been previously subject to varying levels of historical ground disturbance, there is still potential for Aboriginal objects to be present, with the potential to be impacted through the proposed development.

As noted above, as the proposed activity would disturb the ground surface and has the potential to impact Aboriginal objects and sites, an AHIP would likely be required for the investigation area prior to commencement of development works.

Through the consultation process for the project, project RAPs have identified that it is appropriate for any Aboriginal cultural material recovered from the CCC Transmission Line project area to be repatriated on Country, in an appropriate Keeping Place to be designated for that purpose. Once all Aboriginal cultural material from the study area has been collected, and the location of the Keeping Place confirmed, the cultural material should be reburied by project RAPs within the identified Keeping Plan location, and the location should be registered as an Aboriginal site on the OEH AHIMS database.

The Crown Land (Lot 7004 DP93037, Reserve 33013) was identified as an appropriate potential candidate for the establishment of this Keeping Place. INSW communication with Crown Lands has since indicated that Crown Lands will accept such a place, the details of which will be confirmed through ongoing consultation between project RAPs, INSW and Crown Lands, and through the development of a Management Plan. As noted in Section 5.5, INSW will be making an application to Crown Lands via a General Licence under the Crown Lands Management Act 2016 and Roads Act 1993 to seek approval for the re-burial of Aboriginal objects/cultural material recovered during the course of the CCC Transmission Line project.

6.6.3 Mitigation measures

The following mitigation measures will be undertaken:

37. An AHIP application will be made to the NSW OEH to allow unavoidable impact to Aboriginal objects. The AHIP will be accompanied by appropriate reports (Aboriginal Cultural Heritage Assessment Report and Archaeological Technical Report), prepared in accordance with OEH statutory guidelines.
38. Once access to remaining properties has been granted, archaeological test excavation will be completed within the study area. Should Stage 2 of the test excavation identify the presence of Aboriginal objects that will be impacted by the development, an AHIP variation will be submitted to the OEH detailing these additional locations and impacts.
39. Ongoing consultation will be undertaken between project RAPs, INSW, and Crown Lands, to identify the appropriate management strategies for the establishment of a Keeping Place for Aboriginal objects/cultural material recovered from the project, at a location within the Crown Land (Lot 7004 DP 93037, Reserve 33013).

7 Non Aboriginal heritage

Curio Projects Pty Ltd was commissioned by Infrastructure NSW to prepare a Heritage Impact Statement (HIS) for the Activity. A copy of the HIS is provided at Appendix I.

6.7.1 Existing environment

There are three heritage items, locally listed within the Clarence Valley LEP 2011, that are in proximity to the proposed development:

- Livingstone's House (LEP: I945) 25 Livingstone Lane. The heritage listing describes this item as a four-room brick cottage from prior to 1890, associated with the prominent Livingstone family. The existing transmission line and easement (for which minor works are proposed) traverses the land parcel within which the heritage item is located. However, the heritage item is located approximately half a kilometre south of the path of the new transmission line.
- Dwelling 'Kingcross' (LEP: I946) Swan Lane and Pacific Highway. This item is listed as a highset weatherboard cottage significant for its association with the early settlement of Swan Hill. This item is approximately half a kilometre north of the proposed development area.
- Gum Tree (*Eucalyptus seeana*) (LEP: I934) 144 Washpool Road, Road reserve. A rare specimen of natural flora potentially from prior to European settlement. This item is approximately 1km south west of the proposed development.

The location of these items in relation to the Activity is shown in Figure 13.

There are no items listed on the State heritage register in the vicinity of the site.

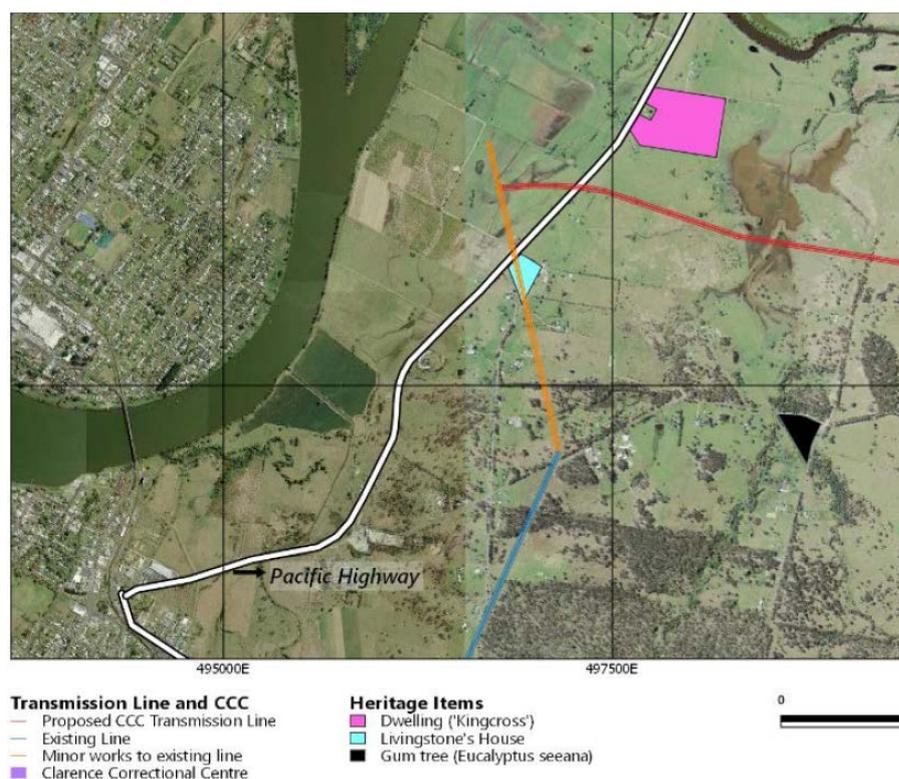


Figure 13: Heritage listings in relation to the Activity.

The proposed development route is located in an area of the Clarence River Valley that is not expected to contain any potential for historical archaeological objects of either local or State significance. This results from a lack of historical uses for the land beyond the clearing of the original riparian rainforest environment. This clearing was carried out in order to implement farming in the areas surrounding the township of Grafton. Subsequent to the initial clearing, the land has been continually and intensively farmed, with very few dwellings or buildings constructed. Additionally, there has been little to no activity that would leave physical subsurface (archaeological) remains within this area. Therefore, it is concluded that there is low to nil potential for historical archaeological resources to be present within the development area.

The main heritage significance associated with 'Livingstone's House' is historical significance, historically demonstrating the growth of the Swan Creek area and influence of flooding on property locations; and associative significance, associated with the Livingstone family who were well known in the Swan Creek area.

6.7.2 Impact assessment

The surrounding heritage items, including Livingstone's House, are likely to be only minimally visually impacted by the proposed development. This is as a result of the topography of the landscape, existing vegetation, and the heritage items' distance from the transmission line.

The 'Livingstone's House' local heritage item is located beneath the existing transmission line, for which minor works are proposed. These minor works entail modifications to the existing Optical Ground Wire (OPGW), which is minimal in nature, and would result in no noticeable visual impacts to the existing transmission line, from that which currently exists. No ground disturbing works are proposed within the land parcel on which 'Livingstone's House' is located. The proposed development would have no physical impact to the local heritage item.

The newly proposed transmission line would not be highly visible from the existing heritage item, and would, in contrast to the existing transmission line within the 'Livingstone's House' property, only be visible in highly restricted and filtered views as a result of existing vegetation and its distance from the heritage item. Therefore, the visual impact of the proposed development to this local heritage item is considered to be minimal (neutral).

The 'Kingcross' dwelling is situated in a topographical location unlikely to have visibility of the transmission line. The distance from the transmission line, the geographical and topographical positioning of the heritage item, in addition to existing vegetation would serve to obscure any possible views of the new transmission line from the heritage item. The adjacent Pacific Highway, with its associated vehicles, infrastructure and transmission lines,

would also contribute to the restriction of any potential view liens between the 'Kincross' heritage item and the new proposed transmission line.

From the Gum Tree heritage item there are unlikely to be views beyond highly filtered views. Even the possibility of filtered views of the transmission line is considered to be highly unlikely due to the topography at this location, and the existing vegetation. Therefore, the significance of this heritage item is unlikely to be impacted by the proposed transmission line.

The HIS concludes that the Activity would have no adverse impacts, physically or visually, on any nearby heritage items. There are no potential historical archaeological sites located directly within, or in close proximity to the development area.

6.7.3 Mitigation measures

The following mitigation measures will be undertaken:

40. In the event that a non-Aboriginal heritage site or artefact is identified during construction works, all ground surface disturbance works in the area will cease immediately and the NSW Heritage Division notified in accordance with the Section 146 provisions of the *Heritage Act 1977*.

6.8 Noise and vibration

6.8.1 Existing environment

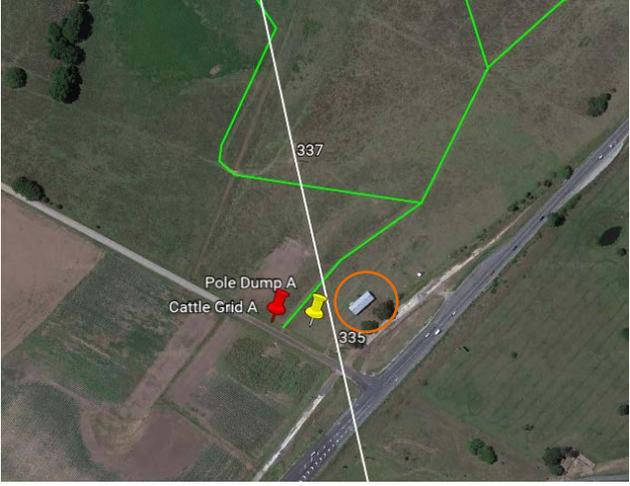
The background noise levels along the investigation area are generally low, as is typical of rural and rural residential areas, with low population density and little background noise from traffic or other noise sources. The exception to this is the Pacific Highway which would experience elevated noise levels from passing light and heavy vehicles.

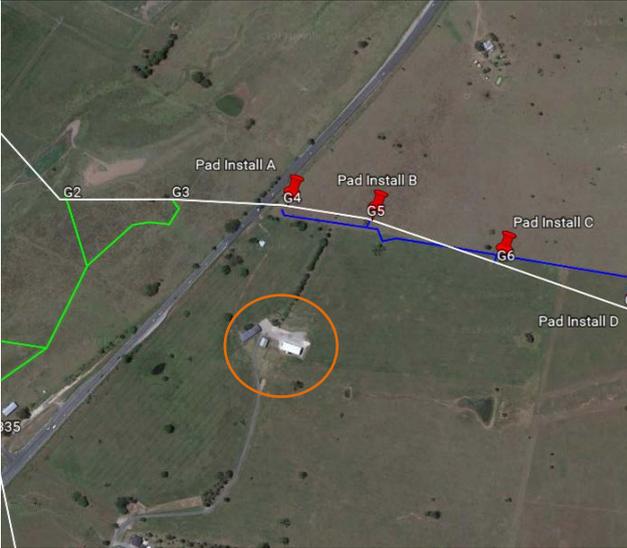
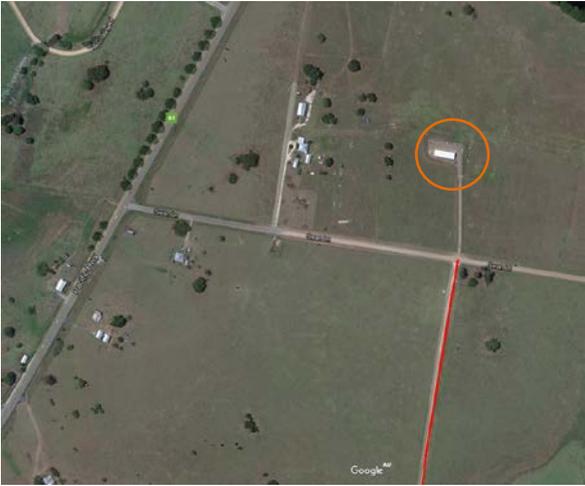
The noise pattern would generally be diurnal in nature with higher background levels during the day and evening periods, decreasing at night.

Four locations along proposed transmission line have residential receivers within 250m of the easement, access tracks and laydown areas. These are presented in Table 8. Locations of access track upgrades and construction would be determined during detailed design; however, it is likely that these tracks would be in close proximity to residential receivers around the proposed transmission line.

No other sensitive receivers, such as schools, hospitals, childcare facilities, aged care facilities or places of worship were identified within 250m of the proposed activity.

Table 8: Residences within 250m of the Activity.

Structure	Proposed activity	Distance to receiver (m)	Site image
Existing 96H transmission line Structure 335	Access route, laydown area	35m	
G4-G5	Erection of poles,	200m	

Structure	Proposed activity	Distance to receiver (m)	Site image
	stringing of lines, access track		 <p>An aerial photograph showing the proposed transmission line route. The route is marked with a blue line and includes four pad installations labeled 'Pad Install A', 'Pad Install B', 'Pad Install C', and 'Pad Install D'. Six gantries are labeled G2, G3, G4, G5, G6, and G7. A building is circled in orange in the lower-left quadrant of the image.</p>
Access route north of G8 and G9	Access route	150m	 <p>An aerial photograph showing an access route marked in red. A building is circled in orange in the upper-right quadrant of the image.</p>

Structure	Proposed activity	Distance to receiver (m)	Site image
G25A-G26A	Erection of poles and stringing of lines, access route	160m	

6.8.2 Impact assessment

Construction

The proposed activity would involve the use of construction plant and equipment discussed in Section 3.7. Mobilisation of heavy and light construction vehicles would also generate additional road traffic noise on the external road network and in relation to proposed access tracks to and from the site.

Construction activity has a low potential to generate noise noticeable at nearby noise sensitive receivers due to the limited number of receivers located in close proximity to the proposed activity. Construction would also occur progressively along the alignments of the existing overhead transmission line and therefore noise impacts at nearby sensitive receivers would be expected to be short-term as each section of the line is installed. The majority of the works would be undertaken during daytime hours and therefore impacts on any nearby receivers would be minimal. Mitigation measures would also be implemented to minimise any potential noise impacts.

Construction is considered unlikely to generate significant vibration given the type of plant and equipment involved and the relatively shallow depth of planned excavation. As such, vibration noticeable at adjacent properties and residences is considered to be unlikely. Blasting is assumed to not be required. If blasting is required, appropriate consultation would be undertaken with potentially impacted property owners.

There may be some additional road traffic noise although given that only approximately 20 to 35 vehicle movements per day are expected, this noise is not expected to be significant. For works close to the Pacific Highway, additional road traffic noise is expected to be negligible in the context of background road traffic noise given the relatively low volume of vehicles that would be required for the proposed activity compared to the existing daily traffic volumes on the highway.

The transport of high mass plant and equipment (e.g. large cranes) may be required to be transported at night for road safety reasons (subject to consultation with RMS, Clarence Valley Council and NSW Police), which may temporarily generate elevated noise at residential properties along the transport route (once the final routes are confirmed with consultation with relevant stakeholders). Elevated noise levels generated from the delivery of high mass materials and equipment are expected to be short-term (i.e. time for vehicles to drive past) and infrequent and would cease at the completion of construction.

Operation

Operation of the proposed transmission line would not generate noise. Maintenance activities would have the potential to generate noise impacts. These activities would be minor, infrequent and temporary.

Overall, potential noise impacts would be limited and would be mitigated with the implementation of the measures outlined below.

6.8.3 Mitigation Measures

The following mitigation measures will be implemented in order to address adverse impacts relating to noise and vibration:

41. Noise generating works will be undertaken in accordance with the Interim Construction Noise Guideline (DECC, 2009):
 - 7:00am – 6:00pm Monday to Friday
 - 8:00am – 1:00pm Saturdays
 - No work on Sundays or Public Holidays
42. Work outside normal hours, on Sundays and public holidays will generally only comprise:
 - The delivery of materials outside normal hours requested by police or other authorities for safety reasons.
 - Emergency work to avoid the loss of lives and/or property.
 - Work timed to correlate with system planning outages.
43. Other noise generating works outside of the standard construction hours will require the prior formal written consent of INSW and require justification in accordance with the Interim Construction Noise Guideline.
44. Noise affected neighbouring properties will be notified as to the timing and duration of the construction works at least 7 days prior to commencing work. These are the residential properties located within 250m of any new structures, proposed access track works or laydown areas as identified in Table 8.
45. Safe working distances will be established prior to commencement of use of vibration intensive plant (rollers / hammers) to ensure that the vibration does not adversely affect structures nearby access tracks.

6.9 Traffic and access

A Traffic Impact Assessment was undertaken by Arup. The full report, *Clarence Correctional Centre Electricity Transmission Line Traffic Impact Assessment* (Arup 2018) is contained in Appendix J.

6.9.1 Existing environment

The surrounding road network is shown in Figure 14. The main roads surrounding the investigation area are:

- Pacific Highway to the west
- Eight Mile Lane to the south
- Centenary Drive to the west
- Avenue Road to the east.

Local roads within the investigation area are:

- Washpool Road
- Tancreds Lane
- Four Mile Lane
- Swan Lane
- Duncans Road
- Timbs Lane
- Six Mile Lane.

The Activity also intersects numerous private access tracks.

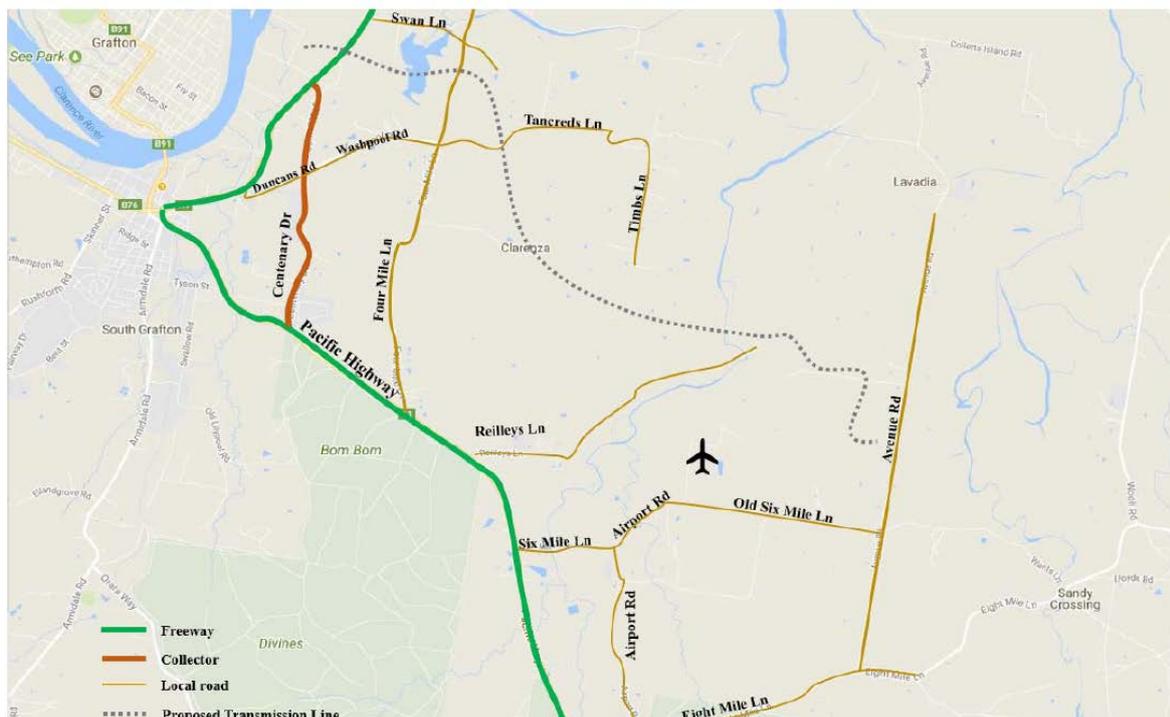


Figure 14: Road network classification surrounding the investigation area

6.9.2 Impact assessment

Construction

Depending on the section of the works under construction, the route and access arrangements for construction vehicles would vary. To access the transmission line structure sites, access tracks would need to be constructed through private property to facilitate the movement of plant and machinery. These tracks would typically consist of unsealed surface roads and would allow for ongoing access during the operation of the proposed activity for maintenance purposes. As required the surfaces would have aggregate placed on them in order to minimise erosion. Track boundaries and routes would be delineated with markings. The tracks would be established such that they do not impact on existing trees as far as possible. These tracks would be built in accordance with the *Managing Urban Stormwater: Soil and Construction Volume 2C – Unsealed Roads* (DECC, 2008).

For the purposes of the traffic impact assessment, the transmission line structure sites have been broken up into five (5) main zones. The proposed access tracks to and from all five zones are shown in Figure 15 and Figure 16. These routes seek use of the arterial road network as much as possible with the use of local streets and local lanes only where required. The final locations of these tracks would be determined in consultation with the landholders in order to coordinate with landholder activities and to minimise impacts.

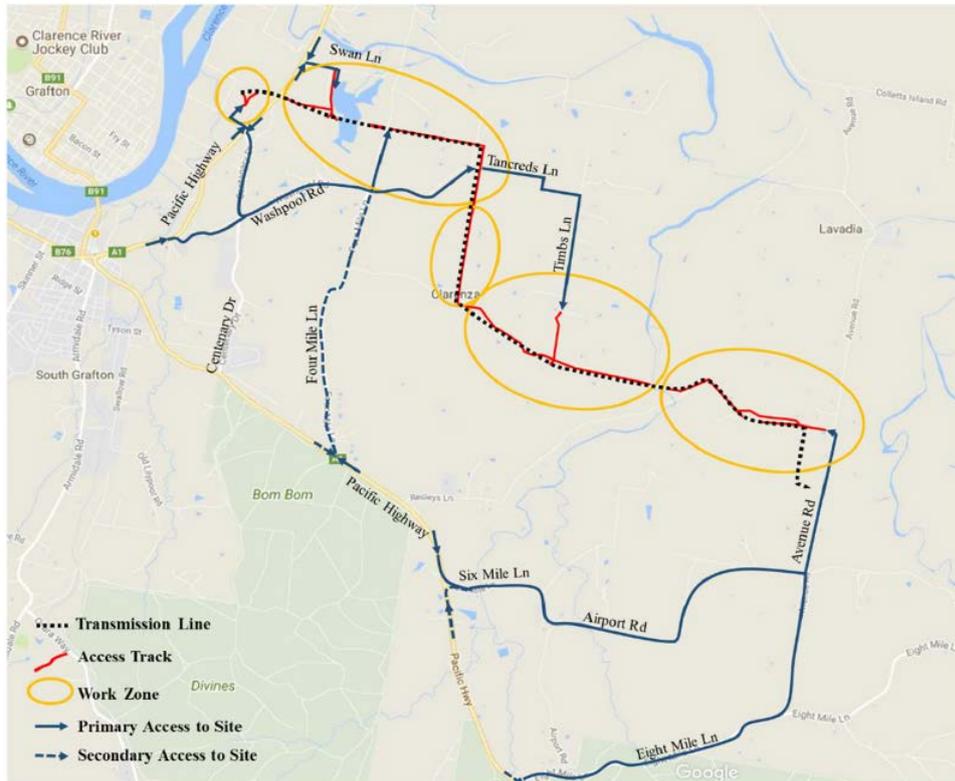


Figure 15: Proposed access routes

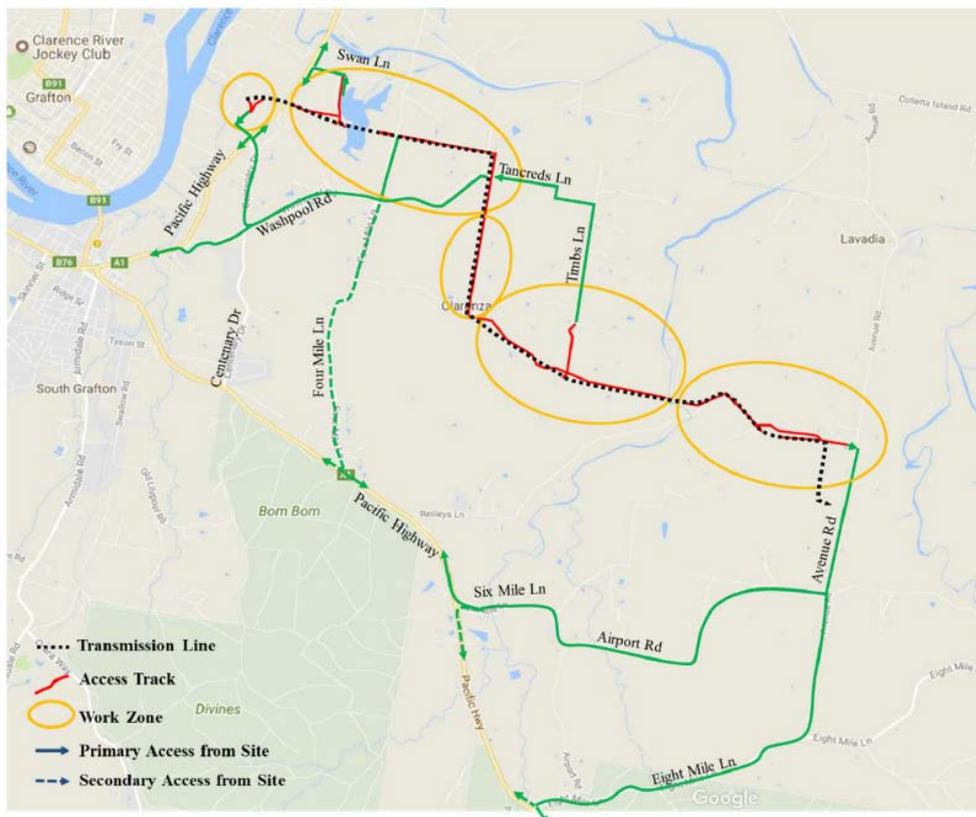


Figure 16: Proposed egress routes

The number of vehicle movements would fluctuate throughout the construction of the transmission line with the maximum daily heavy vehicle movements occurring during the pole delivery and pole erection stages of construction. The number of construction vehicle movements is estimated as follows:

- Average Light Vehicle Movements (typical day): 35
- Average Heavy Vehicle Movements (typical day): 20

This volume of traffic would be distributed on different roads and is considered a minor volume in the context of existing traffic conditions. All access roads proposed to be used for the construction of the transmission line have the capacity to accommodate these vehicle movements. The additional vehicles passing through key intersections in the investigation area are considered to have a negligible impact on the performance of the road network.

Any works occurring over the Pacific Highway would be subject to a separate Traffic Control Plan (TCP) to be submitted to RMS prior to construction.

Operation

During the operational phase, access by field staff would be on a regular basis to complete routine inspection and maintenance works including:

- inspection and maintenance of transmission lines, structures and poles
- vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines.

Typically, maintenance activities would be infrequent and only require light to medium-sized plant and vehicles to access the transmission line. Additional measures, plant and equipment may be required in response to emergencies.

In consideration of the above, the traffic impacts as a result of operational activities are considered negligible.

6.9.3 Mitigation measures

The following mitigation measures would be implemented to minimise traffic and access impacts:

46. A Construction Management Plan will be prepared to manage all deliveries, access, parking, observation of speed limits etc.
47. Transportation and equipment delivery movements on public roads will be in accordance with RMS and Council requirements.
48. Access track works required for the completion of the works will be constructed in accordance with the Construction Environmental Management Plan.
49. Access to properties will be maintained at all times.

6.10 Bushfire

A Bushfire Assessment of the Activity was undertaken by Jacobs Group (Australia) Pty Ltd on behalf of Infrastructure NSW. A copy of the report is provided in Appendix K.

6.10.1 Existing environment

The transmission line route supports a mix of pasture grassland, woodland and dry sclerophyll forest with a grassy understorey. Given the extensive grazing that occurs across private land the remnant forest areas are generally maintained below their potential fuel loads within the Activity area.

Bush fire-prone land (BPL) mapping published by the Clarence Valley Council indicates a small portion of the proposal area to be bush fire prone land. The Bushfire Assessment indicates that this classification underestimates the risk and that considerably more of proposal area should be considered bush fire prone land. This is shown in Figure 17.

6.10.2 Impact assessment

Construction

Construction activities pose risks for on-site ignitions which may result in a fire escaping to surrounding properties. These risks mainly arise from hot work (activities with the potential to generate sparks and cause fire ignitions), vegetation clearing and management and use of vehicles on site. Suitable Bushfire Protection

Measures would need to be incorporated into safe work procedures to ensure these risks are appropriately managed.

Operation

The operator would also need to ensure that the electrical infrastructure is maintained to minimise the risk of infrastructure failure causing ignition. Bushfire risk management mitigation measures would need to be implemented during the operational phase, including easement maintenance to keep fuel loads under control regular checks and undertaking of maintenance of equipment to ensure operational functionality. The main bushfire protection measure for the Activity is the adoption of vegetation management standards in accordance with *ISSC3 - Guide for Management of Vegetation in the Vicinity of Electricity Assets* (2016). The other relevant measure that would need to be incorporated into the Activity is to include sufficient access for the management of vegetation and maintenance of infrastructure, which would also provide potential access for bush fire response activities, such as responding to ignitions.

The Bushfire Assessment indicates that construction of an electrical transmission line, with appropriate bushfire measures in place, is appropriate in this landscape.

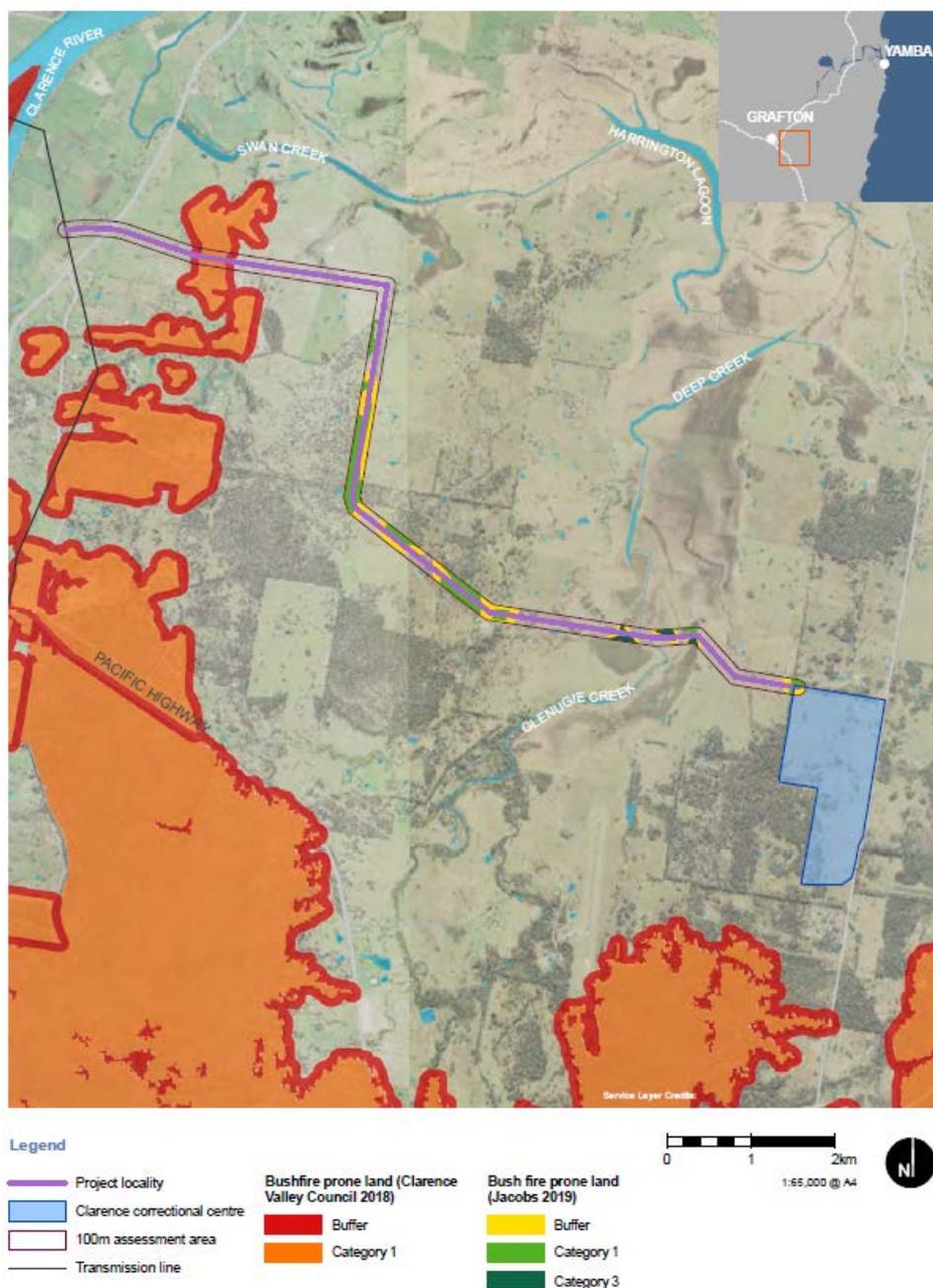


Figure 17: Bush fire prone land

6.10.3 Mitigation measures

The following mitigation measures would be implemented to minimise bush fire impacts:

50. Bush fire prone mapping presented in the *New Grafton Correctional Centre Transmission Line Bushfire Assessment* (Jacobs Group, March 2019) will be adopted when implementing *ISSC3 - Guide for Management of Vegetation in the Vicinity of Electricity Assets* (ISSC 2016).
51. In accordance with ISSC3, vegetation removal and management of hazard trees will be undertaken with consideration of minimising environmental impact while ensuring risk is mitigated to a level consistent with the objectives of the ISSC3 Guide.
52. Network operators will maintain vegetation standards and infrastructure to minimise the risk of bush fire ignition from infrastructure failure.

53. A site induction for contractors working on the Activity will include general bushfire protection measures and requirements.
54. Electrical equipment and other plant and machinery will be maintained in operational order that is fit for purpose and to prevent potential sparks.
55. An emergency management plan will be developed as part of the Activity which will include details regarding protocols to respond to a bushfire incident, including evacuation during construction.
56. Temporary site buildings will be protected from bushfire and maintained so as not to present a fire risk (e.g. perimeter fire break, cleaning gutters, non-flammable materials).
57. Any Hot Work and Fire Risk Work will be undertaken in accordance with *TransGrid Controlled Document – Hot Risk and Fire Risk Work* dated 5.11.18.
58. Site vehicle specifications to include bushfire risk reduction considerations including carrying one or more fire extinguishers and have a suitable height clearance for off road use.
59. The following bushfire risk management mitigation measures will be implemented during the operational phase:
 - a. Easement maintenance to keep fuel loads under control, including:
 - b. Regular checks and undertaking of maintenance of equipment to ensure operational functionality.

6.11 Air quality

6.11.1 Existing environment

The Activity is located in a predominantly rural context. Potential airborne particles within the locality are largely restricted to agricultural activities, vehicle emissions and minor dust generated by vehicle movements in the broader landscape. Controls for air quality are already in place for existing construction activities at the CCC site.

6.11.2 Impact assessment

Construction

The Activity may temporarily affect air quality through exhaust emissions from machinery and associated transportation. There may also be minor dust generated during earthworks and minor excavations and the removal of trees. There is potential that emissions and dust generated from the works may result in air quality impacts to sensitive receivers. However, given the temporary duration of the works in the context of the CCC project and the localised nature of the Activity, the level of potential impact is not considered significant and can be managed or minimised through implementation of safeguards and management measures.

Operational impacts

Once operational, the transmission line would not impact on air quality at the site, other than from minor emissions from vehicles accessing the transmission line easement for maintenance works.

6.11.3 Mitigation measures

The following mitigation measures will be implemented in order to prevent adverse impacts relating to air quality:

60. All surplus soils and materials from excavations which cannot be reused on site will be removed from the site in covered trucks and disposed of at an appropriately licensed facility
61. Dust suppression techniques will be implemented, and incorporated into the Construction Environmental Management Plan, as per the techniques outlined in the “Blue Book”, such as water spraying of surfaces and covering stockpiles.
62. Vegetation or other materials will not be burnt on site.
63. Construction works will not be carried out during weather conditions where high levels of dust or air borne particulates are likely.
64. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle.

6.12 Visual impact and landscape character

A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared by Clouston Associates on behalf of Infrastructure NSW. A copy of the report is provided in Appendix L.

6.12.1 Existing environment

The landscape character surrounding the proposed transmission line is one of predominantly rural and agricultural land, with areas of State Forests, wetlands and floodplains present. Small townships are scattered throughout the wider area, and the major city in close proximity is Grafton.

The visual catchment when viewed from ground level is very minimal due to the extent of existing vegetation within the surrounding area and the low number of residential dwellings in close proximity to the proposed transmission line route.

The changing landscape and elevated nature of the transmission line results in varying aspects from which the Activity route be viewed. For the most part, views of the proposed route are screened or restricted by vegetation or limited due to distance. Other than the properties in proximity to the line and motorists on the Pacific Highway, the line is not highly visible from areas of high public use such as suburban residential, commercial or recreational areas.

6.12.2 Methodology

In the planning context of NSW there are several methodologies documented by the NSW State Government that relate to the assessment of visual impact for varying types of development. The most relevant to this assessment is *EIA-N04 Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment* (Roads and Maritime Services, Sydney, 2014).

The Commissioners of the NSW Land and Environment Court have also developed Planning Principles that relate to visual impact assessment derived from two key cases, namely *Tenacity Consulting v Warringah Council* and *Rose Bay Marina Pty Limited v Woollahra Municipal Council* (2013). The LCVIA has been prepared having regard to these principles.

12 views of the site from a variety of close and more distant viewpoints were selected based on the following sources:

- Visual assessment policy guidance in particular the NSW Land and Environment Court Planning Principles
- Background documents
- Desktop mapping
- In field evaluation

The location of these viewpoints is shown in Figure 18 and Figure 19.

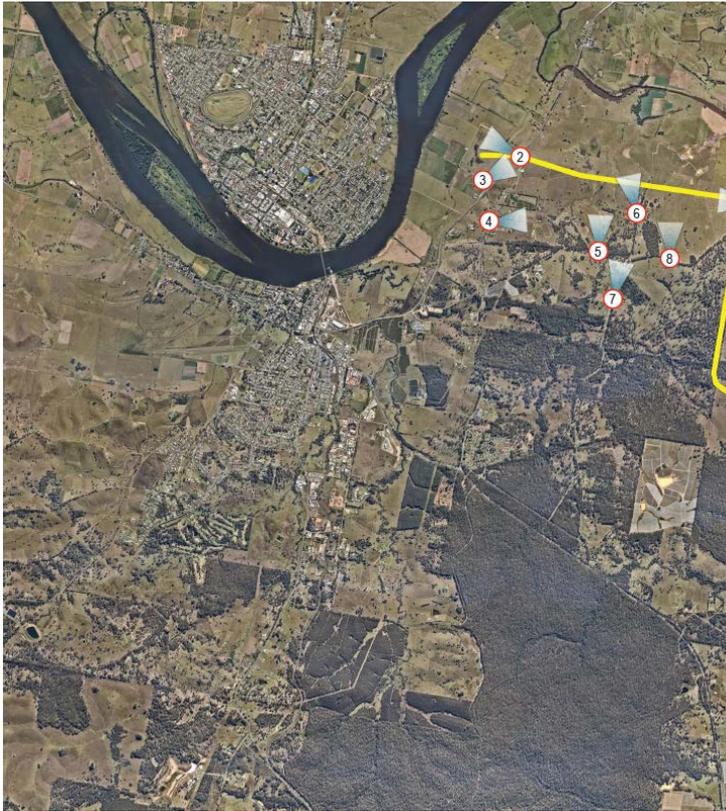


Figure 18: Proposed transmission line route and viewpoints (western section)

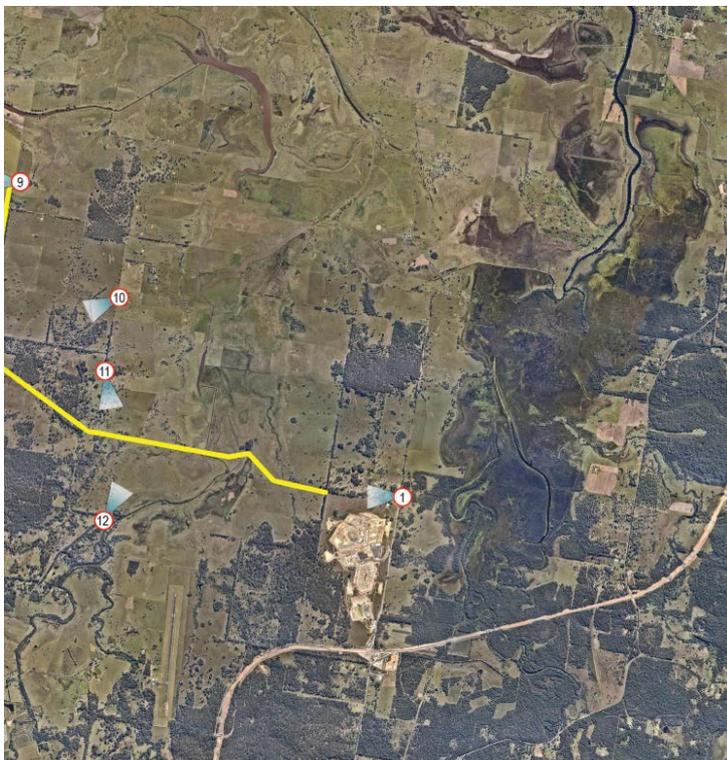


Figure 19: Proposed transmission line route and viewpoints (eastern section)

6.12.3 Impact assessment

The LCVIA draws the following conclusions on the Activity's impact to the visual amenity of the surrounding area:

- the visual catchment of the Activity is limited, due to topography and existing vegetation
- the number of residential visual receptors of the transmission line is very low due to the largely rural/agricultural nature of the land through which the transmission line passes
- established vegetation and topography surrounding the transmission line obscures large sections of the line from both residential visual receivers as well as anyone using the lanes and roads within proximity to it
- the part of the transmission line that would be the most visible to the largest group of receivers is as it passes over the Pacific Highway. However the impact is minimal due to other existing instances of transmission lines in the immediate vicinity, combined with the speed at which vehicles travel on the highway
- the proposed transmission line is not at odds with similar transmission lines within the surrounding area.

Construction

Temporary visual impacts associated with construction are likely to include:

- clearing of vegetation
- setting up of site compounds
- stockpiling
- earthworks
- site fencing
- increased site traffic including heavy vehicles

During the construction period, all viewpoints are likely to have increased visual impacts. Views of storage areas and increased site traffic (including trucks) would lead to a reduction in visual amenity.

Impacts would reduce as viewing distance and screening vegetation increase. Furthermore these visual impacts would be of a temporary nature and would reduce for all viewpoints once the Activity is complete and the construction areas made good.

Operation

The LCVIA indicates that the visual impact on the surrounding visual catchment is highly limited as a result of existing vegetation and topography, limiting the need for mitigation measurements.

The strategic use of planting to screen views of the transmission line could be undertaken to mitigate the visual impact from residential receivers. However, this should only be done at the request of residents.

The report also notes that the steel poles will have a shiny galvanised finish upon installation, but that this will naturally dull over time (at least 12 months) to a matt finish allowing for a more sympathetic blending with the surrounding landscape.

6.12.4 Mitigation measures

The following mitigation measures will be implemented:

65. The strategic use of planting to screen views of the transmission line to mitigate the visual impact from residential receivers will be considered by Infrastructure NSW if requested to do so by residents within the investigation area.

6.13 Electric and magnetic fields

6.13.1 Existing environment

EMFs are part of the natural environment with electric fields present in the atmosphere and static magnetic fields created by the earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Transmission lines, electrical wiring, household appliances and electrical equipment all produce power frequency EMF.

An electric field is the force that fills the space around every electric charge, including any powered electrical appliance or conductor (e.g. a transmission line). Electric fields are measured in volts per metre (V/m) or kilovolts per metre (kV/m). They occur both naturally and as a result of power generation, and are produced every time voltage runs through a wire. The higher the voltage, the stronger the electric field. Electric fields are strongest closest to the wires and their level reduces quickly with distance. Most materials act as a shield or barrier to electric fields.

Magnetic fields are produced by the flow of an electric current through a wire and are measured in milligauss (mG). The higher the current, the greater the magnetic field. Like electric fields, magnetic fields are highest closest to the wire and their level reduces quickly with distance. Most materials would not act as a shield or barrier to magnetic fields. Together, the electric and magnetic fields are referred to as EMF.

All types of electrical equipment, including those associated with transmission lines, produce EMF. For a transmission line, the strength of the electric field varies generally with the operating voltage of the line (measured in volts), while the magnetic field strength is related to the current flowing in the line (measured in amps). The current flowing in the line is dependent upon the load or power flow, and would vary with consumer demand (which varies on a daily and seasonal basis). The EMF strengths at ground level below the conductors are also dependent on the height of the wires above the ground and their geometric arrangements as supported by the transmission structures.

The Activity area and surrounding environment currently contains a series of EMF generating electrical equipment including the existing TransGrid transmission line to the west. The proposed substation located towards the eastern end of the Activity area will also contain EMF generating electrical equipment once established.

6.13.2 Investigations

The scientific literature on EMF exposure is extensive, complex and inconclusive. In addressing the question of adverse health effects, Infrastructure NSW has relied on expert advice on EMF from competent health authorities in Australia and from around the world. This includes the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which is the Federal Government agency responsible for providing health assessments and recommendations to the Government on matters relating to EMF.

ARPANSA has adopted the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for limiting exposure to EMF, published in 2010. The ICNIRP Guidelines express limits in terms of 'Reference Levels' and 'Basic Restrictions' under general public and occupational exposure conditions.

The Basic Restriction values are expressed as the internal electric fields which can be induced in the body without adverse health outcomes and which must therefore be met. As the Basic Restriction values apply within body tissue, it is difficult and impractical to measure them. For that reason, Reference Levels, which are simpler to measure, are provided as an alternative means of showing compliance with the Basic Restrictions. If desktop study and/or direct field measurements show that the EMF is below the Reference Levels, the EMF is well within the Basic Restrictions. The Reference Levels may be exceeded if it can be demonstrated that the Basic Restrictions are still met.

The Reference Levels contained in the ICNIRP Guidelines are listed in Table 9.

Table 9: ICNIRP EMF reference levels*

Exposure Characteristic	Electric Field	Magnetic Field
Public exposure	5kV/m	2,000mG
Occupational exposure	10kV/m	10,000mG

*Reference level limits are taken as instantaneous root mean squared values

6.13.3 Impact assessment

The Activity would introduce a new high voltage transmission line into the investigation area. Consequently, there would be additional potential increases to electric and magnetic fields. However, the proposed infrastructure line would be designed and built to ensure that exposure levels are within the limits recommended by the ICNIRP Guidelines (2010).

The addition of the new transmission line would result in a localised alteration to EMF contours in the immediate vicinity of the transmission line. However, localised field levels would decrease very quickly from the cables and

equipment and is not anticipated to result in impacts to adjacent properties or people or livestock utilising the easements for recreational/rural land uses.

The transmission lines have been designed consistent with the concept of prudent avoidance. Prudent avoidance is generally defined as what can be done at modest cost and without undue inconvenience to avoid a possible risk. With regard to this proposed activity, Infrastructure NSW has undertaken the following steps consistent with prudent avoidance:

- designing structures with appropriate clearance (height above ground) to ensure EMF exposure levels are below the relevant guidelines
- siting and selecting the location of the alignment using objectives that included avoidance of residential dwellings, thereby maximising the distance from public exposure.

Utilising the above principles, it is not expected that the Activity would result in any potential health risks to future adjacent residents with respect to EMF associated with the new transmission line.

6.13.4 Mitigation measures

Final detailed design phase

The following mitigation measures would be implemented to minimise EMF impacts:

66. All final designs will be in accordance with the *International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to EMF* (ARPANSA 2010).

Construction phase

No mitigation measures are proposed for the construction phase.

Operational phase

The following mitigation measures would be implemented to minimise EMF impacts during the operational phase:

67. Any developments and activities within easements will be in accordance with the easement safety requirements established by TransGrid.

6.14 Social and economic considerations

6.14.1 Existing environment

The proposed transmission line is situated on lands dominated predominantly by agriculture and grazing. The line is a key connection for energy supply to the proposed CCC. The area surrounding the Activity area generally consists of agricultural (grazing) land and rural residential dwellings interspersed with areas of native vegetation.

The Clarence Valley LGA provides employment in a range of industries including agriculture, Government services, retail, food and accommodation services and public administration.

6.14.2 Impact assessment

Construction

The proposed activity may temporarily affect the local community as a result of minor increases in noise, traffic and access, air quality emissions and visual amenity impacts. These impacts have been considered and mitigation measures proposed in other sections of this assessment.

Operation

The Activity is not expected to result in any change to land uses adjacent to the transmission line infrastructure which would result in any socio-economic impacts. General land use and property impacts during the operation phase have been discussed previously in Section 6.1.

The proposed activity would have negligible impact on social infrastructure or services in the region, as the proposed activity would only include a small workforce. Negligible positive economic benefits from the proposed activity would be derived from the workforce sourcing daily needs and accommodation from the area.

6.14.3 Mitigation measures

No mitigation measures to prevent adverse socio-economic impacts are required.

6.15 Climate change

6.15.1 Existing environment

Climate change associated with global warming resultant from human activities and the creation of greenhouse gases affects the environment. The proposed Activity is not located in a low-lying area or near the coast.

6.15.2 Impact assessment

Construction impacts

The Activity would contribute to carbon emissions and climate change to a minor extent via the emissions of carbon dioxide by construction equipment as well as the consumption of materials requiring carbon emissions and the removal of vegetation that may otherwise act as a carbon sink. Given the scale of the works however, the influence on climate change would be negligible. However, it is appropriate to implement measures that can reduce or minimise such effects.

Operational impacts

Electricity assets are subject to regular maintenance and monitoring to ensure all equipment is operating effectively. Minimal staff are required to attend the transmission line thus limiting associated vehicle use.

Clause 228(2)(p) of the EP&A Regulation requires consideration of any impact on coastal processes and hazards, including those under projected climate change conditions. The NSW Government acknowledges that increased sea levels will have significant medium to long-term social, economic and environmental impacts for development located in the coastal zone. However, the proposal is not within the coastal zone.

6.15.3 Mitigation measures

Mitigation measures to prevent adverse impacts in relation to climate change will include:

68. A Waste Management Plan Waste will be prepared so waste is minimised and recycling opportunities are available (refer to Mitigation Measure 68).

6.16 Waste

6.16.1 Existing environment

N/A.

6.16.2 Impact assessment

Construction impacts

The Activity would be undertaken to ensure minimal impacts are generated from waste produced on site by ensuring that all waste is managed appropriately. It is not anticipated that spoil will need to be removed from the site. Stockpiled spoil will become the responsibility of INSW following completion of the works.

Waste generated from the Activity may include, but is not limited to:

- Packaging materials.
- General site rubbish.
- Oils and grease from machinery.
- Plastic pipe cut offs and scrap metal.
- Soil spoil
- General building materials waste.

Operational impacts

Wastes generated during operations are largely limited to packaging wastes or those associated with food (eg. lunches etc) and materials. These would be minor in nature and disposed of off site.

6.16.3 Mitigation measures

Measures to prevent adverse impacts in relation to generated waste will include:

69. A Waste Management Plan Waste will be prepared for inclusion in the project CEMP.

70. Waste material will not be left on site once the works have been completed.
71. Ensure the responsible environmental management of wastes that cannot be avoided and promote opportunities for the re-use of waste products where appropriate.
72. Waste will be disposed of at a licensed waste or recycling facility as appropriate.
73. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.
74. Waste management – construction waste would be removed from the site in a timely manner so as not to cause a fire risk or obstruct emergency vehicle access. Unauthorised access to waste receptacles would be prevented, i.e. locked covers and/or fencing to prevent public access or fires being lit.

6.17 Cumulative impacts

6.17.1 Existing Environment

Under Clause 228 of the EP&A Regulation 2000, any cumulative environmental effect with other existing or likely future activities must be considered when assessing the impact of an Activity for the purposes of Part 5 of the EP&A Act.

Cumulative impacts are incremental environmental impacts caused by the combination of past, present, and reasonably foreseeable future actions. Cumulative impacts accumulate over time, from one or more sources. While impacts may be insignificant in isolation, significant impacts may occur when individual effects are considered in combination. As such assessment of the Activity is required in the context of other projects in the vicinity and where construction and/or operational timeframes are likely to be concurrent. In the locality of the proposed transmission line, these include the CCC, the proposed substation and adjoining section of new transmission line, and the Pacific Highway Upgrade (Woolgoolga to Ballina – W2B) which occurs near the southern extent of the CCC and extends over approximately 155 kilometres. Review of Council's Development Application register indicates no Development Applications are currently advertised in the locality.

6.17.2 Impact assessment

Construction impacts

The Activity is expected to add to a number of cumulative impacts including resource consumption, vegetation clearing and generation of greenhouse gas emissions (e.g. through operation of vehicles and equipment). These impacts are cumulative with regard to significant ongoing works for the CCC, the substation and Pacific Highway upgrade. However, the mitigation measures set out within Chapter 8 and the methodology for completion of the Activity aim to minimise the extent to which the Activity contributes to cumulative adverse environmental impacts.

Operational impacts

Once operational, the Activity is unlikely to generate any substantial cumulative impacts, save for the minor generation of greenhouse gas emissions from operation of vehicles and equipment during maintenance operations.

6.17.3 Mitigation measures

No mitigation measures are required.

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7. Consideration of statutory factors

7.1 Section 5.5 of the EP&A Act and 7.3 of the Biodiversity Conservation Act 2016

Under Section 5.5 of the EP&A Act, the determining authority (being Infrastructure NSW), has a duty to consider the effect of the proposed activity on certain agreements, wilderness areas and biodiversity values. Table 10 provides a summary of how each of the factors has been considered.

Table 10: Consideration of Section 5.5 of the EP&A Act

Factor	Comment
5.5(1) Examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity	This REF and associated specialist assessments (refer Appendices) have been prepared to assess the environmental impacts likely to occur as a result of the proposed activity.
5.5(3) Consider the effect of any wilderness area (within the meaning of the <i>Wilderness Act 1987</i>) in the locality in which the activity is intended to be carried on	The proposed activity would not affect any wilderness area.

Under Section 7.3 of the *Biodiversity Conservation Act 2016*, the determining authority (being Infrastructure NSW) has a duty to take into account whether there is likely to be a significant effect on threatened species, ecological communities, or their habitats.

The Biodiversity Assessment provided in Appendix G provides a summary of how each of these factors has been considered. No threatened species, ecological communities, or their habitats have been identified as being significantly affected by the proposed activity.

7.2 Clause 228 of the EP&A Regulation

Clause 228(2) of the EP&A Regulation details those factors that must be taken into account when consideration is given to the likely impact of any activity on the environment, for the purposes of Part 5 of the EP&A Act. Table 11 provides a summary on how each of the Clause 228 factors has been considered.

Table 11: Consideration of Clause 228 factors

Factor	Potential impact
a. any impact on a community	During construction, there would be potential impacts on the community through increased traffic, noise, dust and visual impacts. These potential impacts would be minor and temporary and managed through the mitigation measures summarised in Chapter 8. Once operational, the proposed activity would provide a positive benefit through the supply of energy to the CCC which in turn would have the benefit of meeting the demand for security facilities in the NSW Northern Region.
b. any transformation of a locality	The proposed activity would result in a minor change in the visual amenity in the vicinity of the works. The visual impact on the surrounding visual catchment is highly limited as a result of existing vegetation and topography. Further, the transmission line would not alter the predominant use of land for agriculture and rural residential development. Overall it is considered that the activity would not result in any substantial transformation of the locality.
c. any environmental impact on the ecosystems of the locality	The proposed activity would not significantly impact on any ecosystem of the locality. Refer discussion in Section 6.5.
d. any reduction of the aesthetic, recreational,	The proposed activity would result in some short-term amenity impacts during construction. This includes potential changes to noise levels and dust

Factor	Potential impact
scientific or other environmental quality	<p>generation. All these issues are expected to be minor in nature.</p> <p>The transmission line will impact on the visual amenity of the surrounding area. However, the Landscape and Visual Impact Assessment (Appendix L) concludes that the visual impact will not be significant as:</p> <ul style="list-style-type: none"> • the visual catchment of the Activity is limited, due to topography and existing vegetation • the number of residential visual receptors of the transmission line is very low established vegetation and topography surrounding the transmission line obscures large sections of the line • the proposed transmission line is not at odds with similar transmission lines within the surrounding area, including in the vicinity of the Pacific Highway.
e. any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	<p>An Aboriginal and non-Aboriginal heritage assessment was carried out for the proposed activity. There is potential for Aboriginal objects to be present within the site and impacted through the proposed development (refer discussion in Section 6.6). Appropriate investigations and consultation is occurring and an application for an Aboriginal Heritage Impact Permit may be sought if required.</p> <p>Appropriate mitigation measures are proposed to ensure that any impacts on non Aboriginal heritage are minimised.</p>
f. any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)	<p>A Biodiversity Assessment was carried out for the proposed activity. Impacts on habitats identified in the investigation area would be minimised through implementation of the mitigation measures detailed in Section 6.5.</p>
g. any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air	<p>The proposed activity would involve clearing of native vegetation that may comprise habitat for threatened species. The extent of impact would be minor and would not endanger any species of animal, plant or other form of life living on land, water or in the air.</p>
h. any long-term effects on the environment	<p>The proposed activity would result in a minor permanent change to the existing landscape. However, given the context of the surrounding land use (grazing and agriculture) this minor impact is not significant. The proposed activity would not result in any long term impacts such as air and water quality degradation, waste generation, noise, traffic impacts that would significantly affect the environment.</p>
i. any degradation of the quality of the environment	<p>There may be short-term air quality, waste generation, noise and visual impacts during the construction period. Implementation of the recommended mitigation measures would ensure that any potential environmental impacts are managed appropriately and are minor. Degradation of the quality of the environment is not anticipated.</p> <p>As noted above, in the longer term the transmission line will impact on the visual amenity of the surrounding area. However, the extent of impact is considered minor for the reasons set out under d. above.</p>
j. any risk to the safety of the environment	<p>No major risks to the environment have been identified for the proposed activity. Minor risks to the environment (e.g. erosion and sedimentation, oil spills, waste, contamination) would be minimised by implementing mitigation measures as outlined in Sections 6.2, 6.3 and 6.16. Any minor increases in EMF would remain below the ICNIRP Reference Levels.</p>
k. any reduction in the range of beneficial uses of the environment	<p>The proposed works would not result in any reduction in the range of beneficial uses of the environment. Specifically, the potential for agricultural land uses would not be altered once the works are completed</p>
l. any pollution of the environment	<p>There is the potential for some short-term air, noise, water and soil pollution during the construction of the proposed activity; however, these impacts would be managed and mitigated through the implementation of the</p>

Factor	Potential impact
	measures documented in Chapter 6.
m. any environmental problems associated with the disposal of waste	There are no environmental problems associated with the disposal of waste envisaged for the proposed activity. Any waste generated by the proposed activity would be managed through the waste hierarchy established under the <i>Waste Avoidance and Recovery Act 2001</i> and the POEO Waste Regulation.
n. any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	The proposed activity would not increase demands on resources that are likely to be in short supply.
o. any cumulative environmental effect with other existing or likely future activities	As discussed in Section 6.17, there may be a localised cumulative increase in noise, traffic and dust associated with the construction of the CCC and substation. These impacts are however expected to be minor and temporary in nature.
p. any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposed activity is not in a coastal location and would not affect coastal processes or hazards.

7.3 Matters of NES under EPBC Act

Under the EPBC Act, Infrastructure NSW is required to consider matters of national environmental significance (MNES), to assist in determining whether the proposed activity should be referred to the Commonwealth Department of the Environment and Energy. Table 12 provides a summary of how MNES have been considered.

Table 12: Consideration of Matters of National Environmental Significance and Commonwealth Land

MNES / Commonwealth Land	Potential impact
Any impact on a World heritage property?	Nil, there are no World Heritage properties located in the vicinity of the proposed activity.
Any impact on a National heritage place?	Nil, there are no National heritage places located in the vicinity of the proposed activity.
Any impact on any wetlands of international importance?	Nil, there are no wetlands of international importance located in the vicinity of the proposed activity.
Any impact on a Commonwealth listed threatened species or ecological communities?	Nil, there are no impacts to Commonwealth listed threatened species or ecological communities.
Any impacts on a Commonwealth listed migratory species?	Nil, there are no impacts to migratory species.
Any impact on a Commonwealth marine area?	Nil, there are no impacts to marine areas.
Any impact on the Great Barrier Reef Marine Park?	Nil, the proposed activity is not within the Great Barrier Marine Park.
Does the proposed activity involve a nuclear action (including uranium mines)?	Nil, the proposed activity does not involve a nuclear action
Does the proposed activity involve a water resource, in relation to coal seam gas development and large coal mining development?	Nil, the proposed activity does not involve a water resource in relation to coal activities.
Is the proposed activity likely to have a significant impact on the environment on Commonwealth land?	Nil, there are no World Heritage properties located in the vicinity of the proposed activity.

7.4 Consideration of Ecologically Sustainable Development under the EP&A Act

Obligations under the EP&A Act require that Infrastructure NSW protects the environment by conducting its operations in compliance with the principles of ecologically sustainable development (ESD). The principles of ESD are defined and listed in Section 6(2) of the *Protection of the Environment Administration Act 1991*, namely:

- The precautionary principle
- Intergenerational equity
- Conservation of biological diversity and ecological integrity.
- Improved valuation, pricing and incentive mechanisms.

The principles of ESD and how they have been applied to the proposed activity are detailed below.

7.4.1 Precautionary Principle

The precautionary principle provides that “if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.

The assessment of potential environmental impacts as part of this environmental impact assessment has indicated that there would be no threats of serious or irreversible environmental damage as a result of the construction and operation of the proposed activity. Where potential environmental impacts have been considered to occur, mitigation measures have been proposed to minimise and manage any environmental impacts during construction and operation of the proposed activity.

7.4.2 Intergenerational equity

The principle of intergenerational equity provides that “the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations”.

The proposed activity would provide for projected electricity supply requirements for the CCC, and thus caters for the electricity needs of both current and future generations. In addition, any potential short-term adverse environmental impacts would be minimised with the implementation of appropriate mitigation measures. No long term adverse environmental impacts are envisaged.

Further, the proposed activity would not result in environmental or social impacts that would detrimentally limit the potential for future generations to enjoy and utilise the natural environment.

The proposed activity has been developed through an options assessment process discussed in Chapter 2. This process has sought to minimise the environmental impacts while supporting the development of the CCC which will provide expanded and improved prison facilities to meet the unprecedented forecasted growth in the inmate population.

7.4.3 Conservation of biological diversity and ecological integrity

This principle provides that “conservation of biological diversity and ecological integrity should be a fundamental consideration” in all of Infrastructure NSW’s activities. The design of the activity/site selection/access tracks and the like have and will be selected with consideration of avoiding and minimising impacts to biological diversity and preserving ecological integrity.

An assessment of biodiversity impacts was undertaken as part of this REF (refer to Section 6.5). It is unlikely that the biological diversity and ecological integrity of the proposed activity’s area would be compromised as no significant impacts on any flora or fauna species have been identified. The mitigation measures proposed in Section 6.5.3 would further minimise impacts on biodiversity.

7.4.4 Improved valuation and pricing of environmental resources

The principle of improved valuation, pricing and incentive mechanisms provides that “environmental factors should be included in the valuation of assets and services”.

This principle requires that costs to the environment should be factored into the economic costs of an activity. Environmental issues were considered as key matters in the project scoping / route selection process and in the

economic and financial feasibility assessments for the project. The basis for this principle is the concept that pricing and other financial arrangements relating to the proposed activity should reflect the social and environmental costs of the use of the resource on which it is based, including consideration of future values that may exceed current values as the resources become scarcer.

This environmental impact assessment has assessed the likely environmental impacts of the proposed activity. The proposed activity has taken into account these potential impacts and has identified mitigation measures to be implemented so as to avoid the possibility of significant adverse impacts and the loss of environmental values. The implementation of these environmental measures would increase both the capital construction and operating costs of the proposed activity. This signifies that the environmental costs have been included in the costs of the proposed activity.

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8. Environmental management

8.1 Environmental management plans

This REF identifies a number of safeguards and management measures to minimise adverse environmental impacts that could potentially arise from the Activity. These management measures would be implemented during the construction phase of the Activity.

Infrastructure NSW will require the preparation of a Construction Environmental Management Plan (CEMP) for the works, which would provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation. The CEMP would be prepared prior to commencement of works and must be reviewed and certified by Infrastructure NSW, prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the 'Guideline for the Preparation of Environmental Management Plans' (DIPNR, 2004). Infrastructure NSW would oversee compliance with the requirements of the CEMP.

Environmental safeguards in the CEMP will be communicated to all construction personnel as part of Site Inductions, and repeated (where appropriate) at toolbox sessions prior to commencement of relevant work components.

As part of the CEMP, site maps will also be prepared for site specific work locations. The scale of these maps may vary with the level of detail required to be included. The maps shall detail:

- The location and extent of known environmental constraints and sensitivities at or near each site (such as waterways, heritage sites, no-go zones and noise affected residents)
- The work site layout (such as vehicle parking and equipment lay-down)
- The extent of earthwork and the appropriate soil erosion and sedimentation control measures to be implemented at the site (such as benching, stormwater diversions, sediment fencing).

All workers will be inducted onto the CEMP (including maps and any sub-management plans), site environmental conditions and sensitivities identified in this REF, and receive training as appropriate. All workers will also be advised of any changes to work scope, environmental site conditions or management plans.

8.2 Summary of safeguards and mitigation measures

Table 13 provides a summary of the mitigation measures and safeguards detailed in this report that would be implemented for the Activity.

Table 13: Summary of Mitigation Measures and Safeguards

Environmental Attribute	Mitigation Measures/ Safeguards
Land use	<ol style="list-style-type: none"> 1. Landowners will be notified at least seven days prior to the commencement of the proposed activity on their property 2. As far as practicable, any activities undertaken outside the easement but within the 100m buffer will be located to avoid tree removal.
Soils	<ol style="list-style-type: none"> 3. An Erosion and Sediment Control Plan (ESCP) will be prepared as part of the construction environmental management plan. All erosion and sediment control measures will be designed, implemented and maintained in accordance with relevant sections of "Managing Urban Stormwater: Soil and Construction Volume 1" (Landcom, 2004) ("the Blue Book") (particularly Section 2.2) and "Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services" (DECC, 2008)". The ESCP will apply to stockpiles, site boundaries, access tracks and laydown areas. Exposed surfaces will be kept to a minimum to limit the potential for erosion. 4. The ESCP will include contingencies for flood management and protocols for establishment (and if relevant, removal) of temporary access roads on the floodplain. 5. Any unsuitable excavated material/ waste will be classified and managed appropriately in

Environmental Attribute	Mitigation Measures/ Safeguards
	<p>accordance with the CEMP, including placement in approved stockpile locations or approved landfill facilities as appropriate.</p> <p>6. In the event that unexpected contaminated land is encountered during the works, works will stop immediately and relevant procedures outlined in a CEMP will be followed.</p> <p>7. On completion of the work, disturbed areas will be stabilised and returned to as close to original condition or as otherwise agreed with the landowner subject to noting that any revegetation of disturbed areas will be with non-invasive species.</p> <p>8. Should acid sulphate soils be encountered, the soil will be treated on site and depending upon individual land owner preferences, either spread on site or removed to an approved location.</p> <p>9. Vehicles and equipment entering and exiting the site will be washed down to avoid the spread of material.</p>
Water quality	<p>10. A spill containment kit will be available at all times. All personnel will be made aware of the location of the kit and trained in its effective deployment.</p> <p>11. Any required fuels and other liquids will be stored in self-safe chemical storage containers.</p> <p>12. All refuelling of plant and equipment will be undertaken in appropriately designated areas.</p> <p>13. Cleaning of tools and equipment will occur off site.</p> <p>14. All equipment will be maintained in good working order and operated according to manufacturer's specification.</p> <p>15. No waste and/or wastewater will be discharged directly or indirectly in drains or waterways.</p> <p>16. The NSW EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the POEO Act (via EPA Environment Line on 131 555).</p>
Flooding	<p>17. Flood heights and minimum distances to power lines required in the 1:100 AEP flood event and the PMF will be addressed during the detailed design, having regard to the requirements of Industry code ENA NENS 04-2006 and Australian Standards AS6947 <i>Crossing of waterways by electricity infrastructure</i> and AS7000 <i>Overhead line design</i>.</p> <p>18. If determined during detailed design, appropriate signage will be installed in accordance with AS6947.</p> <p>19. The installation of access gates, fencing and other associated features within the PMF flood extent will be avoided where possible.</p>
Biodiversity	<p>20. A project ecologist will be appointed to manage biodiversity issues relating to the project during the construction phase.</p> <p>21. Clearing of native vegetation will not be undertaken outside of the 30 metre easement and laydown areas, with the exception of the removal of identified 'danger trees'. The limit of vegetation clearing will be clearly delineated on site prior to works commencing.</p> <p>22. Areas of low shrubs (e.g. Cockspur thickets) will be retained wherever possible.</p> <p>23. The extent of laydown areas will be defined by 'no go' fencing with any native trees within these areas retained in-situ and protected by temporary fencing. The project ecologist will provide guidance on the location of 'no go' fencing.</p> <p>24. Temporary fencing will be placed around the closest patch of Weeping Paperbark to the works and this area will be defined as a 'no go' zone. The location of fencing will be determined in conjunction with the project ecologist.</p> <p>25. Plant and vehicles will utilise existing public roads and farm access tracks wherever possible to minimise vegetation disturbance.</p> <p>26. Prior to commencement, the project ecologist will clearly mark all habitat trees affected by the works with flagging tape (these trees are already marked with white spray-paint) for the</p>

Environmental Attribute	Mitigation Measures/ Safeguards
	<p>attention of spotter catchers during vegetation clearing. During this process:</p> <ul style="list-style-type: none"> c. Any 'new' habitat trees (eg. trees with recently constructed nests or dreys) will be marked during this process and GPS records taken and supplied to the contractor/project supervisor. d. The raptor nest in a Swamp Box in the east of Lot 2 DP562924 will be inspected to determine if the nest is occupied. If occupied the contractor/project supervisor must be informed promptly so that contingencies can be planned for. <p>27. A pre-clearing survey by the project ecologist will be completed prior to the clearing of any vegetation. If arboreal fauna are detected, a 10 m clearing buffer area will be established around trees with non-threatened fauna, while a 40 m buffer area will be established around significant fauna (e.g. Koala) and 24 hours given for the animal to move of its own volition.</p> <p>28. In the unlikely event that fauna remain following the 24 hour period, the project ecologist will advise alternative solutions.</p> <p>29. If during pre-clearing surveys any 'unexpected finds' are recorded by the ecologist (eg. Additional fauna features, threatened flora), these will be marked in the field, recorded by GPS and details promptly reported to the contractor/project supervisor.</p> <p>30. As the Crown Reserve provides potential refuge habitat for Rufous Bettong, vegetation clearing in these areas will be preceded by flush surveys completed by the project ecologist. This will prevent the potential for any sheltering bettongs to be hit by falling trees. As a guide, flush surveys should be completed between poles G22A and G24A.</p> <p>31. Vegetation clearing will be completed in a staged process whereby non-habitat trees are cleared first (stage 1) and habitat trees are felled a minimum of two nights after initial stage clearing (stage 2). The project ecologist will be in attendance during the clearing of any habitat trees.</p> <p>32. Woody debris (larger logs, branches) on the ground within the transmission line corridor or laydown areas will be relocated into adjacent land where they will not be subject to impact. Woody vegetation requiring removal will be chipped and retained on site for use in erosion control with larger logs placed into areas of adjacent habitat to provide fauna refuge. Millable logs will be salvaged where possible. It is recommended a landowner register is established and salvaged timber would be managed in accordance with landowner wishes.</p> <p>33. Where hollow-bearing trees are removed, compensatory nest boxes will be established, with one nest box installed for every habitat tree removed. Nest box compensation will be confirmed with NSW Crown Lands (or other individual landowners) and detailed in a separate Nest Box Compensation Assessment. Nest boxes will be installed within 4 weeks of the completion of works within the various sections of the alignment</p> <p>34. A Weed Hygiene Protocol will be established and included in the CEMP prior to works commencing to ensure the potential for the introduction of weed propagules to the site is minimised. The Weed Hygiene Protocol must include consultation with affected landowners and include a targeted survey of all areas likely to be affected by the construction footprint. Any areas of Tropical Soda Apple will be notified in accordance with requirements of the Biosecurity Act 2015.</p> <p>35. All areas of exposed soil (including tracks access pads etc) created by the works will be seeded with non-invasive grasses (e.g. Japanese Millet) immediately following construction to prevent soil erosion.</p> <p>36. Transmission line-marking techniques such as aerial marker spheres, spirals and suspended devices (swinging, flapping, and fixed) will be included within the final detailed design. These markers will be attached to earth wires to increase their visibility over wetland areas likely to be utilised by waterbirds and raptors. These spans include G8 – G11 and G38 – G49.</p> <p>37. Prior to clearing, protocols will be developed with the Clarence Native Bees Landcare</p>

Environmental Attribute	Mitigation Measures/ Safeguards
	<p>group regarding the identification and salvage of any native stingless bees that are found in trees to be removed (as identified by project ecologist during pre-clearing inspections). In the event that native stingless bees are within any trees to be removed, protocols for removal will be observed.</p>
Aboriginal cultural heritage	<p>38. An AHIP application will be made to the NSW OEH to allow unavoidable impact to Aboriginal objects. The AHIP will be accompanied by appropriate reports (Aboriginal Cultural Heritage Assessment Report and Archaeological Technical Report), prepared in accordance with OEH statutory guidelines.</p> <p>39. Once access to remaining properties has been granted, archaeological test excavation will be completed within the study area. Should Stage 2 of the test excavation identify the presence of Aboriginal objects that will be impacted by the development, an AHIP variation will be submitted to the OEH detailing these additional locations and impacts.</p> <p>40. Ongoing consultation will be undertaken between project RAPs, INSW, and Crown Lands, to identify the appropriate management strategies for the establishment of a Keeping Place for Aboriginal objects/cultural material recovered from the project, at a location within the Crown Land (Lot 7004 DP 93037, Reserve 33013).</p>
Non-Aboriginal heritage	<p>41. In the event that a non-Aboriginal heritage site or artefact is identified during construction works, all ground surface disturbance works in the area will cease immediately and the NSW Heritage Division notified in accordance with the Section 146 provisions of the <i>Heritage Act 1977</i>.</p>
Noise and Vibration	<p>42. Noise generating works will be undertaken in accordance with the Interim Construction Noise Guideline (DECC, 2009):</p> <ul style="list-style-type: none"> - 7:00am – 6:00pm Monday to Friday - 8:00am – 1:00pm Saturdays - No work on Sundays or Public Holidays <p>43. Work outside normal hours, on Sundays and public holidays will generally only comprise:</p> <ul style="list-style-type: none"> - The delivery of materials outside normal hours requested by police or other authorities for safety reasons. - Emergency work to avoid the loss of lives and/or property. - Work timed to correlate with system planning outages. <p>44. Other noise generating works outside of the standard construction hours will require the prior formal written consent of INSW and require justification in accordance with the Interim Construction Noise Guideline.</p> <p>45. Noise affected neighbouring properties will be notified as to the timing and duration of the construction works at least 7 days prior to commencing work. These are the residential properties located within 250m of any new structures, proposed access track works or laydown areas as identified in Table 8.</p> <p>46. Safe working distances will be established prior to commencement of use of vibration intensive plant (rollers / hammers) to ensure that the vibration does not adversely affect structures nearby access tracks.</p>
Traffic and access	<p>47. A Construction Management Plan will be prepared to manage all deliveries, access, parking, observation of speed limits etc.</p> <p>48. Transportation and equipment delivery movements on public roads will be in accordance with RMS and Council requirements.</p> <p>49. Access track works required for the completion of the works will be constructed in accordance with the Construction Environmental Management Plan.</p> <p>50. Access to properties will be maintained at all times.</p>

Environmental Attribute	Mitigation Measures/ Safeguards
Bushfire	<p>51. Bush fire prone mapping presented in the <i>New Grafton Correctional Centre Transmission Line Bushfire Assessment</i> (Jacobs Group, March 2019) will be adopted when implementing <i>ISSC3 - Guide for Management of Vegetation in the Vicinity of Electricity Assets</i> (ISSC 2016).</p> <p>52. In accordance with ISSC3, vegetation removal and management of hazard trees will be undertaken with consideration of minimising environmental impact while ensuring risk is mitigated to a level consistent with the objectives of the ISSC3 Guide.</p> <p>53. Network operators will maintain vegetation standards and infrastructure to minimise the risk of bush fire ignition from infrastructure failure.</p> <p>54. A site induction for contractors working on the Activity will include general bushfire protection measures and requirements.</p> <p>55. Electrical equipment and other plant and machinery will be maintained in operational order that is fit for purpose and to prevent potential sparks.</p> <p>56. An emergency management plan will be developed as part of the Activity which will include details regarding protocols to respond to a bushfire incident, including evacuation during construction.</p> <p>57. Temporary site buildings will be protected from bushfire and maintained so as not to present a fire risk (e.g. perimeter fire break, cleaning gutters, non-flammable materials).</p> <p>58. Any Hot Work and Fire Risk Work will be undertaken in accordance with <i>TransGrid Control Risk and Fire Risk Work</i> dated 5.11.18.</p> <p>59. Site vehicle specifications to include bushfire risk reduction considerations including carrying one or more fire extinguishers and have a suitable height clearance for off road use.</p> <p>60. The following bushfire risk management mitigation measures will be implemented during the operational phase:</p> <ol style="list-style-type: none"> a. Easement maintenance to keep fuel loads under control, including: b. Regular checks and undertaking of maintenance of equipment to ensure operational functionality.
Air quality	<p>61. All surplus soils and materials from excavations which cannot be reused on site will be removed from the site in covered trucks and disposed of at an appropriately licensed facility</p> <p>62. Dust suppression techniques will be implemented, and incorporated into the Construction Environmental Management Plan, as per the techniques outlined in the "Blue Book", such as water spraying of surfaces and covering stockpiles.</p> <p>63. Vegetation or other materials will not be burnt on site.</p> <p>64. Construction works will not be carried out during weather conditions where high levels of dust or air borne particulates are likely.</p> <p>65. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle.</p>
Visual impact	<p>66. The strategic use of planting to screen views of the transmission line to mitigate the visual impact from residential receivers will be considered by Infrastructure NSW if requested to do so by residents within the investigation area.</p>
Electric and magnetic fields	<p>67. All final designs will be in accordance with the <i>International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to EMF</i> (ARPANSA 2010).</p> <p>68. Any developments and activities within easements will be in accordance with the easement safety requirements established by TransGrid.</p>
Climate change	<p>69. A Waste Management Plan Waste will be prepared so waste is minimised and recycling</p>

Environmental Attribute	Mitigation Measures/ Safeguards
	opportunities are available.
Waste	<p>70. A Waste Management Plan Waste will be prepared for inclusion in the project CEMP.</p> <p>71. Waste material will not be left on site once the works have been completed.</p> <p>72. Ensure the responsible environmental management of wastes that cannot be avoided and promote opportunities for the re-use of waste products where appropriate.</p> <p>73. Waste will be disposed of at a licensed waste or recycling facility as appropriate.</p> <p>74. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.</p> <p>75. Waste management – construction waste would be removed from the site in a timely manner so as not to cause a fire risk or obstruct emergency vehicle access. Unauthorised access to waste receptacles would be prevented, i.e. locked covers and/or fencing to prevent public access or fires being lit.</p>

9. Conclusion

All relevant statutory planning instruments have been examined in relation to the Activity. Based on the review undertaken, the Activity does not require development consent pursuant to Clause 41 of the Infrastructure SEPP and is subject to environmental impact assessment under Part 5 of the EP&A Act.

The Activity is an important element of infrastructure to support the Clarence Correctional Centre. The potential environmental impacts posed by the Activity have been thoroughly examined through this REF. Some minor impacts would occur from the works (e.g. vegetation loss); however, it is unlikely that any significant or long-term adverse impacts would eventuate. To help ensure that the extent of impacts is limited and that unavoidable impacts are managed and minimised, mitigation measures and safeguards have been developed and would be implemented and monitored.

The Activity is considered justifiable taking into account the potential environmental impacts and subsequent mitigation measures and safeguards. The Activity supports the establishment and operation of the Clarence Correctional Centre. The Activity is in accordance with ESD principles and consistent with the objectives of the EP&A Act.

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Certification

This Review of Environmental Factors provides a true and fair review of the Activity in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Activity.

Signature:



Nicola Gibson
Director
MG Planning Pty Ltd
Date: 5 April 2019

I have examined this Review of Environmental Factors and the certification by Nicola Gibson and accept the Review of Environmental Factors on behalf of Infrastructure NSW.

Signature:

Name:
Title:
Date:

References

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- Bushfire Coordinating Committee, *Bushfire Coordinating Committee 2007 Best Practice Guidelines for Fire Trail Construction and Maintenance*.
- Dan Keary Urban Planning (2016), *New Grafton Correctional Centre Environmental Impact Statement State Significant Development Application SSD 7413*
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- Landcom (2004), *Managing Urban Stormwater: Soil and Construction Volume 1 (Fourth edition)*.
- Office of Environment and Heritage (2011), *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage In NSW*.
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Appendix A

Location plans

Appendix B

Transmission line plans

Appendix C

Pole design

Appendix D

Typical above ground base mount footing plan

Appendix E

Stage 1 Preliminary Site Investigation

Appendix F

Flood Assessment

Appendix G

Biodiversity Assessment

Appendix H

Aboriginal Heritage Due Diligence Assessment

Appendix I

Heritage Impact Statement

Appendix J

Traffic Impact Assessment

Appendix K

Bushfire Assessment

Appendix L

Landscape Character and Visual Impact Assessment