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Sent: Tuesday, 18 July 2017 11:20 AM
To: Lauren Evans <Lauren.Evans@planning.nsw.gov.au>
Subject: Re: Mandalong Mine Mod 5 - Response to Additional Information Request

Hi Lauren.

The TransGrid works on TL 24 towers 45-47 have been done under Part 5 of the EP&A Act. I have attached the Summary Environmental Report (SER) that TransGrid prepared which outlines the planning context.

I have attached the subsidence predictions for all structures on property 205. Property 204 (same landowner) is vacant land with only a couple of small farm dams). All structures are predicted to remain safe serviceable and repairable as per the performance criteria detailed within the development consent. No specific mitigation measures are proposed however if any additional mitigation measures are required, they will be detailed within the Property Subsidence Management Plans prepared as part of the Extraction Plan in consultation with the landowners.

Regards

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Subsidence Predictions for Property 205 Dwellings and Buildings

Centennial Property Ref.	Structure	E	N	End LW24A			Photo
				Vertical (m)	Tilt (mm/m)	Strain (mm/m)	
205	Round yard	351463	6332736	-0.34	0.9	-0.8	
	Stables Timber and corrugated iron	351432	6332730	-0.300	1.9	-0.9	
	Dwelling Brick veneer on concrete slab. (nearest point to LW)	351279	6332707	-0.02	0.6	0.3	

Centennial Property Ref.	Structure	E	N	End LW24A			Photo
				Vertical (m)	Tilt (mm/m)	Strain (mm/m)	
	Concrete plunge pool	351261	6332720	0.010	0.5	0.2	
	Sheds Colorbond (located outside EP Area)	351215	6332639	0	0	0	

SER Decision Statement

Line 24 Cruciform Installation at Mandalong



Proposed Activity Summary

TransGrid is the proponent for the Line 24 Cruciform Installation at Mandalong.

The proposed activity involves the installation of cruciform foundations on three structures (45, 46 and 47) on Line 24 – Vales Point to Eraring.

The proposed activity is needed to mitigate mine subsidence impacts as part of the underground Mandalong coal mine. Mine subsidence effects on a tower structure may result in tilting of the structures, changes in stress to the towers and transmission line leading towers to becoming unserviceable and potential eventual collapse.

The proposed activity has been classed as Class 3 – Summary Environmental Report (SER) in accordance with the *NSW Code of Practice for Authorised Network Operators* (the Code).

A SER was prepared by TransGrid (January 2017) to assess the potential impacts of the proposed activity. The SER was prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), clause 228 of the *Environmental Planning and Assessment Regulation 2000* and the Code.

Determination

I, GERARD REITER, as an authorised person on behalf of TransGrid, have examined and considered the Summary Environmental Report (SER) for the Line 24 Cruciform Installation at Mandalong in accordance with section 111 of the EP&A Act.

The proposed activity is not likely to significantly affect the environment, and is not likely to significantly affect threatened species, populations, ecological communities or their habitats.

I determine that an Environmental Impact Statement and Species Impact Statement are not required in respect of the proposed activity. The proposed activity may now proceed subject to the implementation of the mitigation measures in the SER.

This is not a conditional decision and no further conditions are required (other than the mitigation measures stipulated in the SER).

A handwritten signature in black ink, appearing to read "G. Reiter".

Gerard Reiter

EGM/ Network Planning and Operations

TransGrid

Date: 13/1/17.



TransGrid

**Part 5 EP&A Act
Environmental Impact Assessment**

Summary Environmental Report

Line 24 Cruciform Installation at Mandalong

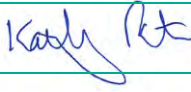
January 2017

Document Preparation History

Revision	Reviewed By	Date
1	Luke Fania	5/12/2016
2	Denise Lo	12/12/16
3	Shahpar Ahmed, Heather Wagland, Warick Schroder	4/1/2016

Certification

I certify that I have prepared this Part 5 environmental impact assessment and, to the best of my knowledge, it is in accordance with the *NSW Code of Practice for Authorised Network Operators* approved under clause 244K of the *Environmental Planning and Assessment Regulation 2000*, and the information is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the proposed activity.

Environmental Impact Assessment prepared by	Kathy Pate
Signed	
Date	5 January 2017
Designation	Environment Officer
Qualification	Bachelor of Science (Resource and Environmental Management)
Organisation	TransGrid

Executive Summary

Proposed Activity Overview

TransGrid proposes to install cruciform foundations on three structures (45, 46 and 47) on Transmission Line 24 – Vales Point to Eraring (Line 24) which would be potentially affected by mine subsidence in the Mandalong area.

Proposed Activity Need and Justification

Modelling completed by Centennial Coal has determined that there is a possibility of subsidence from mining activities affecting three structures on Line 24. The installation of the cruciform foundations would mitigate potential subsidence affecting the existing structures without requiring line deviation work.

Planning Context and Consultation

Pursuant to the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), the proposed activity does not require development consent from the local Council. The proposed activity is therefore subject to Part 5 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). A Class 3 Summary Environmental Report (SER) has been prepared in accordance with the *NSW Code of Practice for Authorised Network Operators*. TransGrid is the proponent and determining authority for the proposed activity.

Consultation was undertaken in accordance with the Infrastructure SEPP and the *Electricity Supply Act 1995*.

Environmental Impacts

The proposed activity has the potential to result in minor short-term impacts during construction. The main potential impacts from the proposed activity include construction noise, traffic, air emissions, erosion and sedimentation impacts. No vegetation removal would be required. No Aboriginal or non-Aboriginal heritage items have been identified as occurring in the vicinity of the proposed activity.

Any potential adverse impacts from the proposed activity would be managed through the implementation of the mitigation measures in this Summary Environmental Report (SER).

Conclusion

This SER has been prepared in accordance with Part 5 of the EP&A Act and assesses the potential environmental impacts associated with the proposed activity.

With consideration of the assessment of impacts detailed in the SER, and the implementation of the proposed mitigation measures, the proposed activity is not likely to significantly affect the environment and is not likely to significantly affect threatened species, populations, ecological communities or their habitats.

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1. Introduction

1.1 Proposed Activity Overview

The proposed activity involves the installation of cruciform foundations on structures 45, 46 and 47 on transmission line 24 – Eraring to Vales Point (Line 24) to negate any potential impacts from subsidence occurring as a result of mining activities by the underground Mandalong Coal Mine.

The proposed works at each structure would involve excavation around the four existing tower legs and under the existing tower in a cross-shape. A thin mortar slab would be laid on consolidated levelled ground, and steel formwork constructed on top of the slab. Concrete would be poured into the formwork, and the footing left to cure for about a month. The depth of the footing is anticipated to be about 2 metres. An excavator would then dig under the footing to cut off the original tower legs (to allow the legs to sit on top of the concrete and thus move together from subsidence effects).

1.2 Purpose of the Environmental Impact Assessment

The purpose of this environmental impact assessment is to determine if the proposed activity would have a significant impact on the environment or significantly affect threatened species, populations, ecological communities or their habitats. This environmental impact assessment 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 environmental impact assessment has been prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For the purposes of the proposed activity, TransGrid is the proponent and the determining authority under Part 5 of the EP&A Act. The aim of the environmental impact assessment is to satisfy the requirements of Section 111 of the EP&A Act that TransGrid examine, and take 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 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 appropriate assessment and approvals process in accordance with the Code for the proposed activity is:

Class 3 – SER – Summary Environmental Report (SER)

2. Proposed Activity Justification

2.1 Purpose and Need of the Proposed Activity

Modelling completed by Centennial Coal as part of the underground Mandalong coal mine has determined that there is a possibility of subsidence from mining activities affecting structures 45, 46 and 47 on Line 24. The installation of cruciform foundations is required to mitigate mine subsidence impacts as a part of the underground Mandalong coal mine. Subsidence effects on a tower structure may result in tilting of the structures, changes in stress to the towers and transmission line leading towers to becoming unserviceable and potential eventual collapse.

2.2 Alternative Options Considered

Not proceeding with the cruciform foundations for the three structures identified would not address the future subsidence issues associated with the Mandalong Mine Colliery Life Extension Project. A 'Do Nothing' option was not identified as acceptable as this may result in potential future collapse of the tower. The deviation of the transmission line around the coal mine was not deemed a feasible option due to the substantial costs and environmental and community impacts which could otherwise be addressed by the installation of the cruciform foundations.

2.3 Preferred Option

The installation of cruciform foundations has been selected as the preferred option as it is the most appropriate measure to ensure the continued stability of the structures and mitigation for potential subsidence issues occurring as a result of the mining operations at Mandalong Coal Mine.

3. Proposed Activity Description

3.1 Proposed Activity Location

The proposed activity would occur at three structures (45, 46 and 47) and associated access on Line 24 that are situated in grazing agricultural land off Chapman Road, Mandalong, as shown in Figure 1. The proposed activity is located within the Lake Macquarie Local Government Area (LGA). The land is gently undulating, with Morans Creek and its ephemeral tributaries located between structures 45 and 46. The site is on the boundary of the Narrabeen Group Tuggerah Formation, which consists of grey to green-grey laminate, red-brown claystone and siltstone, interbedded with fine-to-medium-grained green-grey sandstone.



Figure 1: Locality Map of the proposed activity

3.2 Detailed Proposed Activity Scope

The proposed activity involves the installation of cruciform foundations on three existing structures (45, 46 and 47) on Line 24.

The works would involve excavation around the four existing tower legs and under the existing tower in a cross-shape. Each bored cruciform leg and foundation would be approximately 6.5m long by 1.7m wide, and would be approximately 1.5 to 2m deep (i.e. four required for each structure). The work area for each structure would require the excavation of approximately 200 cubic metres, which includes the creation of a metre wide work zone surrounding the structure and safe batters (construction bench). A laydown area of 15m x 15m would be required for each structure.

A thin mortar slab would be laid on consolidated levelled ground, and steel formwork constructed on top of the slab. Concrete would be poured into the formwork, and the footing left to cure for about a month. Following the appropriate curing period, an excavator would then dig under the footing to cut off the original tower legs, allowing the legs to sit on top of the concrete and thus move together from subsidence effects.

The excavations surrounding the footings would be stabilised with an appropriate batter for a period of up to two years to permit the new footing to settle. Following this period, the pre-existing ground level would be re-established.

No new access tracks would be required for the proposed activity. However, some road base or gravel may be laid temporarily during construction in areas of poorly drained land on existing access tracks, as indicated on Figure 1. Although road base or gravel would be placed adjacent to Morans Creek (a Strahler 3rd order waterway), no works would be required within Morans Creek itself. Following completion of the works, the gravel access would be removed and the site returned to its original condition.

All disturbed areas would be rehabilitated following completion of works.



Figure 2: Example of structure with completed cruciform foundation

3.3 Construction Activities

3.3.1 Construction Methodology

To access each structure, road base or gravel would be imported and placed as required to stabilise the existing track. Additionally, two new gates would be required to enable plant access to the proposed activity (refer to Figure 1).

The footprint of the cruciform structure would be prepared by excavating approximately 200 cubic metres per structure to expose the existing footings and create a level work area. The top of the existing concrete foundations would be removed and the bottom would be scabbled and cleaned to remove any loose material.

A blinding layer of a minimum of 50 mm mortar slab would be constructed to provide a base for the works. Reinforcement and formwork for the cruciform would be constructed on the blinding layer. Once poured, the concrete would cure for approximately one month.

Following concrete curing, an excavator would dig under the cruciform footing and cut off the original tower leg to allow the structure legs to move together with any impacts from subsidence.

3.3.2 Construction Plant, Material and Equipment

Typical construction plant, material and equipment may include, but are not limited to, the following:

- > General work vehicles (staff)
- > Excavator/ jackhammer
- > Cranes
- > EWPs
- > Trucks
- > Concrete delivery vehicles
- > General hand power tools
- > Welder

A site establishment area would be set up near structure 46 on cleared land, owned by Centennial Coal. The site establishment area would include a site shed, toilets, wash areas and garbage disposal. This area would be included on the environmental site map (including identification of any erosion and sediment control measures).

3.3.3 Construction Schedule

The works are scheduled to commence in February 2017, with the majority of the construction works due to be completed in approximately May 2017. The final site remediation involving the reinstatement of fill surrounding the cruciform would be completed by May 2019.

3.3.4 Construction Hours

Noise generating works would be limited to the recommended standard hours for construction work outlined in the *Interim Construction Noise Guideline* (DECC, 2009) which are:

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

Work outside standard hours would only comprise:

- > 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 the need for additional noise generating works outside standard construction hours is identified following the determination of this Summary Environmental Report then they would require justification in accordance with the *Interim Construction Noise Guideline* (DECC, 2009) and the formal written consent of TransGrid prior to occurring.

3.4 Property identification

The proposed activity would occur within TransGrid's existing Line 24 easement, which would be accessed via an existing access track. The easement, and TransGrid's rights under the *Electricity Supply Act 1995*, allows TransGrid to operate and maintain the transmission line.

Within the easement, the proposed activity would occur on three private properties:

- > Structure 45 is located on Lot 17 DP 755238.
- > Structure 46 is located on Lot 179 DP 755238.

- > Structure 47 is located on Lot 41 DP 755238.

3.5 Operation and Maintenance

The proposed activity would not result in any operational changes or significant changes to existing maintenance activities. Following the completion of construction works, the transmission line's regular maintenance program would resume.

4. Planning Context and Consultation

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (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 *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) (refer to Section 4.2), this proposed activity does not require development consent from Council, and is therefore subject to Part 5 of the EP&A Act.

Under Section 111 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.

TransGrid, as an Authorised Network Operator (ANO) under the *Electricity Network Assets (Authorised Transactions) Act 2015*, and as such, is a determining authority for the purposes of Section 111A of the EP&A Act. Accordingly, TransGrid is the proponent and determining authority for this proposed activity. In accordance with Section 111 of the EP&A Act, this environmental impact assessment has been prepared to satisfy TransGrid's requirements as a determining authority.

This environmental impact assessment has also been prepared in accordance with the *NSW Code of Practice for Authorised Network Operators* (the Code 4 September 2015), which sets out the environmental assessment requirements for ANOs. Accordingly this environmental impact assessment is deemed as a Summary Environmental Report. 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 6.2.

4.2 State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (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 an electricity supply authority or public authority without development consent on any land.

The carrying out of development by or on behalf of an ANO (i.e. TransGrid) for the purpose of an electricity transmission or distribution network, constitutes the carrying out of that development as an electricity supply authority and public authority (Clause 41 (2) of the *Electricity Network Assets (Authorised Transactions) Act 2015*).

As this proposed activity meets the definition of development for the purposes of an electricity transmission or distribution network, and would be carried out by TransGrid (an ANO), it is permissible without consent from the Council.

Clauses 13-16 of the Infrastructure SEPP provide that consultation is required with the local council and other public authorities for certain development. Section 4.5 provides further detail on consultation undertaken in accordance with the Infrastructure SEPP.

4.3 Other Environmental Legislation

Other Commonwealth and NSW legislative requirements and their applicability to the proposed activity have been considered in Table 1. This table is not an exhaustive list of all legislation considered, but rather covers only those specific to the proposed activity.

Table 1: Other Environmental Legislation

Legislation Considered	Relevance to the Proposed Activity
<i>Contaminated Land Management Act 1997</i>	The general object of the <i>Contaminated Land Management Act 1997</i> (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. It is unlikely that the proposed activity would involve excavating soil that is contaminated (refer to Section 5.2). 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 <i>Guidelines on the Duty to Report Contamination</i>, EPA 2015) is required to notify the EPA in writing as soon as they become aware of the contamination. Should soils be found to be contaminated or soils accidentally become contaminated during site works, and this contamination is considered significant enough to trigger s60 of the CLM Act, TransGrid would consult with the EPA immediately.
<i>Energy Services Corporations Act 1995</i>	Under the Act, TransGrid as a transmission operator has obligations under Section 6B (1)(b) which includes to: <i>“Protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development contained in Section 6(2) of the Protection of the Environment Administration Act 1991.”</i> The principles of ecologically sustainable development have been considered in the determination of stabilising the existing structures against potential subsidence effects rather than the relocation of the structures.
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	The proposed activity is unlikely to significantly affect matters of national environmental significance (MNES) or Commonwealth land (refer to Section 6.3). Additional Commonwealth approval is therefore not required under the Act.
<i>Fisheries Management Act 1994 (FM Act)</i>	The proposed activity would not involve works that would affect fish or fish habitat. Therefore no approvals or permits under this Act are required.
<i>Heritage Act 1977</i>	The <i>Heritage Act 1977</i> provides for the legal protection of heritage items. The proposed activity would not have an adverse impact on any State listed heritage items and would not involve disturbing or excavating land on which a relic is located or where there is reasonable expectation that the excavation or disturbance is likely to result in a relic being

Legislation Considered	Relevance to the Proposed Activity
	discovered, exposed, moved, damaged or destroyed. Therefore no permits or approvals are required under the Heritage Act. Refer to Section 5.6.
Lake Macquarie Local Environmental Plan 2014	The Infrastructure SEPP provides that Part 4 of the EP&A Act does not apply to the proposed activity, and the provisions of the SEPP override the LEP.
<i>National Parks and Wildlife Act 1974</i>	The Act provides the basis for legal protection and management of Aboriginal sites and objects in NSW. No Aboriginal heritage items would be affected by the proposed activity. Refer to Section 5.5.
<i>Native Vegetation Act 2003</i>	The Act does not apply as Part 5 determinations are excluded under Section 25(g).
<i>Noxious Weeds Act 1993</i>	There are no identified noxious weeds in the works area. Work would be carried out in a manner to minimise the potential spread of weeds (refer to Section 5.4).
<i>Protection of the Environment Operations Act 1997 and Regulations</i>	The proposed activity is not a scheduled development or a scheduled activity under Schedule 1 of the Act and therefore does not require an Environment Protection Licence. Under section 148 of this Act, the EPA must be notified of any pollution incidents that cause or threaten material harm to the environment.
<i>Roads Act 1993</i>	No permit is required under Section 138 of the Roads Act.
<i>Threatened Species Conservation Act 1995</i>	The Act lists a number of threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. The proposed activity would not involve the removal of any vegetation therefore no threatened species, communities or their habitats are likely to be affected by the proposed activity. A Species Impact Statement is not required. Refer to Section 5.4.
<i>Water Management Act 2000</i>	The proposed activity is not a controlled activity under the <i>Water Management Act</i> .

4.4 Other Environmental Approvals or Permits Required

Following consideration of the proposed activity and the applicable environmental legislation, no permits, licences and/or notifications are required for the proposed activity.

4.5 Consultation

In accordance with Section 45 of the *Electricity Supply Act 1995*, Lake Macquarie City Council was provided written notification of the proposed activity on 12 October 2016, and provided with 40 days to provide a submission. Council advised that it had no objection to the proposed activity.

In addition, relevant landowners have been advised of the proposed works by phone/ letter. Further ongoing consultation with landowners would continue to occur prior to the commencement of, and during construction works, to inform of progress and ensure there are no issues affecting the landowners from the proposed activity.

5. Environmental Impact Assessment

5.1 Land Use

5.1.1 Existing Environment

The existing and surrounding land use of structures 45, 46 and 47 comprises grazing on rural residential land. This section of Line 24 also overlies the underground Mandalong coal mine. The transmission line easement and rights under the *Electricity Supply Act 1995* allows TransGrid to operate and maintain the transmission line. The easement contains no existing standing vegetation, although dense vegetation is located to the east of the structures (outside the easement). There is an ephemeral waterbody 50 metres west of the proposed activity.

5.1.2 Impact Assessment

The proposed activity would only affect the land in the vicinity of the existing footprint of the structure and associated access tracks. Each cruciform foundation leg would be approximately 6.5m x 1.7m, with a total impact area of approximately 45m² per structure (for the four legs). The work area for each structure would require the excavation of approximately 200 cubic metres, which includes the creation of a metre wide work zone surrounding the structure and safe batters (construction bench). A laydown area would be required at each structure, with an area of approximately 15m x 15m. Site preparation would involve the reinforcing of an existing access track, with gravel and road base imported to provide appropriate access through wet or low lying areas, if required. Two new gates would be installed to facilitate plant access to site. No new access tracks would be required.

There would be a temporary change to the existing land use during the two year settling period of the cruciform foundations, when excavated material required for landscaping purposes would need to be stockpiled on site. Each cruciform foundation would involve the excavation of approximately 200 cubic metres of Virgin Excavated Natural Material (VENM). Once the foundations have been assessed as appropriately settled, the area would be landscaped. Approximately 50 cubic metres of this excavated material would be required for landscaping surrounding the cruciform once the structure has settled, which is anticipated to take up to two years. All spoil would be stockpiled on site, and stabilised with appropriate erosion and sediment control measures. Once the structure has settled, any residual, clean spoil would be spread in appropriate locations on the property owned by Centennial Coal (structure 46) or disposed of at an appropriate waste management facility. The landowner and/or occupier would be consulted regarding the construction works prior to the commencement of works at their property. A site establishment area would also be set up near structure 46 on Centennial Coal land.

The construction works would involve temporary alterations to the land use, with the exposed cruciform foundations and stockpile locations altering the existing environment. Following the re-filling of the exposed areas, the area would be stabilised and seeded with an appropriate seed mix agreed with the property owners. The permanent changes would be close to the original ground level, and not affect the existing land use. Land use impacts would be minor and not be significant.

5.1.3 Mitigation Measures

The following mitigation measures would be implemented to minimise land use impacts:

- > Any access on areas controlled by Centennial Coal shall be in accordance with their requirements (e.g. inductions).
- > All affected landowners and/or occupiers shall be consulted regarding the construction works prior to commencement of works at their property.
- > Exposed cruciform foundations and stockpile locations shall be clearly delineated and made safe to minimise health and safety risks for the landowners and the public.

5.2 Geology and Soils

5.2.1 Existing Environment

The existing structures (45, 46 and 47) are located on the boundary of the Narrabeen Group Tuggerah Formation, which consists of grey to green-grey laminate, red-brown claystone and siltstone, interbedded with fine-to-medium-grained green-grey sandstone, and quaternary gravel and sand.

Geotechnical studies undertaken by Macquarie Geotech on 24 September 2016 at the structure locations indicate that the soil is soft to very soft silty sandy clay, with wet soil.

A search of the Environment Protection Authority's (EPA) Contaminated Land Register on 16 November 2016 identified no listed contaminated sites within 10 km of the site. A search of the List of NSW contaminated sites notified to EPA identified Mandalong Mine as a site under assessment to determine whether regulation is required.

The proposed activity is not identified on the Office of Environment and Heritage's Potential Acid Sulphate Soil (PASS) mapping as having any potential acid sulphate soils. The geotechnical study did not identify a risk of encountering acid sulphate soils.

5.2.2 Impact Assessment

During construction, the main risks to geology and soil would be erosion and sedimentation from ground disturbance activities. Ground disturbance for each cruciform foundation is anticipated to be approximately 200m².

There would be approximately 200 m³ of excavated material from each structure, 50 m³ of which would require stockpiling on site for remediation works following the settling period (up to two years) for the cruciform foundation. This spoil would be stockpiled on site, and stabilised with appropriate erosion and sediment control measures. Any residual, clean spoil would be spread in appropriate locations on the property owned by Centennial Coal (structure 46) or disposed of at an appropriate waste management facility.

Other potential erosion and sedimentation impacts from the construction works include access track works and movement of construction vehicles over exposed surfaces.

With the implementation of the mitigation measures outlined in Section 5.2.3, potential erosion and sedimentation impacts are expected to be minimal.

Due to the distance from the coastline and significant estuarine systems, the elevation of the site, and lack of acid sulphate soil identification during geotechnical studies make it unlikely that any acid sulphate soil would be encountered during construction.

Given the existing and past land use of this area, it is considered unlikely that there would be any existing contamination affecting the site of the proposed activity. The nearest site listed as under assessment on the NSW contaminated sites notified to EPA is located approximately 5km north east of the site and would not impact on the proposed activity.

5.2.3 Mitigation Measures

The following mitigation measures would be implemented to minimise geology and soil impacts:

- > An Erosion and Sediment Control Plan (ESCP) shall be prepared for the proposed activity. All erosion and sediment control measures shall 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 shall include stockpiles, stormwater run-off, trees, site boundaries, and site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion.

- > Construction plant and vehicles shall be cleaned of any mud or soils prior to access onto public roads. Vehicles and equipment shall remain on existing roads and defined site access tracks.
- > Environmental spill kits containing spill response materials suitable for the works being undertaken shall be kept on site at all times and be used in the event of a spill.
- > All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 130% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s shall be shown on the ESCP.

5.3 Hydrology and Water Quality

5.3.1 Existing Environment

The proposed activity is located approximately 50m east of an ephemeral watercourse, Morans Creek and its unnamed tributaries. Morans Creek is a Strahler 3rd order waterway.

The work sites for structures 45 and 47 are identified as being located on flood planning areas.

5.3.2 Impact Assessment

The proposed activity would require the area surrounding the cruciform foundations to be exposed for up to two years to allow the foundations to settle. This may result in sedimentation into nearby waterways, therefore water management measures would be required for this period to minimise potential water quality impacts. The excavation would have a dish drain to reduce water flow into the excavation, and a sump with drainage to remove water from the area surrounding the foundations. The discharge from the excavation would be monitored until the final site remediation has been completed.

Stockpiles would be located more than 40 metres from identified drainage lines, with appropriate sediment controls installed and monitored until the work site has been remediated. As such, water quality impacts are considered to be minor.

Due to its localised nature, the proposed activity would not adversely affect any potential flood behaviour.

The excavations have the potential to encounter groundwater. Due to the small scale and temporary nature of the works, a groundwater licence is not considered to be required.

Existing crossings of ephemeral waterways would be utilised, and maintained (placement of gravel and road based) as required. As no works would be undertaken within Morans Creek, no controlled activity approval under the *Water Management Act 2000* would be required.

5.3.3 Mitigation Measures

The following mitigation measures would be implemented to minimise hydrology and water quality impacts:

- > Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering waterways (including stormwater drains) or migrating off-site.
- > Any bulk fuel/herbicide or hazardous material transport vehicles shall be parked on level ground a minimum of 40m away from waterways (including drainage and irrigation channels). No refuelling or bulk herbicide preparation shall occur within 40 metres of a waterway or open site drains.
- > Any spills of oil, fuel and other liquids shall be cleaned up promptly and immediately reported to the TransGrid site representative.

5.4 Ecology

5.4.1 Existing Environment

The existing environment consists of cleared grazing land. Database searches of the EPBC Protected Matters and NSW Wildlife Atlas on 25 November 2016 did not identify any threatened species, ecological

communities or populations in the work area. The Black-necked Stork has been identified as occurring approximately 1km to the north of the proposed activity.

The watercourses in the area are ephemeral, and do not form key fish habitat or significant aquatic communities.

No weed species have been identified on the site.

5.4.2 Impact Assessment

There would be no vegetation clearing required for the proposed works and vehicles would remain on established access tracks. As such, no flora and fauna impacts are anticipated and the proposed activity is unlikely to affect any threatened species, ecological communities or populations, including the Black-necked Stork.

Appropriate vehicle hygiene procedures would be maintained to minimise the risk of importing weeds to the proposed activity.

5.4.3 Mitigation Measures

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

- > Disturbed sites shall be stabilised, and areas not required for operation shall be returned to as close to their original condition as soon as possible.
- > Weed control mitigation and management strategies shall be documented and implemented in accordance with the SEP. All herbicide use shall be in accordance with TransGrid requirements, and only TransGrid approved herbicides shall be used. Weed control strategies shall include:
 - Vehicle check procedures, including wash/brush down if required, to reduce the spread of weeds via vehicles and machinery.
 - Mitigation of noxious and problematic weeds and pests should they be found at the activity site.
- > All hot works shall be undertaken in accordance with TransGrid's *Hot Work Procedure*.
- > No fires or burning of materials shall occur on site.

5.5 Aboriginal Heritage

5.5.1 Existing Environment

The Aboriginal Heritage Information Management System (AHIMS) was searched on 25 November 2016 and did not identify any registered Aboriginal heritage sites in the existing Line 24 easement surrounding the proposed activity. Three Aboriginal sites in the adjacent property were identified, with the nearest identified site being 200 metres from the proposed activity. The landscape features do not indicate any likely presence of Aboriginal objects.

5.5.2 Impact Assessment

Given that the works would be located within an existing easement at existing structures which have been previously disturbed and that no Aboriginal heritage items have been identified, it is considered unlikely that any identified or unidentified Aboriginal and non-Aboriginal heritage items would be affected by the proposed activity.

5.5.3 Mitigation Measures

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

- > In the event that a site or artefact (as defined by the *National Parks and Wildlife Act 1974*) is identified during construction works, works would cease at the location. The find would be immediately reported to TransGrid, and the regulator in accordance with legislation. No work would commence in the vicinity of the find until any required approvals have been given by the regulator.

5.6 Non-Aboriginal Heritage

5.6.1 Existing Environment

A search of the NSW Office of Environment and Heritage State Heritage Inventory did not identify any heritage items in the vicinity of the proposed activity. There are no items registered on the Commonwealth Heritage List or the National Heritage List in the vicinity of the proposed activity. The Lake Macquarie Local Environmental Plan 2014 does not have any heritage listings in the vicinity of the proposed activity.

5.6.2 Impact Assessment

There are no listed heritage items in the vicinity of the works. The proposed activity is unlikely to have any impacts on non-Aboriginal heritage items.

5.6.3 Mitigation Measures

The following mitigation measures would be implemented to minimise non-Aboriginal heritage impacts:

- > In the event that a site or artefact (as defined by the *Heritage Act 1977*) is identified during construction works, works would cease at the location. The find would be immediately reported to TransGrid, and the regulator in accordance with legislation. No work would commence in the vicinity of the find until any required approvals have been given by the regulator.

5.7 Noise and Vibration

5.7.1 Existing Environment

The proposed activity is located within a rural area, and noise levels are likely to be reflective of the rural nature of the surrounding area, with minimal noise sources. The existing noise amenity of the local area includes traffic along Mandalong Road, and environmental noise (such as windblown trees, birds and frogs).

The nearest residence to Structure 45 is located 250 metres east of the structure. The nearest residence to Structure 46 is located 250 metres north-west of the structure. The nearest residence to Structure 47 is 90 metres west of the structure, with two other residences also located within 250 metres of the structure.

5.7.2 Impact Assessment

During construction, noise would be generated from excavation for the footings, the delivery of gravel/ road base for access tracks, operation of machinery/equipment and the movement of vehicles for the transport of equipment, materials and staff. Noise generating activities are likely to be intermittent in nature over the construction period, although may be audible at nearby residences.

Given that the proposed activity would be short-term and minor in nature, and would be limited to the standard hours for construction, it is expected that noise impacts would be minor. It is anticipated that the works would take approximately 3-4 weeks per structure.

5.7.3 Mitigation Measures

The following mitigation measures would be implemented to minimise noise and vibration impacts:

- > Noise generating works shall be 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.Work outside normal hours, on Sundays and public holidays shall 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.

Other noise generating works outside of the standard construction hours shall require the formal written consent of TransGrid and require justification in accordance with the Guideline.

- > Affected neighbouring properties shall be notified as to the timing and duration of the construction works at least 7 days prior to commencing work.

5.8 Traffic and Access

5.8.1 Existing Environment

The work site is accessible from Chapman Road, off Mandalong Road. There is an existing bridge on Chapman Road that is not suitable for plant, with an adjacent causeway that would be used. Two new gates would be installed on the existing access track to allow plant to access the site. Chapman Road is an unsealed local access road used by local residents for property access.

5.8.2 Impact Assessment

Existing access tracks would be used during construction. The existing access track would be maintained by laying additional gravel and road base as required. No new access tracks would be required. There would be increased vehicle movements for the duration of the construction work period from the delivery of plant, equipment and materials, transportation of waste and daily movements of construction staff to and from the sites. Traffic impacts would be minor, and the operational access requirements would remain unchanged.

5.8.3 Mitigation Measures

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

- > Upgrades of existing access tracks required for the completion of the works shall be constructed in accordance with the approved plan of work that shall comply with the *Soils and Construction Volume 2C Unsealed Roads* (DECC, 2008).
- > Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the SEP and updated as required. This shall include:
 - The management of the delivery of equipment and materials.
 - Access to and from the site including nominated roads and site access tracks.
 - Parking.
 - Speed limits.

5.9 Air Quality and Climate Change

5.9.1 Existing Environment

Air quality in the region is influenced by emissions generated by the Eraring, Munmorah and Vales Point power stations, vehicular emissions, including Mandalong Mine and Mannering Colliery.

5.9.2 Impact Assessment

The main potential air quality impacts during construction would be dust generated from excavation activities for the footings and construction bench. The proposed activity would have minimal impact on the air quality of the surrounding area, due to the localised and minor nature of the works.

Exhaust emissions would also occur from the operation of construction vehicles, equipment and plant. With the implementation of the mitigation measures in Section 5.9.3, air quality impacts during construction are considered to be negligible.

There would be no changes to air quality during operation as a result of the proposed activity.

5.9.3 Mitigation Measures

The following mitigation measures would be implemented to minimise air quality and climate change impacts:

- > Vehicles and equipment shall be maintained in accordance with the manufacturer's specifications.
- > If necessary, dust suppression techniques shall be implemented, and incorporated into the ESCP, as per the techniques outlined in the "Blue Book", such as water spraying of surfaces and covering stockpiles.
- > All surplus soils and materials from excavations, which cannot be reused on site, shall be removed from site by covered trucks.
- > Air quality mitigation and management strategies shall be documented and implemented in accordance with the SEP. This shall include:
 - Reducing vehicle speeds when in the vicinity of residences to minimise the generation of nuisance dust.
 - Progressively revegetating or otherwise rehabilitating disturbed areas as works are completed.
- > Materials shall be sourced from local suppliers, where feasible, to reduce the distance that materials need to be transported to the site.
- > Residual raw materials shall be returned to the supplier, resold or reused at another site at the end of the activity or recycled.

5.10 Visual Amenity

5.10.1 Existing Environment

The existing environment consists of rural residential and agricultural land (vegetated areas). Structures 46, 47 and 48 are currently shielded from the surrounding residences due to the presence of dense vegetation, although structures 46 and 47 are visible from vehicles along Chapman Road, which is an unsealed local access road used by local residents for property access, and access to a residence (located 130 metres to the east of structure 47).

5.10.2 Impact Assessment

During construction, there may be minor visual impacts associated with the construction activities and the presence of construction vehicles, equipment and plant, and stockpiles and equipment laydown; however these visual impacts would not be significant. Once construction activities have been completed, all construction plant, equipment, waste and excess materials would be removed from site. With the implementation of mitigation measures in Section 5.10.3, visual impacts during construction would be minor.

Once works have been completed, the cruciform foundation would be close to the original ground level and would not be visible from any sensitive receiver locations. Visual amenity would not be adversely affected by the proposed activity.

5.10.3 Mitigation Measures

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

- > All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.

5.11 Waste

5.11.1 Existing Environment

Wastes currently generated on Line 24 include redundant equipment and materials and vegetation for the maintenance of the transmission line and associated access tracks.

5.11.2 Impact Assessment

The proposed activity would result in the generation of waste. Waste materials likely to be generated during construction include:

- > Redundant equipment, including structure legs.
- > Off-cuts and excess construction material.
- > Concrete.
- > Waste oils, greases and lubricants from maintenance of construction plant and equipment.
- > Domestic and putrescible waste (including food waste, bottles, cans and paper).
- > Spoil.

It is anticipated that each cruciform foundation would require approximately 85 m³ of concrete. An appropriate facility would be provided to allow concrete delivery vehicles to flick wet wipe their discharge chutes.

General waste would be removed from site as it is generated. Excavated material (spoil) would be used on site to improve contours and reduce erosion risks.

5.11.3 Mitigation Measures

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

- > All waste, including surplus soils, which cannot be reused shall be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.
- > Concrete trucks shall be permitted to flick wet wipe their discharge chutes with the effluent discharged into prepared bored holes, prepared excavations/formwork or a watertight receptacle for disposal (to be shown on the ESCP). No concrete washout is permitted. All surplus concrete shall be returned to the concrete suppliers for recycling and not be discharged on site.
- > Waste mitigation and management strategies shall be documented and implemented in accordance with the SEP, TransGrid Waste Procedures and associated Work Instructions. This shall include:
 - Waste management facilities on-site including their set-up, use, management removal and waste tracking documentation.
 - Waste hierarchy application including information demonstrating the reduction of the amount of waste produced and the maximised reuse and recycling opportunities utilised.
 - Appropriate waste management across all possible waste items produced.

5.12 Electric and Magnetic Fields (EMF)

5.12.1 Existing Environment

EMF is part of the natural environment and electric fields are present in the atmosphere and static magnetic fields are created by the earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Transmission lines, substations 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.

5.12.2 Impact Assessment

No new electrical equipment is proposed to be replaced or installed for the proposed activity. As such, there would be no change in EMF as a result of the proposed activity.

5.12.3 Mitigation Measures

As there would be no change in EMF levels as a result of the proposed activity, no mitigation measures are required.

5.13 Social and Economic Considerations

5.13.1 Existing Environment

The proposed activity site is located in Mandalong, which has a population of 388 (ABS, 2011).

Mandalong is located within the Lake Macquarie LGA, which is a major centre for NSW's power generation capacity (Eraring and Vales Point power stations). There are a number of underground coal mines in the surrounding area. The majority of employment is office based, with 21.3% Professionals, 14.7% clerical and administrative workers and 12.9% Managers. 14.2% of the residents of Mandalong are technicians and trades workers (ABS, 2011).

5.13.2 Impact Assessment

Construction of the proposed activity may temporarily affect the local community as a result of minor increases in noise, traffic, air quality emissions and visual amenity impacts during construction. These impacts have been considered in Sections 5.7, 5.8, 5.9 and 5.10, respectively, and would be appropriately managed with the mitigation measures outlined in Sections 5.7.3, 5.8.3, 5.9.3 and 5.10.3.

In the long-term, the proposed activity would have no impact on the surrounding environment.

5.13.3 Mitigation Measures

No additional mitigation measures are proposed.

5.14 Cumulative Impacts

5.14.1 Existing Environment

The Mandalong Coal Mine and its southern extension is located adjacent to the proposed activity. As part of the southern extension of the coal mine, a 2.4 km section of Line 24 (structures 33 to 44) need to be deviated due to mine subsidence impacts. It is currently scheduled that works will commence in Qtr 2 2017.

5.14.2 Impact Assessment

The proposed activity (due to commence in early 2017) may be undertaken concurrently with the Line 24 deviation and mine activities associated with the Mandalong Coal Mine. Although cumulative noise, traffic, air quality and visual amenity impacts may occur as a result of the development occurring concurrently, these are not considered to be significant, given the minor works associated with the cruciforms.

In the long-term, the proposed activity would not alter the overall impact of the transmission line. Following the final remediation of the site, the cruciform foundations will be close to the original ground level.

5.14.3 Mitigation Measures

No additional mitigation measures are proposed.

5.15 Summary of Impacts

The key impacts associated with the proposed activity include:

- > Erosion and sedimentation from excavation for cruciform foundations and stockpiling.
- > Temporary noise, traffic and air quality impacts during construction of the proposed activity.

Potential impacts on soil and water quality would be addressed by the preparation and implementation of an Erosion and Sediment Control Plan during the construction of the proposed activity. The stockpiles would be stabilised with appropriate erosion and sediment controls for the duration of the period while the stockpiles are in place. Following the filling of the excavations when the cruciform foundations have settled, any remaining stockpiles would be used on-site in consultation with the property owner, and the exposed surfaces stabilised and seeded with an appropriate seed mix.

6. Consideration of Statutory Factors

6.1 Section 111 and 5A of the EP&A Act

Under Section 111 of the EP&A Act, the determining authority (being TransGrid), (refer to Section 4.1) has a duty to consider the effect of the proposed activity on certain agreements, wilderness areas and biodiversity values. Table 2 provides a summary of how each of the factors has been considered.

Table 2: Consideration of Section 111 of EP&A Act – Duty to Consider Environmental Impact

Factor	Comment
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.	The information contained within this SER covers this consideration.
2(a) Consider the effect on any conservation agreement entered into under the <i>National Parks and Wildlife Act 1974</i> and applying to the whole or part of the land to which the activity relates.	The proposed activity would not affect any conservation agreement.
2(b) Consider the effect on any plan of management adopted under that Act for the conservation area to which the agreement relates.	The proposed activity would not affect any plan of management for a conservation agreement.
2(c) Consider the effect on any joint management agreement entered into under the <i>Threatened Species Conservation Act 1995</i> .	The proposed activity would not affect any joint management agreement.
2(d) Consider the effect of any biobanking agreement entered into under Part 7A of the <i>Threatened Species Conservation Act 1995</i> that applies to the whole or part of the land to which the activity relates.	The proposed activity would not affect any land subject to a biobanking agreement.
3 Consider the effect on 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.
4(a) Consider the effect on critical habitat	The proposed activity would not affect any critical habitat.
4(b) Consider whether there is likely to be a significant effect on threatened species, populations and ecological communities, and their habitats	The proposed activity would not significantly affect any threatened species, populations and ecological communities, and their habitats.
4(c) Consider the effect on any other protected fauna or protected native plants within the meaning of the <i>National Parks and Wildlife Act 1974</i> .	The proposed activity would not affect any protected fauna or native plants within the meaning of the <i>National Parks and Wildlife Act 1974</i> .

Under Section 5A of the EP&A Act, the determining authority (being TransGrid) has a duty to take into account whether there is likely to be a significant effect on threatened species, populations, ecological communities, or their habitats. As no vegetation removal would be required, there is unlikely to be a significant impact on threatened species, populations, ecological communities or their habitats.

6.2 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 3 provides a summary on how each of the Clause 228 factors has been considered.

Table 3: 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 impacts would be minor and temporary and managed appropriately through the implementation of mitigation measures.
b. any transformation of a locality	There would be no transformation of the locality as the works would be restricted to the existing footprint of the structures.
c. any environmental impact on the ecosystems of the locality	The proposed works are not anticipated to adversely affect the local ecosystems.
d. any reduction of the aesthetic, recreational, scientific or other environmental quality	During construction, there would be potential impacts on the aesthetic quality of the locality through increased traffic, noise, dust and visual impacts. These impacts would be minor and temporary and managed through the implementation of appropriate mitigation measures. There would be no long-term reduction of the aesthetic, recreational, scientific or other environmental quality.
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	The proposed activity would not affect any known Aboriginal or non-Aboriginal heritage items or sites (refer to Section 5.5 and 5.6).
f. any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)	The proposed activity would not affect the habitat of any protected fauna.
g. any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air	The proposed activity would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.
h. any long-term effects on the environment	The proposed activity would not result in any long-term impacts on the environment as the transmission line would continue to operate in a similar manner to which it currently does.
i. any degradation of the quality of the environment	During construction, there would be potential minor degradation of the quality of the environment due to traffic, noise, dust, and visual impacts. These impacts

Factor	Potential Impact
	would be short term and managed appropriately through the implementation of mitigation measures.
j. any risk to the safety of the environment	During construction, there would be a minor risk to the environment from soil movement from the excavated material. This risk would be minimised through the implementation of mitigation measures.
k. any reduction in the range of beneficial uses of the environment	There would be no reduction in the range of beneficial uses of the environment.
l. any pollution of the environment	During construction, potential pollution may occur from an increase in vehicle emissions, noise, dust and oil and chemical spills. These impacts would be managed through the implementation of appropriate mitigation measures.
m. any environmental problems associated with the disposal of waste	Excavated material would be reused on site where appropriate. Any additional waste would be disposed of, to appropriately licensed facilities.
n. any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	No increased demands on resources would occur as a result of this work.
o. any cumulative environmental effect with other existing or likely future activities	Although there are other major projects within the locality (including coal mines), the proposed activity is not anticipated to contribute to a significant increase in the current disturbance level of the area. As such, no cumulative environmental effects are likely to occur.
p. any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposed activity is not located within the coastal area and would not affect any coastal processes and coastal hazards, including those under projected climate change conditions.

6.3 Matters of NES under EPBC Act

Under the EPBC Act, TransGrid 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 Environment and Energy. Table 4 provides a summary of how MNES have been considered.

Table 4: Consideration of Matters of National Environmental Significance and Commonwealth Land

MNES / Commonwealth Land	Potential Impact
Any impact on a World heritage property?	No World heritage properties are located within 500 metres of the proposed activity. None would be affected by the proposed activity.
Any impact on a National heritage place?	No National heritage places are located within 500 metres of the proposed activity. None would be affected by the proposed activity.

MNES / Commonwealth Land	Potential Impact
Any impact on any wetlands of international importance?	The proposed activity is located approximately 100 km upstream of the Hunter Estuary Wetlands. No wetlands of international importance would be affected by the proposed activity.
Any impact on a Commonwealth listed threatened species or ecological communities?	No Commonwealth listed threatened species or ecological communities would be affected by the proposed activity.
Any impacts on a Commonwealth listed migratory species?	No Commonwealth listed migratory species or their habitat would be affected by the proposed activity.
Any impact on a Commonwealth marine area?	No Commonwealth marine areas are located within 500 metres of the proposed activity. None would be affected by the proposed activity.
Any impact on the Great Barrier Reef Marine Park?	The Great Barrier Reef Marine Park would not be affected by the proposed activity.
Does the proposed activity involve a nuclear action (including uranium mines)?	The proposed activity does not involve a nuclear action (or uranium mines).
Does the proposed activity involve a water resource, in relation to coal seam gas development and large coal mining development?	The proposed activity is not a coal seam gas development or a large coal mining development.
Is the proposed activity likely to have a significant impact on the environment on Commonwealth land	The proposed activity would not be undertaken on Commonwealth land. There would be no significant impacts on the environment on Commonwealth land.

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

Obligations under the *Environmental Planning and Assessment Act 1979* and the *Energy Services Corporations Act 1995* require that TransGrid 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; and
- > Improved valuation, pricing and incentive mechanisms.

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

6.4.1 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 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.

6.4.2 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 both current and projected electricity supply requirements, and thus caters for the electricity needs of both current and future generations. In addition, any potential short-term and long-term adverse environmental impacts would be minimised with the implementation of appropriate mitigation measures.

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.

6.4.3 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 TransGrid’s activities. The design of the activity has been selected with consideration of avoiding and minimising impacts to biological diversity and preserving ecological integrity.

An assessment of ecological impacts was undertaken as part of this Summary Environmental Report (refer to Section 5.4). It is unlikely that the biological diversity and ecological integrity of the proposed activity’s area would be compromised as the mitigation measures proposed in Section 5.4.3 would further minimise impacts on ecology.

6.4.4 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 Summary Environmental Report 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.

7. Environmental Management

7.1 Construction Environmental Management

TransGrid is committed to conducting its activities and services, including the current proposed activity, in a manner that minimises pollution, environmental impacts, and complies with relevant legislation, industry standards and codes of practice. To achieve this, TransGrid maintains an Environmental Management System (EMS) that is certified under the international standard ISO 14001. All activities undertaken for the activity would be consistent with the EMS.

As a result of the detailed environmental assessment undertaken in this SER, mitigation measures have been recommended for implementation. Appendix A provides a compilation of the mitigation measures proposed for the activity. These mitigation measures form an integral part of the activity and have been taken into account in considering the likely significance of the activities impacts. Where the mitigation measures in technical reports differ from those listed in Appendix A, the mitigation measures contained in Appendix A take precedence.

A Site Environmental Plan (SEP) shall be prepared and submitted to TransGrid. The SEP shall contain specific mitigation measures identified in this SER and shall detail:

- > The location and extent of known environmental constraints and sensitivities near the site (heritage sites and EECs).
- > The work site layout (such as vehicle parking, equipment lay-down, spoil locations).
- > The extent of earthwork and the appropriate soil erosion and sedimentation control measures to be implemented at the site (such as stormwater diversions, sediment fencing).

All workers shall be inducted onto the SEP (including maps and mitigation measures), site environmental conditions and sensitivities identified in this SER, and receive training as appropriate. All workers shall also be advised of any changes to work scope, environmental site conditions or management plans.

An Environmental Inspector shall be appointed by TransGrid to regularly audit the work activities to ensure that all mitigation measures are being effectively applied and that the work is being carried out in compliance with all environmental approval and legislative conditions.

All complaints received during the activity shall be recorded within a complaints register. Any environmental incidents shall be registered in TransGrid's Asset and Risk Management System and managed in accordance with TransGrid's procedures.

7.2 Operational Environmental Management

The operation of the activity would be managed in accordance with TransGrid's certified Environmental Management System, which includes detailed maintenance procedures to minimise potential environmental impacts. Details of the environmental constraints identified as part of this environmental impact assessment, that are relevant to the ongoing operation and maintenance of the asset, would be included in TransGrid's Geographical Information System (GIS). Due diligence environmental checks, including environmental information generated from GIS where relevant, are undertaken before any maintenance works are carried out.

8. Conclusion

The cruciform installation has been assessed under Part 5 of the EP&A Act and this Summary Environmental Report has been prepared in accordance with relevant legislation, including but not limited to Section 111 of the EP&A Act, Clause 228 of the EP&A Regulation and the Commonwealth EPBC Act. Actions to mitigate (prevent, minimise, or offset) potential and likely impacts have been prescribed in Appendix A. These measures shall be implemented in undertaking the activity.

This Summary Environmental Report 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.

Considering the assessment of the impacts detailed in this Summary Environmental Report, it is concluded that the activity **is not likely to have a significant impact on the environment**. Therefore, an Environmental Impact Statement under s. 112 (1) of the EP&A Act is not required, and Part 5.1 of the Act is not triggered.

In addition, it is concluded that the activity is not likely to significantly affect threatened species, populations, ecological communities or their habitats and therefore a Species Impact Statement is not required.

TransGrid is therefore able to make a determination of the activity's impacts based on this Summary Environmental Report.

This Summary Environmental Report is limited to the assessment of the activity described in Section 3. Supplementary assessment and determination in accordance with the *Environmental Planning and Assessment Act 1979* would be required for:

- (a) works outside of the scope of work assessed in this environmental impact assessment, for which the environmental impact has not been considered; or
- (b) modifications to the activity scope, methodology or recommended mitigation measures, that alter the environmental impact assessed in this environmental impact assessment.

9. References

Australian Bureau of Statistics, 2011 Census QuickStats, Mandalong, http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/SSC11451?opendocument&navpos=220

DECC, 2009, *Interim Construction Noise Guideline*, Department of Environment and Climate Change, July 2009.

DECCW, 2009, *Waste Classification Guidelines*, Department of Environment, Climate Change and Water (DECCW), Sydney.

ICNIRP – International Commissioning on Non-Ionizing Radiation Protection. 2010. Guidelines for limiting exposure to time-varying electric and magnetic fields (1Hz – 100 kHz).

Landcom, 2004, *Managing Urban Stormwater: Soil and Construction Volume 1*,

Rasmus P.L., Rose D.M. and Rose G., 1969, *Singleton 1:250 000 Geological Sheet SI/56-01, 1st edition*, Geological Survey of New South Wales, Sydney

Appendix A Summary of Mitigation Measures

Mitigation Measures

Environmental Management

EM1	A Site Environmental Plan (SEP) shall be prepared and submitted to TransGrid prior to the commencement of works. The SEP shall contain specific mitigation measures identified in this SER and shall detail: > The location and extent of known environmental constraints and sensitivities near the site. > The work site layout (such as vehicle parking, equipment lay-down, spoil locations). The extent of earthwork and the appropriate soil erosion and sedimentation control measures to be implemented at the site (such as stormwater diversions, sediment fencing)
EM2	All workers shall be inducted onto the SER, site environmental conditions and sensitivities identified in this SER and receive training as appropriate. Records shall be kept of this induction and training.
EM3	An Environmental Supervisor shall be included as part of the construction staff to oversee implementation of the SEP and to ensure that all mitigation measures are being effectively applied.
EM4	All incidents and near misses shall be reported to TransGrid. All pollution incidents that threatens or harms the environment shall be reported immediately to relevant authorities, and TransGrid, in accordance with the <i>Protection of the Environment Operations Act 1997</i> (POEO Act).

Land Use

LU1	Any access on areas controlled by Centennial Coal shall be in accordance with their requirements (e.g. inductions).
LU2	All affected landowners and/or occupiers shall be consulted regarding the construction works prior to commencement of works at their property.
LU3	Exposed cruciform foundations and stockpile locations shall be clearly delineated and made safe to minimise health and safety risks for the landowners and the public.

Geology and Soils

GS1	An Erosion and Sediment Control Plan (ESCP) shall be prepared for the proposed activity. All erosion and sediment control measures shall be designed, implemented and maintained in accordance with relevant sections of “<i>Managing Urban Stormwater: Soil and Construction Volume 1</i>” (Landcom, 2004) (‘the Blue Book’) (particularly Section 2.2) and “<i>Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services</i>” (DECC, 2008)”. The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, and site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion.
GS2	Construction plant and vehicles shall be cleaned of any mud or soils prior to access onto public roads. Vehicles and equipment shall remain on existing roads and defined site access tracks.

GS3	Environmental spill kits containing spill response materials suitable for the works being undertaken shall be kept on site at all times and be used in the event of a spill.
GS4	All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 130% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s shall be shown on the ESCP.
Hydrology and Water Quality	
HW1	Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering waterways (including stormwater drains) or migrating off-site.
HW2	Any bulk fuel/herbicide or hazardous material transport vehicles shall be parked on level ground a minimum of 40m away from waterways (including drainage and irrigation channels). No refuelling or bulk herbicide preparation shall occur within 40 metres of a waterway or open site drains.
HW3	Any spills of oil, fuel and other liquids shall be cleaned up promptly and immediately reported to the TransGrid site representative.
Ecology	
EC1	Disturbed sites shall be stabilised, and areas not required for operation shall be returned to as close to their original condition as soon as possible.
EC2	Weed control mitigation and management strategies shall be documented and implemented in accordance with the SEP. All herbicide use shall be in accordance with TransGrid requirements, and only TransGrid approved herbicides shall be used. Weed control strategies shall include: > Vehicle check procedures, including wash/brush down if required, to reduce the spread of weeds via vehicles and machinery. > Mitigation of noxious and problematic weeds and pests should they be found at the activity site.
EC3	All hot works shall be undertaken in accordance with TransGrid's <i>Hot Work Procedure</i> .
EC4	No fires or burning of materials shall occur on site.
Heritage	
HE1	In the event that a site or artefact (as defined by the <i>National Parks and Wildlife Act 1974</i> or <i>Heritage Act 1977</i>) is identified during construction works, works would cease at the location. The find would be immediately reported to TransGrid, and the regulator in accordance with legislation. No work would commence in the vicinity of the find until any required approvals have been given by the regulator.
Noise and Vibration	
NV1	Noise generating works shall be in accordance with the <i>Interim Construction Noise Guideline</i> (DECC, 2009): > 7:00am – 6:00pm Monday to Friday. > 8:00am – 1:00pm Saturdays. > No work on Sundays or Public Holidays. Work outside normal hours, on Sundays and public holidays shall 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. Other noise generating works outside of the standard construction hours shall require the formal written consent of TransGrid and require justification in accordance with the Guideline.
NV2	Affected neighbouring properties shall be notified as to the timing and duration of the construction works at least 7 days prior to commencing work.

Traffic and Access

TA1	Upgrades of existing access tracks required for the completion of the works shall be constructed in accordance with the approved plan of work that shall comply with the <i>Soils and Construction Volume 2C Unsealed Roads</i> (DECC, 2008).
TA2	Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the SEP and updated as required. This shall include: > The management of the delivery of equipment and materials. > Access to and from the site including nominated roads and site access tracks. > Parking. > Speed limits.

Air Quality and Climate Change

AQ1	Vehicles and equipment shall be maintained in accordance with the manufacturer's specifications.
AQ2	If necessary, dust suppression techniques shall be implemented, and incorporated into the ESCP, as per the techniques outlined in the "Blue Book", such as water spraying of surfaces and covering stockpiles.
AQ3	All surplus soils and materials from excavations, which cannot be reused on site, shall be removed from site by covered trucks.
AQ4	Air quality mitigation and management strategies shall be documented and implemented in accordance with the SEP. This shall include: > Reducing vehicle speeds when in the vicinity of residences to minimise the generation of nuisance dust. > Progressively revegetating or otherwise rehabilitating disturbed areas as works are completed.
AQ5	Materials shall be sourced from local suppliers, where feasible, to reduce the distance that materials need to be transported to the site.
AQ6	Residual raw materials shall be returned to the supplier, resold or reused at another site at the end of the activity or recycled.

Visual Amenity

VA1	All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.
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Waste	
WA1	All waste, including surplus soils, which cannot be reused shall be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.
WA2	Concrete trucks shall be permitted to flick wet wipe their discharge chutes with the effluent discharged into prepared bored holes, prepared excavations/formwork or a watertight receptacle for disposal (to be shown on the ESCP). No concrete washout is permitted. All surplus concrete shall be returned to the concrete suppliers for recycling and not be discharged on site.
WA3	Waste mitigation and management strategies shall be documented and implemented in accordance with the SEP, TransGrid Waste Procedures and associated Work Instructions. This shall include: > Waste management facilities on-site including their set-up, use, management removal and waste tracking documentation. > Waste hierarchy application including information demonstrating the reduction of the amount of waste produced and the maximised reuse and recycling opportunities utilised. > Appropriate waste management across all possible waste items produced.
Electric and Magnetic Fields	
EF1	N/A
Social and Economic Considerations	
SE1	N/A
Cumulative Impacts	
CU1	N/A