

## Sydney West 330kV Substation – Battery Energy Storage System (BESS) Installation

### Proposed Activity Summary

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TransGrid is the proponent for the Sydney West 330kV Substation – Battery Energy Storage System (BESS) Installation, and the Summary Environmental Report (SER) for the proposed activity was approved in April 2020. Additional works are required due to detailed design which includes the repositioning of the proposed BESS bench requiring removal of up to three additional trees and installation of additional ancillary equipment within the proposed BESS bench (the proposed modified activity).

The proposed modified 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).

An Addendum SER was prepared by TransGrid (July 2020) to assess the potential impacts of the proposed modified activity. The Addendum 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

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I, BRIAN SALTER, as an authorised person on behalf of TransGrid, have examined and considered the Addendum SER for the Sydney West 330kV Substation – BESS Installation in accordance with section 5.5 of the EP&A Act.

As per the requirements of section 2.5.1 of the Code, I have not been involved in conducting the assessment.

The proposed activity is not likely to significantly affect the environment, and is not likely to significantly affect threatened species, ecological communities or their habitats and is not to be carried out on land that is, or is part of a declared area of outstanding biodiversity value.

I determine, on behalf of TransGrid, 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 Addendum SER.

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



Brian Salter

EM/ Legal Governance and Risk

TransGrid

Date: 28/07/2020



**TransGrid**

## **Addendum Summary Environmental Report**

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**Sydney West 330kV Substation – Battery Energy  
Storage System (BESS) Installation**

Part 5 EP&A Act Environmental Impact Assessment

July 2020

## Document Preparation History

Revision	Reviewed By	Date
01	Denise Lo	15/07/2020

## 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.

<b>Addendum SER Prepared By</b>	Avi Thakur
<b>Signed</b>	
<b>Date</b>	27/07/2020
<b>Designation</b>	Environmental Planner
<b>Qualification</b>	Master of Planning, Bachelor of Civil Engineering
<b>Organisation</b>	TransGrid

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# 1. Introduction

## 1.1 Background

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A Summary Environment Report (SER) was prepared by TransGrid for the Sydney West 330kV Substation – Battery Energy Storage System (BESS) Installation and was determined in April 2020.

The approved activity described in the SER includes the installation of BESS units, a power transformer, ancillary equipment / facilities on a new bench within the existing TransGrid property boundary and installation of a new switchbay within the existing substation bench.

A modification to the proposed activity is required due to detailed design which includes the repositioning of the proposed BESS bench, requiring removal of up to three additional trees, and installation of additional ancillary equipment within the proposed BESS bench. Furthermore, there is an increase in predicted noise power levels of the BESS units than originally assessed in the SER.

## 1.2 Purpose of the Addendum SER

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The purpose of this Addendum SER is to describe the modified proposed activity, assess the potential impacts on the environment, identify any additional mitigation measures that should be implemented and determine whether the modified proposed activity can proceed.

This Addendum SER only addresses the changes to the Sydney West 330kV Substation – BESS Installation. For an understanding of the entire activity, this Addendum SER should be read in conjunction with the original SER the Sydney West 330kV Substation – Battery Energy Storage System (BESS) Installation (April 2020).

This Addendum SER has been prepared to address the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act), clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and the *NSW Code of Practice for Authorised Network Operators* (IPART, 2015). For the purpose of the works described in this Addendum SER, TransGrid is the proponent and the determining authority under Part 5 of the EP&A Act.

## 2. Proposed Activity

### 2.1 Description of the Approved Activity

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The key features of the determined activity as described in the SER include:

- > Construction of a new bench (approximately 115 m x 35 m) for the installation of the BESS within the TransGrid property boundary which includes:
  - Installation of 10 BESS units, which includes 33kV transformers and battery arrays;
  - Installation of a 132/33kV power transformer which includes auxiliary transformer, disconnecter and oil containment system;
  - Installation of two 33kV switchgears (current transformers and circuit breakers) and associated cabling;
  - Installation of a secondary systems control room;
  - Installation of 132kV underground cabling between the new bench and existing substation via new trenching / conduits;
  - Installation of welded-mesh fencing around the BESS bench area; and
  - Construction of a new access road within the new bench;
- > Construction of a new 132kV switchbay on the existing substation bench, which includes a voltage transformer, circuit breaker, disconnectors, post-insulators and cable sealing end structure; and
- > Installation of cabling in existing and new conduits / trenches within the existing substation bench.

### 2.2 Description of the Proposed Modified Activity

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Changes to the proposed activity include:

- > Repositioning of the BESS bench by approximately 10 m south-west of originally proposed location and a minor increase in the bench area (approximately 120 m x 40 m compared to approximately 115 m x 35 m in the original SER);
- > Reduction in number of the BESS units to be installed from ten to nine, each BESS units containing 4 BESS megapacks, totalling up to 36 BESS megapacks;
- > Higher noise outputs from each BESS megapack;
- > Installation of ancillary equipment such as isolation transformer, surge arrestors and earth switches within the BESS bench;
- > Change in underground cabling trench dimensions from approximately 0.5 m wide and up to 1 m depth to approximately 1.5 m wide and up to 1.2 m depth; and
- > Removal of up to three additional trees (identified in Figure 1).

The indicative layout of proposed modified bench is shown in Figure 1 below:



Figure 1: Indicative modified BESS bench layout

## **2.3 Description of the Construction for the Proposed Modified Activity**

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### **2.3.1 Construction Methodology**

The construction methodology for the proposed modified activity mainly remains the same as per section 1.5.1 of the SER (TransGrid, 2020), besides the construction of oil containment tank. Changes in construction methodology of oil containment tank has been described below:

#### **Oil Containment Tank**

The oil containment tank would be cast in-situ, adjacent to the power transformer, to contain any potential oil spill, instead of being manufactured off-site and delivered to the site via trucks, as assessed in the original SER. The oil containment tank is expected to be up to 15 m long and up to 3 m in diameter and would be semi-embedded (up to 1.5 m in depth) with a portion of the tank below the ground surface level and the remaining portion above the surface level. The oil containment tank would be connected to the power transformer via an underground oil spill line requiring minor trenching.

The exact dimensions of the oil containment tank would be confirmed during detailed design.

#### **Surge Arrestors and Earth Switches**

Installation of surge arrestors and earth switches would also be required within the BESS bench and each would require minor footings works of approximately 3 m x 3 m and up to 1.5 m in depth.

#### **Isolation Transformer**

The isolation transformer would be installed on a concrete slab approximately 3 m x 3 m and up to a depth of 0.5 m. The transformer would be secured on the slab using bolts.

### **2.3.2 Plant and equipment**

The construction plant and equipment to be used for the proposed modified activity remain the same as per section 1.5.2 of the SER (TransGrid, 2020).

### **2.3.3 Construction Schedule and Hours**

The schedule and construction hours for the modified proposed activity would be consistent with the construction hours previously described in Sections 1.5.3 and 1.5.4 of the determined SER (TransGrid, 2020).



# 3. Planning Context

## 3.1 Relevant Legislation

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Section 3 of the SER considered the Commonwealth and NSW legislation applicable to the proposed activity, and additional permits/ approvals required to be obtained. The proposed modified activity continues to be consistent with the legislation considered in the SER.

The modified activity would not result in any changes to the approval pathway, being Part 5 of the EP&A Act and also would not change the classification of the proposed activity as Class 3 - SER in accordance with the NSW Code of Practice for Authorised Network Operators.

## 4. Consultation

Section 3.3 of the SER (TransGrid, 2020) outlines consultation that was undertaken for the determined activity and considers applicable consultation and notification requirements. No additional consultation is required under State Environmental Planning Policy (Infrastructure) 2007 (ISEPP), the EP&A Act and the *Electricity Supply Act 1995*. No additional community consultation was deemed required as no additional impacts on the community were identified and the modified activity is substantially the same as the activity described in the SER.

# 5. Environmental Impact Assessment

This section of the Addendum SER provides a detailed description of the potential environmental impacts associated with the proposed change to the activity.

## 5.1 Existing Environment

The existing environment is generally consistent with the existing environment described in the SER.

## 5.2 Impact Assessment

Table 1 assesses the change in, or additional impacts from the modified proposed activity. It addresses any construction or operational impact changes.

Table 1: Change to Environmental Impacts from the Modified Proposed Activity

Environmental Issue	Changes to Impacts
Land Use	As the proposed bench is entirely within TransGrid's existing property boundary and close to its original proposed position, impacts associated with the modified activity would be consistent with those described in the SER.
Geology and Soils	Impacts associated with the modified activity would be generally consistent with those described in the SER. There may be a minor risk of erosion and sedimentation due to the excavation associated with the minor increase in the proposed bench area and underground cabling trench, and additional ancillary equipment footing / slab (isolation transformer, surge arrestors and earth switches), however it is not likely that additional erosion and sedimentation impacts would occur.
Hydrology and Water Quality	Impacts associated with the modified activity would be consistent with those described in the SER.
Ecology	<p>Due to the proposed move of the BESS bench further south, two additional trees would be removed, and one additional tree, east of the BESS bench (refer Figure 1), may be removed to provide access for over-sized over mass (OSOM) vehicles for delivery of the power transformer.</p> <p>A site visit by a TransGrid environmental officer was undertaken on 22 June 2020 to examine the trees proposed to be removed. The two trees south of the BESS bench were identified as Grey Box (<i>Eucalyptus moluccana</i>) and the tree east of the BESS bench was identified as Forest Red Gum (<i>Eucalyptus tereticoris</i>). Both the Grey Box and Forest Red Gum are identified as one of the assemblage of species characteristic of Cumberland Plain Woodland (CPW). The trees are semi-mature, at approximately 10-14 m tall. No nests or hollows were identified, which could represent potential habitat for fauna species.</p>

Environmental Issue	Changes to Impacts
	<p>The trees proposed to be removed do not meet the criteria of CPW (Environment NSW, 2020) for the following reasons:</p> <ul style="list-style-type: none"> <li>&gt; While there are planted CPW and regrowth remnant CPW in close proximity, these trees south are considered to exist outside these patches of vegetation, including the Forest Red Gum east of the BESS bench which is separated by the vegetation patch by approximately 10 m;</li> <li>&gt; The trees do not form part of the open tree canopy characteristic of CPW;</li> <li>&gt; The trees are surrounded by grassland dominated by exotic species, and does not include a near-continuous groundcover dominated by grasses and herbs.</li> </ul> <p>Since the trees are not considered to be part of the CPW vegetation community and do not provide habitat to any threatened fauna species, removal of the trees would not have a significant impact on threatened flora or fauna.</p> <p>However, removal of the Forest Red Gum east of the BESS bench shall be avoided, if possible. Minor pruning of the tree to allow for OSOM access shall be undertaken where possible.</p>
Aboriginal Heritage	Impacts associated with the modified activity would be consistent with those described in the SER.
Non-Aboriginal Heritage	Impacts associated with the modified activity would be consistent with those described in the SER.
Noise and Vibration	<p>TransGrid commissioned ERM to prepare a noise impact assessment (ERM, 2019) based on concept noise power levels of the original BESS units (75 dBA at 1 m) as part of the original SER. However, following detailed design of BESS units, an increase BESS megapack's sound power levels (&lt;75 dBA at 10 m) was identified. Further noise re-modelling was undertaken by ERM (ERM, 2020) and an accompanying noise impact assessment memorandum was prepared and has been attached in Appendix B.</p> <p>Noise modelling undertaken, incorporating both normal and noise enhancing meteorological conditions, determined that the operation of the BESS would not result in any predicted operational noise levels above the project specific noise criteria at the surrounding potentially sensitive receptor locations during daytime, evening or night-time periods. The construction noise levels are expected to remain unchanged.</p> <p>The noise modelling did not include isolation transformer, given the sound power level of isolation transformer (&lt;60 dBA) is significantly lower than other equipment in close proximity, it is not expected to significantly impact the overall noise emission from the BESS bench.</p> <p>The operational noise compliance has been achieved with the assumption that each BESS megapacks would achieve a maximum Sound Power Level</p>

Environmental Issue	Changes to Impacts
	(Lw) of 98.1 dBA for daytime / evening periods, and an Lw of 93.2 dBA for night time, and each new BESS 33kV transformers would achieve an Lw of 68 dBA and the power transformer would achieve an Lw of 95 dBA. Isolation transformer would achieve an Lw of <60 dBA.
Traffic and Access	Impacts associated with the modified activity would be consistent with those described in the SER.
Air Quality and Climate Change	Impacts associated with the modified activity would be consistent with those described in the SER.
Visual Amenity	Impacts associated with the modified activity would be consistent with those described in the SER.
Waste	There would be a minor increase in excavated spoil associated with the BESS bench area, additional ancillary equipment footing / slab (surge arrestors and earth switches) and underground cabling trench, however impacts would be consistent with those described in the SER.
Electric and Magnetic Fields (EMF)	Impacts associated with the modified activity would be consistent with those described in the SER.
Social and Economic Considerations	Impacts associated with the modified activity would be consistent with those described in the SER.
Cumulative Impacts	Impacts associated with the modified activity would be consistent with those described in the SER.

### 5.3 Summary of Impacts

The impacts of the proposed modified activity are considered consistent with the original SER. Actions to mitigate potential and likely impacts have been prescribed in the original SER and this addendum (refer to Section 6). These measures shall be implemented in undertaking the activity. Considering the assessment undertaken within this addendum, it is considered that the environmental risk from potential impacts is low.

# 6. Mitigation Measures

A review of the mitigation measures in the SER was undertaken and changes / additions to these measures are required as a result of the proposed modified activity as shown in Table 2. An updated consolidated list of mitigation measures is included in Appendix A of this document.

**Table 2: Changes to Mitigation Measures & Additional Mitigation Measures**

Mitigation Measures	
<b>Ecology</b>	
EC1	Removal of the Forest Red Gum, east of the BESS bench (refer Figure 1), shall be avoided, if possible. Pruning of the tree to allow access for OSOM shall be undertaken where possible.
EC2	<p>A suitably qualified person must supervise the removal of all trees and ensure the following steps are undertaken prior to and after tree removal:</p> <ul style="list-style-type: none"> <li>&gt; Tap along trunk to scare fauna from hollows. Repeat several times.</li> <li>&gt; Re-check after felling to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely located to nearby habitat.</li> <li>&gt; If taking the tree down in stages, the non-hollowing bearing branches should be removed before the hollow-bearing branches are removed.</li> <li>&gt; Take care when moving equipment near vegetation to be retained (all vegetation not marked in Figure 1).</li> </ul>
<b>Noise</b>	
NV2	<p><del>The proposed BESS shall achieve a noise level of 75 dBA at 1 metre and the power transformer shall achieve a Sound Power Level (Lw) 95 dBA.</del></p> <p>The BESS units shall achieve a maximum Sound Power Level (Lw) of 98.1 dBA for daytime / evening periods, and an Lw of 93.2 dBA for night time, while each new BESS 33kV transformers shall achieve an Lw of 68 dBA, and the power transformer shall achieve an Lw of 95 dBA. Isolation transformer would achieve an Lw of &lt;60 dBA.</p>

# 7. Consideration of Statutory Factors

## 7.1 Section 5.5 and 5A of the EP&A Act

Under Section 5.5 of the EP&A Act, the determining authority (being TransGrid), has a duty to consider all matters affecting or likely to affect the environment by reason of the proposed modified activity and the effects on any wilderness area. Table 3 provides a summary of how each of the factors has been considered for the proposed modified activity.

**Table 3: Consideration of Section 5.5 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.	This Addendum SER has addressed the environmental impacts of the amended proposed activity.
2. Without limiting subsection 1, 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.	No change from the SER.

## 7.2 Section 7.3 of the Biodiversity Conservation Act 2016

Under Section 7.3 of the *Biodiversity Conservation Act 2016*, the determining authority (being TransGrid) has a duty to take into account whether there is likely to be a significant effect on threatened species, or ecological communities, or their habitats or whether the activity is to be carried out in a declared area of outstanding biodiversity value.

The proposed modified activity is not likely to significantly affect threatened species, or ecological communities, or their habitats and would not be carried out in an area of declared outstanding biodiversity value.

## 7.3 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 4 provides a summary on how each of the Clause 228 factors has been considered for the proposed modified activity.

**Table 4: Consideration of Clause 228 factors**

Factor	Potential Impact
a. any impact on a community	No change from the SER.
b. any transformation of a locality	No change from the SER.
c. any environmental impact on the ecosystems of the locality	No change from the SER.

Factor	Potential Impact
d. any reduction of the aesthetic, recreational, scientific or other environmental quality	No change from the SER.
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	No change from the SER.
f. any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i> )	Removal of three additional trees would not have a significant impact on threatened flora or fauna as the three trees did not meet the criteria of CPW and do not provide habitat for any threatened species.
g. any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air	No change from the SER.
h. any long-term effects on the environment	No change from the SER.
i. any degradation of the quality of the environment	No change from the SER.
j. any risk to the safety of the environment	No change from the SER.
k. any reduction in the range of beneficial uses of the environment	No change from the SER.
l. any pollution of the environment	No change from the SER.
m. any environmental problems associated with the disposal of waste	No change from the SER.
n. any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	No change from the SER.
o. any cumulative environmental effect with other existing or likely future activities	No change from the SER.
p. any impact on coastal processes and coastal hazards, including those under projected climate change conditions	No change from the SER.

#### 7.4 Matters of National Environmental Significance (MNES) under EPBC Act

Under the EPBC Act, TransGrid is required to consider matters of national environmental significance (MNES) and impacts to Commonwealth land, to assist in determining whether the proposed activity should be referred to the Commonwealth Department of Agriculture, Water and the Environment.

The proposed modified activity would not affect Commonwealth land or have an impact on any MNES.



## 8. Conclusion

The Sydney West 330kV Substation – BESS Installation has been assessed under Part 5 of the EP&A Act and this Addendum SER has been prepared in accordance with relevant legislation, including but not limited to Section 5.5 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 Addendum SER provides a true and fair review of the proposed modified 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 modified activity above and beyond the existing impacts assessed as part of the determined SER.

Considering the assessment of the impacts detailed in this Addendum SER, it is concluded that the activity **is not likely to have a significant impact on the environment**. Therefore, an Environmental Impact Statement under s. 5.7 (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.

This conclusion has been based on the assessment undertaken within this Addendum SER.

TransGrid is therefore able to make a determination of the activity's impacts based on this Addendum SER.

Supplementary assessment and determination in accordance with the EP&A Act would be required for:

- (a) works outside of the scope of work assessed in the original SER and this Addendum SER, 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 the original SER and this Addendum SER.

## Appendix A Summary of Mitigation Measures

Mitigation Measures	
Environmental Management and Incident Response	
EM1	A Construction Environmental Management Plan (CEMP) shall be prepared and submitted to Environment HSE /TransGrid for review and endorsement four weeks prior to the commencement of works, including site establishment. The CEMP shall be prepared in accordance with TransGrid's procedure <i>Preparation of a Construction Environmental Management Plan</i> .
EM2	All works shall be undertaken in accordance with the TransGrid Environmental Handbook.
EM3	All workers shall be inducted onto the CEMP, site environmental conditions and sensitivities identified in this SER and receive training as appropriate. Records shall be kept of this induction and training.
EM4	An Environmental Supervisor shall be included as part of the construction staff to oversee implementation of the CEMP and to ensure that all mitigation measures are being effectively applied.  In addition to the Contractor's Environmental Supervisor, TransGrid shall appoint an Environmental Inspector to regularly check that the work is being carried out in compliance with all environmental approval and legislative conditions.
EM5	The following additional environmental approvals/licences/permits are required for the activity: <ul style="list-style-type: none"> <li>Road occupancy license (ROL) would be required for partial closure of Old Wallgrove Road prior to delivery of power transformer on OSOM.</li> </ul>
EM6	All environmental 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, in accordance with the <i>Protection of the Environment Operations Act 1997</i> (POEO Act).
EM7	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. Any spills shall be contained, cleaned up promptly and immediately reported to the TransGrid site representative.
EM8	All chemicals or other hazardous substances shall be stored in a bunded area and away from any drainage lines/pits. 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 Site Plans.
EM9	Any environmentally sensitive areas shall be clearly delineated and shown on Site Plans.
EM10	A SER Close Out Report shall be prepared (in accordance with the Code requirements) at the conclusion of the construction of the proposed activity to document how and whether the conditions and measures were observed, and the nature of and reasons for any non-compliance.

<b>Geology and Soils</b>	
GS1	An Erosion and Sediment Control Plan (ESCP) shall be prepared. 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)”.
GS2	Any imported fill shall be certified at source location (e.g. Quarrymaster or property owner) as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the Protection of the <i>Environment Operations Act 1997</i> (POEO Act) and the Waste Regulation.
GS3	Any excavated material suspected of showing evidence of contamination shall be sampled and analysed by a NATA Registered laboratory and managed in accordance with the Waste Classification Guidelines (EPA, 2014), the Guidelines on the Duty to Report Contamination (EPA, 2015) and the <i>Contaminated Land Management Act 1997</i> .
GS4	All oil handling shall be undertaken in accordance with TransGrid procedure Oil Management.
<b>Hydrology and Water Quality</b>	
HW1	No refuelling or bulk herbicide preparation shall occur within 40 metres of drainage lines/pits.
<b>Ecology</b>	
EC1	Removal of the Forest Red Gum, east of the BESS bench (refer Figure 1), shall be avoided, if possible. Pruning of the tree to allow access for OSOM shall be undertaken where possible.
EC2	A suitably qualified person must supervise the removal of all trees and ensure the following steps are undertaken prior to and after tree removal: <ul style="list-style-type: none"> <li>&gt; Tap along trunk to scare fauna from hollows. Repeat several times.</li> <li>&gt; Re-check after felling to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely located to nearby habitat.</li> <li>&gt; If taking the tree down in stages, the non-hollowing bearing branches should be removed before the hollow-bearing branches are removed.</li> <li>&gt; Take care when moving equipment near vegetation to be retained (all vegetation not marked in Figure 1).</li> </ul>
<b>Heritage</b>	
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 shall cease at the location and no further harm to the object shall occur. The find shall be immediately reported to TransGrid, and the regulator in accordance with legislation. No work shall commence in the vicinity of the find until any required approvals have been given by the regulator. In the event that skeletal remains are encountered during the activity, works must stop immediately, the area secured to prevent unauthorised access and NSW Police, DPIE and TransGrid contacted.
<b>Noise and Vibration</b>	
NV1	Noise generating works shall be in accordance with the <i>Interim Construction Noise Guideline</i> (DECC, 2009):

	<ul style="list-style-type: none"> <li>&gt; 7:00am – 6:00pm Monday to Friday.</li> <li>&gt; 8:00am – 1:00pm Saturdays.</li> <li>&gt; No work on Sundays or Public Holidays.</li> </ul> <p>Work outside normal hours, on Sundays and public holidays shall only comprise:</p> <ul style="list-style-type: none"> <li>&gt; The delivery of materials outside normal hours requested by police or other authorities for safety reasons.</li> <li>&gt; Emergency work to avoid the loss of lives and/or property.</li> <li>&gt; Work timed to correlate with system planning outages.</li> <li>&gt; Vacuum and oil filling of equipment.</li> </ul> <p>Other noise generating works outside of the standard construction hours shall require the prior formal written consent of Environment - HSE/TransGrid and require justification in accordance with the Guideline.</p>
NV2	The BESS units shall achieve a maximum Sound Power Level (Lw) of 98.1 dBA for daytime / evening periods, and an Lw of 93.2 dBA for night time, while each new BESS 33kV transformers shall achieve an Lw of 68 dBA, and the power transformer shall achieve an Lw of 95 dBA. Isolation transformer would achieve an Lw of <60 dBA.
<b>Traffic and Access</b>	
TA1	Transportation and equipment delivery movements on public roads shall be in accordance with RMS and Council requirements.
TA2	Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the CEMP and updated as required.
TA3	A Traffic Management Plan (TMP) shall be prepared for delivery of power transformer by OSOM.
<b>Air Quality</b>	
AQ1	If necessary, dust suppression techniques shall be implemented, and incorporated into the CEMP, as per the techniques outlined in the “Blue Book”, such as water spraying of surfaces, covering stockpiles and covering surplus soils and materials during transportation.
AQ2	Air quality mitigation and management strategies shall be documented and implemented in accordance with the CEMP.
AQ3	Works would be undertaken in accordance with TransGrid’s SF6 policies and procedures.
<b>Visual Amenity</b>	
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.
<b>Waste</b>	
WA1	<p>Waste mitigation and management strategies shall be documented in the CEMP, and be in accordance with TransGrid Waste Procedures and associated Work Instructions.</p> <ul style="list-style-type: none"> <li>&gt; 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</li> </ul>

	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 recycling or disposal. No concrete washout or agitators is permitted.
<b>Electric and Magnetic Fields</b>	
EF1	All designs shall be in accordance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to EMF (ARPANSA 2010).

## Appendix B Noise Impact Assessment – Memorandum

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**Memorandum – Noise Impact Assessment – Detailed Design: Sydney West 330/132kV Substation**

<b>To</b>	TransGrid
<b>From</b>	Environmental Resources Management Pty Ltd (ERM)
<b>Date</b>	2 July 2020
<b>Reference</b>	0510554M01_F01
<b>Subject</b>	Noise Impact Assessment – Detailed Design: Sydney West 330/132kV Substation

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## 1. OVERVIEW

This memorandum (memo) presents the methodology, results and findings of the operational noise impact assessment completed for the detailed design layout of the TransGrid Sydney West 330/132kV Substation (the substation). TransGrid is proposing to install a grid-scale Battery Energy Storage System (BESS) and associated transformers at the substation. The scope of Substation upgrades includes:

- Construction of a new bench (approximately 120 m x 40 m) for the installation of the BESS within the TransGrid property boundary which includes:
  - Installation of 9 BESS units, which includes 33kV transformers and battery arrays;
  - Installation of a 132/33kV power transformer which includes auxiliary transformer, disconnector and oil containment system;
  - Installation of two 33kV switchgears (current transformers and circuit breakers) and associated cabling;
  - Installation of a secondary systems control room;
  - Installation of 132kV underground cabling between the new bench and existing substation via new trenching / conduits;
  - Installation of welded-mesh fencing around the BESS bench area; and
  - Construction of a new access road within the new bench;
- Construction of a new 132kV switchbay on the existing substation bench, which includes a voltage transformer, circuit breaker, disconnectors, post-insulators and cable sealing end structure; and
- Installation of cabling in existing and new conduits / trenches within the existing substation bench.

Further information regarding the proposed project is provided in initial noise impact assessment (NIA) *Sydney West 330/132kV Substation - Noise Impact Assessment Report, prepared by ERM dated April 2020 (0510554RP09\_F01)*.

## 2. METHODOLOGY

To assess project operational noise, the scope of work outlined in the *0510554RP09\_F01* report was undertaken for this assessment, however the site was remodelled based on the detailed design layout of the BESS. This assessment was conducted with consideration to the NSW Environment Protection Authority – *Noise Policy for Industry* (NPI, 2017), October 2017.

The substation site, the surrounding area and sensitive residential receptors relevant to this assessment are identified in **Figure 2.1** below. The general arrangement for the proposed BESS is presented in **Figure 2.2** with key noise generating equipment outlined in light-blue. Operational emission sources and detailed noise modelling data are provided in **Table 3.1**.





**Legend**

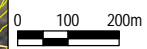
- Site Boundary
- Receptors**
- Residential (Dwelling)
- Other Sensitive (Commercial)
- Contours
- Cadastre

Source:  
DTDB, DCDB 2020  
Nearmap 22nd Feb 2020

**Noise Assessment Map**

**F2.1**

Drawing No: 051055s_SWS_G003_R0.mxd		Noise Impact Assessment Report - Western Sydney	
Date: 27/03/2020	Drawing Size: A4		
Drawn By: VN	Reviewed By: NL	Client: TransGrid	
Coordinate System: GDA 1994 MGA Zone 56			



This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.



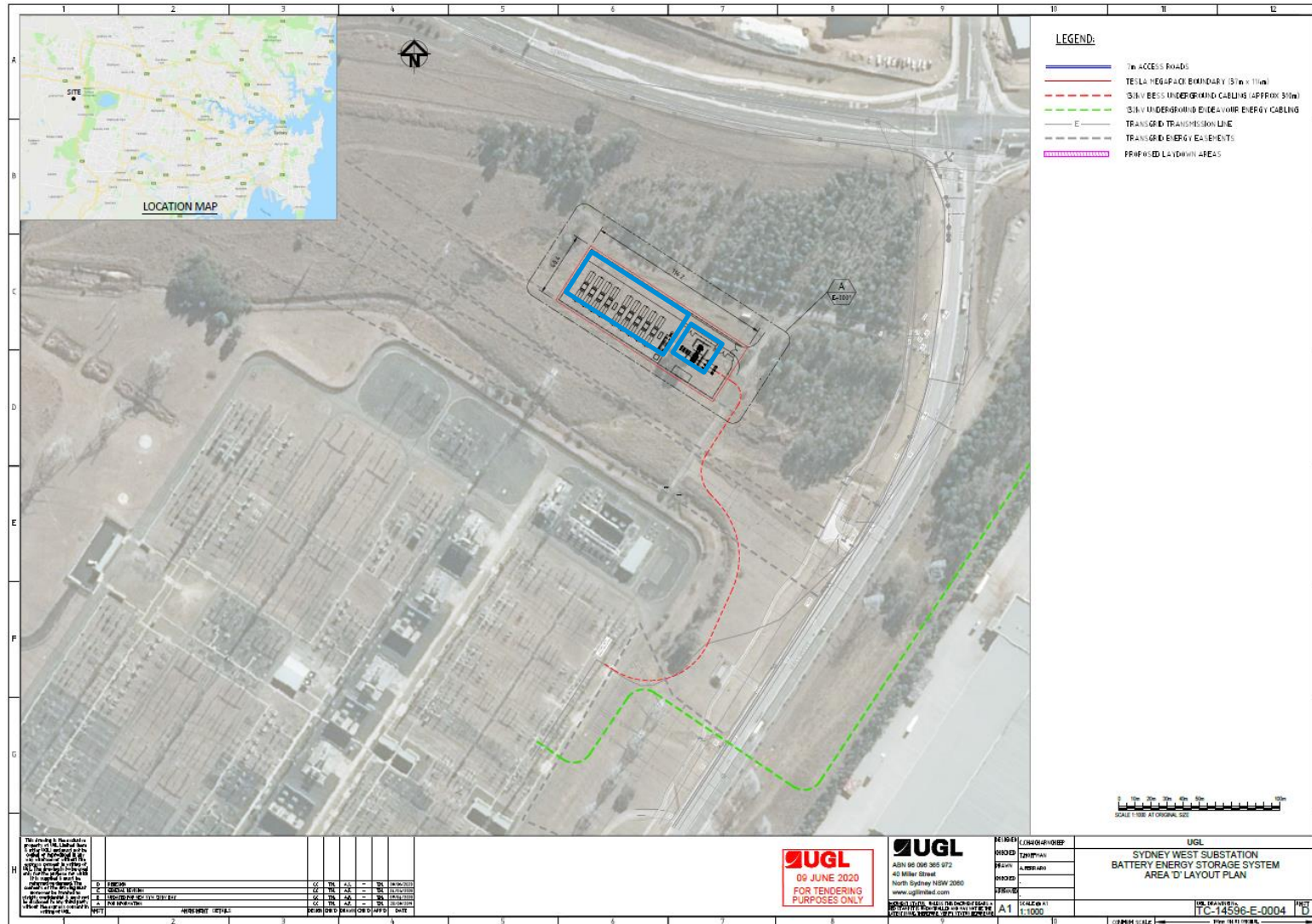


Figure 2-2 Detailed Design Layout

### 3. NOISE MODELLING INPUTS

**Table 3.1 Detailed Noise Modelling Inputs**

Asset				Comments / Mitigation	Individual Noise Source Term Data - Spectral Data in dBA									
ID	Description	Status	Sound Power Level (Lw)		31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Lw Total
Tx1	No. 1 Transformer	Existing	100	No Tx bay walls but incl. fans (Lw from AECOM 2011), increased load	55.8	77.7	95.3	92.7	96.1	86.6	81.0	75.6	62.9	100
Tx2	No. 2 Transformer	Existing	91	No Tx bay walls but incl. fans (Lw from AECOM 2011), increased load	54.5	68.3	80.8	86.9	85.4	83.0	77.7	73.4	64.2	91
Tx3	No. 3 Transformer	Existing	101	No Tx bay walls but incl. fans (Lw from AECOM 2011), increased load	61.9	77.9	94.1	97.5	94.9	88.6	86.5	78.7	66.4	101
Tx4	No. 4 Transformer	Existing	101	No Tx bay walls but incl. fans (Lw from AECOM 2011), increased load	58.2	74.4	97.2	95.3	94.7	87.9	85.2	78.8	66.0	101
Tx5	No. 5 Transformer	Existing	109	No Tx bay walls but incl. fans (Lw from AECOM 2011), increased load	66.6	78.8	90.3	101	108	98.3	92.0	78.4	71.2	109
CB1	No.1 Capacitor Bank	Existing	75	Lw from AECOM 2011 Assessment	37.2	56.8	74.1	65.6	57.8	57.2	54.6	51.0	51.3	75
CB2	No.2 Capacitor Bank	Existing	76	Lw from AECOM 2011 Assessment	37.4	57.3	75.3	62.5	62.5	59.5	55.7	53.3	51.1	76
CB3	No.3 Capacitor Bank	Existing	75	Lw from AECOM 2011 Assessment	37.2	56.8	74.1	65.6	57.8	57.2	54.6	51.0	51.3	75
CB5	No.5 Capacitor Bank	Existing	75	Lw from AECOM 2011 Assessment	37.2	56.8	74.1	65.6	57.8	57.2	54.6	51.0	51.3	75
CB6	No.6 Capacitor Bank	Existing	77	Lw from AECOM 2011 Assessment	35.3	47.0	61.9	67.4	67.7	74.7	67.3	61.6	58.6	77

Asset				Comments / Mitigation	Individual Noise Source Term Data - Spectral Data in dBA									
ID	Description	Status	Sound Power Level (Lw)		31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Lw Total
CB7	No.7 Capacitor Bank	Existing	79	Lw from AECOM 2011 Assessment	37.3	49.0	63.9	69.4	69.7	76.7	69.3	63.6	60.6	79
SVC	Static Var Compensator (SVC)	Existing	92	Lw from AECOM 2011 Assessment	61.6	76.3	89.5	85.1	81.4	81.4	76.1	69.4	63.6	92
SVC Tx (Fans)	Transformer for SVC	Existing	88	Lw from AECOM 2011 Assessment	56.0	70.5	78.2	76.8	82.3	83.9	79.0	70.1	56.6	88
SVC (Exh-Fan #1)	No. 1 SVC Building Exhaust Fan	Existing	74	Lw from AECOM 2011 Assessment	29.2	51.7	71.2	68.1	66.8	55.2	48.9	43.1	31.3	74
SVC (Exh-Fan #2)	No. 2 SVC Building Exhaust Fan	Existing	78	Lw from AECOM 2011 Assessment	33.2	55.7	75.2	72.1	70.8	59.2	52.9	47.1	35.3	78
BESS (Primary Tx)	BESS Transformer (132/33kV)	New	95	BESS 132kV Transformer specification Lw of 95dBA	50.8	72.7	90.3	87.7	91.1	81.6	76.0	70.6	57.9	95
BESS (Tx)	BESS Transformer (33kV) (Quantity x 9)	New	68	BESS 33kV Transformer specification Lw of 68dBA	23.8	45.7	63.3	60.7	64.1	54.6	49.0	43.6	30.9	68
BESS (Megapack)	BESS Megapack (Quantity x 36)	New	98.1	BESS Tesla Megapack specification Lw of 98.1 dBA at 95% fan operation (11 fans). <b>Maximum operation day/evening.</b>	63.2	70.9	71.9	86.9	94.9	93.3	88.0	75.8	71.3	98.1
BESS (Megapack)	BESS Megapack (Quantity x 36)	New	93.2	BESS Tesla Megapack specification Lw of 93.2 dBA at 60% fan operation (11 fans). <b>Maximum operation night time.</b>	58.3	66.0	67.0	82.0	90.0	88.4	83.1	70.9	66.4	93.2

## 4. PROJECT-SPECIFIC ASSESSMENT CRITERIA

The project-specific intrusiveness noise level, recommended amenity noise level (residential receptors) and the project amenity noise levels are presented in the *0510554RP09\_F01* report. These criteria represent the operational noise criteria used to assess potential impacts, with the most stringent of these values adopted as the project-specific “Noise Trigger Level”, PNTL. The PNTL for the residential receptors surrounding the Substation are outlined in **Table 4.1**.

**Table 4.1 Project-specific Noise Trigger Levels (PNTL)**

Receptor Type	PNTL Leq, 15 minute in dBA			Sleep Disturbance Criteria in dBA	
	Day	Evening	Night	Night-time only	
				Leq, 15 minute	Lmax
Residential (R01 / R02)	42	39	37	40	52
Residential (R03 to R05)	39	39	37	40	52
Commercial	63	63	63	-	-
Industrial	68	68	68	-	-

1. NPI, 2017 daytime is the period from 7 AM to 6 PM, Monday to Saturday; or 8 AM to 6 PM on Sundays and public holidays. The evening is the period from 6 PM to 10 PM, Monday to Sunday (seven days per week) and night-time is all remaining periods.

## 5. RESULTS

The potential worst-case noise generating situations (all plant and equipment operating concurrently) were considered, as applicable to the proposed operational activities outlined in **Section 1** and the equipment identified in **Table 3.1**. Based on the information provided by TransGrid, two operational sound power levels (LW) have been adopted for the BESS Tesla Megapacks. These are summarised below:

- **Daytime / Evening:** 95% fan duty cycle for maximum temperatures. This would only occur at ambient temperatures of >50°C and continuous 52MW discharge.
- **Night time:** 60% fan duty cycle, indicative of maximum operation with ambient temperatures between 20°C and 40°C.

Standard meteorological conditions and noise-enhancing meteorological conditions have been considered based on the following meteorological parameters:

- Standard meteorological conditions: daytime, evening and night Pasquill–Gifford stability Category D conditions and calm winds.
- Noise-enhancing meteorological conditions: daytime and evening Pasquill–Gifford stability Category D conditions, light source-to-receiver winds (3 m/s) and a night-time stability Category F (temperature inversion condition), light source-to-receiver winds (2 m/s).

Leq, 15 minute noise levels (in dBA) have been predicted for daytime, evening and night time operation of the substation. The predicted noise levels and a compliance assessment (comparison of predictions to PNTL) is provided in **Table 5.1** to **5.2** for each scenario. All predicted noise levels are rounded to the nearest whole decibel.

**Table 5.1 Predicted Operational Noise Levels and Compliance: Proposed Substation (Standard MET)**

ID	Scenario	Predicted Operational Noise levels Leq 15 minute in dBA			Comparison to PNTL (Predicted – Criteria) Leq, 15 minute in dBA				Compliant?
		Day	Evening	Night	Day	Evening	Night	Sleep Disturbance	
R01 <sup>1</sup>	Existing + Proposed Substation Operations (Standard MET)	35	35	34	-7	-4	-3	-6	Yes
R02 <sup>1</sup>		35	35	34	-7	-4	-3	-6	Yes
R03 <sup>1</sup>		37	37	36	-2	-2	-1	-4	Yes
R04 <sup>1</sup>		37	37	36	-2	-2	-1	-4	Yes
R05 <sup>1</sup>		36	36	35	-3	-3	-2	-5	Yes
R06a <sup>2</sup>		57	57	56	-6	-6	-7	-	Yes
R06b <sup>2</sup>		58	58	57	-5	-5	-6	-	Yes
R06c <sup>2</sup>		57	57	55	-6	-6	-8	-	Yes
R06d <sup>2</sup>		47	47	45	-16	-16	-18	-	Yes
R06e <sup>2</sup>		59	59	54	-4	-4	-9	-	Yes
R07a <sup>2</sup>		49	49	48	-14	-14	-15	-	Yes
R07b <sup>2</sup>		45	45	44	-18	-18	-19	-	Yes
R07c <sup>2</sup>		43	43	42	-20	-20	-21	-	Yes
R07d <sup>2</sup>	41	41	40	-22	-22	-23	-	Yes	

1. Residential (Dwelling)
2. Other Sensitive Receptor (Commercial)

**Table 5.2 Predicted Operational Noise Levels and Compliance: Proposed Substation (Noise Enhancing MET)**

ID	Scenario	Predicted Operational Noise levels Leq 15 minute in dBA			Comparison to PNTL (Predicted – Criteria) Leq, 15 minute in dBA				Compliant?
		Day	Evening	Night	Day	Evening	Night	Sleep Disturbance	
R01 <sup>1</sup>	Existing + Proposed Substation Operations (Noise Enhancing MET)	36	36	35	-6	-3	-2	-5	Yes
R02 <sup>1</sup>		36	36	35	-6	-3	-2	-5	Yes
R03 <sup>1</sup>		38	38	37	-1	-1	0	-3	Yes
R04 <sup>1</sup>		38	38	37	-1	-1	0	-3	Yes
R05 <sup>1</sup>		37	37	36	-2	-2	-1	-4	Yes
R06a <sup>2</sup>		58	58	57	-5	-5	-6	-	Yes
R06b <sup>2</sup>		59	59	57	-4	-4	-6	-	Yes
R06c <sup>2</sup>		58	58	56	-5	-5	-7	-	Yes
R06d <sup>2</sup>		48	48	46	-15	-15	-17	-	Yes
R06e <sup>2</sup>		59	59	55	-4	-4	-8	-	Yes
R07a <sup>2</sup>		49	49	49	-14	-14	-14	-	Yes
R07b <sup>2</sup>		46	46	44	-17	-17	-19	-	Yes
R07c <sup>2</sup>		43	43	43	-20	-20	-20	-	Yes
R07d <sup>2</sup>		41	41	41	-22	-22	-22	-	Yes

1. Residential Receptor (Dwelling)
2. Other Sensitive Receptor (Commercial)

## 6. DISCUSSION

The results presented in **Table 5.1** and **5.2** identify the following:

- Predicted Leq, 15 minute noise levels for the proposed substation operations are again between 34 and 59 dBA, for standard meteorological conditions. The highest Leq, 15 minute noise level (59 dBA) is predicted at R06e which is a commercial receptor. R03 and R04 are the closest and/or most affected residential receptors situated within the potential area of influence of the substation at which the highest Leq, 15 minute noise levels (36 to 37 dBA) are predicted.
- Predicted Leq, 15 minute noise levels for the proposed substation operations are again between 35 and 59 dBA, for noise enhancing meteorological conditions. The highest Leq, 15 minute noise level (59 dBA) is predicted at R06e which is a commercial receptor. R03 and R04 are again the closest and/or most affected residential receptors at which the highest Leq, 15 minute noise levels (37 to 38 dBA) are predicted.
- Predicted Leq, 15 minute noise levels for proposed operations are compliant with the NPI, 2017 (i.e. at or below criteria) for the daytime, evening and night-time periods at all receptors.
- Due to the nature of operational activities on the site and the absence of maximum noise generating operations, an L<sub>max</sub> model was not required. The operation of the substation equipment generally involves a constant noise emission; therefore, the Leq, 15 minute parameter is applicable to the assessment of sleep disturbance. Predicted Leq, 15 minute noise levels for proposed operations are below the Leq, 15 minute sleep disturbance criteria of 40 dBA at all applicable residential receptors. The sites night-time operations are compliant with the NPI, 2017 requirements.

Noise level measurements and analysis for annoying noise characteristics (e.g. tonality) were completed and documented in the AECOM, 2011 report. It concluded that annoying noise characteristics were not a feature of the substation's existing operation. Annoying noise characteristics associated with the BESS and its transformer are not considered a feature of the substation's proposed operation. Based on the noise source data presented in this assessment and model outputs, penalties were not applied to the results in this assessment. These findings are consistent with other similar substations and equipment (with receptors situated at distances greater than 100 metres from emission sources) that have been assessed by the authors of this report.

Based on the results and findings discussed above, recommended safeguards and/or provisions for monitoring are provided in **Section 7**. They are designed to assist TransGrid in maintaining compliance and minimise any residual impacts as far is commonly feasible, reasonable and safe to do so.



## 7. RECOMMENDATIONS

Based on the findings presented in **Sections 5 and 6**, all predicted operational Leq, 15 minute noise levels for worst-case future operations are below the PNTL at all identified receptors. The substation is deemed compliant with the NPI, 2017 for the daytime, evening and night-time periods. As such no further recommendations for noise reducing mitigation or management measures are warranted, or provided in this report. Suitable safeguards and/or provisions for monitoring have however, been recommended below to assist operational noise levels being maintained below the applicable NPI, 2017 PNTL.

### 7.1 Safeguards & Provisions

Operational compliance has been demonstrated with the assumption that each new BESS Megapack would achieve a maximum Sound Power Level (Lw) of 98.1 dBA during the daytime/evening periods and a maximum Lw of 93.2 dBA during the night time periods, each new BESS 33kV Transformer would achieve a Lw of 68 dBA and the BESS 132/33kV Transformer would achieve a Lw of 95 dBA. On this basis the following safeguards and provisions are provided:

- During equipment procurement, ensure that all new equipment achieve the operational Lw values presented in **Table 3.1**. Based on discussions with TransGrid, these Lw values can be achieved, TransGrid are committed to doing so as far as is currently considered feasible, reasonable and safe.
- All formal / reoccurring operational noise complaints should be investigated and where necessary operator attended noise validation, and compliance measurements should be undertaken to measure and compare the site noise level contributions to a) the predicted values; and b) the PNTLs presented in this memo:
  - All site noise levels should be measured in the absence of any influential source not associated with the project;
  - If the measured site noise levels are below the predicted values and comply with the PNTLs presented in this report, no further mitigation or management measures are required; and
  - If the measured site noise levels are above the predicted noise levels or PNTLs presented in this report, further mitigation and/or management measures should be considered.

## 8. CONCLUSION

The operational noise assessment identified that all predicted Leq, 15 minute noise levels for proposed operations are at or below the PNTL at all the identified receptors. The substation is compliant with NPI, 2017 requirements for all assessment periods. As such no additional recommendations for noise reducing mitigation or management measures warranted to those already implemented into the project design. Suitable safeguards and provisions for monitoring were provided as outlined in **Section 7** of this memo.

Based on the outcomes of this assessment the potential for noise impacts to nearby receptors is minimal, and these impacts (if any) would be low. The recommendations provided in this report will assist reduce project noise emissions, where necessary, to compliant levels and to minimise residual impacts as far as may be feasible, reasonable and safe to do so.

## 9. CLOSURE

Please do not hesitate to contact ERM if you have any inquiries regarding the content of this report.

For Environmental Resources Management Australia Pty Ltd

Approved – Unsecure Version

Approved – Unsecure Version

Steven De Luzuriaga  
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Jane Barnett  
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