Operational Noise and Vibration Review Addendum

Epping to Thornleigh Third Track Alliance

ALLIANCE

Operational Noise and Vibration Review Addendum

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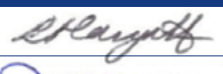
	Name	Position	Signed/Approved	Date
ORIGINATOR	Lucy Havyatt	Environment Coordinator		8/6/16
REVIEW	Reece Wilkie	Safety Health Environment and Community Manager		8/6/16
APPROVAL	Andrew Naylor	Alliance Manager		8/6/16

Details of Revisions

Rev	Date	Description
1	23/03/2016	Draft
2	8/06/2016	Submitted to DP&E for information

Contents

Abbreviations

Abbreviation	Definition
dB	Decibel- a unit used to measure sound level
dBA	A-weighted decibels, where the decibel value of noise is adjusted to approximately reflect that of human hearing, compared with unweighted decibels where no correction is made for audio frequency.
DP&E	Department of Planning and Environment
EPA RING	Environmental Protection Authority Rail Infrastructure Noise Guidelines
ETTT	Epping to Thornleigh Third Track
IGANRIP	Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects
ONVR	Operational Noise and Vibration Review
LAeq (dBA)	LAeq is the A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound
LAmax (dBA)	LAmax represents the maximum noise level (occurring during a train pass-by noise event)
NB01	Noise Barrier 01
NB02	Noise Barrier 02
NB03	Noise Barrier 03
UDLP	Urban Design and Landscaping Plan

1 Background to Operational Noise and Vibration Review

The Epping to Thornleigh Third Track Project (ETTT) involves the construction of six kilometres of new and upgraded track within the rail corridor between Epping and Thornleigh stations on the western side of the existing tracks.

The new (third) track will separate northbound freight from all-stops passenger train movements along the steep incline between Epping and Thornleigh. This will help provide additional capacity for northbound interstate container freight trains, particularly during the daytime when passenger trains currently have priority.

The Conditions of Approval of the ETTT Project required the proponent to develop an Operational Noise and Vibration Review (ONVR) to predict operational noise and vibration impacts associated with the Project and propose reasonable and feasible mitigation measures. The ETTT ONVR was prepared by the Epping to Thornleigh Third Track Alliance (the ETTT Alliance) operational noise and vibration technical advisor, SLR Consulting.

The ONVR was developed in consultation with the Environmental Protection Agency and released for public comment in May 2014. The ONVR was approved by the Department of Planning and Environment (DP&E) in December 2014. The ONVR was also independently reviewed by a third party acoustic consultant. The ONVR noted that the predicted noise levels at various properties are expected to exceed the Environmental Protection Authority Rail Infrastructure Noise Guidelines (EPA RING) and the Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (IGANRIP) noise trigger guidelines. To mitigate this, three noise barriers are being installed along the rail corridor:

1. Noise Barrier 01 (NB01) at Beecroft Station on the east side of the railway between Copeland Road and Chapman Avenue bridges at Beecroft.
2. Noise Barrier 02 (NB02) on the west side of the railway between approximately 49 and 107 Wongala Crescent, Pennant Hills.
3. Noise Barrier 03 (NB03) on the south side of the railway between approximately Hampden Road and 15 Cassia Grove, Pennant Hills.

In addition to the installation of these noise barriers, a number of properties received property treatments (e.g. reinforced windows and doors), in locations where it was not reasonable or feasible to install a noise barrier.

As the need for noise barriers was not known when the Urban Design and Landscaping Plan (UDLP) was prepared by the Alliance and approved by DP&E in 2014, the potential visual impacts of these noise barriers were not included. These have since been assessed and documented in the UDLP Addendum (dated May 2016).

The purpose of this ONVR addendum is to document the changes which have occurred since the ONVR was approved in December 2014. An overview of these changes is provided in Section 2 of this report.

2 Changes to ONVR

Following approval of the ONVR by the DP&E in December 2014, detailed design of the noise barriers was undertaken. As a result of the detailed design process, it was confirmed that some design changes were required to be implemented to those outlined in the approved ONVR. During this process the noise performance requirements were maintained as per those in the approved ONVR. In particular, the new noise barrier design differs (in comparison to the approved ONVR) for:

1. NB01 at Beecroft Station on the east side of the railway between Copeland Road and Chapman Avenue bridges at Beecroft.

2. NB02 on the west side of the railway between approximately 49 and 107 Wongala Crescent, Pennant Hills.

This document has been prepared as an addendum to the ONVR, summarising the main changes since the approval of the ONVR in 2014.

2.1. Noise Barrier 1

The approved ONVR proposed a low height noise barrier inside the rail corridor between Copeland Road and the Chapman Avenue Bridge. Further design and investigations confirmed that the low height barrier could not be built close to the track due to safety concerns and space constraints. These constraints are as a result of requiring maintenance access to the following pieces of infrastructure:

- overhead wiring stanchions
- signalling troughs
- tuning units.

Utilising a low height noise barrier would result in no safe place for track workers to carry out maintenance work.

The following table shows the differences between the low height noise barrier and the conventional noise barrier in this location.

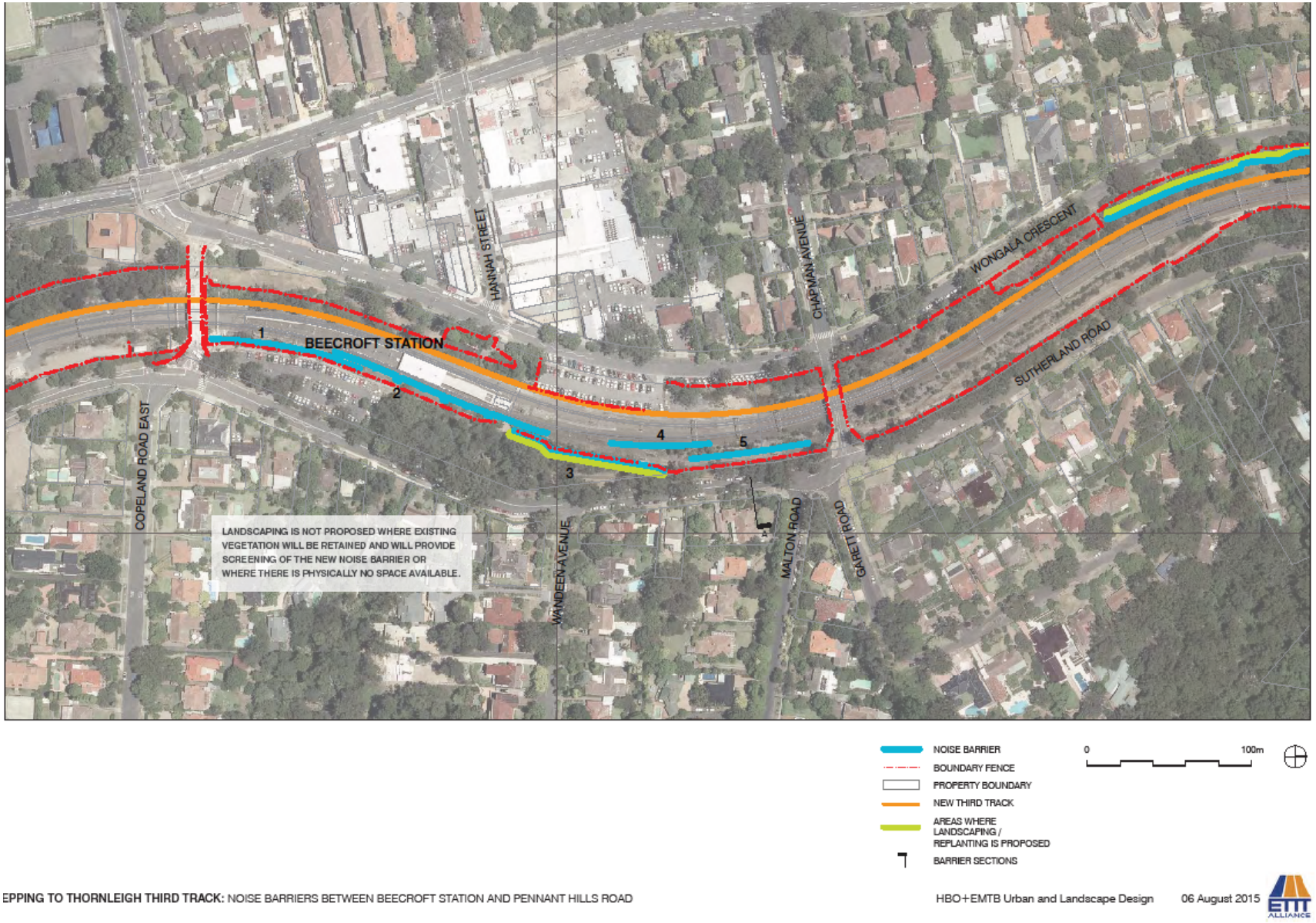
Table1. NB01 changes in design

Barrier Details	Low Height Noise Barrier	Conventional Noise Barrier
Height	1m (1m above top of track)	1.5 – 5.0m (1.5m above top of track)
Distance from track	2.25m	4.5m

As a result of the above issues, a conventional noise barrier ranging between 1.5 and 5.5 metres high, was proposed to replace the low height barrier. The barrier has been constructed in five overlapping sections along the eastern side of the rail corridor (Sutherland Road side). The barrier will provide the same acoustic benefit as the low height noise barrier.

The majority of the noise barrier is made from aerated concrete panels (providing a solid barrier between the track and residential receiver), with the remainder comprised of brick. From the existing Beecroft Station pedestrian underpass east along the commuter car park, the barrier takes the form of an upward extension of the existing brick portal. The extension of the brick portal was identified to be used (instead of the aerated concrete) as it maintains the aesthetic heritage values of the station area whilst still providing effective treatment to mitigate the noise impacts.

Figure 1. Aerial image showing the location of the five sections of noise barrier 1



EPPING TO THORNLEIGH THIRD TRACK: NOISE BARRIERS BETWEEN BEECROFT STATION AND PENNANT HILLS ROAD

HBO+EMTB Urban and Landscape Design 06 August 2015

Figure 2. Noise barrier 1 Beecroft Station showing the masonry design

Figure 3. Painted noise barrier 1 photomontage from Sutherland Road

2.1.1. Noise Barrier 1 Acoustic parameters

The varied height conventional noise barrier described above will provide the same acoustic benefit as the originally proposed low-height noise barrier. The approved ONVR identified that either a low height or a conventional height noise barrier would be acoustically feasible at this location (see section 8.8.8 of the ONVR).

When the low height noise barrier (1m above top of rail at 2.25m from track centre line) is relocated to 4.5m from the track centreline in the form of a conventional noise barrier, the resulting calculated noise levels for all rail sources increase by up to 0.5 dB for LAeq and 1.0dB for LAmax at the nearest sensitive receivers. Raising the revised barrier height by 0.5m at the relocated position provides the same level of mitigation as per the approved ONVR or better at all nearby receivers, except for two locations where a deficit in mitigation of 0.1dB is predicted. This level of mitigation is considered acceptable.

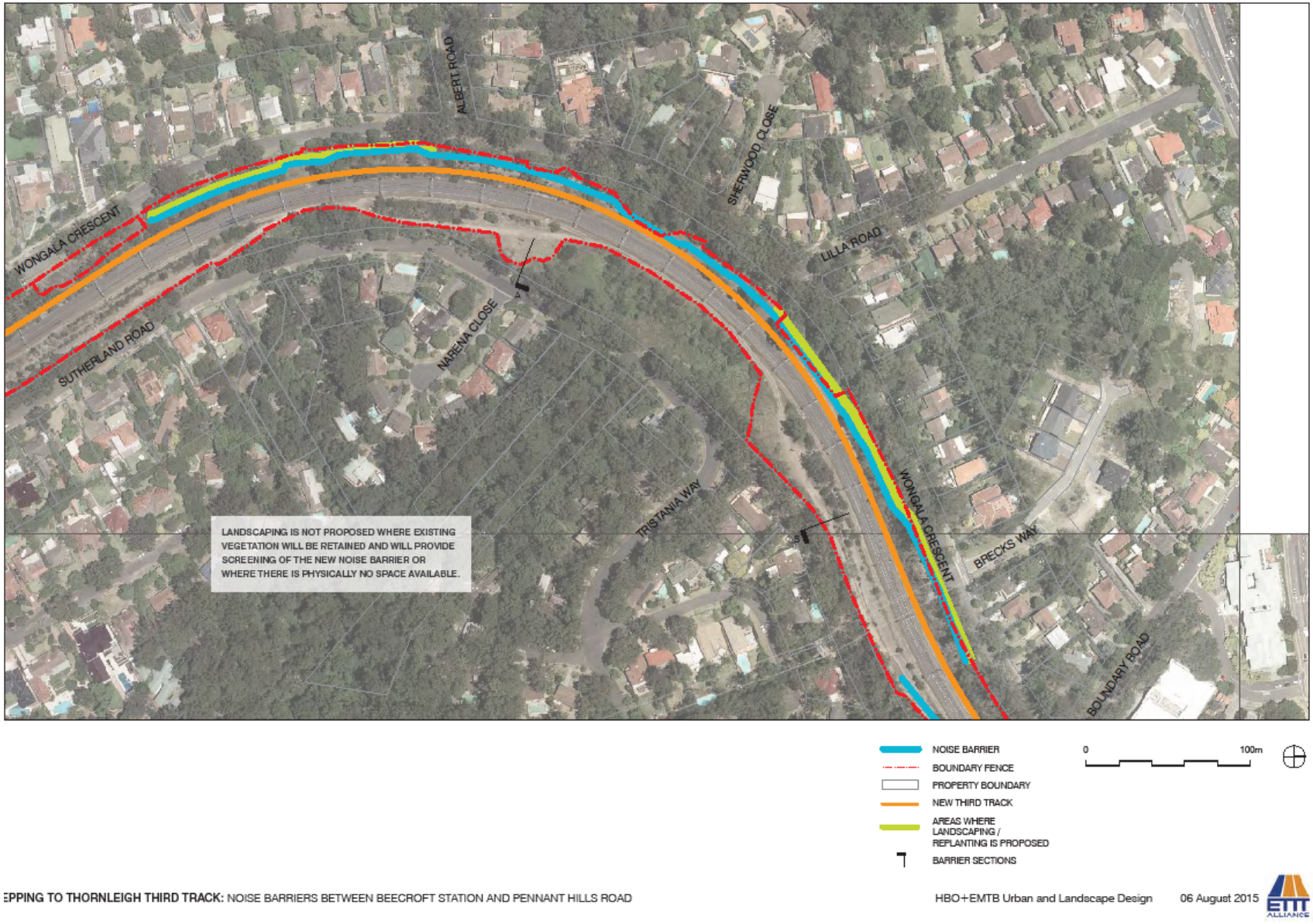
2.2. Noise Barrier 2

The approved ONVR identified that a noise barrier approximately 660 metres long would be built from approximately 49 Wongala Crescent, Beecroft to Brecks Way, Pennant Hills. The ONVR also identified that a large amount of Blue Gum High Forest, an endangered ecological community, would need to be removed to construct the barrier in this area. During the detailed design of this noise barrier ETTT identified ways to minimise impacts on vegetation through an alternate location and construction methodology. This was achieved primarily through two means:

- changing the alignment of the barrier to be close to the rail-line
- shortening the barrier by approximately 100m (and providing property treatment instead).

The barrier has been constructed closer to the rail corridor boundary and the length of the barrier reduced by approximately 100 metres at the northern end to reduce impacts on the Blue Gum High Forest community (see map below). By shortening this barrier, there were five properties that required property treatment.

Figure 5. Aerial image showing the location of the sections of noise barrier 2



2.2.1. Noise Barrier 2 Acoustic parameters

Change in Alignment

Following a revision of the noise barrier alignment whereby the noise barrier was relocated closer to the tracks to reduce vegetation clearing, the revised alignment was compared with the performance of the noise barrier developed for the approved ONVR.

To achieve the same barrier performance as the ONVR noise wall, the barrier was increased in height by up to 0.9 m in the vicinity of an existing gully near 61 Wongala Crescent, Beecroft. This localised change in height meant the noise barrier would achieve the same noise mitigation performance as that proposed in the approved ONVR for receivers in the vicinity of the gully.

The revised noise barrier alignment also produces reduced barrier performance of between 0.5 dB and 1.9 dB at 14 receiver buildings that were not triggered for treatment under the approved ONVR. Through implementation of the above noise barrier height changes, the number of these receivers is reduced to 11 in the vicinity of Lilla Road, Beecroft. To achieve the same barrier performance as the noise barrier in the approved ONVR, the revised barrier was raised in the vicinity of these receivers by up to 1m to achieve the same noise performance as the ONVR design.

Shortening Barrier

The revised noise barrier alignment was shortened at the northern end of the alignment near 121 Wongala Crescent, Beecroft. A comparison of the revised noise barrier alignment with the performance of the noise barrier developed for the approved ONVR indicated the predicted LAeq and LAmax noise levels at six (6) receivers in the vicinity of the noise barrier shortening would potentially increase by up to 1.9 dB as a result of the modification.

Whilst these properties did not qualify for treatment under the approved ONVR, five of the properties were located behind the ONVR noise barrier and would have experienced some benefit. As a result of this, the ETTT Alliance has contacted the five properties which were located behind the barrier in its original form. These properties have been offered property treatment measures so that they are not disadvantaged by the design change.

Figure 6. Photomontage of noise barrier 2 on the northern end of Wongala Crescent

Figure 7. Photomontage of noise barrier 2 on the southern end of Wongala Crescent

2.3. Noise Barrier 3

During detailed design, the design for Noise Barrier 03 did not change and therefore is consistent with what was approved in the ONVR.

3 Noise Monitoring Station

The ETTT Project's Conditions of Approval (Condition C5) requires real time noise monitoring at a representative rail curve that potentially causes wheel squeal and other annoying rail noise characteristics. As per the approved ONVR, to provide this information, the ONVR proposed to upgrade the existing TfNSW noise monitoring station prototype, location shown in Figure 8, to facilitate this noise monitoring data.

In the approved ONVR, the location of the noise monitoring station was at the top of a cutting adjacent to the track, on the eastern side of the rail corridor at Beecroft, near Narena Close / Sutherland Road. The track at this location is tightly curved (as seen in Figure 8).

As a result of consultation with Sydney Trains (who will be the asset owner of this monitoring station), the location of the noise monitoring station has changed and the monitoring station is now located adjacent to Sutherland Road, Beecroft, sharing existing infrastructure with an angle of attack monitoring device. The new location is consistent with requirements of Condition of Approval C5 and is located on a rail curve (see Figure 9).

Figure 8 – Noise monitoring station original location (star depicts location of monitoring station)

Figure 9 – Noise monitoring station new location (star depicts location of monitoring station)