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Project Manager:	Paul Brown
Author:	Marge Eastoe
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Jacobs Engineering Ireland Limited

Merrion House
Merrion Road
Dublin 4, D04 R2C5
Ireland
T +353 1 269 5666
F +353 1 269 5497
www.jacobs.com

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Contents

1. Introduction and Background

This addendum provides additional information for Chapter 14 of the EIAR which concerns the assessment of Groundborne Noise and Vibration associated with the Metrolink project.

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2. Groundborne Noise during Mechanical Excavation at Station Boxes

This section presents a clarification of the residual significant groundborne noise impacts during mechanical excavation at the station box sites. Whilst the predicted values for all receptors are correctly listed in Appendix 14.5 of the EIAR, not all of the receptors predicted to exceed the construction groundborne noise significance threshold levels during mechanical excavation are listed in Table 14.50 of the EIAR. Asa result the EIAR Table 14.50 needs to be updated (Refer to Table 2-1 with amendments shown as highlighted rows).

Table 2-1. Updated EIAR Table 14.50 Summary of Residual effects during Mechanical Excavation in AZ4

Receptor	Description of impact	Nature of impact	Mechanical Excavation L_{ASmax} dB	Predicted impact	Mitigation	Residual Impact
Charlemont oversite development	Groundborne Noise	Temporary	42	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
1-18 The Court, Dalcassian Downs	Groundborne Noise	Temporary	41	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
19-36 The Court, Dalcassian Downs	Groundborne Noise	Temporary	40	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
Saint Josephs Catholic Church, Berkeley Road	Groundborne Noise	Temporary	35	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
10 Georges Quay	Groundborne Noise	Temporary	40	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
Dublin City Fire & Rescue Services HQ, Townsend Street	Groundborne Noise	Temporary	40	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
11A Dartmouth Square West	Groundborne Noise	Temporary	40	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
12-16 Dartmouth Square West	Groundborne Noise	Temporary	40-42	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
19—25 Dartmouth Road	Groundborne Noise	Temporary	42	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant
33 & 34 Dartmouth Road	Groundborne Noise	Temporary	41	Significant	As identified in Section 14.5.1.3 of Chapter 14 and restricted working zones	Not Significant

3. Groundborne Noise during Mechanical Excavation at Intervention Tunnels

An update to the groundborne noise predictions in Appendix 14.5 of the EIAR for Mechanical Excavation associated with the Intervention Tunnels is provided giving results for all relevant locations.

There are no predicted exceedances of the significance thresholds for groundborne noise (40 dB L_{ASmax}) or for vibration (0.8 $ms^{-1.75}$ day, 0.4 $ms^{-1.75}$ night) during the excavation of the intervention tunnels.

4. Groundborne Noise during TBM Passage

This section presents an update of groundborne noise predictions in Appendix 14.5 of the EIAR for TBM passage for a short section of the route between Harbour Court and Tara Station. This is due to a minor error in the co-ordinates used in the prediction model in this section.

The associated predicted groundborne noise contours have also been updated on page 6 of Figure 14.2.

4.1 Updates to Appendix 14.5

The results table in EIAR Appendix 14.5 Section 14.4.6 for Section AZ4(f) O'Connell Street Station and Running Tunnel to Tara Station has been updated for those receptors with differing prediction results. Generally the effects have reduced, but there is one new significant effect at 21 Eden Quay where the predicted grounborne noise level is predicted to be 46 dB and above the threshold of 45 dB for TBM passage.

5. Groundborne Vibration during TBM Passage

This section presents a clarification of the vibration residual impacts during TBM passage. The residual impact for the National Concert Hall is incorrectly identified as a Significant Effect in the EIAR.

5.1 Summary EIAR Impacts

The EIAR Table incorrectly reports adverse residual impacts for groundborne vibration during TBM passage for the National Concert Hall in Table 14.49 reproduced below .

Table 5-1. Reproduced part of EIAR Table 14.49 Summary of Residual impacts during Tunnel Boring in AZ4

Receptor	Description of impact	Nature of impact	Predicted impact	Mitigation	Residual Impact
National Concert Hall	Vibration (human response)	Temporary	Significant	Advance public consultation and stakeholder engagement.	Significant

The predicted level of TBM vibration at the National Concert Hall is predicted to be 0.255 $ms^{-1.75}$ VDV during the daytime, which is below the threshold of 1.0 $ms^{-1.75}$ VDV for Theatres, indicating no significant impact. The Floating Slab Track proposed in EIAR Table 14.47 at this location will remain in recognition of the importance of this building.

5.2 Update to EIAR Residual Impacts

The row of EIAR Table 14.49 for the National Concert Hall is to be removed.

6. Groundborne Vibration from Blasting

This section presents a clarification of vibration from blasting at Charelomnt station. Whilst the predictions for all receptors are listed in Appendix 14.5 of the EIAR, not all receptors where the blasting threshold level of 8 mms^{-1} PPV is predicted to be exceeded are listed in Table 14.34 of the EIAR.

6.1 Updated Summary of EIAR Impacts

The Table 14.34 of the EIAR lists predictions of vibration during blasting for a cross section of receptors that are close to blasting in AZ4. This includes the Charlemont Oversite Development, where a blasting level of 10.7 mms^{-1} is reported, exceeding the threshold of 8 mms^{-1}.

The Appendix 14.5 includes predicted levels of vibration during blasting at a large number of receptors, and a further 10 receptors exceed the threshold level for significance. A list of those additional individual locations where the 8 mms^{-1} significance threshold is predicted to be exceeded is summarised in Table 6-1.

Table 6-1.Locations where blasting threshold level is predicted to be exceeded

Address	Blasting Vibration mms^{-1} PPV	Mitigation	Residual Impacts
16 Dartmouth Square West	9.0	As identified in Section 14.6.1.3 of Chapter 14	Not significant
15 Dartmouth Square West	11.2	As identified in Section 14.6.1.3 of Chapter 14	Not significant
14 Dartmouth Square West	11.2	As identified in Section 14.6.1.3 of Chapter 14	Not significant
13 Dartmouth Square West	10.4	As identified in Section 14.6.1.3 of Chapter 14	Not significant
12 Dartmouth Square West	9.3	As identified in Section 14.6.1.3 of Chapter 14	Not significant
11A Dartmouth Square West	8.4	As identified in Section 14.6.1.3 of Chapter 14	Not significant
19-25 Dartmouth Road	10.7	As identified in Section 14.6.1.3 of Chapter 14	Not significant
19A Dartmouth Road	10.9	As identified in Section 14.6.1.3 of Chapter 14	Not significant
34 Dartmouth Road	9.3	As identified in Section 14.6.1.3 of Chapter 14	Not significant
33 Dartmouth Road	9.2	As identified in Section 14.6.1.3 of Chapter 14	Not significant

6.2 Updates to the EIAR Chapter 14

The final sentence of the first paragraph underneath EIAR Table 14.34 on p41 of Chapter 14 should therefore be updated as follows, with the text indicated in red additional text:

"The threshold of 8 mm/s PPV is also predicted to be exceeded at Dublin Fire Brigade HQ and also within the new oversite development at Charlemont station and receptors at Dartmouth Road and Dartmouth Square West."

In addition, there is a list of properties in Section 14.5.1.2 where preconstruction condition surveys will be undertaken prior to blasting, and the above listed properties should be added as follows (the additional text and properties are highlighted in red text):

*"Notwithstanding the implementation of the above measures, potential significant impacts have been identified at six**teen** receptors where preconstruction condition surveys will be undertaken, and any required pre-construction repair work identified and undertaken. The receptors identified in Section 14.4 are listed:*

- *Our Lady Queen of Heaven Church;*
- *St Joseph Church*
- *42 O'Connell Street*
- *Dublin Fire Brigade HQ;*
- *Charlemont station new oversite development*
- *11 to 16 Dartmouth Square West*
- *19A Dartmouth Road*
- *19-25 Dartmouth Road*
- *33 and 34 Dartmouth Road"*

7. Seatown Station Mechanical Excavation

This section presents an update to the assessment of groundborne noise and vibration during the mechanical excavation at Seatown Station in AZ1.

7.1 Summary of EIAR Impacts

Calculations of vibration from secant piling have been carried out for one of the closest buildings to this activity. Woodies homeware is located just north of the Seatown Roundabout on the R132, where the building is a distance of 2.7 m from secant piling.

As summarised in Section 14.4.1.1 of the EIAR the level of vibration from secant piling at Woodies homeware is predicted to be approximately 1.2 mm/s, reducing by about half into the building. A vibration level of 0.6 mm/s entering the building would be equivalent to a VDV well below the threshold level for significant effects on "occupants of residential buildings" of $0.8ms^{-1.75}$. This is not a residential building, with residential buildings at greater distances and therefore below the threshold level for significant impact for all such receptors in AZ1.

7.2 Additional Assessment of Seatown Station Excavation

Some further analysis of the excavation of the station box at Seatown Station is presented here. The closest receptors to the Seatown Station are the Hertz building, located approximately 6 m east of the station, and Kids Inc. a Childrens Nursery location approximately 65 m south of the station.

Groundborne noise from the mechanical excavation of Seatown station has been calculated to be 24 dB L_{ASmax} at Kids Inc. This is below the threshold of 40 dB for Schools, indicating no significant effect.

The assessment of vibration from piling for Woodies homeware states that there would be no significant impacts to people within the building. As both Hertz and Kids Inc. are located at greater distances than Woodies Homeware then construction vibration within these buildings will be of a lower level, and will not be significant. Vibration from piling would be at a higher level than any other construction activity at Seatown station, indicating no significant effect from vibration.

7.3 Summary

An assessment of potential groundborne noise and vibration from the excavation of Seatown station indicates that both groundborne noise and vibration would be below the significance thresholds for the closest receptors, resulting in no reportable significant effects.

8. Groundborne Noise during Operation

This section presents a clarification of the groundborne noise residual effects during operation. Whilst The predictions for all receptors are listed in Appendix 14.5 of the EIAR, the predicted impacts section 14.4.2 and residual impacts section 14.6.2.1 do not give a complete summary.

8.1 Summary EIAR Impacts

The impacts section 14.4.2.1.1 of the EIAR includes Table 14.37 Predicted Groundborne Noise during Railway Operation at Non-Residential Receptors in AZ1. There are two additional non-residential receptors where exceedance of the threshold level is predicted that is to be included.

The impacts section 14.4.2.6.1 of the EIAR includes Table 14.43 Predicted Groundborne Noise during Railway Operation at Receptors in AZ4. There are 20 additional residential receptors where exceedance of the threshold level is predicted that are to be included.

8.2 Updates to EIAR Tables

The EIAR Table 14.37 which reports effects at non-residential receptors is reproduced in Table 8-1 below with the additional rows highlighted.

Table 8-1. Updated EIAR Table 14.37: Predicted Groundborne Noise during Railway Operation at Non-Residential Receptors in AZ1

Receptor	Threshold Groundborne Noise $L_{Amax,S}$ dB	Predicted Groundborne Noise $L_{Amax,S}$ dB	Impact	Description of Impact
O'Scanaill Veterinary Hospital	40	37	Not significant	No significant impact
Hertz Customer Services Centre	40	36	Not significant	No significant impact
Fujitsu Ireland	40	38	Not significant	No significant impact
Tara Winthrop Private Clinic	40	21	Not significant	No significant impact
Woodies DIY	45	46	Significant	Noticeable to all and disturbing to some
Unit 100 Airside Business Park	47	40	Significant	Noticeable to all and disturbing to some
Grove Commercials	47	45	Significant	Noticeable to all and disturbing to some

The EIAR Table 14.43 which reports effects at residential receptors is reproduced in Table 10-2 overleaf with the additional rows highlighted.

Table 8-2. Updated EIAR Table 14.43: Predicted Groundborne Noise during Railway Operation at Residential Receptors in AZ4

Receptor	Groundborne Noise $L_{Amax,S}$ dB		Magnitude	Impact	Description of Impact
	Threshold Level	Predicted Level			
Albert College Court	40	29	Low	Not significant	No significant impact
39/47 Botanic Avenue	40	40	Medium	Significant	Noticeable to all and disturbing to some
41/43/45 Botanic Avenue	40	41	Medium	Significant	Noticeable to all and disturbing to some
180 Botanic Avenue	40	41	Medium	Significant	Noticeable to all and disturbing to some
178/176 Botanic Avenue	40	40	Medium	Significant	Noticeable to all and disturbing to some
1/3/5/7/9 Daneswell Road	40	40	Medium	Significant	Noticeable to all and disturbing to some
11/13/15/17 Daneswell Road	40	40	Medium	Significant	Noticeable to all and disturbing to some
19/21/23 Daneswell Road	40	40	Medium	Significant	Noticeable to all and disturbing to some
Dalcasian Downs	40	31	Low	Not significant	No significant impact
Cross Gun Quay Apartments	40	33	Low	Not significant	No significant impact
Berkeley Road	40	33	Low	Not significant	No significant impact
12/13 O'Connell Street	40	36	Low	Not significant	No significant impact
35 Pearse Street	40	35	Low	Not significant	No significant impact
Trinity, Dixon Hall	40	35	Low	Not significant	No significant impact
Dartmouth Square West	40	21	Low	Not significant	No significant impact

There are exceedances of the significance threshold at twenty residential receptors in the geographical area of AZ4.

In order to mitigate these exceedances mitigation in the form of enhanced track support measures is required. Enhanced track support locations are listed in EIAR Table 14.47, which is reproduced below and includes the additional measures highlighted over three rows. An additional Figure 14.8 has been produced to demonstrate the location of these proposed FST measures.

Table 8-3. Updated EIAR Table 14.47: Location Summary where Track Support Measures will be Required

Location	Receptor(s)	Design Measure	Threshold to be Met
AZ1, CH. 2+260 to Ch. 2+400	Seaview Mews	Floating Slab Track	40 dB $L_{Amax,S}$

Location	Receptor(s)	Design Measure	Threshold to be Met
AZ1, CH. 2+260 to Ch. 2+400	Veterinary Clinic	Floating Slab Track	40 dB $L_{Amax,S}$
AZ1, Ch 3,920 to Ch. 4,080	Airside Business Park	Floating Slab Track	40 dB $L_{Amax,S}$
AZ1, Ch 5,180 to Ch. 5,360	Grove Commercials	Floating Slab Track	45 dB $L_{Amax,S}$
AZ4, Ch 13,910 to Ch. 14,230	Botanic Avenue & Daneswell Road	Floating Slab Track	40 dB $L_{Amax,S}$
AZ4, Ch 16+400 to Ch. 16+600	Gate Theatre	Floating Slab Track	25 dB $L_{Amax,S}$ VC-E
AZ4, Ch 17+000 to Ch. 17+200	Abbey Theatre	Floating Slab Track	25 dB $L_{Amax,S}$ VC-E
AZ4, Ch 17+600 to Ch. 17+980	Trinity College Buildings	Floating Slab Track	VC-E
AZ4, Ch 17+980 to Ch. 18+100	National Museums & National Gallery	Floating Slab Track	VC-E
AZ4, Ch 18+760 to Ch. 18+940	National Concert Hall	Floating Slab Track	25 dB $L_{Amax,S}$ VC-E

9. Groundborne Vibration during Operation

This section presents a clarification of the vibration residual impacts during operation. The residual significant impact for the National Museum and National Gallery was incorrectly identified.

9.1 Summary of EIAR Impacts

The EIAR Table incorrectly reports adverse residual impacts for vibration during Metrolink operation for the National Museum and National Gallery in Table 14.54 as follows.

Table 9-1. Reproduced part of EIAR Table 14.54 Summary of Residual impacts during Operation in AZ4

Receptor	Description of impact	Nature of impact	Predicted impact	Mitigation	Residual Impact
National Museum and National Gallery	Vibration (human response)	Temporary	Significant	Advance public consultation and stakeholder engagement.	Significant

This line of the EIAR Table 14.54 should therefore not have been included.

9.2 Update to EIAR Residual Impacts

The row of EIAR Table 14.54 for the National Museum and National Gallery is to be removed.