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Presenter
Kenneth Goodwin
Charlemont and Dartmouth Community Group

1. MetroLink - Module 1

- Tunnelling, Excavation Related Issues (Groundborne Noise & Vibration, Hydrogeological and soils impacts, settlement, property damage
- Airborne Noise & Vibration

Monday 4th March

Witness Statement by Kenneth Goodwin on Behalf of Charlemont & Dartmouth Community Group in relation to Airborne Noise and Vibration

2. Introduction

This statement is submitted on behalf the Charlemont & Dartmouth Community Group (DCDG). DCDG made submissions on behalf of

- Dartmouth Road Residents
- Dartmouth Square West Residents
- General Area

This statement relates to acoustic and vibration impacts and principally concerns impacts upon Dartmouth Road properties 26-28 and 32-35 and Dartmouth Square West nos. 1, 3, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16.

3. Qualifications

Kenneth Goodwin, Associated Director Acoustics, with over 15+ years' experience and a Member of the Institute of Acoustics (MIOA) and the Association of Acoustic Consultants of Ireland (AACI). Holding a BSc in environmental Science and Technology, Higher Certificate in Acoustics, and the Higher Diploma in Acoustics and Noise Control.

4. Cross Reference with TII Response

This submission is concerned with the below responses by TII:

- Dartmouth Road Submission (TII Response 40); and,
- Dartmouth Square West Submission (TII Response 41).

Some of the Items can be classified in different themes, the most relevant theme has been used to present a summary in Table 1 below.

Table 1: Cross Reference with TII response

Themes	TII Response Item No.
Theme 01 - Baseline	Response 40: Item 36
Theme 02 – Construction Methodology	Response 40: Items 5, 6, 14, 15, 16, 17, 31, 45, 47 Response 41: Items 6, 8, 9, 18, 19
Theme 03 – Construction Assessment	Response 40: 6, 7, 8, 14, 15, 16, 18, 38, 40, 41, 42, 43, 45, 47, 56, 71 Response 41: 3, 4, 5, 6,7, 8, 9, 10, 11, 12, 13, 14, 19, 20, 29, 40, 45, 49, 51, 54, 55, 56, 57, 60, 65
Theme 04 – Mitigation	Response 40: 7, 8, 12, 16, 40 Response 41: 13, 14, 29, 45, 60, 64, 65

Themes	TII Response Item No.
Theme 05 – Operational Assessment	Response 40: 12, 13, 20, 22, , 37, 57, 58, 59, 60, 61, 62, 63, 65 Response 41: 3, 7, 12, 30, 31, 32, 33, 34, 35, 38, 59, 61, 62, 63, 64

5. Overview

This submission raises the topic of acoustics in the Dartmouth Charlemont area. The submission is based around 5 themes, as outlined previously. Each theme is given a heading relating to the main themed responses from TII. The main topics, in review of the TII response are:

- The selection of suitable baseline data;
- The use of standards for free moving road traffic in an environment of slow moving/stopped traffic, ambient noise sources, including construction, and light rail.
- The selection of moderate ambient noise environment for selection of construction noise threshold values;
- The undefined reason for variation in receptor effect between weekday and weekend daytime construction noise;
- The omission of receptor ID 39 & 40 (Darthmouth Road) from the mitigation strategy, following their identification as significantly impacted receptors (errata 19/02/2024).
- The apparent lack of assessment of the TBM operation at evenings and night-time hours;
- The apparent omission of a detailed assessment of the night-time running of the generators, or the proposed structures that will house them;
- The revision needed within the EIAR to accommodate the exceedance of several properties in our study area for the mechanical excavations ground borne noise;
- The inclusion of new receptors at Dartmouth Road and Dartmouth Square West for pre-development vibration assessment due to likely risks of blasting vibration exceedance;
- The apparent lack in an assessment of noise and vibration arising from the demolition of the building at Charlemont Station, Zone AZ4;
- The interactions between the assessment on human health and acoustics in the assessment;
- The apparent lack of detail on the proposed acoustics barrier, and its ability to functionally achieve its purpose;
- The lack of cohesion between the impact assessment values and the triggers presented for mitigation;
- The generality given to the operational stage of the Proposed Development in terms of likely emission and the generality on the impact and mitigation proposed.

6. Theme 01 Baseline

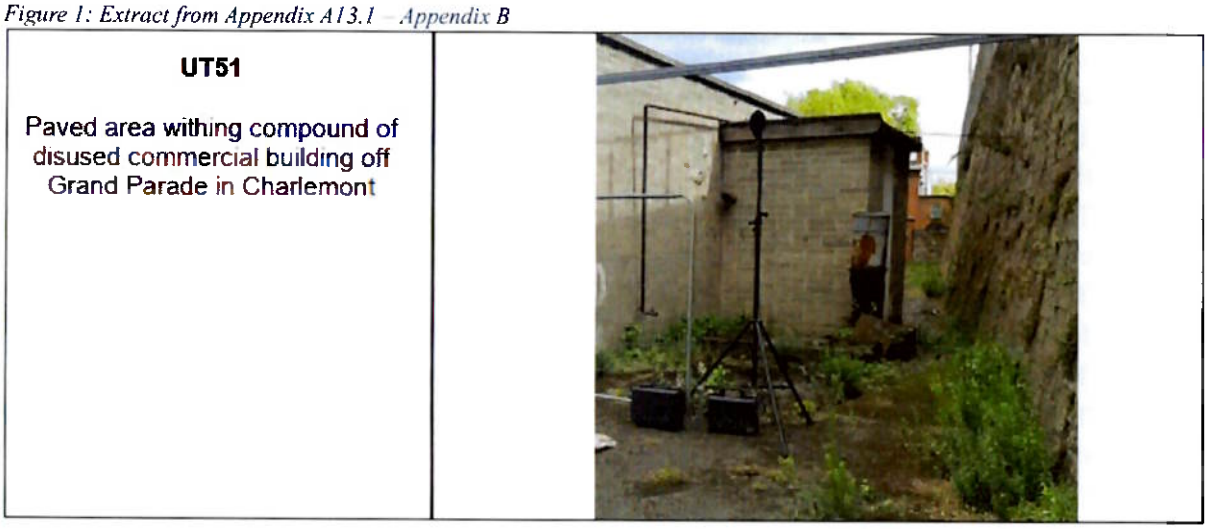
From Appendix A.13.1, Table 25 we can extract from the comments that attended baseline noise at locations, ATT72 and ATT73, are dominated by Construction Noise occurring at the time of the survey. However, there is little discussion or information provided within the EIAR or its appendices detailing how construction noise is a standard ambient source in this locality or how this noise has been removed from the baseline assessment. The omission or statement regarding the use of such data makes it difficult to understand how or why such information forms the basis for an impact assessment, as the guidance used and presented in Section 13.2.1.3 stated that the location should be representative of ambient noise levels without construction noise.

An extract from Section 13.2.1.3 regarding BS5228-1 is:

> *"The ABC method detailed in Paragraph E.3.2 of BS5228-1 (BSI 2009 + A1 2014a) calls for the designation of a noise sensitive locations into a specific category (A, B or C) based on the existing rounded ambient noise levels in the absence of construction noise."*

For unattended locations, values are 3dB lower than attended, however location UT51, located near the Luas Rail Embankment as presented in Appendix A.13.2, and presented in Figure 1 below, is not best practice for baseline monitoring due to the reflective walls located either side of the sound level meter, absence of a noise receptor in proximity, and sheltering aspect, however there is no mention in the EIAR for the inclusion or omission of this location from the assessment undertaken.

Figure 1: Extract from Appendix A13.1 – Appendix B



It is further understood that the short-term measurements undertaken along this area were post processed to a long-term average L_{DEN} utilising the NRA guidance methodology for road traffic. However, information on how this methodology is fit for purpose for an urban area, where road traffic is not in constant motion, and where road traffic is not the sole dominant noise source, is missing from this assessment methodology.

7. Theme 02 Construction Methodology

The primary concern in relation to construction methodology builds upon the concerns outlined in the baseline above, specifically regarding the thresholds identified and used to identify impact or effect on receptors.

7.1. Construction Noise Thresholds

Construction Methodology have been developed within Chapter 13, Section 13.2.6.1.3 and Construction Noise Thresholds (CNT) have been derived from unattended baseline measurements, using recognised British Standard BS5228-1 (2014) ABC Method, as presented in Section 13.2.4 and Appendix A.13.7. This methodology generates a CNT based on ambient measurements.

At receptors, within our study area, where UT51 baseline measurements have been used, the presented UT51 measured average is 61dB for $L_{Aeq,16hr}$ daytime period, as presented in Table 24 from Appendix A.13.1. The CNT for receptors, where UT51 is used is presented as 70dB, refer to Table 13-68 for the summarised receptors and Appendix A.13.7.

However, using BS5228-1 Guidance, Method ABC, as presented in Tabe 13.12 from Chapter 13 submitted, to use the noise limits from category B, a CNT of 70dB, the BS5228 standards note 3 states:

"Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values".

For a reported measured daytime value of 61dB $L_{Aeq.16hr}$, the nearest 5dB should be 60dB, which is below that Category A value of 65dB and therefore, Category A should be applied to the residential receptors identified with UT51. This change will likely alter the level of significance on receptors where this value is used. If Category B is being selected, further explanation should be made to the reasoning.

8. Theme 03 Construction Assessment

Construction stages/phases have been modelled and the predicted results are presented in Appendix A.13.7, updated on 19th February 2024 from 1st Oral Hearing Session.

8.1. Construction Predicted Impact – Category A and B

Following the statement above in Section 7, if Category A is applied, the predicted Magnitude of Impacts changes at receptors will result in higher significance effects arising.

As per an example, receptor 40 at different stages after mitigation, instead of being categorised as 'Moderate to Significant' should be 'Significant to Very Significant'. This will have an impact to mitigation being applied at this receptor, further discussion in Theme 04 - Mitigation below.

8.2. Construction Predicted Impact

There are different impacts between weekday daytime and Saturday daytime periods as presented in the application. For example, without any mitigation, Phase 'Advanced Enabling & Utility Works', Site Preparation Works receptor ID 2 has a 'Non Significant' impact during weekday daytime period and 'Slight to Moderate' impact during Saturday daytime period. No clear explanation of why the impact is different has been provided.

In the schedule of Errata, presented on 19th February 2024, in Appendix 9, Errata Item 19 is believed to be duplicate, the last one represents the Charlemont Table, and we deduct that it updates Table 13-68 instead of Table 13-66 as presented in that document.

In Table 0-10 from Schedule of Errata document, in South Station works – 'excavation ground levels and batching plant', the predicted magnitude of impact presented in relation to receptors 27-29 (13-17 Dartmouth Square) is deemed to be 'Very Significant to Profound', however in the table presented in Updated Appendix 13-7 in the Errata with unmitigated results presented in the updated Appendix 13.5 this change is not shown.

Furthermore, regarding construction methodology impacts stated in Table 13.13 of the EIAR, we can extract the rating of effect as:

Table 2: Extract from Table 13.13

Range of Construction Noise level	**Guidelines for Noise Impact Assessment Significance (DMRB)**	**EPA EIAR Significance Effects**
Above CNT +5 and below or equal to CNT +15dB	Major	Significant, to Very Significant
Above +15dB		Very Significant to Profound

Following Category 'A' CNT of 65dB, a $L_{Aeq,T}$ and CNT of + 15dB is equal to 80dB, all the predicted construction noise levels above 80dB should be categorised as 'Very Significant to Profound'. In that case, predicted impacts without mitigation to Receptors 21, 25 and 26 present differences above 15dB and therefore the Predicted Magnitude of Impact should be 'Very Significant to Profound'.

Further details in our Table 3 below.

Table 3: Extract from Unmitigated data for South Station works excavation ground levels and batching plant.

Receptor Ref.	Description	Predicted CNL, dB $L_{Aeq,t}$	Baseline Ref.	Construction Noise Thresholds		Predicted Magnitude of Impact		Difference	Predicted Magnitude of Impact Proposed
		Day		Weekday Day (07:00 - 19:00)	Saturday Morning (07:00 - 13:00)	Weekday Day (07:00 - 19:00)	Saturday Morning (07:00 - 13:00)		
21	1 Dartmouth Sq	82	UT52	65	65	Significant to Very Significant	Significant to Very Significant	17	Very Significant to Profound
25	9 Dartmouth Sq	82	UT52	65	65	Significant to Very Significant	Significant to Very Significant	17	Very Significant to Profound
26	11 Dartmouth Sq	85	UT52	65	65	Significant to Very Significant	Significant to Very Significant	20	Very Significant to Profound
27	13 Dartmouth Sq	86	UT52	65	65	Significant to Very Significant	Significant to Very Significant	21	Very Significant to Profound
28	15 Dartmouth Sq	86	UT52	65	65	Significant to Very Significant	Significant to Very Significant	21	Very Significant to Profound
29	17 Dartmouth Sq	86	UT52	65	65	Significant to Very Significant	Significant to Very Significant	21	Very Significant to Profound

CNL – Construction Noise Level, dB $L_{Aeq,T}$ Predicted by Applicant

CNT – Construction Noise Threshold

Column 'Difference' and 'Predicted Magnitude of Impact Proposed' mocked up by MOR, based on the information provided in the original table extracted above.

Following Updated results for Construction Phase modelling, and according to Item 112 from Schedule of Errata, presented below:

Table 4: Item 112 from Schedule of Errata

Item No.	EIAR/ NIS/ RO/ Other doc?	Section	Page	Error	Correction
112	Appendix A13.7	Charlemont Station	23 -28	Residual noise levels calculated at Receptors R39 & R40 (32 - 34 Dartmouth Road) assume first floor height of 4m in model. Calculation height should be 6m in line with higher elevation of windows	Update residual calculated noise levels for R39 & R40 at receiver height at 6m included in updated Appendix A13.7 Tables for mitigated scenario with 4m high hoarding. Please refer to Appendix 10 of this document.

For mitigated results, predicted Construction Noise Levels (CNL's) have been updated for receptors ID 39 and 40. An extract from Appendix A.13.7 for these receptors are summarised below:

Table 5: Extract from Appendix 13.7 – Mitigated results

Phase	Receptor Ref.	Predicted CNL, dB $L_{Aeq,T}$	CNT	Predicted Magnitude of Impact
Advanced Enabling & Utility Works, Site Preparation Works	39	70	70	Slight to Moderate
	40	71	70	Moderate to Significant
Station Piling Works North	39	68	70	Slight to Moderate
	40	66	70	Slight to Moderate
Station Piling Works South	39	80	70	Significant to Very Significant
	40	79	70	Significant to Very Significant
South Station Works Excavation - Gound Level (includes batching plant)	39	77	70	Significant to Very Significant
	40	76	70	Significant to Very Significant
South Station Works Excavation – Underground	39	76	70	Significant to Very Significant
	40	74	70	Moderate to Significant
Finishing & Fit-Out Works	39	70	70	Slight to Moderate
	40	71	70	Moderate to Significant

For Phase 'Station piling Works South' and 'South Station Works' the predicted magnitude of impact is presented as 'Significant to Very Significant'. These receptors should be included in Table 13.90 from Chapter 13 as the predicted magnitude of impact has changed due to the receiver height (6m).

If Category A is applied, as explained in Section Theme 01 Baseline of this report above, all the phases will be Significant to Very Significant for receptor ID 40.

8.3. Construction Hours

One of the biggest concerns from the residents are the construction noise outside typical hours (Daytime 07:00 to 19:00 and Saturday 07:00 to 13:00), as stated in Items 14, 15, 16, 17, 31, 45 and 47 from Response 40 and Items 4, 9, 18, 19, 20 and 54 from Response 41.

TII response to Item 14 states:

> *"In EIAR Chapter 5, MetroLink Construction Phase, Table 5.5, the proposed working hours for this site are outlined. The assessments presented in Chapters 13 and 14 are based on these proposed working hours with no works proposed above ground occurring during the night time (Refer to response (7) above for further detail).* ***As outlined in Table 5.5 of the EIAR, there will be underground works during the night time period and these have been assessed in both Chapter 13 and 14. The impact of support activities for those works and associated mitigation has also been assessed in Chapters 13 and 14. Chapter 13 assesses potential impacts associated with the operation of plant above ground only i.e. ventilation fans at the surface to facilitate this work, while Chapter 14 covers the potential impacts associated with underground works.*** *"*

As stated in Section 13.5.2.1 Compound Lighting, Water Pumps and Ventilation

> *"At the main site compounds, there will* ***be site lighting which will operate on a 24/7 basis which may require generators for power.*** *The use of* ***water pumps may also be required to operate on a 24/7 basis*** *depending on the requirement for de-watering within excavations. Any fixed item of plant for these compounds such as generators or pumps requiring night-time operation will be fully attenuated and/or enclosed to control noise emissions beyond the site boundaries to below the significance thresholds.* ***These will be established at each site prior to commencement of the works.***
>
> *Similarly,* ***ventilation fans may require operation outside of normal hours*** *at mined stations, TBM and SCL tunnel portals and the intervention shaft. These items will be fully enclosed within soundproofed housing with attenuators to control noise emissions beyond the site boundaries to below the significance thresholds. Detailed modelling has therefore not been undertaken for night-time periods for these compounds to account for these items of plant which will be* ***controlled through strict mitigation measures****. Further details on mitigation measures are included in Section 13.6.1.2."*

Only the Tunnel Boring Machine (TBM) has been assessed during night-time period, and mentioned, as in Response 40 Item 1, with statements that it will have a duration of two weeks. It is understood that construction works may need to occur outside typical daytime hours, however no construction assessment have been conducted during evening and night-time hours, with the exception of mentioning the TBM will occur for up to 2 weeks as stated in Response 40 Item 17.

As the generators and compressor presented in Appendix A.13.7 where plant and equipment have been presented for each phase. A reduction of 10dB for generators and compressor is presented, as presented above: *"be fully attenuated and/or enclosed to control noise emissions beyond the site boundaries to below the significance threshold"*. However, no predicted levels are shown and presented against CNT to present what effect this will be during this period.

However, TII have confirmed that TBM can't be mitigated at source, and presented it as acceptable construction noise due to it's short duration (2weeks). According to Appendix A5.2, last Table the duration of the tunnels in Charlemont are 6months and 3months, it is understood that other works would happen during this phase, though further details of programme are unavailable within the assessment to understand the variation between 2 weeks of operational TBM and 3 to 6 months given to this period of works locally, whether this will be continuous or intermittent.

Overall, it is our submission that to understand the likely future effect from this programme of scheduled works a cumulative construction assessment should have been conducted for evening and night-time

periods against CNT and duration of phases should have been provided, detailing the notable acoustic event phases resulting in any likely breach of the CNT.

Typical construction will occur during daytime hours, and that has been assessed in construction assessment at Chapter 13. It is presented by the Applicant that there will be occasions where night-time construction will be needed for construction of the tunnel using TBM or mechanical excavation, deliveries, concrete pour, as stated in Section 13.6.1.2.3 and Items 15 from Response 40:

> *"As referred to in response to Item (8) above, there is an error in Table 14.13 of the EIAR where it is outlined that drill and blast will be used at "all underground stations and intervention tunnels". A number of amendments were made to the proposed construction methodology for the intervention tunnel and these were assessed in the EIAR. These amendments included moving the intervention tunnel deeper and excavating the tunnel by mechanical means only.* ***Both of these interventions were proposed to reduce potential effects arising from the construction of the intervention tunnel.*** *The assessment of the mechanical excavation for the evacuation tunnel and intervention tunnel has been carried out, and is included within Chapter 14 of the EIAR. The assessment of groundborne noise and vibration from mechanical excavation for a number of representative receptors is presented in Table 14.31 and Table 14.33, with predictions for a greater number of receptors in the area presented in Appendix 14.5 Groundborne Noise and Vibration Blasting Modelling Results*
>
> *Owing to the nature of the sprayed concrete intervention tunnel construction and to ensure a safe and stable method of excavation minimising any potential for settlement, the sprayed concrete intervention tunnel construction will be undertaken 24 hours per day, seven days per week.* ***The groundborne noise and vibration arising from mechanical excavation of the tunnel will not exceed threshold limits.*** *During night-time support works at the surface, an acoustically clad steel framed building will be used within the compound to control airborne noise breakout to surrounding sensitive properties. All concrete to support the sprayed concrete tunnel lining operation will be batched on site within the acoustic enclosure and will not require night-time delivery."*

Regarding groundborne noise mentioned above "*The groundborne noise and vibration arising from mechanical excavation of the tunnel will not exceed threshold limits*".

As stated in Table 14.2 Groundborne noise thresholds are significant effect and medium magnitude above 40 $L_{As,max}$ except for TBM equipment. In updated Appendix 14.5, presented on Oral Hearing 19th February, Table 14.4.9 there are seven receptors, detailed below in Table 6, that exceeded the 40dB $L_{As,max}$ for mechanical excavation.

Mechanical excavation is being used in this area as per TII response to Item 15 in Response 40, updated Section 3 from Errata Appendix 5 Chapter 14 GBNV Addendum document stated:

> *"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."*

This is in line with the results presented in Table 14.30 from Chapter 14, where they only show Dartmouth West Receptor and the predicted level is 38dB below the 40dB limit. This contradicts the paragraph below that table that stated:

> *"There are a small number of predicted exceedances of the groundborne noise thresholds during mechanical excavation. These are in the area of Dartmouth Square West, Glasvevin Station, Tara Station and Charlemont Station."*

As mentioned above, the Appendix A.14.5 and the Errata on 19th February 2024, shows exceedances from Mechanical Excavation at various receptors located in Charlemont area.

In conclusion, mechanical excavation is exceeding groundborne noise at closest receptors and should be mentioned, and further assessment should be made.

Table 6: Extract from Table 14.4.9 - Appendix AZ4(i) - Charlemont Station and Turnback South of Station

Receptor	Construction - Mechanical Excavation			
	L_{ASmax} dB(A)	V C	VDV day	VDV night
15 DARTMOUTH SQUARE WEST DUBLIN 6,	42	>VC-A	0.004	0.003
14 DARTMOUTH SQUARE WEST DUBLIN 6	42	>VC-A	0.004	0.003
13 DARTMOUTH SQUARE WEST DUBLIN 6	41	>VC-A	0.004	0.003
12 DARTMOUTH SQUARE WEST DUBLIN 6	41	>VC-A	0.003	0.003
25 DARTMOUTH ROAD DUBLIN 6	42	>VC-A	0.004	0.003
34 DARTMOUTH ROAD DUBLIN 6	41	>VC-A	0.003	0.003
33 DARTMOUTH ROAD DUBLIN 6	41	>VC-A	0.003	0.003

8.4. Construction Vibration

With the Errata on 19th February 2024, new receptors at Dartmouth Road and Dartmouth Square West have been included as they will experience an exceedance on **blasting limits** (8mm/s PPV).

The Applicant notes that these receptors will need preconstruction conditions surveys prior to blasting:

- 11 to 16 Dartmouth Square West;
- 19A Dartmouth Road;
- 19-25 Dartmouth Road; and,
- 33 and 34 Dartmouth Road.

The exceedances demonstrate that new receptors will need preconstruction conditions surveys prior to blasting. However, Item 8, 15 and 42 from Response 40 stated:

> *"As referred to in response to Item (8) above, there is an error in Table 14.13 of the EIAR where it is outlined that drill and blast will be used at "all underground stations and intervention tunnels". A number of amendments were made to the proposed construction methodology for the intervention tunnel, and these were assessed in the EIAR. These amendments included moving the intervention tunnel deeper and excavating the tunnel by mechanical means only. Both of these interventions were proposed to reduce potential effects arising from the construction of the intervention tunnel. The assessment of the mechanical excavation for the evacuation tunnel and intervention tunnel has been carried out and is included within Chapter 14 of the EIAR. The assessment of groundborne noise and vibration from mechanical excavation for a number of representative receptors is presented in Table 14.31 and Table 14.33, with predictions for a greater number of receptors in the area presented in Appendix 14.5 Groundborne Noise and Vibration Blasting Modelling Results."*

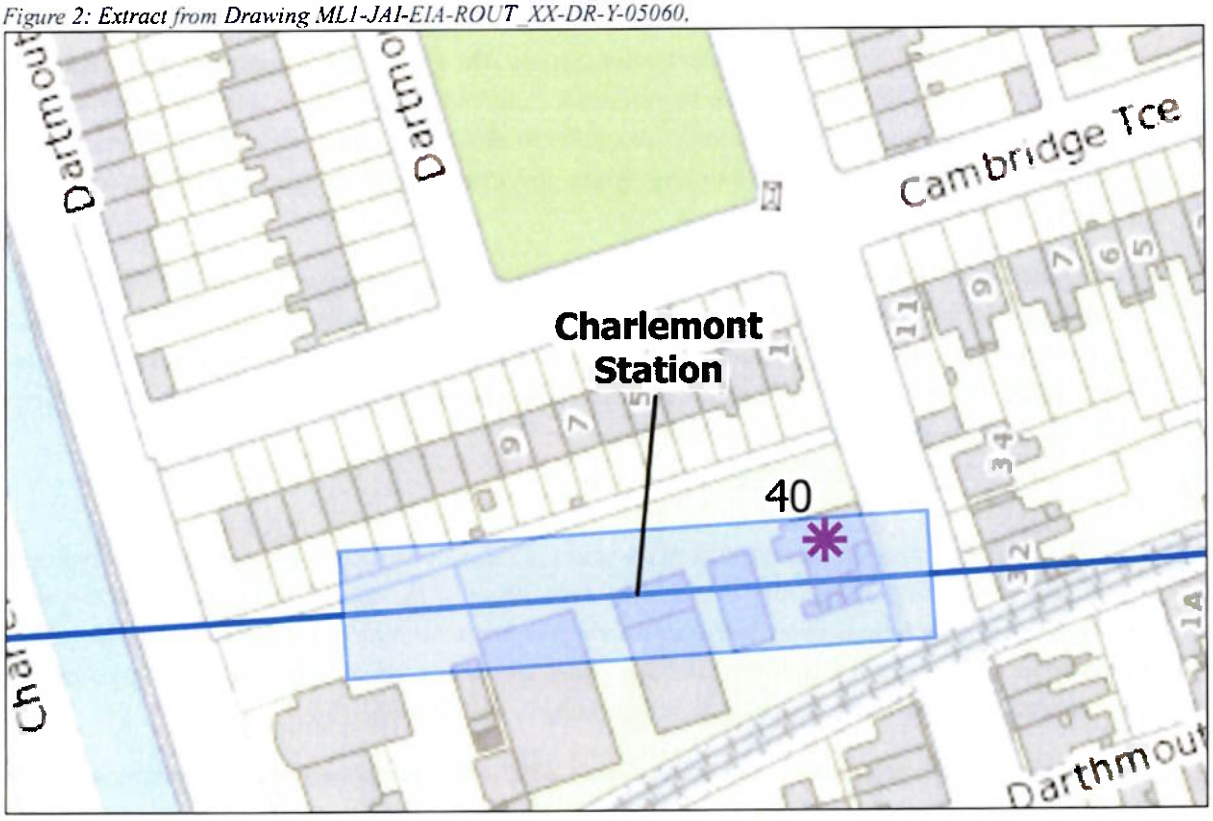
If the revised design promotes mechanical excavation in this section, rather than blasting, it is undeclared why additional receivers are now considered for blasting exceedances preconstruction surveys.

In the event that blasting will be occurring, details on where and the purpose of these blasts, the likely duration and number of blasts per day, should be presented clearly.

8.5. Construction Demolition

From Chapter 5, drawing ML1-JAI-EIA-ROUT_XX-DR-Y-05060 as presented below in Figure 2, and Appendix A.5.8 Table 2-1, 19 and 19A Dartmouth Road are proposed to be demolished. However, in Chapter 5 in Table 13.38 there is no specification of a demolition phase related in Zone AZ4 and the effect of this demolition at the closest receptors.

Figure 2: Extract from Drawing ML1-JAI-EIA-ROUT_XX-DR-Y-05060.



Furthermore, it is confusing why buildings proposed to be demolished, presented in Section 8.4 of this report, are being included in pre-construction surveys for blasting vibration. Moreover, as TII have stated at different responses (i.e. Items 15 and 42 from Response 40 and Items 12 and 54 from Response 41) that drill and blasting will not happen at this location and mechanical excavation is going to be used.

8.6. Human Health (Chapter 10)

There are several Items (8, 21, 28 and 59) related to Human Health and effects due to noise and vibration.

Section 10.5.1.2 stated:

> *"Charlemont There are a number of residences which are predicted to have significant adverse effects from construction noise during the day as outlined in Chapter 13 (Airborne Noise & Vibration), particularly in relation to the upper floors. Significant mitigation including 4m high hoarding is proposed. While residual effects are possible,* ***these would be during the day and will***

not apply to night-time and therefore will not affect the potential for sleep. *Consequently no human adverse effects are expected and although limited noise impacts are predicted near this receptor no significant adverse effects to human health are predicted."*

As stated in Item 28 from Response 41:

"Response (4) above explains how the impacts from night-time working will be controlled. With the exception of some temporary disturbance (c. 2 weeks) resulting from the TBM passing all other activities are not predicted to cause significant impact after mitigation."

Response (4) detailed:

Table 13.68 shows the predicted noise impacts before mitigation. Potential noise impacts identified due to airborne noise & vibration are presented in EIAR Chapter 13. Mitigation proposed includes 4m high noise barriers and further proposed mitigation in line with the Airborne and Ground borne Noise Mitigation Policy at 10 & 11 Dartmouth Square. ***On the implementation of these measures the residual impacts are predicted to be moderate****. ...tunnelling and other works underground will be undertaken 24 hours a day. The only exception to this is the requirement for other noisy work above ground outside standard working hours for events such as concrete pours, abnormal deliveries etc....*

All planned night-time work activities will have to be undertaken, controlled and mitigated under the detailed Construction Environmental Management Plan to maintain impacts below the agreed construction noise thresholds. Examples of mitigation measures that can be used to reduce impact are detailed within Chapter 13, section 13.6, including the use of enclosure structures for planned activities outside of the standard working hours.

...

... tunnel construction will be undertaken 24 hours per day, seven days per week. The groundborne noise and vibration arising from mechanical excavation of the tunnel will not exceed threshold limits. During nighttime support works at the surface, an acoustically clad steel framed temporary building located above the access to the SCL work site on the south east corner of the compound will control airborne noise breakout to surrounding sensitive properties....

The predicted level of groundborne noise during TBM passage will result in a significant impact for a relatively short 2-week duration of the TBM passage. Unfortunately there are no effective methods available to reduce groundborne noise from TBMs at source and therefore the principal mitigation measure is advance consultation and engagement to inform residents of the timing of the TBM passing to allow building occupants to prepare for the temporary elevated noise levels.

Therefore with the exception of some temporary disturbance (c. 2 weeks) resulting from the TBM passing. All other activities are not predicted to cause significant impact after mitigation.

As outlined in Transport Infrastructure Ireland (TII) Airborne and Groundborne Noise Mitigation Policy (Appendix A14.6) there is a process in place whereby further mitigation measures can be implemented at individual properties should this be merited."

As shown above potential impacts are presented, but not assessed and significant impacts during night will occur, which is at odds to the statements on the Human Health chapter.

9. Theme 04 Mitigation

9.1. Wall Reduction

As stated in Response 40 Item 8:

"Section 13.6.1.2.4 discusses the proposed steel clad building, in the fourth bullet point under Table 13.85. To reduce reverberant noise build up, the requirements of this building are that it will be suitably clad to achieve a minimum sound reduction index of 24dB Rw"

This building is a key construction stage feature, enabling underground works to occur, and will therefore be operational 24 hours a day, throughout the construction period. However, no design details are presented on what this structure will be, and therefore no assessment on how this 24dB reduction will be achieved, while maintaining air flow and access in and out of the structure.

9.2. Noise Insulations and Temporary Re-housing

In Appendix A14.6, further information about mitigation policies regarding airborne noise have been presented as:

- Noise Insulation;
- Temporary Rehousing; or,
- Soft Interventions.

Noise Insulation (NI) triggers are presented in Appendix A Table 1 from Appendix A14.6 Document. The NI trigger values are different depending on the hour and can not be correlated to the predicted construction noise levels (CNL) that are presented in the EIAR and in the Appendix A.13.7 as the duration are different.

The same correlation issue occurs with Temporary rehousing mitigation values.

It is unknown why NI triggers, which do not correlate to the impact assessment values have been given, and in doing so, why a clear identification /correlation of properties which will likely exceed such mitigation have not been identified.

To enable an understanding by locals of just how effected they will be, a preliminary identification of all residences under these criteria should be presented.

10. Theme 05 Operational Assessment

As per Items 12, 13, 57, 58, 59, 60,61, 62, 63 and 65 from Response 40, there are concerns regarding the operational noise assessment from fixed plant noise, PA systems, operational train noise and pedestrians.

TII response in Item 12 from Response 40 stated:

> *"Once the Project moves into the next phase of design development then the **detailed design of each shaft and surface grill will** include measurements of background and ambient noise at the closest noise sensitive receptor to each of these fixed items of plant, **this data will be used to establish a noise threshold level** in accordance with BS 4142, That each item of plant must be below, with bespoke noise mitigation at each location."*

It is unclear when they are going to get representative values of background sound levels through a baseline noise survey as the background will become dominated by construction noise for the project as is existing supplied sound levels in the EIAR, based on the comments on the existing monitoring.

In drawing "ML1-JAI-SRD-ROUT_XX-DR-Z-02090" from Structures Details Book 2 of 3 MetroLink Stations Dublin City Council document, there are different ventilations systems that may have an impact however there is no detailed assessment, other than general statements saying that best guidance will be used and taken into account in future design stage.

As stated in Section 13.5.3.2.3 regarding ventilation systems :

> *"All baseline noise values will be confirmed prior to the selection and design of the operational plant items through updated baseline noise surveys".*

As presented in Section 6 above, baseline noise levels are not representative of day-to-day ambient background due to the construction noise arising near the equipment. Furthermore, the lack of a basic PA audibility assessment (speech intelligibility assessment) of the underground stations, thus to enable an understanding of the likely breakout noise from the tunnel entrance and ventilation, is a lacking long term effect for the local sound environment.

In Item 65 of Response 40, there is concern regarding the pedestrian traffic that will occur in the new station. A clear assessment looking at the likely increase in pedestrian traffic, any associated increase in vehicular traffic (increased taxi, Luas or bus services at terminus point) and the movement of air in and out of the access/egress tunnels resultant from movement of trains within the line, have not been adequately calculated to show assessment for these long-term effects to the sound present locally.

Operational assessment should be presented at this stage, establishing maximum sound pressure values at 10m (Lp @10m) of equipment/plant proposed.

In conclusion, there is not a suitably robost operational assessment or predicted levels for the proposed operational noise sources.

11. Summary and Conclusions

The following conclusions are drawn from the documentation submitted with the application.

1. The EIAR and the significant further information submitted on the 19th February fails to provide a robust analysis and impacts of the project in relation to residents of the properties listed in section 2 above.
2. In relation to the baseline the EIAR is deficient specifically in relation to:
    a. Baseline noise locations were surveyed at a time of ongoing construction and are not representative of ambient noise levels usually associated with a residential area.
    b. Unsuitable selection of a survey point adjacent to railway embankment owing to reflective nature of walls.
    c. Inappropriate use of NRA guidance methodology for surveying of road traffic. However, road traffic is not the sole dominant noise source for urban area.
3. Critically, it is considered that the methodology adopted results in a flawed assessment due to the inaccurate categorisation of construction noise thresholds, where category A, rather than category B, should be utilised (baseline data UT51).
4. Using the appropriate categorisation of thresholds would result in unmitigated impact of assessment for receptors 21, 25, and 26 which would be categorised as 'Very Significant to Profound'.
5. For undefined reasoning, different impacts between weekdays and weekends have been applied.
6. Construction assessment have not been conducted during evening or night-time periods, with the exception of mentioned TBM and emergency works for the tunnel, such as pouring concrete.
7. The cumulative and in combination assessment of other nighttime construction activities should have been assessed. Critically for the residents of Dartmouth Square West and Dartmouth Road, the Chapter on Human Health assumes no night-time working and therefore no impact upon sleep. However, evidence presented elsewhere clearly indicates that night-time construction will occur.
8. There is conflicting evidence in relation to whether TBM operations at Charlemont will last 2 weeks or 6 months.
9. The errata of 19th February shows that ground borne noise associated with the mechanical excavation shows exceedance of the minimum threshold of 40dB limit in relation to 7 properties on Dartmouth Square West. However, this exceedance is not highlighted in the assessment.
10. New receptors are added for ground borne noise resulting from blasting in a scenario where the applicant has committed to mechanical excavation.
11. The demolition stage has not been assessed to the closest receptors.
12. There is no operational assessment that considers all the operational sources from the Proposed Development.
13. At Charlemont Station only predicted levels from operational trains, with no cumulative assessment from fixed operational sources, as ventilation systems or PA systems is provided.

In conclusion, we consider that a full assessment has not been conducted to present the impact of the construction of Charlemont station and the duration of the significant effects has not been presented. Furthermore, no operational assessment have been conducted as there are no predicted values for any of the operational sources, such as ventilation systems. Pedestrians and MetroLink users should also be considered as receptors when assessing operational sources and the impact.

12. Queries /Questions.

1. Why has Category B been used for receptors using UT51 baseline when the data presents this measurement location with 61dB L_{Aeq}?
2. Why is the information about the duration of each construction phase that have been modelled in Appendix A.13.7 lacking in the EIAR?
3. What factors contribute to the observed variation in receptor effect between weekday and weekend daytime construction noise?
4. Can you provide information on why receptors 39 and 40 were omitted from the mitigation strategy despite being identified as significantly impacted?
5. One of the mitigation measures presented is a 7m barrier to the west and 4m barrier to the north, south and western boundaries of the Charlemont Compound. As presented in Table 4 above, receivers located to the southern receptors have been modified from 4m to 6m receptor height, due to the height of windows and the resulting predicted noise levels are higher than before. Why has consideration for an extension to the 7m barrier to the southern boundary been presented?
6. Why were new receptors added at Dartmouth Road and Dartmouth Square West for pre-development vibration assessment? As per TII response, mechanical excavation is used, instead of drill and blasting at this area.
7. Regarding the TBM for the construction of the tunnel, it is expected to be 2 weeks, however according to construction programme the duration of the construction of tunnels in the locality is stated as 3 to 6 months. Further details and assessment should be made.
8. How were noise and vibration from the demolition of the building at Charlemont Station, Zone AZ4, assessed and presented?
9. Why wasn't there a detailed assessment of night-time operation of generators at the receptors, both direct effects and cumulative with the other works at night?
10. How do the impact assessment values align with the presented triggers for mitigation?
11. Why is there no assessed operational noise levels for closest receptors, including street pedestrians and MetroLink users?