

**M7 Osberstown Interchange & R407 Sallins Bypass Scheme**

**Noise and Vibration**

**Brief of Evidence**

**by**

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## 1. Introduction

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- 1.1 My name is Jennifer Harmon. I am a Senior Acoustic Consultant with AWN Consulting which is an environmental and acoustic consultancy company. I hold a degree in Environmental Science from the University of Ulster and a Diploma in Acoustics and Noise Control from the Institute of Acoustics, of which I am a full member.
- 1.2 I have worked in the field of acoustic consultancy since 2001 and have a range of experience in the areas noise and vibration impact assessments for various transport, commercial and industrial developments in addition to noise and vibration control in relation to both construction sites and operational developments. I have conducted noise impact assessments for over 20 road and rail projects throughout Ireland.

## Executive Summary

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- The noise and vibration impact assessment of the proposed scheme has been undertaken in line with the NRA's *Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)* and also comply with the more recent draft version of the *Good Practice Guidance on the Treatment of Noise During the Planning of National Road Schemes (December 2013)*.
- During the construction phase of the development, temporary noise increases to residents in close proximity to construction activities will be experienced for short periods as the works progress along the length of the scheme. All construction works, will, however, be required to operate within the noise and vibration limits set out in the EIS and in the schedule of environmental commitments. In this instance, the most appropriate mitigation measures will be employed during specific phases of work in order to ensure compliance with the appropriate limits set.
- For construction works associated with the railway underbridge, it is possible that some limited night-time work will be required in line with rail safety procedures. In the event that night-time works are required for this construction phase, these will be limited to appropriate criteria set out in BS 5228 *Code of Practice for the Control of Noise and Vibration in National Road Schemes. Part 1: Noise and Part 2: Vibration (2009)* in order to control noise impacts during this period. In this instance, all appropriate mitigation measures will be put in place to ensure the noise impact from this phase of work is reduced to within the relevant limits.
- During the operational phase, the redistribution of traffic from the existing R407 passing through the town of Sallins to the new bypass and link roads will result in a positive impact to noise sensitive properties located along this existing road.
- For properties along the new bypass and link roads, the scheme has incorporated noise mitigation measures into its design so that the residual noise levels are all within the relevant noise criteria for the scheme
- The residual impact of the proposed scheme is considered to be acceptable and within national design goals.

## 2. Impact Assessment Methodology

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- 2.1 The methodology adopted for the noise and vibration impact assessment of the proposed scheme is set out in Sections 11.2. and 11.4 of Volume 2 of the EIS.
- 2.2 The criteria used for both the construction and operational phases are those set out in the NRA's guidance document for the treatment of noise and vibration in national road schemes and these criteria are outlined in Sections 11.2.2.1 and 11.2.2.2 of Volume 2 of the EIS.
- 2.3 For the operational phase design, a goal of 60dB  $L_{den}$  has been used to assess the requirements for noise mitigation in line with the NRA document.
- 2.4 For the construction phase, a maximum limit of 70dB  $L_{Aeq, 1hr}$  has been applied for works to be undertaken during normal working hours i.e. Monday to Friday between 07:00 to 19:00hrs. Where works are to be undertaken during evening periods, Sundays and bank holidays, lower construction noise limits are applied in the range of 60 to 65dB  $L_{Aeq, 1hr}$  as outlined in Table 11.1 of Volume 2 of the EIS.
- 2.5 The NRA guidelines do not specify noise limits for construction works during night-time periods. In the event that night-works are required to construct the railway underbridge noise limits set out in British Standard BS 5228 *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites* (2009), Part 1: *Noise* will be applied. This standard indicates that appropriate night-time construction noise criteria are in the range of 45 to 55dB  $L_{Aeq}$  depending on the pre-existing noise environment in the surrounding area.

## 3. Existing Environment

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- 3.1 The existing noise environment was characterised by undertaking noise surveys over both short-term attended and 24hour unattended periods. Measurements were performed in the vicinity of 12 properties in the vicinity of the proposed development.
- 3.2 Full details of the baseline noise survey are contained within Tables 11.2 and 11.3 of Chapter 11 of Volume 2 of the EIS. The survey locations are illustrated in Figure 11.1 in Volume 3 of the EIS.
- 3.3 During the survey, the main sources of noise were noted to be from the M7 motorway at properties in proximity to the proposed Osberstown Interchange and south of the proposed Sallins bypass road. At properties along the proposed bypass and link road, the baseline noise environment was noted to be influenced by local traffic movements and distant road traffic. Other sources of noise were noted to be from birdsong, passing trains and rustling foliage. For properties in close proximity to the existing R407 Sallins Road, noise levels were dominated by passing traffic. Noise levels were measured in the range of 47 to 60dB  $L_{den}$ .

## 4 Impact Assessment

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### Construction Phase

- 4.1 The construction phase will primarily involve site clearance and preparation works, excavation and fill works, construction of structures, road surfacing and landscaping.
- 4.2 Noise prediction calculations were undertaken for a range of assumed construction activities as set out in Section 11.4.1.1 of Volume 2 of the EIS. The closest properties to the proposed construction activities are for the majority at distances between 50 and 100m. A small number of properties are within 25m of the proposed alignment (i.e. those in proximity to realigned roads). Construction noise calculations have therefore been conducted at distances of 25 to 150 m from the works for each of the key phases in the absence of any noise mitigation measures, representing a worst case scenario.
- 4.3 The results of the assessment has indicated that at distances of beyond 50m from the works, the construction daytime noise limit of 70dB  $L_{Aeq}$  can typically be complied with for the scenarios assessed. At distances between 25 and 50m from the works, the construction noise criteria have the potential to be exceeded, assuming no mitigation is in place. It will be a requirement of the contractor, therefore, to ensure that the various best practice working methods used to control noise and vibration within the relevant criteria as summarised in Section 2 above and in Section 11.2.2.2 of the EIS will be adopted. Further details relating to mitigation measures are summarised in Section 5 of this brief of evidence.
- 4.4 Construction traffic volumes have been assessed along the main access routes to be used during the various work elements, in particular for the haulage of materials from quarry sites identified as part of the EIS. All works traffic will make use of existing roads namely the R407 Clane Road, the Western Distributor Road, Osberstown Road, the M7 Motorway and the existing M7 accommodation bridge initially.
- 4.5 Traffic volumes associated with the main sections of work have been assessed using forecast traffic volumes associated with the construction phase as set out in Section 11.4.1.2 of Volume 2 of the EIS. In terms of the contribution to noise levels, predicted noise levels are all below 1dB(A). An increase of this magnitude is not significant and will typically not be evident above the prevailing traffic noise environment.
- 4.6 Submissions received from residents living in proximity to the proposed railway underbridge have requested further information on the construction methodology for this phase of works and the likely construction times this will take place over. Consultation with Iarnród Éireann has confirmed that any works in proximity to the railway will be required to be undertaken during out of peak travel times and as a result some limited night-time works will be required.
- 4.7 The main works associated with this phase will involve excavation and development of supports at the embankment to permit the proposed alignment to pass under. The duration of this works are likely to take place over an approximate four week period during different night-time possessions.

### Operational Phase

- 4.8 The cumulative impacts of the adjacent M7 Widening scheme have been fully considered within this project. The Do Minimum scenario assumes the M7 motorway has been widened to three lanes and all relevant traffic flows used in the noise model for the scheme for this scenario for the Do Something scenarios reflect this.
- 4.9 Traffic noise levels have been predicted at a total of 41 receiver locations within the EIS, these being representative of the closest residential noise sensitive locations along length of the scheme. At all locations the relevant  $L_{den}$  values were calculated taking into account the relevant factors contributing to road traffic noise including traffic flow and speeds, road alignments, boundary treatments, landscape berms in addition to distance attenuation and other factors affecting the propagation of sound. All receiver locations are detailed in Figures 11.2 in Volume 3 of the EIS.
- 4.10 The results of the assessment have concluded that during the Do Something scenario for the design year of 2030, six properties were predicted to require noise mitigation. These properties are located in proximity to the southern section of the proposed Sallins Bypass, adjacent to the realigned Osberstown Road and at the junction of the Sallins Bypass and the tie into the existing R407 Clane Road. At all other properties, predicted noise levels associated with the Do Something scenario are either below 60dB  $L_{den}$  or are less than or equal to noise levels in the Do Nothing scenario and hence do not require noise mitigation.

## 5 Mitigation Measures

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### Construction Phase

- 5.1 Mitigation measures during the construction phase are set out in Section 11.5.1 of Volume 2 of the EIS. During the construction phase the project the contractor will be required to construct the scheme within the noise and vibration limits that are set out in the EIS and the schedule of environmental commitments. Measures for noise and vibration control set out in BS 5228: Part 1 and 2 (2009) and the European Communities (*Noise Emission by Equipment for Use Outdoors*) Regulations, 2001 will be complied with.
- 5.2 During the construction phase, the contractor will be required to prepare an Environmental Operating Plan (EOP) as described in Section 4.4.1.3 of Volume 2 of the EIS. This plan will include the various mitigation measures to be undertaken to control noise and vibration to within the limits set out in Tables 11.1 and 11.5 of Volume 2 of the EIS. The measures outlined in the EIS including selection of quiet plant, control of noise sources, localised screening, liaison with the public and monitoring will all form part of this plan which will be developed for specific areas of works. As the project progresses, the requirements for specific mitigation measures will be evaluated by the contractor in order to ensure compliance with the specified limits.
- 5.3 With respect to works at the railway underbridge, preliminary assessments have concluded that mitigation measures in the form of a 4m high temporary screen around the works site will be required to adequately control noise levels during any night-time phases and strict night-time noise limits will be applied in accordance with BS 5228 – Part 1.
- 5.4 It will be a requirement of the contractor to programme the works, select plant items and include adequate control measured to ensure compliance with the criteria noted.

### **Operational Phase**

- 5.5 Mitigation measures during the operational phase are set out in Section 11.5.2 of Volume 2 of the EIS. On review of the various options available and the predicted noise levels associated with each, the most appropriate mitigation measures has been determined to be a combination of a low noise road surface along the M7 Osberstown Interchange and the R407 Sallins Bypass in addition to road side barriers in order to effectively reduce road traffic noise levels to within the relevant design goal at the affected properties.
- 5.6 Road side acoustic barriers will be installed along the eastbound merge slip road of the Osberstown Interchange to reduce traffic noise from the M7 and the Osberstown interchange, and along the Sallins Bypass Road adjacent to specific property boundaries. Specific details relating to barrier locations are set out in Table 11.13 of Volume 2 and within Figure 11.3 in Volume 3 of the EIS.

## **6 Residual Impacts**

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- 6.1 Construction activities can operate within the adopted noise limits for daytime periods at the nearest properties to the construction works using appropriate mitigation measures. Given the linear nature of the works, noise emissions related to construction activities will be of short term impact at any one area as the works progress along the length of the proposed scheme. The application of the noise and vibration limits, along with implementation of appropriate noise and vibration control measures, will ensure that noise impact is kept to within acceptable standards.
- 6.2 During the operational phase, the redistribution of traffic from the existing R407 to the new bypass will provide a positive impact to residential dwellings and other noise sensitive buildings along the existing road by reducing associated traffic noise levels.
- 6.3 For properties along the new bypass and link road, the scheme has incorporated noise mitigation measures into its design so that the residual noise levels are all within the design goal for noise adopted for the scheme. The calculated residual noise levels at the assessment properties are presented in Section 11.6.2 of Volume 2 of the EIS.

## **7 Response to Submissions**

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### *ABP001 Alan Lloyd and Patrick Garvey (Canal Road)*

- 7.1 Individual submissions have been received from Alan Lloyd and Patrick Garvey relating to the proposed road scheme. Both properties are located along the Canal Road to the west of the scheme. A request has been made for a map of the light and noise pollution in front of the proposed roundabout, the proposed Grand Canal Bridge and stretch of road behind the properties of Mr. Garvey and My Lloyd to be provided.
- 7.2 In addition to the above, Mr Garvey notes his concern relating to noise pollution from traffic along the new road, 24 hours, 7 days a week.
- 7.3 In response, a detailed noise model has been developed for the proposed road scheme taking into account the existing roads in the vicinity of these properties in addition to the proposed new roads including roundabouts and the associated traffic flow on each. The traffic flow includes a breakdown of light and heavy goods vehicles over day and night-time periods. Full details of the modelling exercise are set out in Section 11.4.2.1 of Volume 2 of the EIS. Table 11.10 presents the calculated noise levels at Mr Garvey's

property, referenced as assessment location R19. This is shown in Figure 11.2 in Volume 3 of the EIS. This location is the closest of both properties to the proposed scheme. The calculated noise level, taking into account all of the above sources in addition to the low noise road surface along the Sallins bypass is 56dB  $L_{den}$  at this property. This level is below the operational design goal of 60dB  $L_{den}$  which has been applied across the full extent of the scheme.

*ABP0006 Desmond Ward (Canal Road adjacent to Railway under bridge)*

- 7.4 Mr Ward has raised a concern relating to the impacts from increased noise as a result of the operation of the proposed new scheme. A request has been made to install acoustic glass in the windows and doors.
- 7.5 In response, consideration has been given to the noise impact of the proposed road scheme at Mr Ward's property which is referenced as assessment location R7 in Table 11.10 of Volume 2. The assessment has taken into account the existing and proposed road network and the traffic along each for the opening year of 2015 and the design year of 2030. The traffic volumes take account of future traffic scenarios which are outlined in the traffic chapter within the EIS. The calculated noise level at this property, taking account of the low noise road surface proposed along the Sallins bypass is 57dB  $L_{den}$ . This level is below the operational design goal of 60dB  $L_{den}$  which has been applied to all properties across the scheme. In this instance further noise mitigation measures in the form of acoustic windows and doors are not required.

*Mr Ward has queried when and how works relating to the railway line and its environs will be carried out. The submission has requested that no out of hours works will be conducted.*

- 7.6 In response, works associated with the Sallins Bypass railway underpass will be undertaken in liaison with Iarnród Éireann. The works will involve installation of a support wall to the north of the railway line to act as 'wingwalls' to the box structure. A temporary track support system will be installed prior to the box jacking taking place which will allow jacking works to take place during normal train operational periods. This work will be required to take place during off-peak travel times on the railway, and as a result some limited night-time working is envisaged.
- 7.7 For night-time possessions, the environmental operating plan will incorporate specific mitigation measures to deal with noise and vibration control in order to comply with the night-time noise limits at nearby dwellings. This will include locating working compounds as far from noise sensitive dwellings as possible at night, providing adequate screening around rail work sites, limiting the use of percussive or impulsive works during night-time periods as far as practicable, regular liaison with affected residents of extent providing information on timescales and duration of the works in addition to conducting ongoing noise and vibration monitoring.
- 7.8 With respect to works at the railway underbridge, preliminary assessments have concluded that mitigation measures in the form of a temporary 4m high acoustic screen around the works site will be required to control noise levels during this phase. This screen will form part of the environmental commitments for this project.

*ABP0009 Ciaran O'Neill (Castlesize Estate, Sallins)*

- 7.9 Mr O'Neill has noted his concerns relating to the impact on the amenity of his residence relating to noise generated by the proposal.
- 7.10 In response, consideration has been given to the noise impact of the proposed road scheme at Mr O'Neill's property which is referenced as assessment location R30 in Table 11.11 and 11.12 of Volume 2. The assessment has taken into account noise levels associated with the operation of the proposed scheme, incorporating the Osberstown interchange, the Sallins bypass road, and the Sallins Link Road. The predicted noise level at Mr O'Neill's property is below the traffic design goal of 60dB  $L_{den}$ . It should be noted that the Sallins Link Road which passes to the south of the property is predicted to carry a very small volume of traffic (i.e. an AADT flow of 1,450 vehicles) and is not considered to generate significant noise impacts at this property.

*Castlesize Drive Residents Association*

- 7.11 Concerns set out in the Castlesize Drive residents association submission note the potential for *air and noise pollution hazards*.
- 7.12 In response, noise levels relating to the operation of the proposed scheme, incorporating the Osberstown interchange, the Sallins bypass road, and the Sallins Link Road has been predicted at a number of locations within Castlesize Drive to determine the noise impact from the proposed scheme. The assessed properties are included in Tables 11.11 and 11.12 of Volume 2 of the EIS (assessment locations R30 to R34 indicated on Figure 11.2, Volume 3).

The predicted noise levels at the closest residential properties to the proposed scheme are all below the traffic design goal of 60dB  $L_{den}$  and are below noise levels which would be expected to cause a significant noise impact (i.e. these are in the range of 53 to 57dB  $L_{den}$ ). As noted above, the Sallins Link Road which passes to the south of these properties is predicted to carry a very small volume of traffic and is not considered to generate any significant noise impacts

*ABP0025 Deirdre and Martin Boran (Osberstown Road)*

- 7.13 The Boran's submission has noted a concern relating to the operational road noting that "*This road scheme will have a detrimental and negative impact on these lands due to the introduction of the following: 1 Noise impact from traffic...*"
- 7.14 In response, the noise impact associated with the operation of the proposed road scheme has been assessed at the Boran's property within the EIS (Assessment locations R8a and R8b included in Tables 11.11 and 11.12 of Volume 2 of the EIS and indicated on Figure 11.2, Volume 3).. The assessment has indicated that in the absence of noise mitigation, the operational noise from the road is above the design goal of 60dB  $L_{den}$ . In this instance, noise mitigation in the form of a low noise road surface in addition to a 2m high acoustic barrier along the road edge to the east of the property will be provided in order to reduce operational traffic noise at this property (Refer to Figure 11.3, Volume 3). In addition to the above, a noise barrier will be erected along the east bound merge slip road of the Osberstown Interchange will also reduce traffic noise from the M7 Motorway. With the proposed mitigation measures in place, traffic noise levels are reduced to below the noise design goal at this property as described in Table 11.14 in Volume 2 of the EIS).



## 8 Conclusions

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- The noise and vibration impacts associated with the proposed scheme have been assessed in detail within the EIS.
- During the construction phase, the contractor will be required to adopt the various standards and best practice measures relating to noise and vibration control for construction works in order to ensure the noise and vibration limits are not exceeded.
- The alignment of the new route in addition to the noise mitigation measures set out in the EIS results in an operational scenario which complies with the design goals set for new national roads. In addition, the development of the proposed road scheme will remove traffic volumes from the congested main street of Sallins thus reducing noise levels at properties in close proximity to this road and in turn provides a positives noise impact to these residents.