TRANSLINK – NI RAILWAYS

ENVIRONMENTAL NOISE DIRECTIVE
NOISE ACTION PLAN

FOR PUBLIC CONSULTATION

APRIL 2013
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INTRODUCTION

Every day Northern Ireland sees the benefits of a successful public transport system. There are now more passengers travelling on our services than ever before. By focusing on delivering our services with ever greater efficiency and relentlessly reducing and eliminating costs while maintaining service quality we have been able to give our customers a better value travel choice. The organisation also makes a considerable contribution to local employment, with almost 4,000 people employed directly.

At Translink we are proud of our contribution to Northern Ireland society. However, that sense of pride also brings us a sense of responsibility. Within Translink we are committed to Corporate Responsibility. We consider the interests of society by taking responsibility for the impact of our own activities on customers, suppliers, employees, stakeholders and communities as well as the environment. We recognise that living next to the railway also brings its disadvantages, particularly in relation to noise. Whilst we cannot make the noise go away the organisation has shown it is prepared to take action where it can to minimise the noise impact on our local communities. The introduction of new rolling stock and the increase in continuously welded rail throughout the network has decreased our noise profile. However, we are far from complacent. We want to further improve and do better. That is why we have published this draft Environmental Noise Action Plan, which highlights our objectives to minimise noise over the next 5 years.

We hope this publication shows the importance the organisation gives to the issue and our determination in minimizing the impact where possible.

More importantly we take consultation and the concerns expressed regarding the effects of noise on the local community very seriously. We want to know what you think we are doing right and what you think we could be doing better. That is why we are running a public consultation on our draft plan before publishing the final document for presentation to the Department of Environment.
So if you would like to make your views known, you can send your responses in several ways:

- **Email** – environment@translink.co.uk

- **Post** – Environmental Noise Action Plan
  SH&E Dept.
  1st Floor.
  22 Great Victoria Street
  Belfast
  BT2 7LX
EXECUTIVE SUMMARY

Annex V of the Environmental Noise Directive requires that Action Plans must include the detail under the various headings below. This information has been summarised from the main body of the plan for the purpose of complying with the Environmental Noise Regulations (Northern Ireland) 2006 in order to assist with EU reporting requirements.

Description of the agglomeration, major railways

The only agglomeration in Northern Ireland considered in Round Two is the Belfast agglomeration as defined in the Regulations. The Belfast agglomeration is presented in Plate 3.1 and has an approximate area of 198km². Data currently available for 2008 shows the Belfast Urban Metropolitan Area has a population of 267,742. The Agglomeration was considered in Round One due to its population exceeding the Round One threshold of 250,000. The extents of the Agglomeration for Round Two are the same as for Round One.

Northern Ireland Railways network covers 210 route miles of track of which, for Round 1, 55% was continuously welded and 45% flat bottomed jointed track. Recent track relay projects have enhanced the coverage of continuously welded rail (now 98%), particularly in the North West. The rail network also consists of almost 400 railway signals, 205 sets of points and 60 level crossings. Structures on the network include 700 bridges, 290 culverts, 3 tunnels, 10 miles of sea defences, 144 embankments and 124 platforms.

The Authority Responsible

Regulation 10 states the Northern Ireland Transport Holding Company (Translink) is the Competent Authority.

Legislative & Policy Perspective

The Environmental Noise Directive is transposed into legislation by the Environmental Noise Regulations (Northern Ireland) 2006 which came into force on 20th October 2006 and applies to environmental noise levels; in particular in built-up areas, public parks or other quiet areas in
agglomerations, and other noise-sensitive buildings and areas. The Regulations apply to noise from road, railway and airport sources, as well as industrial noise.

**Any Limit Values in Place**

There are no relevant formal limit values in force in Northern Ireland with regard to environmental noise from railways.

**Summary of the Results of the Noise Mapping**

The results are shown in Table 5.2 for the Major Rail and Table 5.3 for the Agglomeration Rail.

Both tables show that the railways have little noise impact, with less than 1 km\(^2\) exposed to noise levels within the L\(_{\text{den}}\) 65-69 contour band, and 189 km\(^2\) (95\%) with less than 50 dB.

With limited railway operations during night time hours the Tables show little noise impact from railways at night.

Table 5.4 shows that for the L\(_{\text{den}}\) noise scenario 98\% of dwellings (256,683) within the Belfast Agglomeration are exposed to railway noise less than 50 dB. No dwellings are exposed to noise levels in excess of 75 dB.

**Evaluation of the estimated number of people exposed to noise.**

The results of the population analysis for railways within the Agglomeration, Table 5.5, shows that only 21 people are exposed to railway noise levels in excess of 70 dB in relation to the L\(_{\text{den}}\) scenario.

**Identification of potential problems and situations that may need to be improved.**

In accordance with the aims and objectives of the Directive, the proposals within this Action Plan are focussed upon:

“preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.”
A record of the public consultations organised in accordance with Article 8(7)

A summary of the public consultation will be included in the final action plan.

Noise reduction measures already in force

Translink have two purpose built noise barriers. One is located at Central Station, Belfast. This barrier is accompanied by a barrier diffuser system at the station end of Platform 3 and 4, at Central Station, Belfast. The second is a recent addition and accompanies the newly developed Adelaide Train Maintenance Facility. Other network features such as the concrete wall at Blythfield Curve will have noticeable impacts on noise. Rolling noise in railways is created by damaged wheels and tracks. If both can be kept smooth, noise can be reduced significantly. The move from cast-iron brake-blocks to disc brakes and composite blocks reduces brake noise levels. The track and rolling stock are regularly monitored and maintained to help reduce noise impacts, and our Infrastructure Division has installed auto track lubrication systems on tight curves which help reduce frictional wear and noise.

Regarding vehicle procurement new trains must have drive-by noise attenuation surpassing EC/ECE70/157, and the specification for the Class 3000 and 4000 rolling stock ensured that they met limits as defined by Council Directive 96/48/EC on the interoperability of the trans-European high speed rail system and conventional rolling stock (2001/16/EC), which specifies maximum noise emission from trains. Implementation of these EUTSIs has led to overall reductions in railway noise impact as the train fleet has been renewed.

Noise related procedures regarding rail operations include Traction Instruction TI05-01-001 ‘Noise Abatement De-Dietrich Head End Power’ which ensures Enterprise locomotives shut down their head-end power unit whilst moving between York Road Depot and Central Station.

We have installed a “wheelset acoustic monitoring” device in Belfast area to provide early warning of poor wheel condition/wheel flats which can give rise to incremental noise levels. This device helps us maintain optimum wheel condition and minimise noise generation.
Operating instructions for train preparation for service have been changed to eliminate the need for train horn testing at Adelaide Depot prior to entering service.

**Actions which the Competent Authority intend to take in the next five years**

Translink will continue the work progressed through our Round One Action Plan within the 5 major headings:

- Demonstrate our continuing commitment to managing noise associated with Translink’s operations.
- Engage with our neighbours affected by Translink’s operations and better understand their concerns and priorities.
- Influence planning policy to minimise the number of noise sensitive properties around our network.
- Align the organisation to continue to efficiently and effectively manage noise pertaining to our operations
- Develop our understanding of noise issues to further inform our priorities, strategies and targets – with additional actions regarding Round Two as per table below

<table>
<thead>
<tr>
<th>ACTION</th>
<th>PERFORMANCE INDICATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop our understanding of noise issues to further inform our priorities, strategies and targets.</td>
<td>Having identified the worst affected 1% of the population and where this group are located. We will carry out field work to ascertain that the noise levels indicated by the strategic noise maps are actually experienced in the area(s).</td>
</tr>
</tbody>
</table>
Identify if noise sensitive rooms are on the most exposed façade of the building or if noise mitigation measures are already in place.

Assess the extent to which noise can be reduced and develop a cost / benefit analysis of mitigation measures if applicable.

Long-term strategy

To promote the use of the best practicable means to minimizing existing noise impacts whilst providing a transformed network of coordinated bus and rail services which attracts a growing number of passengers, enjoys public confidence and is recognised for its quality and innovation.

Financial information: budgets, cost-effectiveness assessment, cost-benefit analysis

Not available

Provisions envisaged for evaluating the implementation and the results of the Action Plan

The current NIENDSG system has proved to be effective in developing this draft Noise Action Plan. Consideration will be given to the form in which the group will continue in order to facilitate on-going planning work (including identification of Noise Management Areas), implementation of actions, and the development of future plans following the required five yearly reviews of the noise maps.

Estimates in terms of the reduction of the number of people affected (annoyed, sleep, disturbed, or other).

The variances in data available has resulted in noise levels be assigned to certain lines / routes which may not accurately reflect the current noise levels. The provision of accurate
data for the Larne Line, for example, and maintenance activities, will help in providing a clearer picture of noise relating to the railway, and we believe significantly reduce the number of dwellings and population exposed to specific noise categories (noise levels 65-69 dB and above). For example - during the mapping process the data provided for the Larne Line only included 3 months operations of the new quieter Class 4000 rolling stock.
1.0 INTRODUCTION

1.1 Purpose

This Noise Action Plan has been prepared to show how Translink, on behalf of the Northern Ireland transport Holding Company, intends to manage noise issues and effects arising from the railway operations of Northern Ireland Railway's and where necessary, improve the noise climate around the railway network during the period 2013 – 2018. It reflects our commitment to controlling the adverse effects of our operations and minimizing their impact on the local communities in which we operate. In respect of noise this means implementing industry best practice to limit and reduce, where necessary, the number of people affected by noise arising from our operations.

The Noise Action Plan has been prepared in accordance with the European Union Environmental Noise Directive (Directive 2002/49/EC) also known as the ‘END’, the Environmental Noise Regulations (Northern Ireland) 2006, which transpose the Directive into local legislation, and its supporting guidance.

This is one of a set of five Action Plans for Northern Ireland, namely:

- The Roads Noise Action Plan;
- The Railways Noise Action Plan;
- The Industrial Noise Action Plan;
- The George Best Belfast City Airport Noise Action Plan; and
- The Belfast International Airport Noise Action Plan.

This Railways Action Plan is based on the results of strategic noise mapping produced under the terms of the Regulations and covers noise from railways mapped within the Belfast agglomeration.

2.0 LEGISLATIVE & POLICY PERSPECTIVE
2.1 Background


The aim of the Directive is to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.

The three main objectives of END are:

- To determine exposure to environmental noise, through noise mapping;
- To ensure information on environmental noise and its effects is made available to the public; and
- Adopt Action Plans based upon the mapping results, to prevent and reduce environmental noise where necessary, where exposure levels can induce harmful effects on human health and to preserve environmental noise quality where it is good.

The END is transposed into legislation by the Environmental Noise Regulations (Northern Ireland) 2006 which came into force on 20th October 2006 and applies to environmental noise levels; in particular in built-up areas, public parks or other quiet areas in agglomerations, and other noise-sensitive buildings and areas. The Regulations apply to noise from road, railway and airport sources, as well as industrial noise. The Regulations do not apply to noise that is caused by the person exposed to the noise from, domestic activities, noise created by neighbours, noise at workplaces, or noise inside means of transport or due to military activities in military areas. They apply solely to environmental noise to which humans are exposed, in particular in built-up areas, in public parks or other quiet areas in agglomerations, near schools, hospitals and other noise-sensitive buildings and area.

Under the Regulations, noise maps and noise action plans must be prepared over a 5-year rolling cycle. The first round of noise mapping in Northern Ireland was undertaken and
completed in 2007 using data representative of 2006. For reporting in 2012, the second round of mapping was undertaken using data representative of 2011.

For the first round of mapping in 2007, the Regulations required the preparation of noise maps for the following:

- All major roads with more than 6 million vehicle passages per year;
- Major railways with more than 60,000 passages per year;
- Major airports; and
- All agglomerations with more than 250,000 inhabitants.

Within agglomerations, the Regulations require the mapping of all road, railway, industry and airport noise sources regardless of the thresholds outlined above.

For the second and subsequent rounds of mapping, the Regulations reduce the thresholds for which noise mapping and action planning should be prepared and reported for the following:

- All major roads with more than 3 million vehicle passages per year;
- Major railways with more than 30,000 passages per year;
- Major airports; and
- All agglomerations with more than 100,000 inhabitants.

This action plan relates to the second round of noise mapping.

It should be noted that noise from domestic activities or noise created by neighbours or construction sites is dealt with under the Pollution Control and Local Government (Northern Ireland) Order 1978. Noise at Work is governed by the Control of Noise at Work Regulations (Northern Ireland) 2006.

If a proposed development is likely to be a source of noise, its location and measures regarding the level or timing of noise emissions may be controlled through the planning system. Existing sources of noise such as road or rail traffic are not subject to planning control but they may be considered in the context of proposed development which may be affected by such sources.
2.2 European Policy

Further to its 1996 Green paper on Future Noise Policy (COM(96)540), the European Commission developed a new framework for noise policy, based on shared responsibility between the EU and national and local levels. The framework included measures to improve the accuracy and standardisation of data which would help improve the coherency of different actions. This document led to a comprehensive set of measures, including:

- The creation of a Noise Expert Network, whose purpose is to assist the Commission in the development of noise policy;
- The END requiring Competent Authority in Member States to produce strategic noise maps based on harmonised indicators, inform the public about noise exposure and its effects, and draw up Action Plans to address noise issues; and
- The follow-up and development of existing EU legislation relating to sources of noise, such as motor vehicles, aircraft and railway rolling stock and the provision of financial support to different noise related studies and research projects; and

2.3 UK Policy

The Department for the Environment, Food and Rural Affairs (Defra) and Devolved Administrations have on-going noise research programmes, which includes surveys of public attitudes to different kinds of noise across the UK and investigations into various technical aspects of noise management. The project outputs inform the government policy in both Westminster and the Devolved Administrations and the governments meet regularly to discuss the outcomes of research and to identify future research priorities.

2.4 Northern Ireland Policy
The English, Scottish and Welsh governments have implemented the END through their own transposing legislation and the END was implemented in Northern Ireland by the Regulations. These Regulations outline a number of stages to manage and, where necessary, reduce environmental noise in line with the requirements of the END. The first stage is strategic noise mapping followed by action planning.

The Regulations specify the general requirements for strategic noise maps. These are:

- Meet the objectives of Article 1(a) of the END;
- Use the supplementary indicators referred to in Schedule 3 of the Regulations;
- Be completed for the \(L_{den}\) and \(L_{night}\) indicators;
- Include all relevant roads, railways, airports and industrial sites affecting an agglomeration;
- Include all areas affected by designated major roads, railways and airports;
- Be completed using data no more than three years old;
- Satisfy the minimum requirements of schedule 1 of the Regulations which replicates most of Annex IV of the END;
- Present data on an existing or predicted situation in terms of a noise indicator, including breaches of any limit values, the number of people affected in a certain area, or the number of dwellings exposed to certain noise levels in a certain area; and
- Be completed using a method of assessment referred to in Schedule 2 of the Regulations.

The Regulations also specify the requirements for Action Plans, which must:

a) Meet the objectives of:

i. Preventing and reducing environmental noise where necessary, in particular where exposure levels can induce harmful effects on human health; and

ii. Preserving environmental noise quality where it is good;

b) Be designed to manage noise issues and effects, including noise reduction if necessary;
c) Aim to protect quiet areas in agglomerations, where appropriate, against an increase in noise;

d) Identify and address priorities for meeting the objectives set out in sub-paragraph (a);

e) Apply in particular to the most important areas as established by strategic noise maps;

f) Meet the requirements in Schedule 4 of the Regulations, which states that an Action Plan shall:

   i. Meet the minimum requirements of Annex V of the Directive;

   ii. Contain a summary covering all the important aspects referred to in Annex V of the Directive, not exceeding 10m pages in length; and

   iii. Be clear and comprehensible: and

g) Be based on Noise Mapping results.

Regulations 34 and 35 place the responsibility for preparing Action Plans on the Northern Ireland Transport Holding Company.

Annex V of the Directive requires that Action Plans must include the detail in Table 1.1 below. Their location in this plan is indicated.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Location in this document</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A description of the agglomerations, the major roads, major railways or major</td>
<td>Section 3.1</td>
</tr>
<tr>
<td></td>
<td>airports and other noise sources taken into account.</td>
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<tr>
<td>2</td>
<td>The authority responsible.</td>
<td>Section 3.2</td>
</tr>
<tr>
<td>3</td>
<td>The legal context.</td>
<td>Section 2</td>
</tr>
<tr>
<td>4</td>
<td>Any limit values in place in accordance with Article 5.</td>
<td>Section 3.3</td>
</tr>
<tr>
<td>5</td>
<td>A summary of the results of the noise mapping.</td>
<td>Section 5.3</td>
</tr>
<tr>
<td>6</td>
<td>An evaluation of the estimated number of people exposed to noise.</td>
<td>Section 5.4</td>
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<tr>
<td>7</td>
<td>Identification of potential problems and situations that may need to be</td>
<td>Section 6</td>
</tr>
<tr>
<td></td>
<td>improved.</td>
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</tr>
<tr>
<td>8</td>
<td>A record of the public consultations organised in accordance with Article</td>
<td>Section 8.0</td>
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<td>8(7).</td>
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<tr>
<td>9</td>
<td>Any noise-reduction measures already in force and any projects in preparation.</td>
<td>Section 9.1</td>
</tr>
<tr>
<td>10</td>
<td>Actions which the competent authorities intend to take in</td>
<td>Section 7.0</td>
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</tbody>
</table>
the next five years, including any measures to preserve quiet areas.

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</thead>
<tbody>
<tr>
<td>11</td>
<td>Long-term strategy.</td>
</tr>
<tr>
<td>12</td>
<td>Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment.</td>
</tr>
<tr>
<td>13</td>
<td>Estimates in terms of the reduction of the number of people affected (annoyed, sleep, disturbed, or other).</td>
</tr>
<tr>
<td>14</td>
<td>Provisions envisaged for evaluating the implementation and the results of the action plan.</td>
</tr>
</tbody>
</table>

Table 1.1 – Annex V Minimum Requirements for Action Plan from Directive

3.0 CHARACTERISTICS
3.1 Description of the agglomeration, major railways

Translink, on behalf of the Northern Ireland Transport Holding Company, are responsible for identifying and reporting sections of major railway, within the Northern Ireland Railways network, within the thresholds set out in the Regulations.

Under the Regulations, Round Two noise maps in relation to railway noise must encompass:

- Major railways with more than 30,000 passages per year;
- All agglomerations (including road, railways, industrial and airport noise sources) with more than 100,000 inhabitants.

The only agglomeration in Northern Ireland considered in Round Two is the Belfast agglomeration as defined in the Regulations. The Belfast agglomeration is presented in Plate 3.1 and has an approximate area of 198km². Data currently available for 2008 shows the Belfast Urban Metropolitan Area has a population of 267,742. The Agglomeration was considered in Round One due to its population exceeding the Round One threshold of 250,000. The extents of the Agglomeration for Round Two are the same as for Round One.

Using the Belfast agglomeration as a basis, a Round Two data capture extent was created to facilitate the modelling. This was developed by applying a 3km corridor to the boundary of the Belfast agglomeration and subsequently clipped against the Northern Ireland coastline. The resulting data capture area of 596 km² is shown in Plate 3.1.

Northern Ireland Railways network covers 210 route miles of track of which, for Round 1, 55% was continuously welded and 45% flat bottomed jointed track. Recent track relay projects have enhanced the coverage of continuously welded rail (now 98%), particularly in the North West. The rail network also consists of almost 400 railway signals, 205 sets of points and 60 level crossings. Structures on the network include 700 bridges, 290 culverts, 3 tunnels, 10 miles of sea defences, 144 embankments and 124 platforms.

Plate 3.1 Belfast Agglomeration showing location of the major and minor railway routes modelled during Round Two.
Railway operational noise originates from a number of sources. These include the engines and cooling fans of locomotives, the under-floor engines of ‘diesel multiple units’ (self-propelled sets of railway coaches), gears, brakes, aerodynamic effects at higher speeds, and the interaction of wheels and rails. This latter source tends to have an influence on overall noise levels at speeds above 50km/h and is normally predominant at speeds above around 100 km/h.

3.2 The Authority Responsible
Regulation 10 states the Northern Ireland Transport Holding Company (Translink) is the Competent Authority.

3.3 Any Limit Values in Place

Noise from individual railway vehicles is increasingly being controlled through legislation. The European Commission (EC) introduced a Technical Specification for Interoperability (TSI) to provide limits for noise emission from rail vehicles. Limits from rail plant and equipment are provided by Directive 2000/14/EC, which relates to noise emissions in the environment from equipment used outdoors.

The EC adopted a Technical Specification for Interoperability relating to rolling stock noise for conventional rolling stock in 2006 (Decision 2006/66/EC), and new rolling stock must meet the limits defined in Directive 96/48/EC on the interoperability of the trans-European high speed rail system. The TSIs (on conventional and high speed rolling stock) include noise limits for starting noise, noise from stationary vehicles and pass-by noise. The majority of the Northern Ireland Railways rolling stock has been introduced that meet these limits.

When proposing the construction of any new major developments noise is taken into account. Mitigation measures such as optimising the track construction and the use of noise barriers, either through landscaping or purpose built walls or fences, are included in the design to minimise any adverse noise impact.

The use of continuously welded rail has been found to help reduce operational noise although switch and crossing noise cannot be eliminated by continuous welding. Although not directly related to operational noise, the noise from train horns has been addressed over recent years. The National Railway Group Standard for horns now specifies a maximum noise level (in addition to a minimum level). Furthermore, the Rule Book has been amended to reduce the number of occasions on which the sounding of the horn is mandatory.

There are no relevant formal limit values in force in Northern Ireland with regard to environmental noise from railways. As previously highlighted Technical Specifications for
Interoperability (TSIs) include limit values at source for railway vehicles, and occupational noise limits apply through general Health & Safety legislation for workplaces.

Within Northern Ireland Railways, noise related procedures regarding rail operations include Traction Instruction TI05-01-001 ‘Noise Abatement De-Dietrich Head End Power’ which ensures Enterprise locomotives shut down their head-end power unit whilst moving between York Road Depot and Central Station.

4.0 REVIEW OF ROUND ONE NOISE ACTION PLAN
4.1 Summary of the results of Round One Mapping

During the Round One Mapping, 2007, it was found that the railways had little noise impact within the Belfast Agglomeration. With no major railways being identified and the limited rail network an area of only 1 km$^2$ was exposed to noise levels within the L$\text{den}$ 65-69 contour band, and 189 km$^2$ (95%) with less than 50dB.

With limited railway operations during night time hours again little noise impact from railways within the Belfast Agglomeration was attributed during the night.

For the L$\text{den}$ noise scenario 98% of dwellings (248,528) within the Belfast Agglomeration were exposed to railway noise less than 50 dB, and no dwellings were exposed to noise levels in excess of 75 dB.

The results of the population analysis for railways showed that only 58 people were exposed to railway noise levels in excess of 70dB within the Belfast Agglomeration in relation to the L$\text{den}$ scenario.

4.2 Round One Action Planning

Our long-term strategy is to – promote the use of the best practicable means to minimizing noise impacts whilst providing a transformed network of coordinated bus and rail services which attracts a growing number of passengers, enjoys public confidence and is recognised for its quality and innovation.

The first round action plan was a high level strategic plan which outlined the general basis upon which we aim to tackle environmental noise in line with the requirements of the Directive.

The actions were grouped into 5 major headings, as highlighted in the following table:

<table>
<thead>
<tr>
<th>ACTION</th>
<th>PERFORMANCE INDICATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate our continuing commitment to managing noise associated with</td>
<td></td>
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</tbody>
</table>
### Translink’s operations.

<table>
<thead>
<tr>
<th>We will endeavour to ensure that relevant noise directives, regulations, codes of practice, etc are adhered too when procuring new buses, coaches and rolling stock.</th>
<th>Report on vehicle standards through Fleet Profile reporting. <strong>Status:</strong> Translink meet and where appropriate exceed relevant requirements in relation to new buses, coaches and rolling stock. We now operate one of the youngest fleets in the UK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>We will enforce and update noise abatement procedures relating to bus and train operations – including the limiting of vehicle idling.</td>
<td>Procedures are monitored through divisional safety management systems. <strong>Status:</strong> an Eco-Driving Programme is being rolled out across the Translink Bus Services Division; a Vehicle Management System has been rolled out for support vehicles, vans etc; and a Driver Aid system is being developed for Class 3000 and Class 4000 rolling stock. Each system helps reduce vehicle idling, over revving, excessive braking and acceleration. All of these factors have implications on improving noise.</td>
</tr>
</tbody>
</table>

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### Engage with our neighbours affected by Translink’s operations and better understand their concerns and priorities.

<table>
<thead>
<tr>
<th>We will provide a dedicated environmental email address – <strong><a href="mailto:environment@translink.co.uk">environment@translink.co.uk</a></strong> for environmental enquiries, including noise, relating to Translink, and utilise the existing customer services / complaints department with respect to our Passenger Charter.</th>
<th>Number of contacts recorded. <strong>Status</strong> – a dedicated environmental email address has been established and monitored by the Group Environmental Manager and Technical Staff.</th>
</tr>
</thead>
</table>
Influence planning policy to minimise the number of noise sensitive properties around our network.

| We will endeavour to engage with planners to ensure awareness of Translink's operations is considered in the development of sensitive sites. | Number of interactions with local planning department. **Status** – Translink work with planners and large developers in relation to our operations |

**Align the organisation to continue to efficiently and effectively manage noise pertaining to our operations**

| Noise complaints will be reported on the Translink TSMIS system and reported to the Translink Senior Management Environmental Committee. | Noise complaint trends. **Status** – any noise issues reported to Translink are recorded on TSMIS and any trends reported a weekly, monthly and quarterly meetings |

| Noise reduction measures will be incorporated in the planning of engineering and maintenance works, and new capital projects. | CEEQUAL and BREEAM assessments. **Status** – where appropriate Translink engage with our contractors and support CEEQUAL and BREEAM assessments. For example the recent construction of Adelaide Train Maintenance Facility includes the construction of a noise barrier, as well as the installation of rolling stock shore-supply and changes to train horn testing. |

**Develop our understanding of noise issues to further inform our priorities, strategies and targets.**

| We will undertake a review of data collected during the noise modelling phase and the feasibility of acquiring detailed information for all routes from Class 3000 vehicles. | **Status** – rolling stock profiles for all routes is readily available for Class 3000 and Class 4000 rolling stock. |
Through our Group Corporate Responsibility Strategy sustainability and environmental aspects including environmental noise are at core of the Group’s values. The strategy sets the businesses in Translink significant outcomes and process challenges. The focus is in delivering the improved performance on the ground with common standards across the businesses. A specialist safety, health and environmental risk management function provides support across the Group. The function also monitors performance against the strategy.

5.0 ROUND TWO NOISE MAPPING
5.1 Agglomeration Modelling Extent

The only agglomeration in Northern Ireland considered in Round Two is the Belfast agglomeration as defined in the Regulations. The Belfast agglomeration is presented in Plate 3.1 and has an approximate area of 198 km$^2$. Data currently available for 2008 shows the Belfast Urban Metropolitan Area has a population of 267,742. The Agglomeration was considered in Round One due to its population exceeding the Round One threshold of 250,000. The extents of the Agglomeration for Round Two are the same as for Round One.

Using the Belfast agglomeration as a basis, a Round Two data capture extent was created to facilitate the modelling. This was developed by applying a 3km corridor to the boundary of the Belfast agglomeration and subsequently clipped against the Northern Ireland coastline. The resulting data capture area of 596 km$^2$ is shown in Plate 3.1

5.2 Major Railways Extent

There have been no major changes to the railway network in Northern Ireland since 2006 and Northern Ireland’s entire major rail network falls within the Belfast Agglomeration. As a consequence the stretches of rail network mapped and considered during the first round have been used during the data capture process.

Under the Regulations, Round Two noise maps in relation to railway noise must encompass:

- Major railways with more than 30,000 passages per year;
- All agglomerations (including road, railways, industrial and airport noise sources) with more than 100,000 inhabitants.

Table 5.1 provides a summary of the extent of railways and data capture areas for the Round One and Round Two mapping exercise.

<table>
<thead>
<tr>
<th>Length of Railways Mapped (km)</th>
<th>Round One</th>
<th>Round Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Railways</td>
<td>148.4</td>
<td>59.2</td>
</tr>
</tbody>
</table>

Table 5.1 Railway – Length of Railway Mapped and the Extent of the Data Capture Area
### 5.3 Summary of the Results of the Noise Mapping

The approach set out in the Directive is to first undertake strategic noise mapping within agglomerations, and for major sources outside agglomerations, and the assess the numbers of people exposed to noise within 5 dB bands.

It should be noted that the noise mapping process produces maps which are to be used on a strategic level. There are limitations to the maps and it is accepted that noise levels represented by the maps do not necessarily reflect noise level which would be experienced at any given point.

The results of the strategic noise mapping process help to gain an understanding of:

- Where environmental noise is located;
- The approximate magnitude of noise levels with the assessment area; and
- Approximately how many people are exposed to differing levels of environmental noise.

The geometric area of the noise bands for each of the 5 dB bands were calculated based on the outputs. The results are shown in Table 5.2 for the Major Rail and Table 5.3 for the Agglomeration Rail.

Both tables show that the railways have little noise impact, with less than 1 km$^2$ exposed to noise levels within the $L_{den}$ 65-69 contour band, and 189 km$^2$ (95%) with less than 50 dB.

With limited railway operations during night time hours the Tables show little noise impact from railways at night.

#### Table 5.2 Major Rail – Area of Noise Bands (dB) in km$^2$

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>$L_{Aeq}, 16$ hr</th>
<th>$L_{Aed}, 18$ hr</th>
<th>$L_{Aed}, 6$ hr</th>
<th>$L_{den}$</th>
<th>$L_{day}$</th>
<th>$L_{eve}$</th>
<th>Noise Level</th>
<th>$L_{night}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major Railways</th>
<th>0</th>
<th>89.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>148.4</td>
<td>148.4</td>
</tr>
<tr>
<td>Date Capture Area (km$^2$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Round One</td>
<td>No information available</td>
<td>455.4</td>
</tr>
<tr>
<td>Round two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise Level</td>
<td>$L_{A_{eq}}$, 16 hr</td>
<td>$L_{A_{eq}}$, 18 hr</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>190.08</td>
<td>190.21</td>
</tr>
<tr>
<td>50 – 54</td>
<td>3.23</td>
<td>3.2</td>
</tr>
<tr>
<td>55 – 59</td>
<td>2.32</td>
<td>2.3</td>
</tr>
<tr>
<td>60 – 64</td>
<td>1.79</td>
<td>1.74</td>
</tr>
<tr>
<td>65 – 69</td>
<td>0.67</td>
<td>0.64</td>
</tr>
<tr>
<td>70 – 74</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>190.09</td>
<td>190.21</td>
</tr>
<tr>
<td>&gt;= 50</td>
<td>8.02</td>
<td>7.89</td>
</tr>
<tr>
<td>Total</td>
<td>198.1</td>
<td>198.1</td>
</tr>
</tbody>
</table>

Table 5.3  Agglomeration Rail – Area of Noise Bands (dB) in km²

5.4 Evaluation of the estimated number of people exposed to noise.
Tables 5.4 and 5.5 detail the results of the Round Two dwelling and population analysis for railways with the Belfast Agglomeration.

### Table 5.4  Agglomeration Railway - Dwellings

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>$L_{Aeq}$, 16 hr</th>
<th>$L_{Aed}$, 18 hr</th>
<th>$L_{Aed}$, 6 hr</th>
<th>$L_{den}$</th>
<th>$L_{day}$</th>
<th>Leve</th>
<th>Noise Level</th>
<th>$L_{night}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>257192</td>
<td>257264</td>
<td>261593</td>
<td>256683</td>
<td>256981</td>
<td>257813</td>
<td>&lt; 45</td>
<td>259401</td>
</tr>
<tr>
<td>50 – 54</td>
<td>2100</td>
<td>2092</td>
<td>360</td>
<td>2321</td>
<td>2188</td>
<td>1868</td>
<td>45 – 49</td>
<td>1374</td>
</tr>
<tr>
<td>55 – 59</td>
<td>1395</td>
<td>1373</td>
<td>22</td>
<td>1396</td>
<td>1411</td>
<td>1378</td>
<td>50 – 54</td>
<td>878</td>
</tr>
<tr>
<td>60 – 64</td>
<td>997</td>
<td>971</td>
<td>0</td>
<td>1178</td>
<td>1092</td>
<td>717</td>
<td>55 – 59</td>
<td>316</td>
</tr>
<tr>
<td>65 – 69</td>
<td>291</td>
<td>275</td>
<td>0</td>
<td>383</td>
<td>321</td>
<td>199</td>
<td>60 – 64</td>
<td>6</td>
</tr>
<tr>
<td>70 – 74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>2</td>
<td>0</td>
<td>65 – 69</td>
<td>0</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>70 – 74</td>
<td>0</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>257192</td>
<td>257264</td>
<td>261593</td>
<td>256683</td>
<td>256981</td>
<td>257813</td>
<td>&lt; 45</td>
<td>259401</td>
</tr>
<tr>
<td>&gt;= 50</td>
<td>4783</td>
<td>4711</td>
<td>382</td>
<td>5292</td>
<td>5014</td>
<td>4162</td>
<td>&lt;= 45</td>
<td>2574</td>
</tr>
<tr>
<td>Total</td>
<td>261975</td>
<td>261975</td>
<td>261975</td>
<td>261975</td>
<td>261975</td>
<td>261975</td>
<td>Total</td>
<td>261975</td>
</tr>
</tbody>
</table>

Table 5.4 shows that for the $L_{den}$ noise scenario 98% of dwellings (256,683) within the Belfast Agglomeration are exposed to railway noise less than 50 dB. No dwellings are exposed to noise levels in excess of 75 dB.

### Table 5.5  Agglomeration Rail – Population

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>$L_{Aeq}$, 16 hr</th>
<th>$L_{Aed}$, 18 hr</th>
<th>$L_{Aed}$, 6 hr</th>
<th>$L_{den}$</th>
<th>$L_{day}$</th>
<th>Leve</th>
<th>Noise Level</th>
<th>$L_{night}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>564125</td>
<td>564256</td>
<td>572419</td>
<td>563124</td>
<td>563684</td>
<td>565357</td>
<td>&lt; 45</td>
<td>588463</td>
</tr>
<tr>
<td>50 – 54</td>
<td>4131</td>
<td>4124</td>
<td>612</td>
<td>4518</td>
<td>4311</td>
<td>3645</td>
<td>45 – 49</td>
<td>2473</td>
</tr>
<tr>
<td>55 – 59</td>
<td>2580</td>
<td>2523</td>
<td>32</td>
<td>2672</td>
<td>2617</td>
<td>2462</td>
<td>50 – 54</td>
<td>1540</td>
</tr>
<tr>
<td>60 – 64</td>
<td>1739</td>
<td>1694</td>
<td>0</td>
<td>2060</td>
<td>1912</td>
<td>1266</td>
<td>55 – 59</td>
<td>555</td>
</tr>
<tr>
<td>65 – 69</td>
<td>490</td>
<td>466</td>
<td>0</td>
<td>669</td>
<td>537</td>
<td>333</td>
<td>60 – 64</td>
<td>13</td>
</tr>
<tr>
<td>70 – 74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>3</td>
<td>0</td>
<td>65 – 69</td>
<td>0</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>70 – 74</td>
<td>0</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>564125</td>
<td>564256</td>
<td>572419</td>
<td>563124</td>
<td>563684</td>
<td>565357</td>
<td>&lt; 45</td>
<td>588483</td>
</tr>
<tr>
<td>&gt;= 50</td>
<td>8940</td>
<td>8807</td>
<td>644</td>
<td>9940</td>
<td>9380</td>
<td>7706</td>
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<td>4581</td>
</tr>
<tr>
<td>Total</td>
<td>573065</td>
<td>573065</td>
<td>573065</td>
<td>573065</td>
<td>573065</td>
<td>573065</td>
<td>Total</td>
<td>573065</td>
</tr>
</tbody>
</table>
The results of the population analysis for railways within the Agglomeration, Table 5.5., shows that only 21 people are exposed to railway noise levels in excess of 70 dB in relation to the $L_{\text{den}}$ scenario.

Tables 5.6 - 5.11 detail the results of the Round Two dwelling and population analysis for major railways, within the Belfast Agglomeration, outside the Belfast Agglomeration and across the whole of Northern Ireland.

Table 5.6  Major Railway – Dwellings (Belfast Agglomeration)

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>$L_{\text{Aeq, 16 hr}}$</th>
<th>$L_{\text{Aed, 18 hr}}$</th>
<th>$L_{\text{Aed, 6 hr}}$</th>
<th>$L_{\text{den}}$</th>
<th>$L_{\text{day}}$</th>
<th>Leve</th>
<th>Noise Level</th>
<th>$L_{\text{night}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>258738</td>
<td>258799</td>
<td>261810</td>
<td>258404</td>
<td>258565</td>
<td>259218</td>
<td>&lt; 45</td>
<td>260263</td>
</tr>
<tr>
<td>50 – 54</td>
<td>1442</td>
<td>1420</td>
<td>143</td>
<td>1579</td>
<td>1514</td>
<td>1231</td>
<td>45 – 49</td>
<td>968</td>
</tr>
<tr>
<td>55 – 59</td>
<td>957</td>
<td>950</td>
<td>22</td>
<td>944</td>
<td>959</td>
<td>988</td>
<td>50 – 54</td>
<td>610</td>
</tr>
<tr>
<td>60 – 64</td>
<td>734</td>
<td>710</td>
<td>876</td>
<td>814</td>
<td>467</td>
<td>55 – 59</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>65 – 69</td>
<td>104</td>
<td>96</td>
<td>160</td>
<td>121</td>
<td>71</td>
<td>60 – 64</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>70 – 74</td>
<td>12</td>
<td>2</td>
<td>70 – 69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;=75</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 50</td>
<td>258738</td>
<td>258799</td>
<td>261810</td>
<td>258404</td>
<td>258565</td>
<td>259218</td>
<td>&lt; 45</td>
<td>260263</td>
</tr>
<tr>
<td>&gt;= 50</td>
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<td>3176</td>
<td>165</td>
<td>3571</td>
<td>3410</td>
<td>2757</td>
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</tr>
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<td>261975</td>
<td>261975</td>
<td>261975</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.7  Major Railway – Population (Belfast Agglomeration)

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>$L_{\text{Aeq, 16 hr}}$</th>
<th>$L_{\text{Aed, 18 hr}}$</th>
<th>$L_{\text{Aed, 6 hr}}$</th>
<th>$L_{\text{den}}$</th>
<th>$L_{\text{day}}$</th>
<th>Leve</th>
<th>Noise Level</th>
<th>$L_{\text{night}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>567009</td>
<td>258799</td>
<td>261810</td>
<td>258404</td>
<td>258565</td>
<td>259218</td>
<td>&lt; 45</td>
<td>260263</td>
</tr>
</tbody>
</table>
### Table 5.8  Major Railway – Dwellings (Outside Agglomeration)

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>( L_{\text{Aeq}, \ 16 \ hr} )</th>
<th>( L_{\text{Aed}, \ 18 \ hr} )</th>
<th>( L_{\text{Aed}, \ 6 \ hr} )</th>
<th>( L_{\text{den}} )</th>
<th>( L_{\text{day}} )</th>
<th>( L_{\text{eve}} )</th>
<th>Noise Level</th>
<th>( L_{\text{night}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>491887</td>
<td>491888</td>
<td>491908</td>
<td>491885</td>
<td>491885</td>
<td>491892</td>
<td>&lt; 45</td>
<td>491896</td>
</tr>
<tr>
<td>50 – 54</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>45 – 49</td>
<td>5</td>
</tr>
<tr>
<td>55 – 59</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>50 – 54</td>
<td>7</td>
</tr>
<tr>
<td>60 – 64</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>55 – 59</td>
<td>0</td>
</tr>
<tr>
<td>65 – 69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>60 – 64</td>
<td>0</td>
</tr>
<tr>
<td>70 – 74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>65 – 69</td>
<td>0</td>
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<td>&gt;=75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>70 – 74</td>
<td>0</td>
</tr>
<tr>
<td>&lt; 50</td>
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<td>491888</td>
<td>491908</td>
<td>491885</td>
<td>491885</td>
<td>491892</td>
<td>&lt; 45</td>
<td>491896</td>
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<tr>
<td>&gt;= 50</td>
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<td>20</td>
<td>0</td>
<td>23</td>
<td>23</td>
<td>16</td>
<td>&lt;= 45</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
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<td>491908</td>
<td>491908</td>
<td>491908</td>
<td>Total</td>
<td>491908</td>
</tr>
</tbody>
</table>

### Table 5.9  Major Railway – Population (Outside Agglomeration)

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>( L_{\text{Aeq}, \ 16 \ hr} )</th>
<th>( L_{\text{Aed}, \ 18 \ hr} )</th>
<th>( L_{\text{Aed}, \ 6 \ hr} )</th>
<th>( L_{\text{den}} )</th>
<th>( L_{\text{day}} )</th>
<th>( L_{\text{eve}} )</th>
<th>Noise Level</th>
<th>( L_{\text{night}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>491887</td>
<td>491888</td>
<td>491908</td>
<td>491885</td>
<td>491885</td>
<td>491892</td>
<td>&lt; 45</td>
<td>491896</td>
</tr>
<tr>
<td>&gt;= 50</td>
<td>21</td>
<td>20</td>
<td>0</td>
<td>23</td>
<td>23</td>
<td>16</td>
<td>&lt;= 45</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
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<td>491908</td>
<td>491908</td>
<td>491908</td>
<td>Total</td>
<td>491908</td>
</tr>
<tr>
<td>Noise Level</td>
<td>L&lt;sub&gt;Aeq&lt;/sub&gt;, 16 hr</td>
<td>L&lt;sub&gt;Aed&lt;/sub&gt;, 18 hr</td>
<td>L&lt;sub&gt;Aed&lt;/sub&gt;, 6 hr</td>
<td>L&lt;sub&gt;den&lt;/sub&gt;</td>
<td>L&lt;sub&gt;day&lt;/sub&gt;</td>
<td>Leve</td>
<td>Noise Level</td>
<td>L&lt;sub&gt;night&lt;/sub&gt;</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------</td>
<td>-----------</td>
<td>-------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>&lt; 50</td>
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<td>750,687</td>
<td>753,718</td>
<td>750,289</td>
<td>750,450</td>
<td>751,110</td>
<td>&lt; 45</td>
<td>752,159</td>
</tr>
<tr>
<td>50 – 54</td>
<td>1450</td>
<td>1428</td>
<td>143</td>
<td>1589</td>
<td>1524</td>
<td>1235</td>
<td>45 – 49</td>
<td>973</td>
</tr>
<tr>
<td>55 – 59</td>
<td>961</td>
<td>953</td>
<td>22</td>
<td>947</td>
<td>962</td>
<td>995</td>
<td>50 – 54</td>
<td>617</td>
</tr>
<tr>
<td>60 – 64</td>
<td>743</td>
<td>719</td>
<td>0</td>
<td>886</td>
<td>824</td>
<td>472</td>
<td>55 – 59</td>
<td>128</td>
</tr>
<tr>
<td>65 – 69</td>
<td>104</td>
<td>96</td>
<td>0</td>
<td>160</td>
<td>121</td>
<td>71</td>
<td>60 – 64</td>
<td>6</td>
</tr>
<tr>
<td>70 – 74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>2</td>
<td>0</td>
<td>65 – 69</td>
<td>0</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>70 – 74</td>
<td>0</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>750,625</td>
<td>753,687</td>
<td>753,718</td>
<td>750,289</td>
<td>750,450</td>
<td>751,110</td>
<td>&lt; 45</td>
<td>752,159</td>
</tr>
<tr>
<td>&gt;= 50</td>
<td>3258</td>
<td>3196</td>
<td>165</td>
<td>3594</td>
<td>3433</td>
<td>2773</td>
<td>&lt;= 45</td>
<td>1724</td>
</tr>
</tbody>
</table>

Table 5.10  Major Railway – Dwellings (Northern Ireland)

Table 5.11  Major Railway – Population (Northern Ireland)
Comparison between Round One and Round Two

For the railways in Northern Ireland, the main change in the data inputs between Round One and Round two, in terms of noise emissions is the change in the rolling stock and a change in the number of movements. Class 450 were operating a reduced number in 2011 in comparison to 2006 as these units were replaced by Class 4000.

In addition to changes in emissions, changes in the 3D modelling of the Belfast Agglomeration, notable changes in topography and changes to the modelling of ground cover will also contribute to changes in the population exposed to railway noise.

Identification of potential problems and situations that may need to be improved.
6.1 Aim of Action Plans

In accordance with the aims and objectives of the Directive, the proposals within this Action Plan are focussed upon:

“preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.”

6.2 Effects of Noise

There are many different effects of noise, and individuals experience each of them to different degrees. It is known that noise can disturb human activity, by causing distraction or by physically interfering with it. These effects can include:

- general detection/distraction;
- speech interference;
- disruption of work/mental activity; and
- sleep disturbance.

Any of these can lead to annoyance and possibly more overt reactions, including complaints.

In addition there are physiological effects that can occur including stress and other health effects. The nature of these effects is much less certain, although it is known that noise can cause a variety of biological reflexes and responses referred to as stress reactions. Whether, over a period of time, these reactions could lead to clinically recognisable disease is unclear. The possibility that severe annoyance might itself induce stress cannot be ignored.

Noise is an inevitable consequence of a mature and vibrant society. People enjoy a benefit from road, rail and air transport and industrial processes, and these benefits manifests themselves in terms of business, leisure, the movement of goods and employment. When managing the environmental noise that arises from transportation noise sources, we have to strike a balance.
6.3 The Action Planning Process

In developing this action plan we have taken into account the guidance issued to Competent Authorities within Northern Ireland. This states that the LA_{eq}^{18h} and LA_{eq}^{16h} indicators should be used for prioritization and that as a first priority the Competent Authority should identify the total population affected by noise levels of more than 50 LA_{eq}^{18h} and LA_{eq}^{16h} from railways. From this information the Competent Authority should then identify where the 1% of the population that are affected by the highest noise levels from railways are located according to the results of the strategic noise mapping (“Important Areas”) and target these areas for investigation with a view of becoming a Candidate Noise Management Areas.

As required by END, Competent Authorities must work to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. To achieve this, Competent Authorities should consider investigating beyond the top 1% of the population affected in situations where this could be advantageous in reducing noise exposure and the effects of noise. Competent Authorities can also examine the L_{day}, L_{eve} and L_{night} results to consider whether or not there are any additional features of the noise impact from railways that could be managed further, in an effort to reduce population exposure and improve the noise situation for those most affected by railway noise.

6.4 Wider Considerations

When considering any new noise management measure within the Action Plan, Translink must bear in mind the legislation and guidance referred to in Appendices C and D together with the following;

- Regional Development Strategy 2025;
- Local Area Development Plans;
- Planning Policy Statements and Planning Supplementary Guidance;
- A Planning Strategy for Rural Northern Ireland;
- Regional Transportation Strategy for Northern Ireland 2002-2012;
- Belfast Metropolitan Transport Plan 2015;
• Regional Strategic Transport Network Transport Plan 2015;
• Sub-Regional Transport Plan 2015;
• Sustainable development objectives, plans and policies;
• Planning Agreements;
• Air Quality Regulations and Action Plans;
• Renewable Energy Action Plans;
• Local Authority Open Space policies;
• Mosaic GI strategy for Northern Ireland;
• Emerging Climate change initiatives;
• Spatial Data Strategy;
• Urban Regeneration Strategies;
• Noise Abatement Policies; and
• Noise Insulation Regulations (Northern Ireland) 1995.

6.5 Identification of areas to be subjected to noise management activities

Within the population analysis approximately 8900 of the population within the Belfast Agglomeration are subject to environmental noise above 50 LA_{eq18h} and LA_{eq16h} from railways, and Translink have then researched where the worst 1% of this group are located. The next stage is to carry out a degree of field work to ascertain that the noise levels indicated by the strategic noise maps are actually experienced in the area(s). This field work will also identify if noise sensitive rooms are on the most exposed façade of the building or if noise mitigation measures are already in place.

Following this fieldwork Translink will be better placed to assess the extent to which noise needs to be reduced. Whilst considering the potential measures to be adopted Translink will assess their effectiveness and cost in the wider context. This will include, for example, positive
impacts on health or quality of life, a potential benefit for the local economy or whether the potential measure may have adverse environmental impacts on air quality.

6.6 Possible Prevention and Mitigation Measures.

There are a wide range of potential direct and indirect noise mitigation measures. Some act at a national or regional level, others may be localised, some relate to vehicle manufacture, whilst some directly mitigate noise and others act to avoid noise. However, not all measures are available to Translink and thus they may not be implemented following assessment of the potential measures. Potential options include:

- Carriage noise emissions and rail noise regulations set at EU level;
- Noise regulations which would be set at national level;
- Transport policy objectives set at regional level;
- District council and Government Departments' powers;
- Railhead grinding;
- Fleet renewal;
- Carriage manufacture/design controlling noise at source and reducing engine noise;
- Electrification of lines;
- Altering the type of rolling stock using a particular rail corridor;
- Managing traffic, for example to reduce start up, acceleration and braking noise;
- Replacement of tread brakes with disc brakes;
- Greasing rails on tight corners;
- Reducing the number of wheel profiles in use to improve contact at the wheel/rail interface;
- Congestion management schemes to divert railways from sensitive premises; and
- Design and layout of developments or urban landscape to ensure that noise insensitive buildings are used as barriers to protect sensitive structures.

7.0 TRANSLINK NOISE ACTION PLAN
Translink will continue the work progressed through our Round One Action Plan within the 5 major headings:

- **Demonstrate our continuing commitment to managing noise associated with Translink’s operations.**

- **Engage with our neighbours affected by Translink’s operations and better understand their concerns and priorities.**

- **Influence planning policy to minimise the number of noise sensitive properties around our network.**

- **Align the organisation to continue to efficiently and effectively manage noise pertaining to our operations**

- **Develop our understanding of noise issues to further inform our priorities, strategies and targets** – with additional actions regarding Round Two as per table below

<table>
<thead>
<tr>
<th>ACTION</th>
<th>PERFORMANCE INDICATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop our understanding of noise issues to further inform our priorities, strategies and targets.</td>
<td>Having identified the worst affected 1% of the population and where this group are located. We will carry out field work to ascertain that the noise levels indicated by the strategic noise maps are actually experienced in the area(s).</td>
</tr>
<tr>
<td>Identify if noise sensitive rooms are on the most exposed façade of the building or if noise mitigation measures are already in place.</td>
<td></td>
</tr>
<tr>
<td>Assess the extent to which noise can be reduced and develop a cost / benefit</td>
<td></td>
</tr>
</tbody>
</table>
analysis of mitigation measures if applicable

8.0 PUBLIC CONSULTATION
Within the final action plan Translink will give details regarding responses received from consulted stakeholders following this consultation.

Stakeholders involved in the consultation include:

- Local Councils
- Local MLA’s
- Irish Branch of the Institute of Acoustics
- Northern Ireland Tourist Board
- Statutory Advisory Council Secretariat
- Section 75 groups and organisations

The Action Plan has also been made available to the public through the Translink website.

9.0 NOISE MANAGEMENT
9.1 Noise Reduction Measures Already in Force

Translink have two purpose built noise barriers. One is located at Central Station, Belfast. This barrier is accompanied by a barrier diffuser system at the station end of Platform 3 and 4, at Central Station, Belfast. The second is a recent addition and accompanies the newly developed Adelaide Train Maintenance Facility. Other network features such as the concrete wall at Blythfield Curve will have noticeable impacts on noise. Rolling noise in railways is created by damaged wheels and tracks. If both can be kept smooth, noise can be reduced significantly. The move from cast-iron brake-blocks to disc brakes and composite blocks reduces brake noise levels. The track and rolling stock are regularly monitored and maintained to help reduce noise impacts, and our Infrastructure Division has installed auto track lubrication systems on tight curves which help reduce frictional wear and noise.

Regarding vehicle procurement new trains must have drive-by noise attenuation surpassing EC/ECE70/157, and the specification for the Class 3000 and 4000 rolling stock ensured that they met limits as defined by Council Directive 96/48/EC on the interoperability of the trans-European high speed rail system and conventional rolling stock (2001/16/EC), which specifies maximum noise emission from trains. Implementation of these EUTSIs has lead to overall reductions in railway noise impact as the train fleet has been renewed.

Noise related procedures regarding rail operations include Traction Instruction TI05-01-001 ‘Noise Abatement De-Dietrich Head End Power’ which ensures Enterprise locomotives shut down their head-end power unit whilst moving between York Road Depot and Central Station.

9.2 Long-term strategy

To promote the use of the best practicable means to minimizing existing noise impacts whilst providing a transformed network of coordinated bus and rail services which attracts a growing number of passengers, enjoys public confidence and is recognised for its quality and innovation.

9.3 Financial information: budgets, cost-effectiveness assessment, cost-benefit analysis
9.4 Provisions envisaged for evaluating the implementation and the results of the Action Plan

The current NIENDSG system has proved to be effective in developing this draft Noise Action Plan. Consideration will be given to the form in which the group will continue in order to facilitate on-going planning work (including identification of Noise Management Areas), implementation of actions, and the development of future plans following the required five yearly reviews of the noise maps.

9.5 Estimates in terms of the reduction of the number of people affected (annoyed, sleep, disturbed, or other).

The variances in data available has resulted in noise levels be assigned to certain lines / routes which may not accurately reflect the current noise levels. The provision of accurate data for the Larne Line, for example, and maintenance activities, will help in providing a clearer picture of noise relating to the railway, and we believe significantly reduce the number of dwellings and population exposed to specific noise categories (noise levels 65-69 dB and above). For example - during the mapping process the data provided for the Larne Line only included 3 months operations of the new quitter Class 4000 rolling stock.

Appendix A
### Action Plan

Plans designed to manage noise issues and effects, including noise reduction if necessary. An Action Plan must include:

- A description of the agglomeration, major roads, major railways and major airports and other noise sources taken into account;
- The authority responsible;
- The legal context;
- Any limit values in place in accordance with Article 5 of the END;
- A summary of the results of the noise mapping;
- An evaluation of the estimated number of people exposed to noise, identification of problems and situations to be improved;
- A record of the public consultations organised in accordance with Article 8(7) of the END;
- Any noise-reduction measures already in force and any projects in preparation;
- Actions which the Competent Authorities intend to take in the next five years, including any measures to preserve Quiet Areas;
- Long-term strategy;
- Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment; and
- Provisions envisaged for evaluating the implementation and the results of the Action Plan.

The actions which the Competent Authorities intend to take in the fields within their competence may include:

- Traffic planning;
- Land-use planning;
- Technical measures at noise sources;
- Selection of quieter sources;
- Reduction of sound transmission; and
- Regulatory or economic measures or incentives.

Each Action Plan should contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other)

<table>
<thead>
<tr>
<th><strong>Agglomeration (first round)</strong></th>
<th>A part of a territory, delimited by the Member State, having a population in excess of 250,000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agglomeration (subsequent rounds)</strong></td>
<td>A part of a territory, delimited by the Member State, having a population in excess of 100,000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.</td>
</tr>
<tr>
<td><strong>Attributable Area</strong></td>
<td>A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height</td>
</tr>
<tr>
<td><strong>Attributing (Data)</strong></td>
<td>The linking of attribute data to spatial geometric data</td>
</tr>
<tr>
<td><strong>ASL</strong></td>
<td>Above Sea Level</td>
</tr>
</tbody>
</table>
| Competent Authority | The Competent Authorities will be responsible for aspects such as making and where relevant, approving noise maps and Action Plans for agglomerations, major roads, major railways and major airports. They will also be responsible for delimiting Quiet Areas within agglomerations and open countryside, and collecting noise maps and Action Plans. The Competent Authorities are as follows:  
• Agglomerations – Department of the Environment  
• Major roads – Department for Regional Development  
• Major railways – Northern Ireland Transport Holding Company  
• Major airports – Airport Operator |

| Data | Data comprises information required to generate the outputs specified, and the results specified. |

| Decibel (dB) | The human ear can detect sound waves exerting pressures ranging from 20 micropascals up to 100,000,000 micropascals. Because these numbers are so unwieldy a logarithmic scale (the decibel scale) is used.  
The typical threshold of human hearing, 20 micropascals, is set as 0 decibels. It follows from this that the loudest sounds we can hear before suffering immediate hearing damage (around 100,000,000 micropascals) corresponds to around 130-140 decibels. Typically, an increase/decrease of ten decibels is perceived by listeners as a doubling/halving in loudness (Doubling/halving the sound power of the source, however, only results in an increase/decrease of three decibels. The response of the human ear is non-linear in energy terms.) |

| dB(A) | The human ear is most sensitive to sound waves with frequencies of a few thousand Hz. A sound wave with the same sound pressure amplitude outside this range will sound noticeably quieter than one in this range. Describing the loudness of a sound purely in terms of decibels based on sound pressure can therefore be misleading.  
When measuring sound, it is therefore standard practice to break it down into frequency bands and apply a correction to each band depending on the sensitivity of the typical human ear to the frequencies in that band, before combining them into an overall ‘A-weighted’ sound pressure level.  
A-weighted decibels are a good indication of perceived loudness for broadband noise (noise covering a broad range of frequencies), but they sometimes underestimate the effect of low-frequency noise. |


| GIS | Geographical Information System |

| ISO | International Standards Organisation |

<p>| LAeq,T | The A-weighted equivalent continuous sound pressure level which is a notional continuous level that, at a given position and over the defined time period, T, contains the same sound energy as the actual fluctuating sound that occurred at the given position over the same time period, T. |</p>
<table>
<thead>
<tr>
<th><strong>Lday</strong></th>
<th>The LAeq over the period 0700 – 1900, local time (for strategic noise mapping this is an annual average).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Levening</strong></td>
<td>The LAeq over the period 1900 – 2300, local time (for strategic noise mapping this is an annual average).</td>
</tr>
<tr>
<td><strong>Lnight</strong></td>
<td>The LAeq over the period 2300 – 0700, local time (for strategic noise mapping this is an annual average).</td>
</tr>
<tr>
<td><strong>LAeq,16h</strong></td>
<td>The LAeq over the period 0700 – 2300, local time (for strategic noise mapping this is an annual average).</td>
</tr>
<tr>
<td><strong>Lden</strong></td>
<td>The LAeq over the period 0000 – 2400, but with the evening values (1900 – 2300) weighted by the addition of 5 dB(A), and the night values (2300 – 0700) weighted by the addition of 10 dB(A).</td>
</tr>
</tbody>
</table>

**Limit Values**

Member States are required to inform the Commission of existing limit values or limit values in preparation (Article 5, paragraph 4 of the END). These must be expressed in terms of the noise indicators L\text{den} and L\text{night}.

**Major Airport**

The END defines a major airport as: a civil airport, designated by the Member State, which has more than 50,000 movements per year (a movement being a take-off or landing), excluding those purely for training purposes on light aircraft (Article 3(p)). In the UK a light aircraft is generally considered to be one with a maximum take-off weight authorised (MTWA) of less than 5,700 kilogrammes. In the UK a civil airport is one operated by civil authorities and so excludes those operated by the military. In any event, military activity in a military area is excluded from the END (Article 2, paragraph 2).

**Major Railway**

The END defines a major railway as: a railway designated by the Member State which has more than 30,000 train passages per year (approximately 80 train passages per day) (Article 3(o)). However, for the first round of mapping in 2007 the qualifying figure is 60,000 train passages per annum (Article 7, paragraph 1).

**Major Road**

The END defines a major road as: a regional, national or international road, designated by the Member State, which has more than 3 million vehicle passages per annum (approximately 8,200 vehicles per day) (Article 3(n)).

**Noise Bands required by the END**

Areas lying between contours of the following levels (dB):

- \( L\text{den} <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, \geq 75 \)
- \( Ld <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, \geq 75 \)
- \( Le <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, \geq 75 \)
- \( Ln <45, 45-49, 50 – 54, 55 – 59, 60 – 64, 65 – 69, \geq 70 \)

Notes:

1) It is recommended that class boundaries be at .00, e.g. 55 to 59 is actually 55.00 to 59.99.
2) The assessment and reporting of the 45 – 49 dB band for \( L\text{night} \) is optional under the Regulations.

**Noise Mapping**

The presentation of data on an existing or predicted noise situation in terms of a noise indicator.

**Noise Mapping (Input) Data**

Two broad categories:

1) Spatial (e.g. road centre lines, building outlines); and
2) Attribute (e.g. vehicle flow, building height – assigned to specific spatial data).

**Noise Mapping Software**

Computer program that calculates required noise levels based on relevant input data.

**Noise Model**

All the input data collated and held within a computer program to enable noise levels to be calculated.

**Noise Model File**

The (proprietary software specific) project file(s) comprising the noise model.
### Output Data

Define the noise outputs generated by the noise model.

### Processing data

Any form of manipulation, correction, adjustment factoring, correcting, or other adjustment of data to make it fit for purpose (includes operations sometimes referred to as ‘cleaning’ of data).

### Quiet Area

Article 3(l) and 3(m) of the END define a 'quiet area in an agglomeration' as an area, delimited by the Competent Authority, for instance which is not exposed to a value of $L_{den}$ or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source.

### Round One

The noise mapping and action planning process is to be taken forward on a five-year rolling programme. The first round of mapping and action planning applies to the largest of the agglomerations (including the industries and ports within them), the busiest major roads and railways and all major airports. The thresholds determining which agglomerations, major roads, major railways and major airports should be mapped during the first round are set out in Article 7 paragraph 1 and are as follows:

- **Agglomerations** - only those which have a population in excess of 250,000 persons;
- **Major roads** - only those which more than 6 million vehicle passages a year;
- **Major railways** - only those that have more than 60,000 train passages per year;
- **All airports within round one agglomerations and major airports**.

### Round Two

- **Agglomerations** - only those which have a population in excess of 100,000 persons;
- **Major roads** - only those which more than 3 million vehicle passages a year;
- **Major railways** - only those that have more than 30,000 train passages per year;
- **All Airports within round one and any which have since expanded and meet the criteria of the END**.

### Spatial (input) Data

Information about the location, shape, and relationships among geographic features, for example road centre lines and buildings.

**WG - AEN**

Working Group – Assessment of Exposure to Noise

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**Appendix B**

**Definition of Railways for which Noise Maps must be produced**
B1 Under the Regulations Noise Maps must be made if:

1. It is a railway with more than 30,000 train passages per year (approximately 80 train passages per day).

2. Railways near to agglomerations must also be mapped regardless of the level of traffic where the level of activity means that railway noise causes

   (a) an Lden value of 55 dB(A) or greater; or
   (b) an Lnight value of 50 dB(A) or greater;
   anywhere within the agglomeration.

B2 An agglomeration is defined as an area having a population in excess of 100,000 persons and a population density equal to or greater than 500 people per km2; and which is considered urbanised.

For the first round of mapping, reported in 2007, the population threshold is 250,000 and in the Regulations these agglomerations are described as ‘first round agglomerations’.

Appendix C

List of Current Policy and the framework for the Management of Environmental Noise
Land Acquisition and Compensation (Northern Ireland) Order 1973

Pollution Control and Local Government (NI) Order 1978

Noise Insulation Regulations (NI) 1995

The Environmental Assessment of Plans and Programmes Regulations (NI) 2004

The Civil Aviation Act 2006

Environmental Noise Regulations (Northern Ireland) 2006.

Relevant Policy and Guidance Publications.

Control of Noise (Code of Practice for Construction and Open Sites) Order (NI) 2002

Land Compensation - Your Rights Explained DOE (NI)

BS 5228 Noise & Vibration Control on Construction and Open Sites

Part 1 1997 - Code of Practice for basic info and procedures for noise & vibration control

Part 2 1997 - Guide to noise & vibration control legislation for construction and demolition including road construction and maintenance

BS 5228 Part 4 1992 - Code of Practice for noise and vibration from piling operations

BS 6472 1992 - Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80 Hz)


BS 7385 Part 2 1993 - Evaluation and Measurement for Vibration in buildings - Guide to damage levels from ground borne vibration

BS 7445 Part 1: 1999 - Description and measurement of environmental noise

BS 7445 Part 2: 1999 - Guide to the acquisition of data pertinent to land use

BS 7445 Part 3: 1999 - Guide to the application of noise limits
Appendix D

Policy and Legislation relating to the control of Noise in Northern Ireland
Noise Act 1996

Councils in Northern Ireland have discretion whether or not to adopt the Noise Act 2006 which provides them with additional powers to deal with noise at night from domestic premises. Such powers include issuing warning and fixed penalty notices and, in certain circumstances, seizing noise making equipment.

Regional Transportation Strategy for Northern Ireland 2002 – 2012

This requires the environmental impact including noise to be assessed for noise improvement schemes and the effects of any noise to be considered when determining the feasibility of any such scheme.

Pollution Control and Local Government (Northern Ireland) Order 1978

Article 38 of this Order gives district councils power to deal with noise from premises (including land) which they consider amounts to a statutory nuisance. The powers apply to the control of existing noise and where a noise is expected to occur or reoccur. Where a council is satisfied a nuisance exists, it is required to serve a legal notice requiring the abatement of that noise nuisance.

Transport Planning

When proposing the construction of a new road or additional carriageway, a noise impact assessment must be carried out as part of the Environmental Statement, which is issued in accordance with EC Directive 85/337 EEC (as amended). The potential noise impact should be assessed for all properties within 300m of each new road or proposed alteration or carriageway.

Current policy also requires an impact assessment to be carried out if there is an expected increase of 1dB LA10,18h from the existing road when alterations are carried out (Design Manual for Roads and Bridges, Vol 11, Section 3, Part 7, (HA 213/08 (August 2008))). The process which tends to be followed is set out in the Design Manual for Roads and Bridges (Design Manual for Roads and Bridges, Vol 11, Section 3, (HA 213/08, August 2008)). Mitigation such as optimising the route alignment and the use of noise barriers, either through
landscaping or purpose built walls or fences, should be included in the road design to minimise any adverse noise impact. The impact assessment process also has regard to the protection of tranquil areas in general, through consideration of the impact on landscape.

Whilst conditions relating to noise can be set as part of a planning permission, there is currently no specific policy or guidance which addresses the issue of noise at the planning stage. However, noise is referred to in several other Planning Policy Statements and noise is a material consideration which is taken into account in the making of planning decisions.

**Land Use Planning**

In dealing with planning applications involving noise that would be generated by the proposed development or existing noise to which the development would be subjected, the Planning Authority consults the appropriate Environmental Health Department and relevant Competent Authority.

It is not the purpose of the planning system to intervene in existing noise problems arising from lawful land use activity and the planning system should not be used to achieve objectives relating to other legislation. Whilst there is no specific policy guidance which addresses the issue of noise in the Northern Ireland planning regime, noise is referred to in several Planning Policy Statements and it is recognised that where relevant, noise is a material consideration in the determination of planning applications. Therefore the Northern Ireland planning system has a role to play in preventing and minimising the impact of noise through its influence in the layout and design of new developments and consideration of the resulting amenity impacts which is a fundamental part of the development management process. The key question is whether a proposed development would unacceptably affect the amenity of the surrounding neighbours/properties or likewise whether a noise-sensitive development would be incompatible with existing noisy activities in the area. However, the Planning Authority will base its decisions on planning applications on planning grounds alone. It will not use its planning powers to secure objectives achievable under non-planning legislation.

**Transport Analysis Guidance**
This is published by the Department for Transport (available at www.webtag.org.uk). The guidance assists in setting objectives, identifying problems, developing solutions, creating a transport model to appraise solutions, and providing general advice on the appraisal of major transport schemes.

**Design Manual for Roads and Bridges Volume 11** (Environmental Assessment) (Highways Agency, 1994). Please see above for more information.

**Noise Insulation Regulations (Northern Ireland) 1995**

These Regulations apply to all Department of Regional Development proposals and enable a resident, subject to increased noise from a new or altered road, to benefit from a reduction in noise level inside their homes by means of double windows, supplementary ventilation and where appropriate venetian blinds and double doors.

**Land Compensation Act 1973**

This provides for monetary compensation to those homeowners affected by the new or improved highway to account for any loss in value of the property that has occurred as a result of the road. The assessment, which is carried out by surveyors, is purely subjective and claims for compensation must be made within a certain period of time.

**Building Regulations**

The Buildings Regulations, which are administered by District Councils in Northern Ireland, ensure the safety, health and welfare of people working in and around buildings. The Department of Finance and Personnel has prepared technical guidance on their implementation.

For buildings constructed in the vicinity of noise sources such as roads, it would be appropriate for specific façade noise insulation to be a requirement of the construction, potentially with a pre-completion sound insulation test required prior to habitation. This would help to ensure that the design targets of the construction are met in practice.

British Standard 8233:199 (BS8233:1999, Sound Insulation and Noise Reduction in Buildings – Code of Practice) provides design advice for various buildings, including dwellings and
offices in order to mitigate the effects of noise from road traffic. Advice is provided on what constitutes reasonable or good standard in terms of internal noise levels and on what mitigation might be used to achieve those levels.

Building Bulletin 93 (BB93 Acoustics Design of Schools, A Design Guide, 2003) provides guidance on acoustics in schools including target noise levels for the indoor and outdoor environment in order to secure an appropriate acoustic environment for teaching. Following the guidelines in BB93 is one way of ensuring that new schools comply with the requirements of the Building Regulations (Northern Ireland) 2000.