

# Technical Guidance for Quiet Areas, under Strategic Noise Action Plans

## 1. Introduction

The aim of this document is to provide guidance to stakeholders in determining whether or not an identified Candidate Quiet Area (CQA) within the Edinburgh and Glasgow agglomerations<sup>1</sup> should progress to a Quiet Area (QA) status or whether the declaration of a QA would not be appropriate in the circumstances.

In so far as reasonably practical every effort has been made to ensure that the published noise contours are accurate. Where the current guidance reveals that the CQA status is inaccurate either as a result of erroneous data or where local topography and design have caused the designated area not to have met the required criteria then the area will not be progressed to a QA.

During the implementation of the Noise Action Plan, a review process should be applied to each CQA to determine whether or not it should become a designated QA. Prior to any CQA being progressed to a QA status it is necessary to subject the CQA to detailed scrutiny. To assist in this process the Scottish Government have provided a tool in the form of a layered Acrobat Portable Document Format (PDF) files to enable each of the stakeholders to view the attribute data used in the production of the strategic noise maps. There is a separate series of layered PDF files for each of the following: the Edinburgh agglomeration (one set each for road and rail) and similarly for the Glasgow agglomeration. In addition, there is a layered PDF file showing the location of each CQA identified within both the Edinburgh and Glasgow agglomerations.

It should be appreciated that an area defined on a map as being a CQA does not necessarily define an absolute area that requires full protection. Instead the designated coverage of a CQA is simply indicative of the likely area within which there is a sufficiently large area worthy of protection i.e. where it is indicated that  $L_{day}$  levels < 55 dB occur.

Finally, it is the intention of the Scottish Government to produce further guidance on measures to protect quiet areas from increases in noise for consideration during the noise management process.

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<sup>1</sup> Strategic Noise Action Plan for the Edinburgh Agglomeration:  
<http://www.scotland.gov.uk/Resource/Doc/224426/0060577.pdf>

Strategic Noise Action Plan for the Glasgow Agglomeration:  
<http://www.scotland.gov.uk/Resource/Doc/224446/0060581.pdf>

## 2. What is a CQA ?

In line with the aim of Articles 1 and 7 of the Directive<sup>2</sup>, Member States are to adopt action plans to include preserving environmental noise quality where it is good with the aim to protect quiet areas against an increase in noise.

The Directive defines 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.*<sup>3</sup>

In identifying CQAs for the Edinburgh and Glasgow agglomerations, a source dataset comprising of Historic Parks and Gardens, Public or Other Open Spaces and Metropolitan Open Land taken from the Land Use constraints dataset as well as relevant Scottish Natural Heritage designation was identified. This source dataset was developed in a consistent manner across all Local Authorities within both agglomerations following responses to prior consultation. The dataset was then subjected to a series of filter specifications based on that developed by TRL.<sup>4</sup> The outcome of this filter process was a list of CQAs.<sup>5</sup>

The following filter specifications were applied:

- *Noise Level filter*: The specification of a 55 dB  $L_{day}$  limit is seen as an appropriate compromise, based on the mapping requirements of the END and definitions for Quiet Areas used elsewhere in Europe;
- *Minimum Area filter*: The specification of a minimum area of 9 hectares is based upon consideration of both the minimum area that should lie within the defined noise limit to warrant preservation (75%) and the minimum area required to achieve 55 dB  $L_{day}$ , based on the presence of at least one major road at the boundary;

In total, 28 CQAs for the Edinburgh agglomeration and 66 CQAs for the Glasgow agglomeration have been identified.

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<sup>2</sup> The Directive has been transposed into the Environmental Noise (Scotland) Regulations 2006 which came into force on 5<sup>th</sup> October 2006. The Regulations apply to environmental noise to which humans are exposed, in particular in built-up areas, public parks or other quiet areas in an agglomeration, near schools, hospitals, and other 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, noise from domestic activities, noise created by neighbours, noise at work places, or noise inside means of transport or due to military activities in military areas.

<sup>3</sup> Although the Directive recognises the importance of protecting quiet areas in open country, these areas fall outside the scope of this document.

<sup>4</sup> *Research into quiet areas – Recommendations for identification*. DEFRA, 2006.  
<http://www.defra.gov.uk/environment/noise/research/pdf/quiet-areas.pdf>

<sup>5</sup> *Research into quiet areas – Recommendations for identification*. DEFRA, 2006.  
<http://www.defra.gov.uk/environment/noise/research/pdf/quiet-areas.pdf>

### 3. CQA Variables

A very general outline of the process involved in validation of a CQA is outlined in each of the Edinburgh and Glasgow agglomerations: these can be viewed at the website given in footnote 1. However, this document provides further detailed guidance.

The input variables used in identifying CQAs are as follows:

- the area defined by the CQA and
- the area defined within the boundary of the CQA which falls within the noise band  $< 55 \text{ dB } L_{\text{day}}$  contour.

The main variable to be checked by the stakeholders in consideration of the progression from CQA to QA is the area contained within the boundary of the designated CQA which falls within the noise band  $< 55 \text{ dB } L_{\text{day}}$  contour.

The position of the  $< 55 \text{ dB } L_{\text{day}}$  contour is based on predicted noise levels which are dependent upon both map data and attribute data. The road, railway and air traffic noise levels that have been combined in determining noise contours has been calculated using the Department of Transport Welsh Office 1988 publication entitled *Calculation of Road Traffic Noise* (with a correction to produce  $L_{\text{day}}$  levels) and the Department of Transport 1995 publication entitled *Calculation of Railway Noise* (with a correction for rail/wheel roughness), for road and rail respectively<sup>6</sup> and using data provided by the Competent Authority for the relevant airports. Each of the aforementioned prediction methodologies rely on both the map and attribute data and each of these will now be considered, in turn, with reference to the checking that can be undertaken by the relevant stakeholders.

#### 3.1 Outline Consideration of Map Data

Map data identifies the geographical location of objects and features included in the noise model. This map data is 'captured' digitally as either points, lines or polygons. The data required for the calculations of noise levels have been determined by consultation with various organisations including Transport Scotland, SEPA, Network Rail, BAA, and relevant Local Authorities. The generated noise contour maps have been created by computer analysis using input data and specialised software. To generate the noise contours the noise level at individual points is calculated on a 10m grid basis, at a reception height of 4m, as required by the Regulations. Hence, it should be appreciated that the predicted noise level will not represent every situation at a local level and,

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<sup>6</sup> For CRTN correction see

<http://www.defra.gov.uk/environment/noise/research/crtn/pdf/noise-crtn-update2006.pdf>

For CRN correction see

<http://www.defra.gov.uk/environment/noise/mapping/research/rail/pdf/railway-noise.pdf>

therefore, a more detailed examination of CQAs is necessary prior to any declaration of QAs.

It may not be possible for stakeholders to compare modelled map data such as ground contours or indeed building heights with the real life situation as it actually exists but they will be able to check for the presence of features such as acoustic barriers, new or demolished buildings, and the presence of other environmental noise sources that have not been included in the assessment but may contribute to the noise within the boundary of the CQA.

### **3.2. Outline Consideration of Attribute Data**

Attribute data is basically the input noise source data. For roads, this includes traffic flow, speeds, percentage of heavy goods vehicles, road gradient and road surface type. For railways, this includes train vehicle types, number of carriages, speed, rail track type and support structure type. Where this data is available to the stakeholder a limited assessment may be carried out.

## **4. General Checking Process for CQAs**

### **4.1 Use of Checking Tool**

Where a CQA has been included in the relevant Action Plan a site visit will almost certainly be required to fully appreciate the nature of the area being considered. A site visit should, however, be undertaken prior to the final decision to declare a QA. Meanwhile, to assist in the preparatory work for any site visit, sets of layered PDF files have been prepared that provide a graphical representation (maps) of the road and rail segments which contribute to noise level within a CQA. CQAs have, where possible, been geographically grouped within PDF files. Opening a CQA PDF file reveals 13 layers, namely;

- Data Frame,
- Road Name Labels,
- CQA Labels
- Road Traffic Data
- Rail Traffic Data
- Road Centrelines,
- Railway Tracks
- Area bounded by CQA,
- Boundary of agglomeration,
- Boundary of study area
- Ordnance Survey including buildings,
- Relevant Area Noise Contours > 55 dB  $L_{day}$  within the agglomerations (e.g. Glasgow or Edinburgh),
- Aerial Photograph.

Each of these layers can be viewed individually, or in combination with other layers, by switching on or off the appropriate layers, as necessary. An outline explanation of each of layer is included in Table 1.

**Table 1 Explanation of Layers in PDF Files**

Name of Layer	Explanation
Data Frame	The Map Frame, including legend and North Arrow
Road Name Labels	Street road names
CQA Labels	CQA identifying label
Road Traffic Data	Coloured boxes containing: traffic flows, speed and %HGV and road surface type, i.e., the CRTN variables required for calculation. Note that flows, speed and %HGVs are 2005 data.
Railway Traffic Data	Coloured boxes containing: $L_{day}$ , $L_{evening}$ and $L_{night}$ noise levels, wheel roughness correction and average speed.
Road Centrelines	Road centrelines for qualifying roads, i.e., those roads as used in the noise models. Note that only roads with flows above 1000 vehicles per day were modelled within agglomerations.
Railway Tracks	Railway tracks as taken from ENM (Network Rail's Engineering Network Model)
CQA	Boundary of CQA
Agglomeration	Boundary of agglomeration
Study Area	Boundary of study area
Base Map	OS data including buildings
Noise Level > 55 dB $L_{day}$	Predicted noise contour.
Aerial Photograph	Aerial photograph of area* (indicative only)

\* Due to licensing issues this layer may be removed

Guidance in relation to the evaluation of CQAs follows. However, this guidance is not prescriptive and, as such, should be used with appropriate care.

#### **4.2 General Information to be Gathered**

In addition to the information provided as listed in Table 1 there are other general considerations to be evaluated. The list below should not be considered as prescriptive or exhaustive, it is intended simply to provide generic guidance.

- a) Identify the actual boundary location of the CQA and the area contained within the CQA where noise levels < 55 dB  $L_{day}$ .
- b) Identify the location and orientation of nearby buildings and/or acoustic barriers.
- c) Consider the relevant provisions of the local plan for CQA and its immediate surroundings.
- d) Evaluate/determine the nature and composition of all environmental noise sources in the vicinity.
- e) If appropriate identify local traffic management plans in the vicinity of the CQA.

f) Identify any changes to road or rail layout and buildings since 2005.

### **4.3 Site Visit**

As has been previously identified there is very likely to be a need for a site visit. A table has been included as Appendix 1 which may assist in the gathering of data on site and subsequent reporting.

## **5. The Evaluations of CQAs**

This process consists of four stages:

- Stage 1: Mapping details
- Stage 2: Source attributes
- Stage 3: Industrial Noise Sources
- Stage 4: Future planning

### **5.1 Stage 1: Mapping details**

It is suggested that the first stage in the evaluation process is to compare the  $L_{day}$  noise contour layer with the aerial photograph. Therefore the following layers should be switched on: Data Frame, CQA Labels, Road and Rail Lines, CQA, Noise Level Contour > 55 dB  $L_{day}$ , and Aerial Photograph. This comparison should confirm that the online published maps ([scottishnoisemapping.org](http://scottishnoisemapping.org)) actually represent the road and rail layout as seen using the aerial photograph. This stage of the process may also reveal a difference in the building footprints shown in the aerial photography and the PDF document/online published noise maps. This could be the result of buildings being either erected or demolished after the mapping data collection exercise; the data used for creation of the three dimensional noise models used 2005 data. It is also possible that local knowledge will reveal that the road/rail layout has in fact changed since the publication of the online maps. There is also the issue of road/trackside acoustic barriers. Such barriers can be in the form of close boarded timber fences, metal or brick/masonry screens or any material with sufficient mass per unit area, height and extent to act as an acoustic screen. The road/trackside barriers used in the mapping process were taken from the information contained within the Transport Scotland SERIS database. Note that barriers formed by virtue of cuttings and embankments should have been captured in the creation of the three dimensional model used in the mapping process. Should, following a site visit, there be any reason to suspect that a noise barrier formed by virtue of a cutting or an embankment may not have been captured in the 3D model used in the mapping process this should be reported to the Scottish Government for consideration and checking of mapping data. If for a particular CQA, discrepancies are found then these should be relayed to the Scottish Government, who can then consider the implications of the findings.

### **5.1.1. Possible Outcome of Stage 1**

**Stage 1: Outcome 1.** Report that the area mapped within the vicinity of the highlighted CQA matches the layout as shown in the aerial photography and that it is in fact representative of the current layout in terms of roads, railways, building footprints and road/trackside acoustic barriers.

**Stage 1: Outcome 2.** Report to the Scottish Government the details of:

- any significant variations between either the PDF document or aerial photograph and the existing road/rail/building layout (this will most likely become apparent during site visits to CQAs);
- the presence or otherwise of road/trackside barriers and other mitigating factors.

The detail reported should be simple and concise and should only refer to the area in the vicinity of the highlighted CQA. It is suggested that where checks reveal a discrepancy in terms of existing buildings that, where possible, photographic evidence is supplied to support Stage 1: Outcome 2. Any discrepancies in road and rail layouts can be evidenced by submission of road and rail centreline (where a road is dual carriageway or motorway, two centrelines should be provided, one for each carriageway), drawings, which should be in an appropriate format<sup>7</sup> and should be correctly geo-referenced. Where the presence of road/trackside barriers are being reported it is suggested that the start and end point of such barriers are reported in terms of their, X, Y and Z coordinates if possible and also accompanied by photographic evidence to assist in the determination of the effectiveness of the barrier. Alternatively, these can also be supplied as geo-referenced shapefile or dxf formatted files.

### **5.2. Stage 2: Source attributes**

In this stage the road and rail traffic data should be checked. Only traffic data for those sources which bound the CQA or, for motorways etc, are located close to a CQA boundary are required to be checked as these will have the most significant impact on noise within the CQA boundary.

#### *Road Traffic*

The information relating to the modelled road traffic data can be viewed on the "Road Traffic Data" layer<sup>8</sup>. These traffic variables can be checked against any other data held by stakeholders. However, it must be borne in mind that the modelled data may not necessarily agree with current data held by stakeholders, as the data used in the mapping exercise was that for the year 2005. In addition, the traffic input data was drawn from strategic road traffic modelling

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<sup>7</sup> E.g. shapefile or dxf format

<sup>8</sup> Although the traffic data will refer to 18 hour flows,  $L_{day}$  noise levels are based on  $L_{A10,18h}$  values.

and, therefore, caution must be exercised when comparing these variables with those obtained from more localised traffic models. It is also worth noting that, in terms of traffic flows, for an increase of 1dB, or indeed a decrease of 1dB to occur, there has to be a corresponding +25% or -20% change in the traffic flow. Furthermore, the speed, percentage of HGVs and road surface type all contribute to the overall noise level and any check of these variables is aimed at establishing reasonable agreement with conditions that would have existed in the year 2005. If, for example, a local authority roads department has records which show that in the year 2005 the percentage of HGVs on a particular road was 15% and the equivalent road in the PDF document indicates that 5% was used for modelling purposes this discrepancy must be reported to the Scottish Government. For further guidance on the effect of changes in percentage HGVs and speeds please refer to Appendix 2.

### *Rail Traffic*

In this stage the rail  $L_{day}$  noise levels should be checked. The information relating to the modelled railways can be viewed in the "Rail Traffic Data" layer. In conjunction with Calculation of Rail Noise (CRN) this information can be checked against any other data held by stakeholders. However, it must be borne in mind that the modelled data may not necessarily agree with current data held by stakeholders, as the data used in the mapping exercise was that for the year 2005. Moreover, it is derived from ACTRAFF data (Network Actual Traffic Data) which reports the actual rail movements rather than those published in passenger and freight timetables. Moreover, the data is based on average rail movements on a weekday and, thus, the predicted noise levels are based on statistical data rather than that for a particular weekday in the year. However, it should be appreciated that in terms of rail traffic flows, for an increase of 1dB, or indeed a decrease of 1dB to occur, there has to be a corresponding +25% or -20% change in the flow of trains of the same type. Furthermore, the speed, track and structure type all contribute to the overall noise level and any check of these variables is aimed at establishing reasonable agreement with conditions that would have existed in the year 2005. If, for example, in the year 2005 the train speeds is significantly different or the track and track structure is different from that detailed in the PDF document these discrepancies must be reported to the Scottish Government.

### **5.2.1. Possible Outcome of Stage 2**

#### **Stage 2: Outcome 1.**

**Road:** Report that the traffic variables used within the vicinity of the highlighted CQA are in reasonably close agreement with the situation as it would have existed in the year 2005.

**Rail:** Report that the  $L_{day}$  noise levels and train variables (speed, track and structure type), as used within the vicinity of the highlighted CQA, are in



reasonably close agreement with the situation as it would have existed in the year 2005.

## **Stage 2: Outcome 2.**

**Road:** Report any variations between the traffic data shown in the PDF document for a particular CQA to the Scottish Government. The detail reported should be simple and concise and should only refer to the area in the vicinity of the highlighted CQA, and the stakeholder should also identify the data source from which the comparison has been made. It is suggested that where a check reveals a discrepancy in the road surface type that, where possible, photographic evidence is supplied to support Road Stage 2 Outcome 2.

**Rail:** Report any variations between the data shown in the PDF document for a particular CQA to the Scottish Government. The information reported should be simple and concise and should only refer to the area that is in the vicinity of the highlighted CQA, and the stakeholder should also identify the data source from which the comparison has been made. It is suggested that where a check reveals a discrepancy in the track structure or track type that, where possible, photographic evidence is supplied to support this Rail Stage 2 Outcome 2.

### **5.3. Stage 3: Industrial Noise Sources**

Where an industrial noise source is identified in the vicinity of a CQA consideration on the likely impact of protecting an area will need to be given.

#### **5.3.1. Possible Outcome of Stage 3**

**Stage 3: Outcome 1.** Report that there are no industrial noise sources in the area that will impact on the area.

**Stage 3: Outcome 2.** Report that there are industrial noise sources in the area that may impact on the area.

### **5.4. Stage 4: Future Planning**

Where the CQA status is considered to be warranted the area will only be promoted if there are no conflicts within the existing local development plans. Consideration will also be given to likely impacts of protecting an area and whether or not they are affordable or desirable. A list of possible considerations is listed below. These considerations are not to be considered as absolute or exhaustive, and should be used with appropriate care:

- Is the area already identified for an alternate use within the local plan?
- Are alternate uses for the area currently being developed for a future local development plan?

- Are there any developments planned in close proximity to the area that would be compromised?
- Are any significant changes to nearby roads/railways proposed which would impact upon the area?

Structure Plans and Local Plans are to be replaced in the coming years due to changes to Scotland's planning system. These will be replaced with Strategic and Local Development Plans, respectively. These plans will set out locations for residential and commercial development, as well as transport policies, and will have an impact on environmental noise. These plans may constrain the designation of CQAs to QAs and consultation with planning authorities will be necessary in this process.

#### ***5.4.1. Possible Outcome of Stage 4***

**Stage 4: Outcome 1.** Report that there are no foreseeable future plans or significant changes to nearby roads or railways proposed which would impact upon the area.

**Stage 4: Outcome 2.** Report to the Scottish Government the details of any future plans significant changes to nearby roads or railways proposed which would impact upon the area.

**Stage 4: Outcome 3.** Report to the Scottish Government the details that there is an alternate use identified in a current local plan or being considered in a future development plan

**Appendix 1: Example of Data Recording Sheet to be used for Desk Study and/or Site Visit**

Location	Agglomeration	Edinburgh
	CQA Label	2
	Location	Inverleith Park
	Road/Rail	Road: East Fettes Avenue
	Local Authority/Infrastructure Manager (usually Network Rail for rail noise)	City of Edinburgh
Technical Details	Flow ( $L_{day}$ for rail)	18h flow
	Surface Type	HRA (If this was a rail example the considerations would be ballast or slab track, sleeper type (concrete, metal, wooden))
	Gradient	1/60
	Traffic Composition	%Heavy vehicles (If rail would consider Local Passenger Trains, Express Passenger rains, Freight Trains)
Visit	Date and time of Site Visit	Some time soon
	Attendees	Name of attendees
Physical Details	Traffic comments	Moderate, heavy vehicle, major bus route
	Road type	Dual carriageway. (If rail would consider Single Track, Double Track, Multiple Track)
	Surface	HRA (If rail would consider jointed track, continuously welder rail, rail switches and crossings)
	Topography (including cuttings, embankments, over bridges, under bridges and tunnels)	As 2005 mapping (see <a href="http://scottishnoisemapping.org">scottishnoisemapping.org</a> ) and on the tool provided.
	Speed Limits	Note that HGVs and freight trains may have a lower limit.
Site Observations	Noise Barrier or Other Mitigating Factors	None (if noise barriers seen, photograph, dimensions and material type would be useful)
	Subjective evaluation of noise climate	Moderate, survey taken (if any measurements taken to substantiate subjective evaluation then all measurement parameters, measured levels, details of calibration, measurements location, distance from source, meteorological conditions etc must be provided).

	Photographs taken	Yes (maps may also be prepared from desk study)
	Observation	Footpaths on both sides. High level of pedestrian traffic. Housing date around 1940s. Carriageway added to road in 2003. Road will maintained. Major commuter route. Is traffic travelling a road design speed? (If rail would consider railway cutting, railway siding (or passing loop), railway signal, level crossing (or footpath crossing)).
	Local Industry	Identify industrial noise sources which may impact on noise climate within CQA.
	Landuse	Play area, boating lake/loch, scrub land etc.
	Public Access	Any pubic access issues. Is the CQA actually accessible to the public?

## Appendix 2. Guidance on Evaluation of HGVs

**Table A2.1: Change in BNL (Noise Level 10m from kerb) due to Changes in Road Traffic Speed and/or %HGV**

	<b>Modelled</b>	<b>Assumed</b>
<b>Speed</b>	50	60
<b>% HGV</b>	10	10

The Noise Level will Increased by 0.8 dB(A)

If you are viewing the PDF version of this document, the tool for assessing changes in BNL can be accessed [here](http://www.scottishnoisemapping.org/downloads/guidance/HGVBNL.doc) (<http://www.scottishnoisemapping.org/downloads/guidance/HGVBNL.doc>).

In Table A2.1 there is an embedded Excel spreadsheet that can be used to determine changes to the BNL due to changes in speed and/or %HGV. To use the spreadsheet simple double click inside the table. On doing so, the spreadsheet will open and you can input the modelled and assumed speeds and %HGVs. Then click outside the excel table and the phrase will update, indicating where there has been an increase, decrease or no change in the BNL. Any increases or decreases in the value of the BNL will be shown.