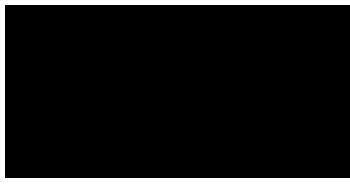


Predicted Timetable Train Noise and Associated Impacts
Stirling Alloa Kincardine Railway Line
Noise Modelling/Mapping

Clackmannanshire Council
October 2009

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Stirling Alloa Kincardine Railway Line Noise Modelling/Mapping

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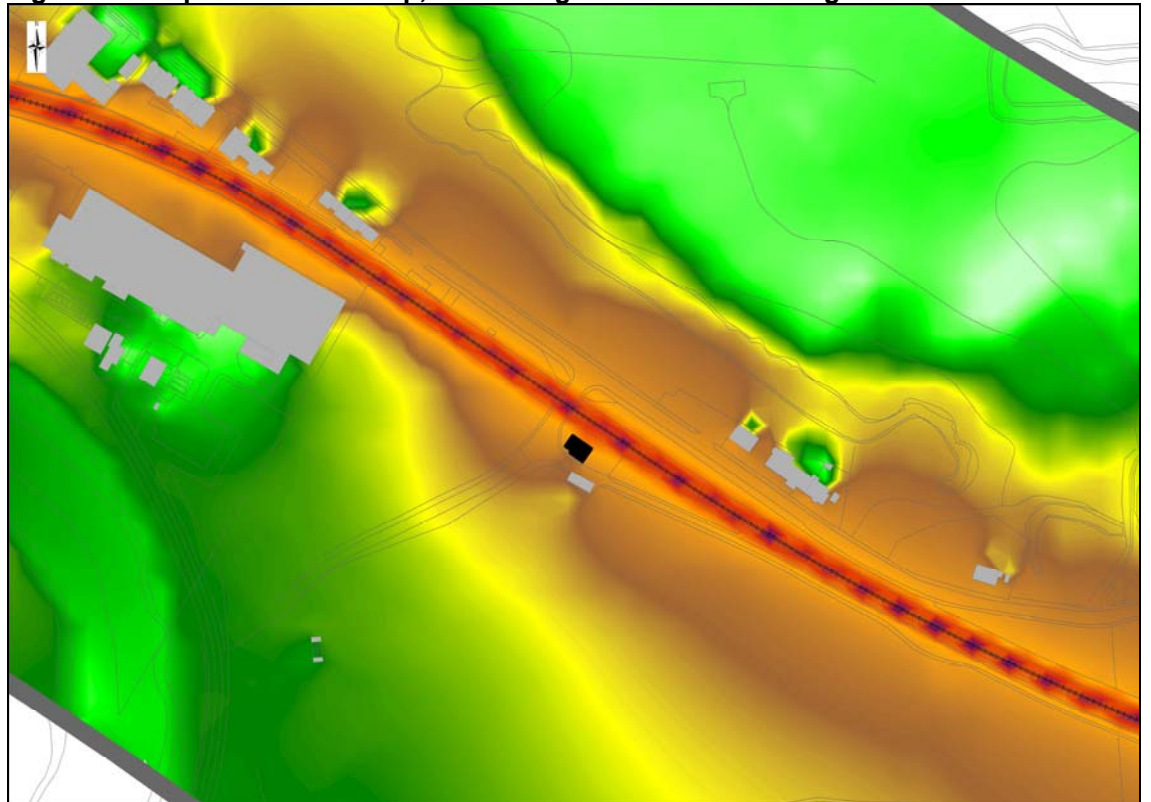
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1 Introduction

- 1.1 This report compliments previous Stirling-Alloa-Kincardine (SAK) reports published on the Clackmannanshire Council's internet website. In an earlier report (Rail Noise Assessment – Stirling-Alloa-Kincardine Rail Link (26th May 2009)) it was stated that of the 11 sample properties, where noise level measurements were undertaken 2 were shown to possibly require daytime noise mitigation. Following on from these noise level measurements a noise modelling exercise has been undertaken to produce noise contours that facilitates the analysis of noise impacts at over 6200 properties within a 600m corridor along the new SAK rail route. Of these properties none qualify for day or night time noise insulation in terms of the adopted Railway Noise Insulation Regulations as set in Section 3.4 of the previous report (26th May 2009).
- 1.2 With regard to maximum train pass-by noise levels ($L_{A_{Max,fast}}$), these have not been predicted as part of the noise modeling process. However, as stated in the aforementioned report of the 26th May 2009 *"If the assessment of night-time noise and the provision of mitigation is considered on the same basis as has previously been addressed by the Scottish Parliament in respect the: Edinburgh Tram Lines Glasgow Airport Rail Link (GARL) and Edinburgh Airport Rail Link (EARL) i.e. both that the maximum level which should not be exceeded more than twice in any one hour is in fact 82dB $L_{A_{Max,fast}}$. On this basis the threshold value is likely to be exceeded at East Neuk Cottage and The Gables and at present we are advised that there is no evidence to suggest that the number of occurrences are being exceeded."*
- 1.3 This document presents background information relating to the noise modelling and mapping of rail noise from the recently re-opened SAK railway line. The section of railway that has been modelled is that from Stirling railway station to Longannet power plant. The noise maps that have been produced have been based upon the combined freight and passenger timetables and can be viewed in Appendix 2, of this report. The maps cover an area 300m either side of the rail tracks, and the total length of track that has been modelled is 21km. The total area covered by the maps extends over an area equal to 14 km², and for this area noise levels have been determined on a 10m x 10m grid at a height of 1.5m above the ground. From these predicted noise levels noise level contour maps have been produced. The noise maps have been coloured according to the legend shown in Figure 1 (next page), with a sample of a mapped area reproduced in Figure 2 (next page).
- 1.4 As can be seen, the colour scheme for each 5dB noise band is not a single solid fill colour; instead progressive colours have been used. This feature enables the viewer to more readily see where within the noise band their property lies.

Figure 1: Colour Scheme used for Railway Noise Band Maps**Figure 2: Sample Rail Noise Map, Illustrating Noise Level Banding**

2 The Rail Noise Model

- 2.1 The main train noise model covers a time period that extends from 06:00 – Midnight and includes all passenger and freight trains timetabled to operate between Stirling and Longannet power station in that time period
- 2.2 To create a noise model various data are required. In particular, it is necessary to know the actual geographical location of the railway tracks and buildings. Moreover, since the propagation of sound is affected by the intervening terrain, between the train track and the noise receptor of interest, it is necessary to create a 3D model and, as such, terrain height information is required.
- 2.3 With regard to the rail tracks it is necessary to know the type of track and the track support structures used in the construction of the railway line.
- 2.4 As for the trains, the required input data includes; train speed, train vehicle composition, number of each vehicle type and the number of trains using the track during the time interval of interest. Table 1 provides details of the trains used in the model. The number of trains was determined from timetable information.

Table 1: Train Numbers Passing Existing Properties along S-A-K Line

| Route | Direction | Day (06:00 – 24:00) | Night (00:00 – 06:00) | Train Types |
|--|-----------|------------------------|--------------------------|---|
| Passenger Stirling – Alloa | Eastbound | 19 | 0 | Off peak: C170 DMU Peak: C170+C158 DMU |
| | Westbound | 19 | 0 | |
| Freight Stirling – Kincardine | Eastbound | 8 | 4 | Class 66 Locomotive 23 x HTA Coal Wagons |
| | Westbound | 9 | 3 | |

- 2.5 A difficulty with modelling freight train noise is determining exactly when the train is or is not operating on full power, as this affects the location of where the dominant train noise source is located. When not on full power the dominant train noise source is located at the rail head and when on full power it is located 4m above the rail head. For modelling purposes trains have been modelled as operating at full power where the train is being driven on a positive incline, i.e., is climbing. Moreover, it should be appreciated that when modelling the train noise, local features such as (garden) walls and barriers have not been included in the model. This is because this data is not readily available. However, by not including this information the predicted noise levels are worst case.
- 2.6 To provide confidence in the final rail time tabled noise modelling output the train noise was first modelled using the same number of trains as were found to use the track during the second day of noise level measurements (the second day of noise level measurements were used because more trains operated on that day), and these predicted noise levels were then compared with the measured results. Thus, if the predicted and measured noise levels

correlated well with each other, alternate train models, using timetabled train movements, could be created and regarded as being representative of the actual train noise levels for that particular level of track usage.

- 2.7 Following an initial inspection of the predicted noise levels for locations at which noise levels had been measured it was found that at a number of locations there was an unacceptable difference between the predicted and measured noise levels. However, analysis of photographs taken whilst on site showed that at a number of locations, for example, “The Gables, 75 Grange Road and others, there were local screens that were acting as acoustic barriers. Once these features were added to the noise model, the predicted and measured noise levels were in much better agreement.
- 2.8 However, at two locations, namely, 138 Ladysneuk Road and East Neuk cottage, the predicted noise level differences were 2.9 and 3.5 dB, respectively, higher than the measured noise levels. Neither of these properties appeared to have local barriers. These noise level differences are likely to occur due to factors out with the model. These factors may include: variance in the track conditions; trains not operating on full power where they are assumed to do so in the model; variance between the digital ground model and the actual terrain; difference in train speeds, and perhaps local screens located between the track and the receptor location of interest, again, not included in the model
- 2.9 With local barriers in place, as identified in site location photographs, the noise level differences between the measured and predicted noise levels are as shown in Table 2.

Table 2: Predicted Versus Measured Noise Levels

| Receiver | Measured L _{Aeq,18hr} (dB) | Predicted L _{Aeq,18hr} (dB) | Noise Level Difference (dB) |
|-------------------------------------|--|---|--------------------------------|
| 2 Dumyat Road Causewayhead* | - | 43.8 | 43.8 |
| 138 Ladysneuk Road, Causewayhead | 55.0 | 57.9 | 2.9 |
| East Neuk Cottage, Causewayhead | 59.7 | 63.2 | 3.5 |
| The Gables, near Cambus | 54.3 | 53.6 | -0.7 |
| 75 Grange Road, Alloa | 57.3 | 57.4 | 0.1 |
| 24 Kingswell Park, Alloa | 53.1 | 51.0 | -2.1 |
| 22 Park Place, Alloa | 52.4 | 53.1 | 0.7 |
| 101 Devonway, Clackmannan | 53.5 | 54.5 | 1.0 |
| Hamewith, Clackmannan | 45.1 | 44.9 | -0.2 |
| 23 Brucefield Crescent, Clackmannan | 52.2 | 52.1 | -0.1 |
| Station House, Kincardine | 55.6 | 54.3 | -1.3 |

*Due to nearby construction work uncorrupted railway noise measurements not possible.

- 2.10 Through the modelling process it is possible to apply correction terms to the noise maps that will adjust the predicted noise level maps so that they agree with the measured noise levels at the measured locations, which in turn adjusts the predicted noise levels at all other locations.. See, for example, Paragraph 2.8. As a result, once the corrections have been applied the model reflects the measured noise levels.

- 2.11 It should be noted that although local barriers were used in the calibration of the time table noise models, these features were removed for the final noise mapping process. They were removed because they are not deemed to be permanent structures.
- 2.12 The output from the noise modelling can be viewed as a series of six maps that cover the mapped area from Stirling to Longannet. They can be viewed in Appendix 2.
- 2.13 Subsequent to this initial noise modelling process site visits were undertaken along the route of the SAK railway line so as to determine the extent of existing barriers/fences that act as acoustic screening at properties adjacent to the railway. These site visits occurred on 26th, 27th and 28th of August 2009.
- 2.14 The locations and heights of barriers that act as acoustic screens to the railway noise were then added to the SAK railway noise model and noise impact analysis, for all residential properties, was undertaken with barriers in place. A summary of the noise impacts is presented in Section 3, below.

3 Data Analysis

- 3.1 In addition to the production of noise maps, façade noise levels have been determined for each property at a location 1m from their façades. Using this data it is possible to predict which buildings exceed the ES criteria for mitigation. These criteria state that the noise level from the trains must exceed $L_{Aeq,18hr}$ 55dB and must exceed the pre-existing ambient noise level by 5dB.
- 3.2 The noise model provides the façade $L_{Aeq,18hr}$ noise levels for the train noise, but clearly does not give the pre-existing ambient noise level at each and every property potentially affected by the train noise. However, measurements have been undertaken at sample measurement locations. This measured data, from both the Environmental Statement (ES) and AECOM, have been used as a proxy for ambient noise levels at properties located near to where the measurements were undertaken. Thus, it is possible to provide an indication of the properties most likely to meet the mitigation criteria.
- 3.3 When determining whether or not there is a 5dB increase in the train noise $L_{Aeq,18hr}$, above the pre-existing ambient noise level the following procedure has been adopted: prior to subtracting the ambient noise level from the $L_{Aeq,18hr}$, the ambient noise level has been rounded down to the nearest whole number and the train noise $L_{Aeq,18hr}$ has been rounded up to the nearest whole number. Clearly by rounding down the pre-existing noise level and rounding up the train noise level a conservative approach to determine potential properties that may require noise mitigation has been adopted.
- 3.4 A full list of properties that exceed the $L_{Aeq,18hr}$ train noise level threshold of 55dB can be viewed in Appendix 1.
- 3.5 There are 62 residential properties that meet both criteria (exceed $L_{Aeq,18hr}$ 55dB and exceed pre-existing ambient noise levels by 5dB), and these are listed below: (It should be noted that indicative ambient noise levels are not available for all locations. However, as can be seen in Appendix 2, the measured indicative $L_{Aeq,16hr}$ is greater than that of the predicted train $L_{Aeq,18hr}$ and, as such the pre-existing ambient $L_{Aeq,18hr}$ is also likely to be greater than train $L_{Aeq,18hr}$.)

Table 1: Properties Predicted to Comply with Noise Mitigation Criteria

| Address | Predicted $L_{Aeq,18hr}$ Train Noise Level | Pre-Existing Ambient $L_{Aeq,18hr}$ Noise Level | Noise Level Exceedence |
|--|--|--|---------------------------|
| 75 Grange Road, Alloa, FK10 1LU | 63.0 | 55.0 | 8.0 |
| 77 Grange Road, Alloa, FK10 1LU | 63.0 | 55.0 | 8.0 |
| The Gables, Alloa Road, Cambus, FK10 2NT | 63.0 | 49.0 | 14.0 |
| Woodside House, Alloa Road, Cambus, FK10 2NT | 62.0 | 53.0 | 9.0 |
| 25 Alexandra Drive, Alloa, FK10 2DQ | 61.0 | 55.0 | 6.0 |
| 8 Alloa Road, Cambus, FK10 2NT | 62.0 | 53.0 | 9.0 |
| 6 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 4 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 20 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 2 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 18 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 22 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 8 The Sheillings, Cambus, FK10 2NN | 60.0 | 53.0 | 7.0 |
| 10 The Sheillings, Cambus, FK10 2NN | 60.0 | 53.0 | 7.0 |
| 12 The Sheillings, Cambus, FK10 2NN | 60.0 | 53.0 | 7.0 |
| 14 The Sheillings, Cambus, FK10 2NN | 60.0 | 53.0 | 7.0 |
| 16 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 24 The Sheillings, Cambus, FK10 2NN | 61.0 | 53.0 | 8.0 |
| 26 The Sheillings, Cambus, FK10 2NN | 60.0 | 53.0 | 7.0 |
| 37 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 39 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 35 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 41 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 43 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 33 Moubray Gardens, Cambus, FK10 2NQ | 60.0 | 53.0 | 7.0 |
| 45 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 47 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 49 Moubray Gardens, Cambus, FK10 2NQ | 61.0 | 53.0 | 8.0 |
| 51 Moubray Gardens, Cambus, FK10 2NQ | 59.0 | 53.0 | 6.0 |
| 16 Ochil View, Kincardine, FK10 4QG | 61.0 | 46.0 | 15.0 |
| 18 Ochil View, Kincardine, FK10 4QG | 57.0 | 46.0 | 11.0 |
| 19 Ochil View, Kincardine, FK10 4QG | 57.0 | 46.0 | 11.0 |
| 20 Ochil View, Kincardine, FK10 4QG | 56.0 | 46.0 | 10.0 |
| 24 Ochil View, Kincardine, FK10 4QG | 58.0 | 46.0 | 12.0 |
| 25 Ochil View, Kincardine, FK10 4QG | 59.0 | 46.0 | 13.0 |
| Ochil View, Clackmannan, FK10 4DJ | 59.0 | 46.0 | 13.0 |
| 17 Ochil View, Kincardine, FK10 4QG | 61.0 | 46.0 | 15.0 |
| 11 Craig Crescent, Causewayhead, FK9 5LR | 59.0 | 49.0 | 10.0 |
| 13 Craig Crescent, Causewayhead, FK9 5LR | 58.0 | 49.0 | 9.0 |
| 15 Craig Crescent, Causewayhead, FK9 5LR | 58.0 | 49.0 | 9.0 |
| 17 Craig Crescent, Causewayhead, FK9 5LR | 57.0 | 49.0 | 8.0 |
| 19 Craig Crescent, Causewayhead, FK9 5LR | 58.0 | 49.0 | 9.0 |
| 9 Craig Crescent, Causewayhead, FK9 5LR | 58.0 | 49.0 | 9.0 |
| 38 Wallace Gardens, Causewayhead, FK9 5LS | 56.0 | 49.0 | 7.0 |
| 42 Wallace Gardens, Causewayhead, FK9 5LS | 58.0 | 49.0 | 9.0 |

| Address | Predicted $L_{Aeq,18hr}$ Train Noise Level | Pre-Existing Ambient $L_{Aeq,18hr}$ Noise Level | Noise Level Exceedence |
|--|--|--|---------------------------|
| 44 Wallace Gardens, Causewayhead, FK9 5LS | 58.0 | 49.0 | 9.0 |
| 46 Wallace Gardens, Causewayhead, FK9 5LS | 58.0 | 49.0 | 9.0 |
| 48 Wallace Gardens, Causewayhead, FK9 5LS | 58.0 | 49.0 | 9.0 |
| 56 Wallace Gardens, Causewayhead, FK9 5LS | 57.0 | 49.0 | 8.0 |
| 58 Wallace Gardens, Causewayhead, FK9 5LS | 62.0 | 49.0 | 13.0 |
| Flat 1 48, Alloa Road, Causewayhead, FK9 5LN | 62.0 | 55.0 | 7.0 |
| 54 Alloa Road, Causewayhead, FK9 5LN | 61.0 | 55.0 | 6.0 |
| 56 Alloa Road, Causewayhead, FK9 5LN | 61.0 | 55.0 | 6.0 |
| Flat 2 48, Alloa Road, Causewayhead, FK9 5LN | 62.0 | 55.0 | 7.0 |
| Flat 3 48, Alloa Road, Causewayhead, FK9 5LN | 62.0 | 55.0 | 7.0 |
| Flat 4 48, Alloa Road, Causewayhead, FK9 5LN | 62.0 | 55.0 | 7.0 |
| Flat 5 48, Alloa Road, Causewayhead, FK9 5LN | 62.0 | 55.0 | 7.0 |
| 8 Craiglea, Causewayhead, FK9 5EE | 62.0 | 55.0 | 7.0 |
| 34 Craiglea, Causewayhead, FK9 5EE | 61.0 | 55.0 | 6.0 |
| 36 Craiglea, Causewayhead, FK9 5EE | 61.0 | 55.0 | 6.0 |
| 38 Craiglea, Causewayhead, FK9 5EE | 61.0 | 55.0 | 6.0 |
| 40 Craiglea, Causewayhead, FK9 5EE | 61.0 | 55.0 | 6.0 |

3.6 As previous stated (Paragraphs 2.13 and 2.14) noise level predictions have been undertaken with identified existing acoustic screens added to the SAK noise model. With these acoustic screens in place

3.7 A summary of the SAK modelling output, following the introduction of existing barriers, is presented in Table 3.

Table 3: Summary of the Effects of Existing Acoustic Screening

| Effects of Barriers | Count |
|--|-------|
| Existing Barriers Successful | 18 |
| Existing Barriers Insufficient | 7 |
| Barrier Failed – Only Partial Screening from Existing Barriers | 18 |
| No Existing Barriers | 19 |

3.8 Hence, the total number of properties still requiring mitigation has reduced by 18, from 62 to 44.

3.9 Table 4 provides an updated list of the properties in Table 3. The predicted noise levels are those following the introduction of existing barriers/fences at these properties, where they exist. This table also presents the effectiveness of the existing barrier.

Table 4: Properties and Existing Noise Screening Results

| Address | Predicted L _{Aeq,18hr} Train Noise Level | Pre- Existing Ambient L _{Aeq,18hr} Noise Level | Noise Level Exceedence | Result of Existing Barriers (Where Applicable) |
|---------------------------------------|--|--|---------------------------|--|
| 75 Grange Road, Alloa | 64 | 55 | 9 | No Mitigation Offered |
| 77 Grange Road, Alloa | 58 | 55 | 3 | Successful |
| The Gables, Alloa Road, Cambus | 64 | 49 | 15 | No Mitigation Offered |
| Woodside House, Alloa Road, Cambus | 60 | 53 | 7 | Insufficient |
| 25 Alexandra Drive, Alloa | 61 | 55 | 6 | No Mitigation Offered |
| 8 Alloa Road, Cambus | 60 | 53 | 7 | Insufficient |
| 6 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 4 The Sheillings, Cambus | 60 | 53 | 7 | Fail - Partial screening |
| 20 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 2 The Sheillings, Cambus | 60 | 53 | 7 | Fail - Partial screening |
| 18 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 22 The Sheillings, Cambus | 60 | 53 | 7 | Fail - Partial screening |
| 8 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 10 The Sheillings, Cambus | 58 | 53 | 5 | Successful |
| 12 The Sheillings, Cambus | 58 | 53 | 5 | Successful |
| 14 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 16 The Sheillings, Cambus | 60 | 53 | 7 | Fail - Partial screening |
| 24 The Sheillings, Cambus | 59 | 53 | 6 | Fail - Partial screening |
| 26 The Sheillings, Cambus | 58 | 53 | 5 | Successful |
| 37 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 39 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 35 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 41 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 43 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 33 Moubray Gardens, Cambus | 60 | 53 | 7 | No Mitigation Offered |
| 45 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 47 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 49 Moubray Gardens, Cambus | 61 | 53 | 8 | No Mitigation Offered |
| 51 Moubray Gardens, Cambus | 59 | 53 | 6 | No Mitigation Offered |
| 16 Ochil View, Kincardine | 61 | 46 | 15 | No Mitigation Offered |
| 18 Ochil View, Kincardine | 54 | 46 | 8 | Successful |
| 19 Ochil View, Kincardine | 49 | 46 | 3 | Successful |
| 20 Ochil View, Kincardine | 49 | 46 | 3 | Successful |
| 24 Ochil View, Kincardine | 58 | 46 | 12 | No Mitigation Offered |
| 25 Ochil View, Kincardine | 57 | 46 | 11 | Insufficient |
| Ochil View, Clackmannan | 59 | 46 | 13 | No Mitigation Offered |
| 17 Ochil View, Kincardine | 61 | 46 | 15 | No Mitigation Offered |
| 11 Craig Crescent, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |
| 13 Craig Crescent, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |
| 15 Craig Crescent, Causewayhead | 55 | 49 | 6 | No Mitigation Offered |
| 17 Craig Crescent, Causewayhead | 55 | 49 | 6 | No Mitigation Offered |
| 19 Craig Crescent, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |

| Address | Predicted $L_{Aeq,18hr}$ Train Noise Level | Pre- Existing Ambient $L_{Aeq,18hr}$ Noise Level | Noise Level Exceedence | Result of Existing Barriers (Where Applicable) |
|--|---|---|---------------------------|--|
| 9 Craig Crescent, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |
| 38 Wallace Gardens, Causewayhead | 54 | 49 | 5 | Successful |
| 42 Wallace Gardens, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |
| 44 Wallace Gardens, Causewayhead | 56 | 49 | 7 | Fail - Partial screening |
| 46 Wallace Gardens, Causewayhead | 57 | 49 | 8 | Fail - Partial screening |
| 48 Wallace Gardens, Causewayhead | 57 | 49 | 8 | Fail - Partial screening |
| 56 Wallace Gardens, Causewayhead | 56 | 49 | 7 | Insufficient |
| 58 Wallace Gardens, Causewayhead | 57 | 49 | 8 | Insufficient |
| Flat 1 48, Alloa Road, Causewayhead | 62 | 55 | 7 | Successful |
| 54 Alloa Road, Causewayhead | 61 | 55 | 6 | Insufficient |
| 56 Alloa Road, Causewayhead | 61 | 55 | 6 | Insufficient |
| Flat 2 48, Alloa Road, Causewayhead | 62 | 55 | 7 | Successful |
| Flat 3 48, Alloa Road, Causewayhead | 62 | 55 | 7 | Successful |
| Flat 4 48, Alloa Road, Causewayhead | 62 | 55 | 7 | Successful |
| Flat 5 48, Alloa Road, Causewayhead | 62 | 55 | 7 | Successful |
| 8 Craiglea, Causewayhead | 53 | 55 | -2 | Successful |
| 34 Craiglea, Causewayhead | 56 | 55 | 1 | Successful |
| 36 Craiglea, Causewayhead | 57 | 55 | 2 | Successful |
| 38 Craiglea, Causewayhead | 52 | 55 | -3 | Successful |
| 40 Craiglea, Causewayhead | 52 | 55 | -3 | Successful |

3.10

Although the *Railway Noise Insulation Regulations*¹ strictly only apply in England and Wales, using the criteria stated in these regulations as a guide, no properties meet with the criteria for the installation of noise insulation. That is, there are no properties exposed to rail noise that meet all of the following criteria:

- the combined expected maximum rail traffic noise level (i.e. the relevant noise level from the new or altered railway) must not be less than the specified noise levels (68 dB $L_{Aeq,18h}$ daytime (06:00-24:00) and 63 dB $L_{Aeq,6h}$ night-time (24:00- 06:00).
- the relevant noise level is at least 1.0 dB(A) more than the prevailing noise level.
- the contribution to the increase in the relevant noise level from the new or altered railway must be at least 1.0 dB(A).

¹ SI No. 428: *Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996*

4 Summary

- 4.1 Rail Noise maps have been created for the SAK railway line from Stirling station to Longannet power station using timetabled train movements. These maps have been contoured as shown in the introduction of this report and can be viewed in Appendix 2.
- 4.2 Façade noise levels have been determined for each and every building within 300m of the modeled rail tracks.
- 4.3 Although the *Railway Noise Insulation Regulations*¹ strictly only apply in England and Wales (as explained in the 26th May 2009 report, the application of the criteria as set out in these regulations shows that the predicted noise levels at properties along the length of the railway line are such that no properties meet with the qualifying criteria in relation to noise insulation.
- 4.4 In addition, 62 properties were predicted to experience façade noise levels from trains that exceed $L_{Aeq,18hr}$ 55dB and exceed the pre-existing ambient noise level by 5dB and, as such, meet with the Scott Wilson Environmental Statement's criteria for noise mitigation. However, this relates to predicted noise levels without existing barriers/fences, which may act as acoustic screening at these properties.
- 4.5 Therefore, following site survey visits to these properties, the original SAK railway noise model was augmented with existing barriers/fences at these properties. With these noise barriers in place the number of properties that meet with the aforementioned mitigation criteria reduces by 18, from 62 to 44 properties.

Appendix 1

Table of Unmitigated Predicted Façade Noise Levels and Indicative Pre-existing Ambient Noise Levels

| Address | Predicted L _{Aeq,18hr} Train Noise dB | Pre- Existing Ambient L _{Aeq,16hr} dB | Pre- Existing Ambient L _{Aeq,18hr} dB | Level Exceeded 16 hr dB | Level Exceeded 18 hr dB | L _{Aeq,16hr} Exceed | L _{Aeq,18hr} Exceed |
|---|--|--|--|----------------------------------|----------------------------------|---------------------------------|---------------------------------|
| 75 Grange Road, Alloa, FK10 1LU | 63 | 55 | 55 | 8 | 8 | Exceed | Exceed |
| 77 Grange Road, Alloa, FK10 1LU | 63 | 55 | 55 | 8 | 8 | Exceed | Exceed |
| 80 Grange Road, Alloa, FK10 1LU | 58 | 55 | 55 | 3 | 3 | No | No |
| 27 Dirleton Gardens, Alloa, FK10 1NL | 56 | 55 | 55 | 1 | 1 | No | No |
| 48 Dirleton Gardens, Alloa, FK10 1NL | 58 | 55 | 55 | 3 | 3 | No | No |
| 2 Mitchell Crescent, Alloa, FK10 1NN | 56 | 55 | 55 | 1 | 1 | No | No |
| 7 Alloa Road, Cambus, FK10 2NT | 58 | 53 | 53 | 5 | 5 | No | No |
| 12 Station Road, Alloa, FK10 2NY | 58 | 53 | 53 | 5 | 5 | No | No |
| The Gables, Alloa Road, Cambus, FK10 2NT | 63 | 49 | 49 | 14 | 14 | Exceed | Exceed |
| Forthvale, Alloa Road, Cambus, FK10 2NT | 56 | 53 | 53 | 3 | 3 | No | No |
| Woodside House, Alloa Road, Cambus, FK10 2NT | 62 | 53 | 53 | 9 | 9 | Exceed | Exceed |
| 25 Alexandra Drive, Alloa, FK10 2DQ | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 8 Alloa Road, Cambus, FK10 2NT | 62 | 53 | 53 | 9 | 9 | Exceed | Exceed |
| 6 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 4 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 20 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 2 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 18 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 22 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 1 The Sheilings, Cambus, FK10 2NN | 56 | 53 | 53 | 3 | 3 | No | No |
| 8 The Sheilings, Cambus, FK10 2NN | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 10 The Sheilings, Cambus, FK10 2NN | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 12 The Sheilings, Cambus, FK10 2NN | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 14 The Sheilings, Cambus, FK10 2NN | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 16 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 24 The Sheilings, Cambus, FK10 2NN | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 26 The Sheilings, Cambus, FK10 2NN | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 37 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 39 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 35 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 41 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 43 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 53 Moubray Gardens, Cambus, FK10 2NQ | 56 | 53 | 53 | 3 | 3 | No | No |
| 33 Moubray Gardens, Cambus, FK10 2NQ | 60 | 53 | 53 | 7 | 7 | Exceed | Exceed |
| 45 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 47 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 49 Moubray Gardens, Cambus, FK10 2NQ | 61 | 53 | 53 | 8 | 8 | Exceed | Exceed |
| 51 Moubray Gardens, Cambus, FK10 2NQ | 59 | 53 | 53 | 6 | 6 | Exceed | Exceed |
| 29 Kingswell Park, Alloa, FK10 3RW | 57 | 52 | 52 | 5 | 5 | No | No |
| 16 Ochil View, Kincardine, FK10 4QG | 61 | 46 | 46 | 15 | 15 | Exceed | Exceed |
| 18 Ochil View, Kincardine, FK10 4QG | 57 | 46 | 46 | 11 | 11 | Exceed | Exceed |
| 19 Ochil View, Kincardine, FK10 4QG | 57 | 46 | 46 | 11 | 11 | Exceed | Exceed |
| 20 Ochil View, Kincardine, FK10 4QG | 56 | 46 | 46 | 10 | 10 | Exceed | Exceed |
| 24 Ochil View, Kincardine, FK10 4QG | 58 | 46 | 46 | 12 | 12 | Exceed | Exceed |
| 25 Ochil View, Kincardine, FK10 4QG | 59 | 46 | 46 | 13 | 13 | Exceed | Exceed |
| Northfields, Clackmannan, FK10 4DJ | 57 | 60 | 60 | -3 | -3 | No | No |
| Station House, Station Road, Kincardine, FK10 4LT | 56 | 53 | 53 | 3 | 3 | No | No |

| Address | Predicted L _{Aeq,18hr} Train Noise dB | Pre- Existing Ambient L _{Aeq,16hr} dB | Pre- Existing Ambient L _{Aeq,18hr} dB | Level Exceeded 16 hr dB | Level Exceeded 18 hr dB | L _{Aeq,16hr} Exceed | L _{Aeq,18hr} Exceed |
|---|--|--|--|----------------------------------|----------------------------------|---------------------------------|---------------------------------|
| 2 Northfield Gardens, Clackmannan, FK10 4DG | 60 | 61 | 60 | -1 | 0 | No | No |
| 1 Villa Place, Clackmannan, FK10 4HZ | 58 | | | | | | |
| 2 Villa Place, Clackmannan, FK10 4HZ | 56 | | | | | | |
| Ochil View, Clackmannan, FK10 4DJ | 59 | 46 | 46 | 13 | 13 | Exceed | Exceed |
| 19 Brucefield Crescent, Clackmannan, FK10 4DE | 57 | 59 | 58 | -2 | -1 | No | No |
| 21 Brucefield Crescent, Clackmannan, FK10 4DE | 57 | 59 | 58 | -2 | -1 | No | No |
| 23 Brucefield Crescent, Clackmannan, FK10 4DE | 57 | 59 | 58 | -2 | -1 | No | No |
| 8C Hetherington Drive, Clackmannan, FK10 4HQ | 59 | 59 | 58 | 0 | 1 | No | No |
| 8D Hetherington Drive, Clackmannan, FK10 4HQ | 59 | 59 | 58 | 0 | 1 | No | No |
| 17 Ochil View, Kincardine, FK10 4QG | 61 | 46 | 46 | 15 | 15 | Exceed | Exceed |
| 1 Forth Place, Stirling, FK8 1UD | 59 | | | | | | |
| 3 Forth Place, Stirling, FK8 1UD | 59 | | | | | | |
| 1 Forthview, Stirling, FK8 1TZ | 56 | | | | | | |
| 2 Forthview, Stirling, FK8 1TZ | 56 | | | | | | |
| 3 Forthview, Stirling, FK8 1TZ | 56 | | | | | | |
| 4 Forthview, Stirling, FK8 1TZ | 56 | | | | | | |
| 65 Alloa Road, Causewayhead, FK9 5LJ | 58 | 55 | 55 | 3 | 3 | No | No |
| 56 Causewayhead Road, Causewayhead, FK9 5EZ | 58 | 64 | | -6 | | No | |
| 58 Causewayhead Road, Causewayhead, FK9 5EZ | 57 | 64 | | -7 | | No | |
| 60 Causewayhead Road, Causewayhead, FK9 5EZ | 57 | 64 | | -7 | | No | |
| 62 Causewayhead Road, Causewayhead, FK9 5EZ | 57 | 64 | | -7 | | No | |
| 64 Causewayhead Road, Causewayhead, FK9 5EZ | 59 | 64 | | -5 | | No | |
| 66 Causewayhead Road, Causewayhead, FK9 5EZ | 59 | 64 | | -5 | | No | |
| 68 Causewayhead Road, Causewayhead, FK9 5EZ | 58 | 64 | | -6 | | No | |
| 70 Causewayhead Road, Causewayhead, FK9 5EZ | 58 | 64 | | -6 | | No | |
| 72 Causewayhead Road, Causewayhead, FK9 5EZ | 58 | 64 | | -6 | | No | |
| 76 Causewayhead Road, Causewayhead, FK9 5HB | 58 | 64 | | -6 | | No | |
| 78 Causewayhead Road, Causewayhead, FK9 5HB | 59 | 64 | | -5 | | No | |
| 2A Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 100 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 114 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 116 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 118 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 88 Causewayhead Road, Causewayhead, FK9 5HJ | 58 | 64 | | -6 | | No | |
| 90 Causewayhead Road, Causewayhead, FK9 5HJ | 58 | 64 | | -6 | | No | |
| 92 Causewayhead Road, Causewayhead, FK9 5HJ | 57 | 64 | | -7 | | No | |
| 94 Causewayhead Road, Causewayhead, FK9 5HJ | 57 | 64 | | -7 | | No | |
| 96 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 98 Causewayhead Road, Causewayhead, FK9 5HJ | 56 | 64 | | -8 | | No | |
| 11 Craig Crescent, Causewayhead, FK9 5LR | 59 | 50 | 49 | 9 | 10 | Exceed | Exceed |
| 13 Craig Crescent, Causewayhead, FK9 5LR | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 15 Craig Crescent, Causewayhead, FK9 5LR | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 17 Craig Crescent, Causewayhead, FK9 5LR | 57 | 50 | 49 | 7 | 8 | Exceed | Exceed |
| 19 Craig Crescent, Causewayhead, FK9 5LR | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 9 Craig Crescent, Causewayhead, FK9 5LR | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 38 Wallace Gardens, Causewayhead, FK9 5LS | 56 | 50 | 49 | 6 | 7 | Exceed | Exceed |
| 42 Wallace Gardens, Causewayhead, FK9 5LS | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 44 Wallace Gardens, Causewayhead, FK9 5LS | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 46 Wallace Gardens, Causewayhead, FK9 5LS | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 48 Wallace Gardens, Causewayhead, FK9 5LS | 58 | 50 | 49 | 8 | 9 | Exceed | Exceed |
| 56 Wallace Gardens, Causewayhead, FK9 5LS | 57 | 50 | 49 | 7 | 8 | Exceed | Exceed |
| 58 Wallace Gardens, Causewayhead, FK9 5LS | 62 | 50 | 49 | 12 | 13 | Exceed | Exceed |
| 70A Causewayhead Road, Causewayhead, FK9 5EZ | 59 | 64 | | -5 | | No | |
| 80 Alloa Road, Causewayhead, FK9 5PN | 62 | 63 | 63 | -1 | -1 | No | No |
| The Old School, Alloa Road, Causewayhead, FK9 5PN | 58 | 55 | 55 | 3 | 3 | No | No |

| Address | Predicted L _{Aeq,18hr} Train Noise dB | Pre- Existing Ambient L _{Aeq,16hr} dB | Pre- Existing Ambient L _{Aeq,18hr} dB | Level Exceeded 16 hr dB | Level Exceeded 18 hr dB | L _{Aeq,16hr} Exceed | L _{Aeq,18hr} Exceed |
|--|--|--|--|----------------------------------|----------------------------------|---------------------------------|---------------------------------|
| 138 Ladysneuk Road, Causewayhead, FK9 5NR | 60 | 55 | 55 | 5 | 5 | No | No |
| 79 Alloa Road, Stirling, FK9 5PN | 57 | 55 | 55 | 2 | 2 | No | No |
| Flat 1 48, Alloa Road, Causewayhead, FK9 5LN | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| 50 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 52 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 54 Alloa Road, Causewayhead, FK9 5LN | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 56 Alloa Road, Causewayhead, FK9 5LN | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 58 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 60 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 62 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 64 Alloa Road, Causewayhead, FK9 5LN | 60 | 55 | 55 | 5 | 5 | No | No |
| 2 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 4 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 6 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 8 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 10 Abbey Craig Court, Causewayhead, FK9 5LQ | 58 | 55 | 55 | 3 | 3 | No | No |
| 12 Abbey Craig Court, Causewayhead, FK9 5LQ | 58 | 55 | 55 | 3 | 3 | No | No |
| 14 Abbey Craig Court, Causewayhead, FK9 5LQ | 57 | 55 | 55 | 2 | 2 | No | No |
| 1 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 3 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 5 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 7 Abbey Craig Court, Causewayhead, FK9 5LQ | 59 | 55 | 55 | 4 | 4 | No | No |
| 9 Abbey Craig Court, Causewayhead, FK9 5LQ | 58 | 55 | 55 | 3 | 3 | No | No |
| 11 Abbey Craig Court, Causewayhead, FK9 5LQ | 58 | 55 | 55 | 3 | 3 | No | No |
| 15 Abbey Craig Court, Causewayhead, FK9 5LQ | 57 | 55 | 55 | 2 | 2 | No | No |
| 2B 0, Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 2C 0, Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 2D 0, Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 2E 0, Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 2F 0, Buchanan Drive, Causewayhead, FK9 5HF | 58 | 64 | | -6 | | No | |
| 22 Blenheim Court, Causewayhead, FK9 5EA | 62 | 64 | | -2 | | No | |
| 67 Causewayhead Road, Causewayhead, FK9 5EG | 59 | 64 | | -5 | | No | |
| 69 Causewayhead Road, Causewayhead, FK9 5EG | 61 | 64 | | -3 | | No | |
| Flat 2 48, Alloa Road, Causewayhead, FK9 5LN | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| Flat 3 48, Alloa Road, Causewayhead, FK9 5LN | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| Flat 4 48, Alloa Road, Causewayhead, FK9 5LN | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| Flat 5 48, Alloa Road, Causewayhead, FK9 5LN | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| 16 Craiglea, Causewayhead, FK9 5EE | 58 | 55 | 55 | 3 | 3 | No | No |
| 6 Craiglea, Causewayhead, FK9 5EE | 56 | 55 | 55 | 1 | 1 | No | No |
| 18 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 14 Craiglea, Causewayhead, FK9 5EE | 59 | 55 | 55 | 4 | 4 | No | No |
| 10 Craiglea, Causewayhead, FK9 5EE | 59 | 55 | 55 | 4 | 4 | No | No |
| 8 Craiglea, Causewayhead, FK9 5EE | 62 | 55 | 55 | 7 | 7 | Exceed | Exceed |
| 20 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 22 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 12 Craiglea, Causewayhead, FK9 5EE | 59 | 55 | 55 | 4 | 4 | No | No |
| 32 Craiglea, Causewayhead, FK9 5EE | 56 | 55 | 55 | 1 | 1 | No | No |
| 34 Craiglea, Causewayhead, FK9 5EE | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 36 Craiglea, Causewayhead, FK9 5EE | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 16 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |
| 19 Blenheim Court, Causewayhead, FK9 5EA | 62 | 64 | | -2 | | No | |
| 10 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |
| 11 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |
| 12 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |
| 14 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |

| Address | Predicted $L_{Aeq,18hr}$ Train Noise dB | Pre- Existing Ambient $L_{Aeq,16hr}$ dB | Pre- Existing Ambient $L_{Aeq,18hr}$ dB | Level Exceeded 16 hr dB | Level Exceeded 18 hr dB | $L_{Aeq,16hr}$ Exceed | $L_{Aeq,18hr}$ Exceed |
|---|---|---|---|----------------------------------|----------------------------------|--------------------------|--------------------------|
| 15 Blenheim Court, Causewayhead, FK9 5EA | 56 | 64 | | -8 | | No | |
| 17 Blenheim Court, Causewayhead, FK9 5EA | 59 | 64 | | -5 | | No | |
| 18 Blenheim Court, Causewayhead, FK9 5EA | 59 | 64 | | -5 | | No | |
| 20 Blenheim Court, Causewayhead, FK9 5EA | 62 | 64 | | -2 | | No | |
| 46 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 48 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 71 Causewayhead Road, Causewayhead, FK9 5EG | 61 | 64 | | -3 | | No | |
| 73 Causewayhead Road, Causewayhead, FK9 5EG | 62 | 64 | | -2 | | No | |
| 21 Blenheim Court, Stirling, FK9 5EA | 62 | 64 | | -2 | | No | |
| 38 Craiglea, Causewayhead, FK9 5EE | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 40 Craiglea, Causewayhead, FK9 5EE | 61 | 55 | 55 | 6 | 6 | Exceed | Exceed |
| 42 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 44 Craiglea, Causewayhead, FK9 5EE | 60 | 55 | 55 | 5 | 5 | No | No |
| 50 Craiglea, Causewayhead, FK9 5EE | 57 | 64 | | -7 | | No | |
| 59 Causewayhead Road, Causewayhead, FK9 5EG | 60 | 64 | | -4 | | No | |
| 61 Causewayhead Road, Causewayhead, FK9 5EG | 60 | 64 | | -4 | | No | |
| 63 Causewayhead Road, Causewayhead, FK9 5EG | 60 | 64 | | -4 | | No | |
| 65 Causewayhead Road, Causewayhead, FK9 5EG | 59 | 64 | | -5 | | No | |
| 75 Causewayhead Road, Causewayhead, FK9 5EG | 62 | 64 | | -2 | | No | |
| 77 Causewayhead Road, Causewayhead, FK9 5EG | 63 | 64 | | -1 | | No | |
| 79 Causewayhead Road, Causewayhead, FK9 5EG | 63 | 64 | | -1 | | No | |
| 81 Causewayhead Road, Causewayhead, FK9 5EG | 63 | 64 | | -1 | | No | |
| 83 Causewayhead Road, Causewayhead, FK9 5EG | 64 | 64 | | 0 | | No | |

Appendix 2

Graphics showing unmitigated $L_{Aeq,18hr}$ noise levels, in 5dB noise bands, have been created for the Stirling-Alloa-Kincardine railway line. They can be viewed by following the following links:

[Stirling Section: SAK 5dB Noise Band Map](#)

[Tullibody Section: SAK 5dB Noise Band Map](#)

[Alloa Section: SAK 5dB Noise Band Map](#)

[Clackmannan Section: SAK 5dB Noise Band Map](#)

[Kincardine Section: SAK 5dB Noise Band Map](#)

[Longannet Section: SAK 5dB Noise Band Map](#)