



ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

## KERRY COUNTY COUNCIL

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT / ENVIRONMENTAL IMPACT STATEMENT FOR SOUTH KERRY GREENWAY, CO. KERRY

## VOLUME 2 – MAIN EIAR/EIS

## CHAPTER 10 – NOISE AND VIBRATION

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## 10 NOISE AND VIBRATION

### 10.1 Introduction

A desktop noise appraisal was carried out on the proposed corridor for the South Kerry Greenway to assess whether the environmental noise anticipated to be generated during both the construction and operational phases of the proposed development could result in any potential impacts on the environment.

The likelihood and significance rating of environmental noise impacts for both phases of the proposed development, prior to mitigation, are described in this chapter. The proposed mitigation measures are described in Section 10.6 and the residual impacts following the implementation of the proposed mitigation measures are described in Section 10.7 of this document.

### 10.2 Study Area

The study area for the noise and vibration appraisal was based on the location of noise and vibration sensitive receptors within 200 m of the centreline of the proposed South Kerry Greenway.

### 10.3 Methodology

The methodology adopted for this noise and vibration assessment is as follows:

- Review of appropriate guidance, planning conditions applicable to other sites and specification of suitable construction and operational noise / vibration criteria;
- Characterisation of the receiving noise and vibration environment;
- Characterisation of the proposed development;
- Prediction of the noise and vibration impact associated with the proposed development;
- Evaluation of noise and vibration impacts;
- Proposed mitigation measures;
- Residual impacts

A noise appraisal is carried out by ascertaining the predicted noise levels for the construction and operational phases of the development and comparing these to applicable noise limits (if available) or to the existing noise levels (if suitable). As there is potential for noise to be generated during both the construction and operational phases of the project, existing noise levels will either increase or remain as is (depending on a sufficient distance to attenuate to negligible levels) at receptors located in or in proximity to the South Kerry Greenway corridor.

This noise appraisal initially examines the predicted noise levels arising from the construction and operational phases and seeks to determine whether these noise levels are compliant with relevant limits and / or the magnitude of the impact.

Noise will be generated whenever activity occurs. The timescale and probability of impacts occurring relates to the length of the relevant stage, e.g. the operational noise impact, be it positive or negative, will last for the entire operational lifetime of the development.

Noise is defined as unwanted sound. The impacts of noise are subjective and vary from person to person. Factors such as frequency, tonal patterns and existing background noise impact how noise levels are experienced by individuals.

To assist in the understanding of the noise measurement scales, Table 10.1 presents the A-weighted decibel scale (dB(A)) for some common place activities.

Table 10-1: Examples of Indicative Noise Levels<sup>1</sup>

Situation/Noise Source	Approximate Noise Level dB(A)	Sound Pressure $\mu$ Pa	Subjective Description
30 m from a military jet aircraft take-off	140	200,000,000	Painful, intolerable
Rock / Pop concert	105	3,500,000	
Nightclub	100	2,000,000	
Pop concert at mixer desk	98	1,600,000	
Passing Heavy Goods Vehicle at 7 m	90	630,000	Very noisy
Ringling Alarm Clock at 1 m	80	200,000	
Domestic Vacuum cleaner at 3 m	70	63,000	Noisy
Busy Office	60	20,000	
Normal Conversation at 1 m / Day time, busy roadway 0.5 km away.	55	11,000	
Rural night time setting with no wind	35	1,100	
Bedroom in a quiet area with the windows shut	30	360	Very quiet
Remote location without any identifiable sound	20	200	
Theoretical threshold of hearing	0	20	Uncanny silence

Noise level and frequency varies constantly with time. It cannot be described with a single number. As a result, statistical metrics are commonly used to describe the noise levels. To understand the terms used in this chapter, some definitions of the terms used are outlined as follows:

- L<sub>Aeq</sub>** The energy equivalent continuous noise level recorded over the sampling period. This parameter is very sensitive to local high-level short time sources, e.g. local traffic. The relationship between the L<sub>Aeq</sub> value and the L<sub>A10</sub> or L<sub>A90</sub> value provides an indication as to the relative impact of the intermittent noise sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background noise level.
- L<sub>A10</sub>** Refers to those noise levels in the top 10 percentile of the sampling interval; it is the level which is equalled or exceeded for 10% of the measurement period. It is used to determine the intermittent high noise level features of locally generated noise and usually is an indicator of the level of traffic.
- L<sub>A90</sub>** Refers to those noise levels in the lower 90 percentile of the sampling interval; it is the level which is equalled or exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is often used to represent the background noise level.

### 10.3.1 Evaluation Criteria

#### 10.3.1.1 Construction Noise

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. In the absence of specific noise limits, appropriate emission criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise*.

<sup>1</sup> Brüel & Kjær. (2000). Environmental Noise. Brüel&Kjær Sound & Vibration Measurement A/S.

BS 5228-1:2009+A1:2014 contains three example methods for the assessment of the significance of noise effects:

- 1) Use of 70 dB façade fixed limit, corrected to 67 dB  $L_{Aeq}$  free field
- 2) Use of threshold limits as defined in Table 10.2 based on existing ambient levels, which if exceeded, signify a significant effect and
- 3) Use of comparative pre and during construction noise levels to indicate significance.

The final method in the list above has minimum criteria that are applicable to construction noise where existing noise levels are low and construction activities continue for more than one month. These are 45, 55 and 65 dB  $L_{Aeq,1hr}$  for night-time (23:00-07:00), evening and weekends, and daytime (07:00-19:00) including Saturdays (07:00-13:00) respectively. These are the same as the threshold criteria derived from the second method.

**Table 10-2: Example Threshold of Significant Effect at Dwellings**

Assessment category and threshold value period ( $L_{Aeq}$ )	Threshold Value, in decibels (dB)		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends <sup>D)</sup>	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.  
 B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.  
 C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.  
 D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. For the appropriate period (e.g. daytime), the ambient noise level is determined and rounded to the nearest 5dB. In this instance, as there is no baseline data available it has been conservatively assumed that ambient noise levels are low. Accordingly, the residential dwellings in the vicinity of the proposed development are afforded Category A designation which is the most onerous noise limit threshold for construction noise. The noise limits apply to residential properties only.

Section 10.5.2 provides the detailed appraisal in relation to this site. If the total noise level (i.e. ambient and construction noise) exceeds the appropriate category value (e.g. 65 dB  $L_{Aeq,1hr}$  during daytime periods) then a significant effect is deemed to occur.

**10.3.1.2 Operational Noise**

For the operational phase, likely noise emissions will be limited to use of the route by walkers and cyclist, traffic associated with walkers and cyclists accessing the route and a low impact maintenance routine. This usage will occur during daylight hours. As such, noise levels associated with the operation of the proposed South Kerry Greenway will be minimal and no operational noise criteria have been specified.

## 10.4 Existing Noise

The study area is located in a rural setting and has a low population with the exception of Cahersiveen town and Glenbeigh village. There are 848 buildings within 200 m of the centreline of the proposed development and 512 dwellings within 100 m of the proposed route.

The topography of the study area ranges in elevation from approximately 10 mOD to 120 mOD. Surrounding land-uses comprise Pastures (CORINE Code 231) and Peat Bog (CORINE code 412) with discontinuous urban fabric (CORINE Code 111) at Cahersiveen and Glenbeigh. Small areas of estuary (CORINE Code 522) run along the Cahersiveen shoreline and an area of coniferous forest (CORINE Code 312) exists along Cahersiveen's southern edge. Both Mountain Stage and Glenbeigh also have areas of Moors and Heaths (CORINE code 322) as well as land principally occupied by agriculture with significant areas of natural vegetation (CORINE code 243). The route of the South Kerry Greenway also runs in close proximity to the N70 national secondary road and so traffic noise is also present. Throughout the rural region of the study area, the noise environment is dominated by this traffic noise as well as noise sources of typical rural environs including rustling foliage, livestock and birdsong.

No baseline measurements were undertaken given the minimal operational impact from a development of this nature. Based on the activities / sources of noise that take place / exist in proximity to the proposed South Kerry Greenway, it is anticipated that the existing noise levels fall within 35-55 dB(A) – See Table 10.1 for comparative examples of activities / sources at these noise levels.

## 10.5 Potential Impacts

The potential impacts on the existing noise environment due to the proposed South Kerry Greenway are discussed in this section under the following headings:

- 'Do-Nothing' Scenario;
- Construction phase; and
- Operational phase.

### 10.5.1 'Do-Nothing' Scenario

If the proposed South Kerry Greenway is not permitted and constructed, the general noise level in the vicinity of the study area would remain unchanged from the current environment.

### 10.5.2 Construction Phase

#### 10.5.2.1 *Noise*

The predicted construction noise levels at the nearby noise sensitive locations were calculated in accordance with BS 5228-1:2009+A1:2014. BS 5228-1:2009+A1:2014 sets out sound power levels and  $L_{Aeq}$  noise levels of plant items normally encountered on construction sites, which in turn enables the prediction of noise levels at selected locations.

BS 5228-1:2009+A1:2014 also sets out a number of methods predicting construction noise levels. Methods are presented for stationary and quasi-stationary activities and for mobile plant using a regular well-defined route (e.g. haul roads). The predictions account for source-receiver distance, reflections and screening or soft ground attenuation and some methods include a percentage on-time.

Construction noise predictions are based on information contained in the outline construction programme. Noise predictions have been calculated for a number of tasks. For each task a set of assumed plant with noise data taken from BS5228:2009+A1:2014, *Code of practice for noise and vibration control on construction and open sites* has been used. Noise predictions were carried out using guidance from BS5228:2009+A1:2014. The noise model assumes that the ground cover is a mix between hard and soft ground. Percentage on time for plant is outlined for each of the assumed plant.

The construction noise model appraised a number of tasks with the potential to generate noise. The linear and repetitive nature of the works lends itself to a progressive and sequential form of construction. The construction phase is anticipated have a total duration of 54 weeks (generally 5/6 weeks at any one compound based on the construction methodology report). These tasks include: deliveries and/or removal of material to and from site, establishment of site compounds, activity at site compounds, on line works and off line works as well as specific construction tasks on bridges, viaducts, tunnels, gabion walls, road re-alignment and underpasses.

### Site Traffic

Detailed information on construction traffic is presented in Chapter 9. To summarise, additional light goods vehicles travelling to and from the site during the construction phase would be expected to peak during the morning (arrival of contractors at the site) and evening (departure of contractors from the site) and are envisaged not to be a continuous source of noise emissions from the site during a typical working day. The impact from construction personnel movements to and from the site is expected to be low.

Chapter 9 presents details of HGV movements for all construction activities. However, as the proposed construction works will be occurring along different stretches of the greenway and these would be assessed in isolation to gain a realistic appraisal of the likely impact on the N70 along a particular stretch. A maximum number of 27 HGV two-way trips per day has been assumed based on Kerry County Councils 'Construction Methodology Report for the South Kerry Greenway'.

The noise impact for construction works traffic would be mitigated by generally restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise.

### Establishment of Site Compounds

Construction works will be completed from 24 site compounds and a small number of direct access points. Compounds 2, 3, 4, 6, 8, 10, 13 and 16 are sufficiently distant from the nearest noise sensitive locations such that the noise emissions from the compounds will be significantly below the noise limits. The remainder of the compounds are located within 55m with the boundary of compound 7 c. 15m away from the nearest noise sensitive location.

The establishment of a site compound generally consists of fencing off the site compound, providing provision for drainage, removal of topsoil, lay and compact Clause 804, locating cabin and lock up within the compound. The typical plant involved in this process are outlined in Table 10.3. Table 10.4 presents the predicted noise levels at set distances from the compounds.

**Table 10-3: Establishment of Site Compounds - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Excavator	C.2.25	Earthworks / Distribution of CL804	80
Excavator	C.10.9	Loading Topsoil	80
Dump Truck / Dumper	C.2.30	Tipping Fill	10
Vibratory Roller	C.5.27	Rolling and Compaction	80
Road Lorry*	C.6.21	Haulage	2 two-way trips per hour

Table 10.4 presents predicted noise level for a range of construction activities at distances of 15 m, 25 m, 30 m and 50 m from the works. The noise levels presented are predicted maximum expected levels and are expected to occur for only short periods of time at a very limited number of properties.

**Table 10-4: Establishment of Site Compound – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		15m	25m	30m	50m
Excavator (C.2.25)	80	67.3	62.9	61.1	56.1
Excavator (C.10.9)	80	73.4	69	67.2	62.2
Dump Truck / Dumper (C.2.30)	10	68.5	64.1	62.3	57.3
Vibratory Roller (C.5.27)	80	65.1	60.7	58.9	53.9
Road Lorry* (C.6.21)	2 two-way trips per hour	57.6	55	54	51.1

In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . These elevated noise levels will only occur for short durations and at a limited number of properties. Mitigation measures will be employed to minimise the noise impact at noise sensitive locations. These are discussed in section 10.6.

### Activity at Site Compounds

Construction works will be completed from site compounds and a small number of direct access points. The site compounds will be used for acceptance of import materials and export of waste material. It is expected that there will be a maximum of two loads delivery/export per hour. One 13t excavator will typically located at the site compound. The excavator will stockpile waste material from 6t dumpers prior to transport off site. The 13t will also load trucks with material for export off site as well as the loading of 6t dumpers with material for distribution along the greenway. It has also been assumed that there will be a diesel generator operating continuously during the working day. Refuelling is also assumed to occur at the site compound although the frequency of this activity is expected to be low. The typical plant and activities occurring at the site compound are outlined in Table 10.5.

**Table 10-5: Activity at Site Compounds - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Excavator	C.2.25	Earthworks / Distribution of CL804	30
Excavator	C.10.9	Loading Topsoil	25
Excavator	C.10.10	Loading Gravel	25
Dump Truck / Dumper	C.2.30	Tipping Fill	10
Pumping Fuel	C.4.16	Refuelling	10
Diesel Generator	C.8.24	Power Generation	100
Road Lorry*	C.6.21	Haulage	2 two-way trips per hour

Table 10.6 presents predicted noise level for a range of construction activities at distances of 15 m, 25 m, 30 m and 50 m from the works. For this purpose of this assessment the distance between compounds and noise sensitive dwellings has been assumed as a minimum. In practice the construction activity will not occur at the compound boundary and the distance between the compound site boundary and noise sensitive locations will be greater. The noise levels presented are predicted maximum expected levels. The elevated noise levels at the compound are primarily due to the loading and tipping of soil and gravel. The noise predictions assume that construction activities will be occurring at the nearest site boundary. Activities will occur at locations as far away as possible from the nearest noise sensitive locations and actual noise levels will be lower. Mitigation measures will be employed to minimise the noise impact. These mitigation measures are discussed in greater detail in section 10.6.

**Table 10-6: Activity at Compounds – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		15m	25m	30m	50m
Excavator (C.2.25)	30	63.1	58.6	56.9	51.9
Excavator (C.10.9)	25	68.4	63.9	62.1	57.1
Excavator (C.10.10)	25	77.7	73.2	71.5	66.5
Dump Truck / Dumper (C.2.30)	10	68.5	64.1	62.3	57.3
Pumping Fuel (C.4.16)	10	62	57.6	55.8	51.1
Diesel Generator (C.8.24)	100	58.4	53.9	52.2	47.2
Road Lorry* (C.6.21)	2 two-way trips per hour	57.6	55	54	51.1

### Greenway Works

Greenway works have been broken down into the following categories:

- On line works where original ballast remains in-situ (Type 1A)
- On Line works where original track make up has been removed (Type 1B)
- Construction of Greenway on Public Road (Type 3A)
- Offline Works (Type 3B)

The typical plant and activities involved for Type 1A, 1B and 3B works are similar and the noise impacts from these construction activities were grouped. The typical plant and activities for construction of the greenway on public roads differs and this will be assessed separately. In addition to the greenway works above, there will other additional elements outlined below, and these will be assessed separately:

- Gabion basket wall construction
- Underpass 'Kells Station'
- Nimmo's Bridge
- Drung Hill Tunnel Works
- Gleensk Viaduct Works
- Cahersiveen Bridge
- Boardwalk
- Revetment Wall

**Greenway Works (Type 1A, 1B and 3B)**

Approximately 18 km of the proposed greenway route will be on line and will require Type 1A or Type 1B construction methodology. Approximately 13.5 km of the proposed greenway will be off line. Of this section of greenway, approximately 11 km traversing private land.

The typical plant and activities involved for Type 1A, 1B and 3B works are similar and the noise predictions carried out cover all activities as per Type 1A, 1B and 3B works.

The works will involve the excavation of new drainage channels, removal of subsoil and transport of material via 6t dumper(s) to site compounds, delivery of sub-base material via dumper(s) for distribution with a 13t tonne excavator, backfill material to be rolled and compacted. There are a number of backfill stages requiring similar plant. Once the compacted sub-base material is at the design level, a surface course of tarmacadam will be laid using a paver and this will be rolled and compacted. The typical plant and activities involved the construction of the greenway using construction methodologies Type 1A, 1B and 3B are presented in Table 10.7.

**Table 10-7: Greenway Works (Type 1A, 1B and 3B) - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Excavator	C.2.25	Earthworks / Distribution of CL804	80
Excavator	C.10.9	Loading topsoil	80
Dump Truck / Dumper	C.2.30	Tipping fill	10
Roller	C.5.27	Rolling and compaction	80
Dumper*	C.4.6	Distribution of material	7 two-way trips per hour
Excavator	C.4.67	Trenching	80
Excavator <sup>§</sup>	C.2.25	Distribution of topsoil	80
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
§ - No 5t excavator source data in BS 5228-1:2009+A1:2014 so data for 14t excavator was used. * - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

A review of the Eircode data indicates that there are very few noise sensitive locations within 10m of the proposed greenway. The majority of the noise sensitive locations within 10m of the greenway are in Cahersiveen where the existing road surface will be used. Other locations where the route is within 10m of a noise sensitive location are very few in number (less than 15 using distance between NSL and centre line of proposed greenway).

Table 10.8 over presents predicted noise level for a range of construction activities at distances of 10 m, 20 m, 30 m and 50 m from the works. The noise levels presented are predicted maximum expected levels.

**Table 10-8: Greenway Works (Type 1A, 1B and 3A) – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		10m	20m	30m	50m
Excavator (C.2.25)	80	70.8	64.8	61.1	56.1
Excavator (C.10.9)	80	76.9	70.9	67.2	62.2
Dump Truck / Dumper (C.2.30)	10	72.1	66	62.3	57.3
Roller (C.5.27)	80	68.6	62.6	58.9	53.9
Dumper* (C.4.6)	7 two-way trips per hour	66	62.7	60.5	57.6
Excavator (C.4.67)	80	66.7	60.7	57	52
Excavator <sup>§</sup> (C.2.25)	80	70.8	64.8	61.1	56.1
Asphalt Paver + tipper lorry (C.5.31)	80	78.6	72.6	68.8	63.8
§ - No 5t excavator source data in BS 5228-1:2009+A1:2014 so data for 14t excavator was used. * - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)					

In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . Again, these are predicted worst case noise levels and the noise predictions do not include attenuation due to site topography. Due to the linear nature of these works, construction activities will not occur over an extended period at any one location and these elevated noise levels will only occur for short durations at very limited number of properties.

General best practice mitigation measures will be employed to minimise the noise impact. However, as noted above there is potential for short term elevated noise levels due to these works. However, these works will be for a short duration at a particular property (i.e. less than 3 days) and where the works are to occur over an extended period, a temporary barrier or screen will be used to reduce noise level below the noise limit.

### Greenway Works (Type 3A)

Approximately 2.4 km of the proposed greenway route will be on the road. The section of the greenway going through Cahirsiveen will use the existing road surface. The on-road sections of the greenway will require works to maximise the available width of the road. Works will involve the clearance of drainage channels, excavation of material, backfill with crushed stone, compact material and lay, roll and compact tarmac. The typical plant and activities involved the construction of the greenway on public road (Type 3A) are presented in Table 10.9.

**Table 10-9: Greenway Works (Type 3A) - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Wheeled backhoe loader	C.4.66	Trenching	80
Dump Truck / Dumper	C.2.30	Tipping fill	10
Roller	C.5.27	Rolling and compaction	80

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Dumper*	C.4.6	Distribution of material	7 two-way trips per hour
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

Table 10.10 presents predicted noise level for a range of construction activities at distances of 10 m, 20 m, 30 m and 50 m from the works. The noise levels presented are predicted maximum expected levels and are expected to occur for only short periods of time at a very limited number of properties.

**Table 10-10: Greenway Works (Type 3A) – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		10m	20m	30m	50m
Wheeled backhoe loader (C.4.66)	80	71	64.9	61.2	56.2
Dump Truck / Dumper (C.2.30)	10	72.1	66	62.3	57.3
Roller (C.5.27)	80	68.6	62.6	58.9	53.9
Dumper* (C.4.6)	7 two-way trips per hour	66	62.7	60.5	57.6
Asphalt Paver + tipper lorry (C.5.31)	80	78.6	72.6	68.8	63.8
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)					

In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . Again, these are predicted worst case noise levels and site topography will also attenuate the noise levels. Due to the linear nature of these works, construction activities will not occur over an extended period at any one location and these elevated noise levels will only occur for short durations at a particular property and at a very limited number of properties.

General best practice mitigation measures will be employed to minimise the noise impact. However, as noted above there is potential for short term elevated noise levels due to these works. However, these works will be for a short duration at a particular property (i.e. less than 3 days) and where the works are to occur over an extended period, a temporary barrier or screen will be used to reduce noise level below the noise limit.

### Greenway Works – Underpass ‘Kells Station’

As part of the proposed greenway development there is a requirement to construct an underpass under the N70 national road from Chainage 14,660 to 14,710. The construction methodology is presented in Kerry County Councils ‘Construction Methodology Report for the South Kerry Greenway’. The typical plant and activities involved the construction of the underpass are presented in Table 10.11 over.

**Table 10-11: Greenway Works - Underpass - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Vibratory Piling Rig	C.3.8	Sheet Piling	80
Excavator	C.2.21	Break out and loading	80
Breaker mounted on wheeled backhoe	C.1.1	Breaking up concrete	80
Dumper*	C.4.4	Distribution of material	5 two-way trips per hour
Wheeled Mobile Telescopic Crane	C.4.38	Lifting Precast Concrete	80
Lifting Platform	C.4.57	Lifting Platform	80
Dump Truck / Dumper	C.2.30	Tipping Fill	10
Excavator	C.2.25	Earthworks / Distribution of CL804	80
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
Vibratory Roller	C.5.27	Rolling and compaction	80

The nearest noise sensitive location to the underpass works is c.38m away with the next nearest dwelling over 120m away. The predicted noise level for a range of construction activities are presented in Table 10.12.

**Table 10-12: Greenway Works - Underpass – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB	
		38m	120m
Vibratory Piling Rig (C.3.8)	80	77.9	66.7
Excavator (C.2.21)	80	61	49.8
Breaker mounted on wheeled backhoe (C.1.1)	80	78.6	67.3
Dumper* (C.4.4)	5 two-way trips per hour	54.6	47.7
Wheeled Mobile Telescopic Crane (C.4.38)	80	68.2	57
Lifting Platform (C.4.57)	80	57.1	45.9
Dump Truck / Dumper (C.2.30)	10	60	48.8
Excavator (C.2.25)	80	58.8	47.6
Asphalt Paver + tipper lorry (C.5.31)	80	66.5	55.3
Vibratory Roller (C.5.27)	80	56.6	45.3

The noise levels presented are predicted maximum expected levels. In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . However, these elevated noise levels will only occur for short durations at one possibly two dwellings. There is significant foliage and vegetation between the receptors and the construction works. Foliage and vegetation are considered as acoustically soft ground cover whereas a mixture between hard and soft ground cover was conservatively modelled. In practice it is expected that the actual noise levels at the nearest receptors will be below the predicted noise levels. Furthermore, in some instances direct line of sight between construction works and the nearest dwelling will be blocked, and this will reduce the noise impact at the nearest dwelling. If noisy activities are to occur over a period greater than 3 days that result in an exceedance of the noise limit, it is recommended that a temporary barrier/enclosure is installed.

### Greenway Works – Gabion Wall Construction

As part of the proposed greenway development there is a requirement to construct a gabion wall from Chainage 23,200 to 23,358 and 24,105 to 25,155. The construction methodology is presented in Kerry County Councils 'Construction Methodology Report for the South Kerry Greenway'. The typical plant and activities involved in the construction of the gabion wall and the greenway are presented in Table 10.13.

**Table 10-13: Greenway Works – Gabion Wall Construction - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Dump Truck / Dumper	C.2.30	Tipping Fill	10
Excavator	C.2.21	Earthworks / Distribution of CL804	80
Dumper*	C.4.4	Distribution of material	5 two-way trips per hour
Wheeled Mobile Telescopic Crane	C.4.38	Lifting Precast Concrete	80
Lifting Platform	C.4.57	Lifting Platform	80
Excavator	C.2.25	Earthworks / Distribution of CL804	80
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
Vibratory Roller	C.5.27	Rolling and compaction	80
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

The nearest noise sensitive location is 130m away. There are very few other receptors within 500m of these works. Furthermore, the works will be attenuated by the site topography. Given that the nearest noise sensitive locations are over 130m away as well as there being significant attenuation due to site topography, the noise impact from these works will be minor and will be below the noise limit of 65dB  $L_{Aeq,1hr}$ .

### Greenway Works – Cahersiveen Railway Bridge

As part of the proposed greenway development there is a requirement to repair Cahersiveen Railway Bridge at Chainage 5,230 to 5,400. The construction methodology is presented in Kerry County Councils 'Construction Methodology Report for the South Kerry Greenway'.

A direct access site compound will be established at Chainage 5,029. This will be used for the import of a small amount of material. The main lock up and storage area will be at site compound 14.

Components will be fabricated off site and transported from the temporary compound via dumper to the south side of the bridge. From there material will be transported by hand. Minimal cutting of imported components is expected but any cutting will take place in the temporary compound. The typical plant and activities involved in the repair of Cahirsiveen Railway Bridge are presented in Table 10.14. The noise emissions from the cutting torch will be negligible. The use of a mobile telescopic crane has also been considered.

**Table 10-14: Greenway Works – Cahirsiveen Railway Bridge Repair - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Dumper*	C.4.6	Distribution of material	7 two-way trips per hour
Angle Grinder	C.4.93	Grinding steel	50
Cutting Torch	-	Cutting steel	50
Wheeled Mobile Telescopic Crane	C.4.38	Lifting Precast Concrete	80
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

The nearest noise sensitive location is c. 26m from the haul route (direct access site compound to bridge) and c.45m from the direct access compound. The predicted noise levels at 26m and 45m away from the construction activities are presented in Table 10.15. The noise levels presented are predicted maximum expected levels.

**Table 10-15: Greenway Works – Cahirsiveen Railway Bridge Repair – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB	
		26m	45m
Dumper* (C.4.6)	7 two-way trips per hour	61.3	58.2
Angle Grinder (C.4.93)	50	-	67
Cutting Torch	50	low	low
Wheeled Mobile Telescopic Crane (C.4.38)	80	71.9	66.6
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

The maximum predicted noise levels of the grinding activities may on occasion (depending on the frequency and duration of the activity) be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . However, these elevated noise levels will only occur for short durations at limited properties. It is expected that the actual noise levels at receptors will be below the predicted levels as a result of additional attenuation due to more acoustically favourable ground cover and site topography which were not included in the noise model. If it is a case that noise levels are above 65 dB  $L_{Aeq,1hr}$ , a temporary enclosure/barrier can be installed to mitigate noise from grinding activities.

**Greenway Works – N70 Re-alignment**

It will be necessary to carry out re-alignment of a short section of the N70 at chainage 21,050 m to 21,250 m adjacent to Caitíns.

The N70 will be realigned to accommodate the greenway adjacent to but separate from the road at this location. The realignment works may consist of additional pavement surfacing to the car park area and realignment of the road markings. It is expected the existing drainage will be reused and retained.

Material will be excavated and loaded into dump trucks. Following the completion of the excavation works, work will commence on the construction of the realigned section of road. Granular fill material (e.g. crushed aggregate subbase) will be laid and compacted in layers according to the specifications. The material will be brought to site in open trucks, unloaded and distributed with an excavator. Material will be rolled and compacted. A paver will distribute tarmacadam to the design level and the tarmacadam will be rolled and compacted. The typical plant and activities involved the re-alignment of the N70 are presented in Table 10.16.

**Table 10-16: Greenway Works – N70 Re-alignment - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Excavator	C.2.21	Earthworks / Distribution of CL804	80
Excavator	C.10.10	Loading Gravel	25
Road Lorry*	C.6.21	Haulage	2 two-way trips per hour
Dump Truck / Dumper	C.2.30	Tipping Fill	10
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
Road Roller*	C.5.19	Rolling and compaction	80
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

The nearest noise sensitive location is Caitíns B&B located adjacent to the N70. There are also a number of other noise sensitive locations within 200m of the section of road requiring re-alignment. The predicted noise levels at 10m, 20m, 40m and 80m away from the construction activities are presented in Table 10.17.

**Table 10-17: Greenway Works – N70 Re-alignment – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		10m	20m	40m	80m
Excavator (C.2.21)	80	73.1	67.1	60.5	53.8
Excavator (C.10.10)	25	81.2	75.2	68.7	61.9
Road Lorry* (C.6.21)	2 two-way trips per hour	59.5	56.2	52.4	48.3
Dump Truck / Dumper (C.2.30)	10	72.1	66	59.5	52.7
Asphalt Paver + tipper lorry	80	78.6	72.6	66	59.3

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB			
		10m	20m	40m	80m
(C.5.31)					
Road Roller* (C.5.19)	80	81.7	75.6	69.1	62.4
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)					

In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$ . Due to the linear nature of these works, construction activities will not occur over an extended period at any one location and these elevated noise levels will only occur for short durations at a particular property and at a very limited number of properties. Nonetheless, best practice mitigation measures will be employed to minimise the noise impact at the nearest noise sensitive locations.

**Car Parks Works**

It is proposed to develop 3 no. new car parks and to upgrade two existing car parks to provide parking for greenway users. A list of car parks is outlined below:

- Reenard Trail Head Car Park
- Cahersiveen Marina Car Park (existing and to be upgraded)
- Kells Car Park
- Glenbeigh Trail Head Car Park
- Glenbeigh Quarry Car Park (existing and to be upgraded)

The works will involve the excavation of new drainage channels, removal of subsoil and transport of material off site, delivery of sub-base material for distribution with a 13t tonne excavator, backfill material to be rolled and compacted. There are a number of backfill stages requiring similar plant. Once the compacted sub-base material is at the design level, a surface course of tarmacadam will be laid using a paver and this will be rolled and compacted. The typical plant and activities involved the construction of the car parks are presented in Table 10.18.

**Table 10-18: Car Parks Works - Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)
Excavator	C.2.25	Earthworks / Distribution of CL804	80
Excavator	C.10.9	Loading topsoil	80
Dump Truck / Dumper	C.2.30	Tipping fill	10
Roller	C.5.27	Rolling and compaction	80
Excavator	C.4.67	Trenching	80
Asphalt Paver + tipper lorry	C.5.31	Laying asphalt	80
Road Lorry	C.6.21	Delivery / Removal of Material	2 two-way trips per hour
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

The nearest noise sensitive location is c.30m away from Glenbeigh Trail Head Car Park. The predicted noise levels at 30m and 50m from the construction activities are presented in Table 10.19.

**Table 10-19: Car Parks Works – Predicted Noise Levels**

Plant	Percentage on-time (%)	A-Weighted Sound Pressure Level, $L_{Aeq}$ , dB	
		30m	50m
Excavator (C.2.25)	80	61.1	56.1
Excavator (C.10.9)	80	67.2	62.2
Dump Truck / Dumper (C.2.30)	10	62.3	57.3
Roller (C.5.27)	80	58.9	53.9
Excavator (C.4.67)	80	57	52
Asphalt Paver + tipper lorry (C.5.31)	80	68.8	63.8
Road Lorry* (C.6.21)	2 two-way trips per hour	54.0	51.1
* - Drive-by maximum sound pressure level in $L_{max}$ (octave bands) and $L_{Amax}$ (overall level)			

In some instances, the maximum predicted noise levels may be above the noise limit of 65 dB  $L_{Aeq,1hr}$  at the nearest noise sensitive location. Given the nature of these works, plant will not be stationary for long periods and the distance between the construction activities and the nearest noise sensitive locations will be greater than the minimum distances modelled. The predicted maximum expected levels are expected to occur for only short periods of time at a very limited number of properties. Best practice mitigation measures will be employed to minimise the noise impact at the nearest noise sensitive locations.

### Greenway Works – Nimmo's Bridge

A new lightweight steel bridge is proposed at the intersection between the Glenbeigh southern and middle tunnels to replace a bridge that had previously been in place as part of the former railway line which has since eroded. The bridge is located at chainage 23,780m to 23,810m. The construction methodology is presented in Kerry County Councils 'Construction Methodology Report for the South Kerry Greenway'. However, there are no noise sensitive locations within 800m of this part of the greenway and noise impact will be negligible.

### Greenway Works – Drung Hill Tunnel Works

There are three tunnels (southern, northern and middle) located between chainages 23,6900m to 23,940m. The tunnels require some repair and upgrade. The damage and repair works are outlined in a Principal Inspection Report prepared by Malachy Walsh & Partners on behalf of KCC, included in Appendix 3 of Volume 3. The upgrade/pavement works will be constructed as per Section 2.3.2 of this report. As discussed above, there are no noise sensitive locations in within 800m of part of the greenway and noise impact will be negligible.

### Greenway Works – Gleensk Viaduct

Gleensk Viaduct is located at Gleensk and passes over the River Gleensk valley. A Principal Inspection undertaken on the viaduct by Malachy Walsh & Partners on behalf of KCC, included in Appendix 3 of Volume 3 of this EIAR/EIS identified that, in general, the structure has some damage and repair is required but overall the structure is suitable for operation as a pedestrian/cycle bridge as part of the Greenway.

The Gleensk viaduct is located at chainage 21,620 to 21,850. The nearest noise sensitive locations are over 250m away and at that distance the noise impact from the Gleensk Viaduct works will be minor and will be below the noise limit of 65dB  $L_{Aeq,1hr}$ .

### Boardwalk at Coolnaharragill

A short section (100m) of boardwalk will be installed at Coolnaharragill at chainage Ch 27,580 to 27,680. This is proposed to mitigate any potential impact on the existing ground where the required finished height of the greenway exceeds local existing ground level. The wooden boardwalk will be 4 m wide and 100 m long. It will be supported by posts 200 x 200 mm at 2.4 m centres. The posts will sit in steel shoes which will be fixed to the footings. Excavation for each footing will be completed by hand and be 600 x 600 mm square to a depth that will provide adequate bearing. Hand power tools will be required in the construction of the boardwalk and the noise emissions from these construction activities will be below the noise limit of 65 dB  $L_{Aeq,1hr}$ .

### Reenard Revetment Wall

It is proposed to construct a timber pile wall to the west of the Met Station in Cahirsiveen at Ch.2,650 to Ch.2,820. Greenheart piles rough sawn 250mm x 150mm in lengths ranging from 3.0m to 3.5m will be used. The piles will be driven approximately 2m into the existing cobble beach and braced in two locations with similar green heart bracing elements. The pile toes will have a steel strap attached and be pointed to aid in driving. The area between the railway line and the piles will be backfilled with a granular material laid on a geotextile.

The nearest noise sensitive location is over 200m away and the noise emissions from these construction activities will be below the noise limit of 65 dB  $L_{Aeq,1hr}$ .

#### 10.5.2.2 Vibration

The potential for vibration at neighbouring sensitive locations during construction is typically limited to piling works, rock breaking, excavation works and lorry movements on uneven road surfaces. The most significant of these is the vibration from piling operations; the method of which will be selected and controlled to ensure there is no likelihood of structural or even cosmetic damage to existing neighbouring dwellings. Considering the distances proposed from the majority of works and the nearest sensitive locations, vibration will be localised and vibration from construction activities will not have a significant impact on the nearest sensitive locations.

### 10.5.3 Operational Phase

#### 10.5.3.1 Noise

There will be no significant continuous or intermittent noise sources along the proposed development corridor during its operational phase. For this phase, likely noise emissions will be limited to use of the route by walkers and cyclist, traffic associated with walkers and cyclists accessing the route and low impact maintenance routine. This usage will occur during daylight hours. As such, noise levels associated with the operation of the proposed South Kerry Greenway will be minimal.

### 10.5.3.2 Vibration

There is no potential for vibration due to the proposed development during its operational phase.

### 10.5.4 Cumulative Impacts

A list of projects outlined in Chapter 1 were reviewed to determine if there are any potential cumulative impacts. Cumulative impacts are restricted to the construction phase and only if there is an overlap during the construction phase of proposed development and other planning applications.

If the proposed development and other planning applications occur concurrently there is potential increased vehicle movements. However, it is expected that cumulative impacts will be negligible.

## 10.6 Mitigation Measures

### Construction Phase

The linear and repetitive nature of the works lends itself to a progressive and sequential form of construction. For the most part elevated noise levels from construction activity will only occur for short durations at a particular property and at a very limited number of properties.

The construction phase has recognised impacts on the ambient noise levels and while these noise impacts are temporary in nature and short in duration, mitigation will be required so as to minimise potential impacts on NSLs. Construction phase mitigation measures will include the following:

- A noise management plan will be developed for the construction phase to ensure that best practice in the reduction of noise is implemented during this phase;
- Construction will be carried out in accordance with the Codes of Practice provided in BS 5228, 2009+A1:2014 and the guidance given therein, for minimising noise emissions from the site;
- Construction activities will be undertaken in such a way as to minimise noise levels using the best available techniques. Method statements dealing with each activity and detailing the noise reduction measures will be produced for each phase of the construction activities;
- One of the main construction activities like to give rise to noise is the placement, movement and loading of material, and the drop heights for material such as gravels will be minimised whenever practicable.
- Mobile barriers of suitable material will be used where deemed necessary;
- There will be no work outside of normal working hours;
- Where practicable, the number of machines in simultaneous operation will be minimised;
- Machines in intermittent use will be shut down, or throttled down to a minimum, in the intervening period between works;
- Employees working on the construction site will be informed of the requirement to minimise noise and will be instructed:
  - The proper use and maintenance of tools and equipment;
  - The position of machinery on-site to reduce the emission of noise and the nearest noise sensitive receptors;
  - Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment;
  - The use and maintenance of sound reduction equipment fitted to power pressure tools and machines; and
  - Reporting defective noise control equipment.
- Where practicable, noisy plant or operations will be positioned as far as possible from NSLs in order to capitalise on the attenuation of sound due to distance.

- All noise producing equipment will comply with S.I. No. 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001;
- Plant and machinery on-site will comply with the EC (Construction Plant and Equipment) Permissible, Noise Level Regulations, 1988 (S.I. No. 320 of 1988); and
- All mechanical plant used on site will be fitted with effective exhaust silencers and will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use.

Construction activity at the site compounds will typically occur for a longer duration and if the works at the compound are expected to be greater than one month it is recommended that site hoarding is installed to break direct line of sight between the compound and nearest noise sensitive dwellings. The compound locations identified where there may be potential exceedances in the noise levels include compounds 1, 7, 10-12, 14, 15, 18-20 and 22-24. The determining factor on the extent of site hoarding will be dependent on the plant used by the contractor and these will be finalised once a contractor has been appointed.

### Operational Phase

As there will be no significant noise or vibration impacts due to the operational phase of the proposed development, no mitigation measures are proposed for this phase.

## 10.7 Residual Impacts

In general, the construction phase of the proposed development has the potential to increase the noise and vibration levels in the immediate vicinity of the site works during the construction phase. These increased noise and vibration levels will be of a temporary adverse nature. It is important to note that the NSLs in the study area will not suffer high noise levels on a continuous basis. In general, an increase in noise levels will be present for a short time period, due to the sequential nature of the works (typically 1-2 days per section). Progression will be on a daily basis, therefore construction impacts at each section will be limited in duration and therefore the impact, after mitigation, is assessed to be a significant temporary impact.

However, works associated with site compounds have potential to occur for increased duration of impacts (up to 47 days) and therefore the impact, after mitigation, is assessed to be a significant temporary impact on a limited number of dwellings (expected to be less than 15 dwellings).

No significant residual impacts are predicted for the operational phase of the proposed South Kerry Greenway.

## 10.8 References

British Standard *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise*.