

- Legend:**
- Proposed Pipeline Route
  - 1km Area of Search
  - Listed Building
  - Sites and Monuments Record
  - Sites and Monuments Record
  - Archaeology feature identified from Walkover Survey
  - Archaeology feature identified from Walkover Survey
  - Archaeology feature identified from Walkover Survey
  - Cropmarks visible on aerial photograph
  - Cropmarks visible on aerial photograph
  - Archaeological feature identified from historic maps
  - Archaeological feature identified from historic maps
  - Archaeological feature identified from BGS
  - Non Inventory Gardens and Designed Landscapes
  - Area of high potential for the occurrence of a Roman road

This map contains data from the following sources:-

NMR  
 Historic Scotland  
 Dumfries and Galloway Council HER  
 Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

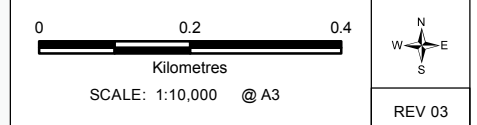


Rev	Date	Description	Drn	Chk	App
03	06/05/2015	Updated Route	FC	SR	JS
02	14/04/2015	Updated Logo	FC	SR	JS
01	18/03/2015	Sites Added	FC	SR	JS

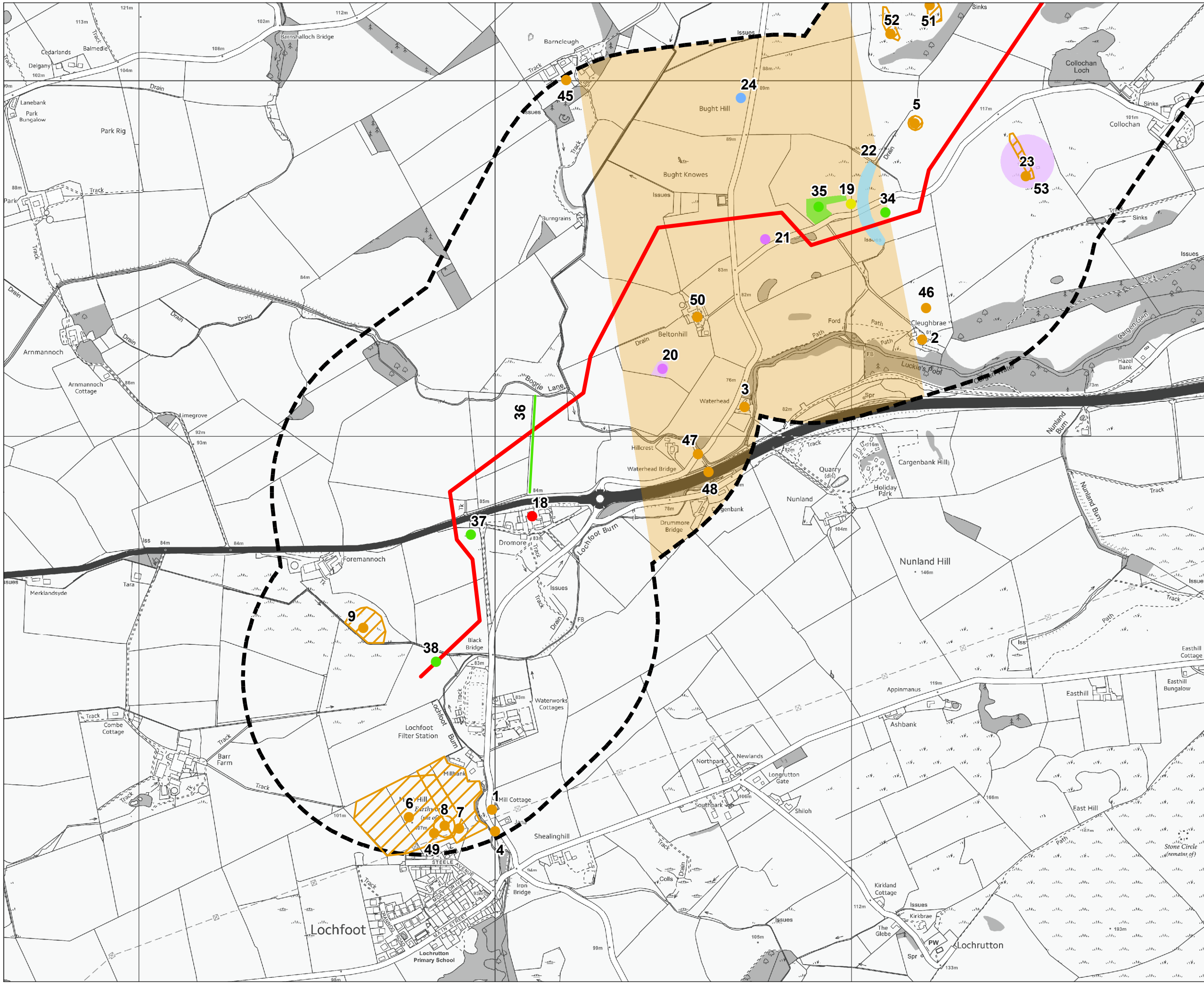
**Cluden to Lochfoot Pipeline**



TITLE: Figure 8.1 -  
 Heritage Assets  
 Map 2 of 3



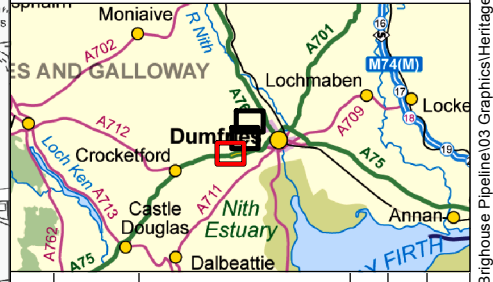




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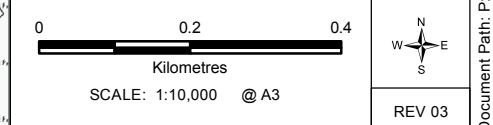


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**Cluden to Lochfoot Pipeline**



TITLE: Figure 8.1 - Heritage Assets Map 3 of 3



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## 9 LANDSCAPE AND VISUAL

### 9.1 Introduction

This section sets out the findings of the landscape and visual impact assessment of the pipeline.

The overall landscape character of the land crossed by the pipeline and its surroundings is a result of the relationship between landform, land cover, landscape elements and climate. Landscape is never static – is in a constant state of change, resulting from both natural processes and human activities. All landscapes have a relative sensitivity to change that is known as ‘susceptibility to change’. The introduction of new features into a landscape, regardless of the characteristics of those features, inevitably brings about change.

The susceptibility of the landscape to accommodate change, without deterioration or loss of its essential landscape character and quality is as varied as the range of different landscape types themselves. Assessing the effects of such change requires a clear understanding of the landscape character of the study area and its surrounding landscape.

### 9.2 Consultation

A Scoping meeting was held with Dumfries and Galloway Council, Scottish Natural Heritage and SEPA. No specific concerns have been raised with regard to landscape issues, provided the project implements best practice mitigation measures to avoid, minimise or reduce impacts on the landscape.

### 9.3 Legislation and Policy Context

#### 9.1.1 Key Legislation

Key legislation covering the protection of the landscape is listed in Table 9-1.

**Table 9-1 Key Legislation**

<b>Act/ Regulation</b>	<b>Key Relevant Provisions</b>
The National Parks and Access to the Countryside Act 1949	This introduced National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSI), and provided local authorities with the power to establish Local Nature Reserves (LNRs).
The Countryside (Scotland) Act 1967	This strengthened the powers granted under the 1949 Act and required public bodies to have regard to the conservation of the natural heritage of Scotland.
The Wildlife and Countryside Act 1981	The Wildlife and Countryside Act 1981 (as amended) is the principle mechanism for the legislative protection of wildlife in Great Britain. It does not extend to Northern Ireland, the Channel Islands or the Isle of Man. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds

Act/ Regulation	Key Relevant Provisions
	<p>(79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/FFC) are implemented in Great Britain. Similar legislation is enacted to fulfil these obligations elsewhere in the United Kingdom. The Wildlife and Countryside Act is divided into four parts:</p> <ul style="list-style-type: none"> <li>• Part I is concerned with the protection of wildlife;</li> <li>• Part II relates to the countryside and national parks (and the designation of protected areas);</li> <li>• Part III covers public rights of way; and</li> <li>• Part IV deals with miscellaneous provisions of the Act.</li> </ul>
The Natural Heritage (Scotland) Act 1991	This Act established Scottish Natural Heritage and charged it with responsibility for protecting, enhancing and facilitating the enjoyment of Scotland's natural heritage.
The Town and Country Planning (Scotland) Act 1997	This Act consolidated the system of development control in Scotland. It set out a statutory framework for the creation of planning guidance in Scotland, and requires that development plans allow for conservation of natural beauty and amenity and for the improvement of the physical environment. This established the system of Scottish Planning Policies (SPPs) (formerly known as National Planning Policy Guidance (NPPG)), providing statements of Scottish Executive policy and Planning Advice Notes (PANs), providing advice on good practice and other relevant information.
National Parks (Scotland) Act 2000	This legislation set out the four main aims in terms of National Parks in Scotland, and provides criteria in terms of what constitutes a National Park. The Act does not in itself create any national parks, specifying instead the process for their creation.
Land Reform (Scotland) Act 2003	This provided a legal framework for responsible access to land and inland water, providing a formalisation of the tradition in Scotland of unhindered access to open countryside.
Nature Conservation (Scotland) Act 2004	This Act places obligations on public bodies in relation to the conservation of biodiversity; increasing the protection for Sites of Special Scientific Interest (SSSI); amending the legislation relating to Nature Conservation Orders and strengthening wildlife enforcement legislation.
Planning etc. (Scotland) Act 2006	This Act states the special protection measures of outstanding scenic value in a national context and the method for relevant guidance and procedure in designating a National Scenic Area (NSA) by Scottish Ministers with consultation from Scottish Natural Heritage and such other persons as are prescribed.

### 9.1.2 Policy Guidance and Local Planning Policies

#### National Policy and Guidance

The National Planning Framework 3 (NPF3) which was published in June 2014 sets out the context for development planning in Scotland and provides a framework for the spatial development of Scotland. Scottish Planning Policy (SPP) published in June 2014 sets out national planning policies that reflect Scottish Minister's priorities in relation to the planning system and for development and use of land.

Planning Advice Notes (PANs) provide advice and information on technical planning matters. A number of these are of relevance to this assessment. These include:

- PAN 60 Planning for Natural Heritage, provides advice on working with Scotland's Natural Heritage through the use of assessment, setting objectives and awareness of identifying landscape character, biodiversity, local designations and greenspace;
- PAN 1/2013 Environmental Impact Assessment, is guidance to replace PAN 58 that contains advice on the integration of EIA procedures into the overall development management process.

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 No.139 states the general principles and policy in context of the EIA directive that apply to development in Scotland and establishes whether EIA is required through identifying Schedule 1 and Schedule 2 development.

#### Local Policy and Guidance

The local planning documents of relevance to this assessment are:

- Dumfries & Galloway Council Local Development Plan, adopted September 2014; and
- Dumfries & Galloway Council Technical Paper; Regional Scenic Areas, adopted September 2014.

The Local Development Plan sets out a number of policies and statements of intent to respect, protect, and enhance the region's rich landscape quality. The plan also serves to protect, conserve and enhance specific landscape features such as hedgerows and trees, which form important nature conservation habitats and visual focal points within the landscape.

The Technical Paper is supplementary to the Local Development Plan and explains the designation process as well as showing the boundaries of the designated Regional Scenic Areas within Dumfries and Galloway.

The relevant planning policies are discussed in Section 9.1.1, with a list of other relevant policies provided in Section 4.

## **9.4 Assessment Methodology and Uncertainty**

As a matter of best practice the assessment has been undertaken in accordance with the *Guidelines for Landscape and Visual Impact Assessment, Third Edition*, The Landscape Institute and Institute of Environmental Management and Assessment, 2013, published by Routledge. The guidance will be subsequently referred to within this report at GLVIA3.

### **9.1.3 Establishment of Baseline Environment**

Both the landscape and visual assessment include baseline studies that describe, classify and evaluate the existing landscape and visual resources, focusing on their sensitivity and ability to accommodate change. In order to review the existing baseline conditions the following information and sources of information have been used:

- consultations with the client regarding The Project;



- a review of the relevant structure and local plans to identify policies specifically relating to landscape issues;
- a review of publicly available landscape character assessments;
- Ordnance Survey Maps, at 1:10,000 scale; and
- a vantage point field survey.

## 9.1.4 Identification and Assessment of Effects and Mitigation Measures

### 9.4.1.1 Landscape Assessment

Landscape assessment seeks to identify the key elements and features of the landscape within the study area, and considers the changes that the development would have on this character. This involves the consideration of the landscape sensitivity and the predicted magnitude of landscape change resulting from The Project in order to assess residual effects on the landscape. The criteria for this have been developed from *GLVIA3* (described in Section 9.4).

#### Landscape sensitivity

This refers to combining judgements made regarding the susceptibility of the landscape to change brought about by The Project, and the value of the landscape

#### Susceptibility to change

Susceptibility to change is derived from the ability of the landscape, whether it be a particular landscape type or an individual landscape feature, to accommodate The Project without negative consequence on the baseline situation or planning policy relevant to landscape. For the purposes of this assessment, the criteria defining susceptibility to change have been summarised in Table 9-2.

**Table 9-2 Susceptibility to Change**

Susceptibility to change	Description
Very High	Important features and or elements of the landscape highly susceptible to change: landscape is of very high quality and condition, and aesthetic character/experience of the landscape is very susceptible to change.
High	Important features and or elements of the landscape relatively susceptible to change: landscape is of high quality and condition, and aesthetic character/experience of the landscape is susceptible to change.
Medium	Important features and or elements of the landscape of moderate susceptibility to change/moderately important elements of the landscape susceptible to change: the landscape is of moderate quality and/or condition, and aesthetic character/experience of the landscape is susceptible/partially susceptible to change.
Low	Important/moderately important feature or elements of the landscape of low susceptibility to change: landscape is of low quality and condition, and aesthetic character/experience of the landscape is largely insusceptible to change.
Very low	Important/moderately important features or elements of the landscape of negligible susceptibility to change: the landscape is of very low quality and condition, and aesthetic character/experience of the landscape is of negligible susceptibility to change.

### Landscape value

This refers to the relative value that is attached to different landscapes. Such value can be expressed in terms of formal classification such as statutory/local landscape designations and by other methods, such as landscape character assessment. A landscape that has not been formally classified in terms of landscape value may be of importance to a community of interest or consultees. For the purposes of this assessment, the criteria defining landscape value have been summarised in Table 9-3.

**Table 9-3 Landscape Value**

<b>Landscape Value</b>	<b>Description</b>
Very High	Typically areas and/or features that have a particularly highly valued landscape by nature of their condition, high scenic qualities, strong characteristics, cultural associations and amenity  Landscape includes areas of international or national landscape or landscape conservation importance such as National Parks, Areas of Outstanding Natural Beauty, and Historic Gardens and Designed Landscapes (Inventory and Non-Inventory)
High	Typically areas and/or features considered to be of high value in terms of landscape or conservation importance on a regional scale, which display positive characteristics such as pattern, land cover, and sense of place  These areas are likely to be designated by LPA as being of landscape value such as Special Landscape Areas, or to have been identified as high value landscapes through landscape character assessment
Medium	Typically areas of landscape or conservation importance on a local scale, which retain a positive character such as pattern, land cover, or a sense of place  These areas are unlikely to be designated for their landscape quality or value. However, their value may be apparent via landscape character assessment of the areas in question or through consultation with local communities
Low	Typically undesignated areas, in poor to fair condition, which have undergone change and no longer have a distinctive local character, such as pattern, land cover or aesthetic quality. This low value may be apparent via landscape character assessment of the landscape in question or through consultation with local communities
Very low	Degraded landscapes whose distinctive character and aesthetic quality has been seriously damaged. This very low value may be apparent via landscape character assessment of the landscape in question or through consultation with local communities

Using professional judgement, the overall landscape sensitivity is derived by combining the assessed values attributed to susceptibility to change and landscape value to define an average overall value within the range ‘very low’, ‘low’, ‘medium’, ‘high’ and ‘very high’.

### **Landscape Change**

This relates to the effects of The Project on the receiving landscape. The criteria used to define magnitude of effects for this assessment are summarised in Table 9-4.

**Table 9-4 Magnitude of Landscape Change**

Magnitude	Description
Large	<p>Change would cause a total loss of or major alteration to, key valued elements, features, and characteristics of the baseline or introduction of elements considered to be prominent and totally uncharacteristic when set within the attributes of the receiving landscape. Change would be at a considerable variance with the landform, scale and pattern of the landscape.</p> <p>Change is likely to cause a direct adverse permanent or long-term (more than 10 years) effect on the integrity/value of the receptor.</p>
Medium	<p>Change would cause a partial loss of or alteration to one or more key elements, features, characteristics of the baseline or introduction of elements that may be prominent but may not be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape. Change would be out of scale with the landscape, and at odds with the local pattern and landform.</p> <p>Change is likely to adversely affect the integrity/value of the receptor but recovery is predicted in the medium term (5–10 years). No permanent effect on its integrity is predicted.</p>
Small	<p>Change would cause minor loss of, or alteration to, one or more key elements, features, characteristics of the baseline, or introduction of elements that may be prominent but may not be uncharacteristic when set within the attributes of the receiving landscape. Change may not quite fit into the landform and scale of the landscape.</p> <p>Change is likely to adversely affect the integrity/value of the receptor but recovery is expected in the short term (0–4 years).</p>
Negligible	<p>Change would cause a very minor loss or alteration to one or more key elements, features, and characteristics of the baseline or introduction of elements that are not uncharacteristic when set within the attributes of the receiving landscape. Change would maintain existing landscape quality, but may be slightly at odds with the scale, landform and pattern of the landscape.</p>



## Significance of Effects

The assessment of the significance of residual effects, which are the effects after mitigation measures have been applied, is a result of the assessment of magnitude of change related to the assessment of sensitivity of the receiving landscape within the range of the following.

- highly significant (major or major/moderate) - it has been an objective of the route selection process to avoid any such effects;
- significant (moderate) - it has been an objective of the route selection process and the focus of mitigation strategies to minimise any such effects; and
- not significant (moderate/minor, minor or negligible) - effects that are considered to not require further mitigation.

The assessment of the significance of residual effects will consider the landscape effects during the Construction Phase of The Project as this phase has been identified as having greater potential to result in significant effects than the Operational Phase due to the nature of The Project. The construction phase effects will form the focus of this assessment and have been considered in detail.

For the purposes of this assessment ‘significant’ landscape effects would be those effects assessed to be major, major/moderate or moderate.

### 9.4.1.2 Visual Assessment

The visual assessment assesses the change that would result to existing views and visual amenity for the visual receptors (i.e. the properties or locations from which the development will be visible) located around The Project. This takes into account the sensitivity and importance of those receptors, and the nature, scale or magnitude and duration of the change. The assessment of visual effects from any one location takes into account:

- the design and layout of the development;
- the location of the visual receptors;
- the sensitivity of the visual receptors;
- the distance of visual receptor from the development;
- the degree of visual intrusion perceived by the visual receptors (i.e. the extent and nature of change to the views at the location of the different visual receptors that would result from The Project). This includes consideration of:
  - whether the development is seen completely, or in part;
  - whether the development would be seen against a backdrop of land or against the sky or with a complex foreground;
  - whether the site forms part of an expansive landscape or is visible within a restricted view; and
  - the angle of the sun, the time of year and weather conditions at the time of the assessment.
- how views are likely to be experienced (i.e. directly or obliquely, and in the case of road vehicles and trains, the direction and speed of travel).

### Importance/Sensitivity

For the purposes of the visual assessment the visual receptors have been graded according to their importance and sensitivity to change and are summarised in Table 9-5.

In order to evaluate what the visual effects of the development will be and what can be done to ameliorate them, it is necessary to describe the existing situation to provide a basis against which any change can be assessed.

Each assessment of visual effects has therefore been made taking into consideration the character and quality of the existing view.

**Table 9-5 Importance/Sensitivity of Visual Receptor**

Receptor Sensitivity	Examples
High	Occupiers of residential properties Users of outdoor recreational facilities, including public rights of way, whose attention or interest may be focused on the landscape Communities where the development results in changes in the landscape setting or valued views enjoyed by the community
Medium	People travelling through or past the affected landscape in cars, on trains or other transport routes where higher speeds are involved and views are sporadic and short-lived People engaged in outdoor recreation where enjoyment of the landscape is incidental rather than of main interest
Low	People at their place of work; at commercial/industrial facilities

### Magnitude

The potential magnitude of change resulting from The Project is categorised in Table 9-6.

**Table 9-6 Magnitude of Visual Change**

Magnitude	Description
High	The development would appear as large scale and become the dominant feature of the view; it would result in a significant change in the existing view and permanently diminish the quality and character of the existing view.
Medium	The development would result in a noticeable change in the existing view and would cause a noticeable deterioration in the quality and character of the view. The development would form recognisable new elements within the overall view and may be readily noticed by the observer or receptor.
Small	The development would result in a perceptible change in the existing view, without affecting the overall quality and/or character of the view. The development would form an apparently small element in the wider landscape that may be missed by the casual observer or receptor.
Very small	The development would result in a barely perceptible change in the existing view, without affecting the overall quality, or would form an inconspicuous element in the wider landscape, which may be easily missed by the observer or receptor.

Magnitude	Description
Negligible	Only a small part of the development would be discernible, and/or it is at such a distance that no change to the existing view can be discerned.

### Significance of Effects

The assessment of the significance of residual visual effects is a result of the assessment of magnitude of visual change related to the assessment of sensitivity of the receptor within the range of the following.

- highly significant (major or major/moderate) - it has been an objective of the route selection process to avoid any such effects;
- significant (moderate) - it has been an objective of the route selection process and the focus of mitigation strategies to minimise any such effects; and
- not significant (moderate/minor, minor or negligible) - effects that are considered to not require further mitigation.

The assessment of the significance of residual effects will consider the visual effects during the Construction Phase of The Project as this phase has been identified as having greater potential to result in significant effects than the Operational Phase due to the nature of The Project. The construction phase effects will form the focus of this assessment and have been considered in detail.

For the purposes of this assessment ‘significant’ visual effects would be those effects assessed to be major, major/moderate or moderate.

#### 9.4.1.3 *Uncertainty and Technical Difficulties Encountered*

In order to assess the worst-case scenario for visual effects, field survey work was undertaken during the winter months of 2015, when the screening effects of tree and other deciduous vegetation are reduced by the loss of leaf cover. Assessment was undertaken previously in August 2007 during the summer months.

## 9.5 Baseline Overview

### 9.1.5 *Landscape Designations and Planning*

Consideration of the planning documents listed in Section 9.1.2 have identified a number of landscape designations and landscape planning policies relevant to this assessment.

#### 9.5.1.1 *Landscape Designations*

The pipeline route crosses an area designated as the Terregles Ridge Regional Scenic Area (RSA), within the area covered by the Technical Paper; Regional Scenic Areas of the Dumfries & Galloway Council Local Development Plan.

The Dumfries and Galloway Local Development Plan under Policy NE2 ‘*Regional Scenic Areas*’ states that:

*‘The siting and design of development within a Regional Scenic Area should respect the special qualities of the area. Development within, or which affects*



*Regional Scenic Areas (RSAs), may be supported where the local Council is satisfied that:*

- *the landscape character and scenic interest for which the area has been designated would not be significantly adversely affected; or*
- *there is a specific need for the development at that location which could not be located in a less sensitive area.*

*Boundaries of RSAs are shown on the proposals maps.'*

### 9.5.1.2 *Historic Gardens and Designed Landscapes*

Historic gardens and designed landscapes are extensive planned gardens, often but not always established as the setting for a historic building. No historic gardens and designed landscapes (inventory or non inventory) have been identified along the proposed pipeline corridor, although one non-inventory designation named The Grove is located approximately 0.3km away from the proposed pipeline (See Figure 9.1).

The Dumfries and Galloway Local Development Plan under Policy HE6 '*Gardens and Designed Landscapes*' states that:

*'a) The Council will support development that protects or enhances the significant elements, specific qualities, character, integrity and setting, including key views to and from, gardens and designed landscapes included in the Inventory of Gardens and Designed Landscapes or the Non-Inventory List.*

*In considering development proposals the Council will need to be satisfied that:*

- *the development protects or enhances the significant elements of the garden or landscape in-situ; and*
- *due consideration has been given to the significance and value of the asset in relation to the long-term benefit and specific need for the development in the location proposed.*

*b) Developers will be required to submit the results of an assessment of the impact of their proposals on the sites and their settings plus details of any potential mitigation measures.*

*c) Proposals that would have a detrimental effect on the specific quality, character or integrity of a garden or designed landscape will not be approved unless it is demonstrated that the proposal has benefits of overriding public interest.'*

Non-inventory HER Gardens and Designed landscape can be found within at Dumfries and Galloway Council (2015) Historic Environment Viewer, <http://www.dumgal.gov.uk/index.aspx?articleid=11720>.

### 9.5.1.3 *Landscape Planning*

A number of planning policies have been identified as being of relevance to The Project. Of particular relevance in terms of the assessment of landscape and visual effects is Policy OP1 '*Development Considerations*' of the Dumfries & Galloway Local Development Plan which states:

*'c) Landscape*

*Development proposals should respect, protect and/or enhance the region’s rich landscape character, scenic qualities and features and sites designated for their landscape quality at any level. They should also reflect the scale and local distinctiveness of the landscape. Principles established in the European Landscape Convention and the Dumfries and Galloway Landscape Assessment, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.’*

### 9.1.6 Landscape Character

The National Programme of Landscape Character Assessment, undertaken by Scottish Natural Heritage in partnership with local authorities and other agencies, involved the assessment of landscape character for all of Scotland. The assessment of relevance to this report is: *Dumfries and Galloway Landscape Assessment*, Scottish Natural Heritage Review 94, Land Use Consultants, 1998.

The Dumfries and Galloway Landscape Assessment was designed to provide information on landscape character and landscape change, in part to support the Dumfries & Galloway Structure Plan review. The assessment had the following aims:

- *‘to produce a detailed description and analysis of the varying landscape of Dumfries and Galloway;*
- *to consider the likely pressures and opportunities for landscape change;*
- *to assess the sensitivity of these landscapes to landscape change;*
- *to develop guidelines as to how landscape change can be accommodated; and*
- *to develop guidelines as to how the differing landscapes can be conserved, enhanced, improved or restructured as appropriate.’*

In order to achieve this end, a series of different landscape types were defined. The pipeline corridor crosses three of those types. A summary of the landscape character types crossed by the proposed pipeline route corridor can be seen in Table 9-7 and on Figure 9.1. Further details of the key characteristics and summary guidelines for the landscape character types can also be seen in Appendix G.

**Table 9-7 Landscape Character Types of the Pipeline Route**

<b>Landscape Character Types crossed by the Proposed Pipeline Route Corridor</b>		
<small>(taken from <i>Dumfries and Galloway Landscape Assessment</i>, Scottish Natural Heritage, Review 94, Land Use Consultants, 1998)</small>		
<b>Landscape Character Type/Unit</b>	<b>Pipeline Route Section</b>	<b>Distance</b>
Type 6: Lower Dale type, Lower Nithsdale unit	Start Point to 0.21km negative of RDX02	1.1km
Type 16: Upland Fringe type, Cairn unit	0.21km negative of RDX02 to 0.24km positive of RDX04	3.7km
Type 13: Drumlin Pastures type, Milton unit	0.24km positive of RDX04 to End Point	1.9km

### 9.1.7 Baseline Conditions: Landscape Character, Landscape Fabric and Visual

For the purposes of this assessment the proposed pipeline route has been divided into three sections, which roughly correspond with local changes in the landscape character

crossed by the pipeline route study corridor. These are listed in Table 9-8 below. For each section, a description is given of the baseline conditions for landscape character, landscape fabric and visual.

**Table 9-8 Pipeline Route Description Sections**

**SECTION 1 START TO RDX03 (~2.1KM)**

**Landscape Character Baseline**

This section comprises the Lower Dale (1.1km) and Upland Fringe (1km) landscape types. The landform along the initial section of pipeline route is dominated by the valley of Cluden Water, which is framed to the north and south by a series of hills. Within this wider valley form, the terrain undulates forming a series of ridges and hillocks. This leads to varying degrees of visual enclosure and exposure, with medium–long distance views possible from more elevated terrain. Landcover mainly consists of a mixture of small–medium-size pastoral and arable fields, with the emphasis on the former.

Field boundaries comprise a mixture of hedgerows, post and wire fences and dry stone dikes. Hedgerows are in many cases fragmented and have been stockproofed with post and wire fencing, and often contain hedgerow trees.

Some deciduous and coniferous woodland blocks are present within the landscape, most notably that of Cogershaw Wood, and include shelterbelts around a number of the farm properties present in the landscape. Settlement consists of scattered farm properties and hamlets, while further to the east the north western elements of the town of Dumfries are perceptible.

**Landscape Fabric Baseline**

This section of pipeline runs a generally south south west direction for approximately 2.1km. Along this section the pipeline largely crosses pasture fields with some arable cover, divided by a combination of post and wire fences and hedgerow boundaries. Minor roads are crossed at RDX01 and RDX03, in addition to a farm track at RDX02. Minor watercourses are crossed at RVX01 and RVX02.

**Visual Baseline: Visual Receptors and Sensitivity**

However, views are possible from a number of properties to the north of the proposed pipeline route. Properties with such views include Nether Gribton, Upper Cluden, Almar Cottage, Sunnyhill Cottages, Steilston House and Rue. Equally, views are possible from sections of the B729, along with minor roads to the north of the site. Such views are often over long distances (>1km), with the pipeline forming a small element in the wider field of view, and tend to be of a short section of pipeline as it crosses a ridge approximately 900m positive of RDX01.

Other views from this section of pipeline are largely screened by a combination of topography, and vegetation cover. The properties of Ingleston and Maryfield possess oblique views of the pipeline route, while users of the minor roads crossed at RDX01 and RDX02 possess glimpsed views through gaps in summer roadside hedgerows. A section of minor road running parallel to the pipeline route north west of RDX02 also possesses glimpsed, oblique views of the pipeline route.

**SECTION 2 RDX03 TO RDX04 (~2.4KM)**

**Landscape Character Baseline**

This section comprises the Upland Fringe landscape type. A 2.05km segment of this section of pipeline route also falls within the Terregles RSA. Landform within this section of pipeline route relates to a series of steeply sloping hills and narrow, undulating valleys. Landcover is a simple mixture of grazing land and, to a lesser extent, coniferous plantation woodland. Small grazing fields exist between sections of woodland, and boundaries

comprise post and wire fences and stone dikes. The series of small scale valleys and ridges, combined with vegetation cover, lead to a constantly changing experience of the landscape, with varying levels of enclosure and exposure. From certain points, long distance views are possible to lower lying areas to the east and west, including long distance views of Dumfries. Settlement here is limited to isolated farm properties.

#### **Landscape Fabric Baseline**

The pipeline in this section is routed for approximately 2.4km in a generally south west direction. The pipeline route passes predominantly through rough grazing land, with limited field boundaries comprising stone dikes and post and wire fences. A minor road is crossed at RDX04, and a minor watercourse at RVX03.

#### **Visual Baseline: Visual Receptors and Sensitivity**

Much of this section of pipeline route is screened from potential receptors by a combination of rolling topography and coniferous plantation.

However, an 800m-section of pipeline route from 100m positive of RVX03 is visible from a number of receptors, including many of the properties in and around the settlement of Terregles, although this involves screened and/or oblique views in many cases. As the pipeline crosses in the vicinity of Beacon Hill approximately 800m negative of RDX04, long-distance views are possible from the properties and roads to the south, including oblique views from the A75. With regard to longer distance views of the pipeline route positive of RVX03 and in the vicinity of Beacon Hill negative of RDX04, it should be noted that the pipeline route forms a small element in a wider, visually complex, landscape.

Views are also possible from the minor roads crossed at RDX04 and RDX05. The pipeline route passes in close proximity to Collocan Loch, which appears to be used for fishing, although direct views of the pipeline route are not possible.

### **SECTION 3 RDX04 TO END POINT (~2.2KM)**

#### **Landscape Character Baseline**

This section of the pipeline route corridor falls primarily within the Drumlin Pastures landscape type (1.9km), with a short section in the Upland Fringe type (0.3km). The initial 0.3km segment of this section falls within the Terregles Ridge RSA. Landscape here generally occupies a broad valley enclosed to the north, south and east by hills, with more distant hills visible to the west. Within the valley, the drumlin landforms lead to an undulating terrain. This creates a landscape with varying levels of enclosure, ranging from small scale to large scale with variations in topography. Landcover is predominantly pasture fields, with small areas of coniferous and deciduous woodland and scrub. Field boundaries consist of hedgerows of varying intactness, post and wire fences and stone dikes. Settlement consists of scattered properties, including farms and more modern residential properties, and the village of Lochfoot.

#### **Landscape Fabric Baseline**

The pipeline route runs generally in a south west direction along this section of pipeline route for approximately 2.2km. It is routed predominantly through pasture fields, along with a number of dry stone dikes, hedgerows and post and wire fences. The pipeline route also crosses a minor road at RDX05 along with the A75 at RDX06. Additionally, the pipeline route crosses three streams at RVX04, RVX05 and RVX06. A short stretch of pipeline route also crosses boggy grassland negative of RDX04.

#### **Visual Baseline: Visual Receptors and Sensitivity**

Glimpsed views are possible through gaps in the roadside vegetation and the undulating terrain from the A75, the minor road crossed at RDX05 and the minor roads running north and east from the settlement of Lochfoot.

Several properties around the proposed pipeline route have views, including Foremannoch,

Barr Farm, the properties at Dromore and Millbank. In particular, the two properties at Beltonhill possess direct close proximity views.

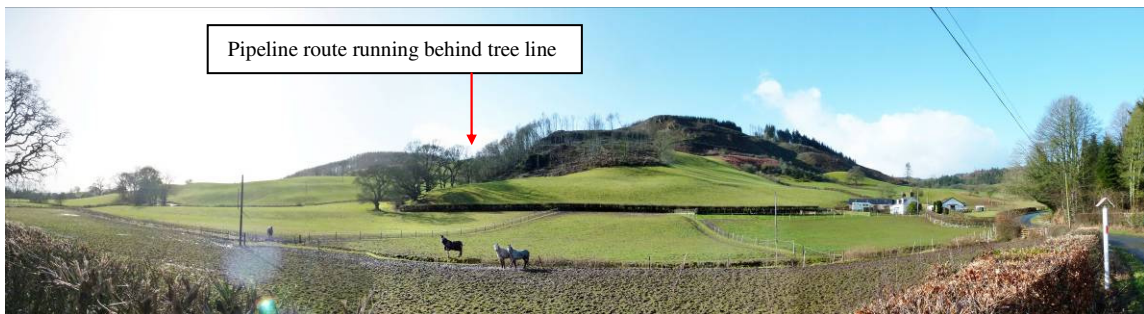
A number of properties on the hillside south east of the proposed pipeline route have long-distance views downwards to the pipeline route, including Southpark, Newlands Longrutton Gate, Ashbank and Appimanus.

The plates subsequently (9.1 to 9.8) show the landscape baseline from key viewpoints, looking towards the proposed route of the pipeline.



**Plate 9.1: Viewpoint 1**

*View south across the Lower Dale and Upland fringe landscape character types from 0.9km north west of RDX01, adjacent to Nether Gribton. The pipeline route is visible as it crosses a ridgeline, as shown.*



**Plate 9.2: Viewpoint 2**

*View south across the Upland Fringe landscape character type from the minor road at RDX03. The pipeline route runs in the direction of view, kinking around and avoiding the tree line visible in the centre of the view.*



**Plate 9.3: Viewpoint 3**

*View west across the Upland Fringe landscape character type from Kirklands Road, Terregles, 0.95km south east of RDX03. The pipeline route crosses the grassland strip to the front of the hill that has a partly felled coniferous plantation, as shown.*





**Plate 9.4: Viewpoint 4**

*View west across the Upland Fringe landscape character type from Brae Croft, 0.6km south of RDX03. The pipeline route crosses the field boundary in a right-to-left direction across the foreground field beneath the hill with partly felled coniferous plantation.*



**Plate 9.5: Viewpoint 5**

*View north north east across the Upland Fringe landscape character type from adjacent to RDX04. The pipeline route runs down the sloped grass field to the east of the hilltop woodland (left of plate) between the two rounded hill tops that form the skyline. The pipeline route passes in a left-to-right direction crossing the road and across the adjacent field.*



**Plate 9.6: Viewpoint 6**

*View south west across the Drumlin Pastures landscape character type from the property line of Beltonhill, 150m south west of RDX05. The pipeline route passes adjacent to the buildings to the right of the plate, before turning to run in a right to left direction, crossing the ridge visible to the left of the plate.*



**Plate 9.7: Viewpoint 7a**

View north across the Drumlin Pastures landscape character type from the A75 adjacent to RDX06. The pipeline is visible in the distance crossing the ridgeline, as shown. In the foreground, the pipeline crosses the pasture fields adjacent to the road in a right-to-left direction.



**Plate 9.8: Viewpoint 7b**

View south across the Drumlin Pastures type, Milton Unit landscape character area from the A75 adjacent to RDX06. The pipeline is routed across the road to right of the plate, crossing the low ridge in the centre of the plate and the fields to the left of the plate

### 9.1.8 Landscape Sensitivity

#### 9.5.1.4 Landscape Sensitivity

##### Landscape elements

Section 9.4.3 provides a description of the landscape elements found along the pipeline route. Table 9-9 provides an assessment of the sensitivity of the various elements that form the landscape along the pipeline route to the type of development proposed. Overall, the landscape through which the pipeline route passes is primarily made up of agricultural land, with much smaller proportions of the other landscape elements. The sensitivity of the landscape elements as a whole to the type of development proposed is thus judged to be *low*.

**Table 9-9 Sensitivity of Landscape Elements**

Landscape Element	Sensitivity to Pipeline Construction
Agricultural land/grassland	Agricultural land falls into two main categories: arable fields and improved/semi-improved grassland. Arable land is typically cropped and ploughed on an annual basis, leading to constant disturbance. Thus, provided that topsoil is handled carefully, reinstatement is relatively unproblematic. Sensitivity is assessed as <i>negligible</i> . Grassland is relatively easy to reinstate, provided that land drainage is replaced,

Landscape Element	Sensitivity to Pipeline Construction
	topsoil carefully handled and fields are re-seeded. Sensitivity is thus assessed as <i>negligible to low</i> .
Post and wire fences/stone dikes	These elements can be quickly removed and replaced. The sensitivity is therefore assessed as being <i>negligible</i> .
Hedgerows	These elements, once removed, require several years to fully reinstate. The sensitivity of the tall, dense, species-rich, mature hedgerows affected by the pipeline route may be assessed as being <i>moderate</i> . The sensitivity of species of poor, low, gappy and less dense hedgerows may be assessed as being <i>low</i> .
Trees and woodlands	Replacement tree and woodland plantings, once these elements are removed, require many years to become fully established. The sensitivity of these elements is assessed as being <i>high</i> .
Watercourses	The sensitivity of these features is dependent upon the degree of bank-side and marginal vegetation, and the techniques used to cross the watercourse. Generally, the sensitivity of these features is assessed as being <i>high</i> .
Hard surfaces	These include elements/areas such as roads, railway lines, car parks, waste ground and construction sites. Such elements/areas are easily removed and replaced. The sensitivity is therefore assessed as <i>negligible</i> .

### 9.1.9 Landscape Condition and Quality

The condition and quality of the landscape varies to some degree along the proposed pipeline route. Generally, the landscape is assessed as being in good condition and of high quality, especially with regard to the RSA. Landscape condition and quality is assessed as being *high*.

### 9.1.10 Aesthetic Character

The type of development proposed for the pipeline route involves the temporary removal of landscape elements such as agricultural land, hedgerows and woodland, which are then typically reinstated. In the short term (0–10 years), the landscape is of *low sensitivity* in terms of aesthetic character, while reinstated vegetation becomes established. In the longer term, the landscape is of *very low* sensitivity in terms of aesthetic character.

### 9.1.11 Landscape Value

A 2.6km section of the pipeline corridor is designated as the Terregles Ridge RSA, which, as a local designation means the landscape is assessed as being of *high value*. Other sections of the pipeline route, while not recognised via designation, retain a positive character in terms of pattern and land cover and consequently retain a sense of place. Therefore, the landscape outside the RSA is assessed as being of *medium value*. The Grove non-inventory garden GDL is approximately located 0.3km away from the pipeline and would be assessed as being of *very high value*. The proposed pipeline does not cross the non-inventory GDL with dense east and south boundary dense mixed woodland and mature hedgerow trees that screen and or filter views towards the pipeline. Overall, the landscape is recognised as being of *medium – high value*.

### 9.1.12 *Susceptibility to Change*

The landscape condition and quality is *high*, while the sensitivity of the landscape in terms of its individual elements and its aesthetic character is assessed as being *low* and *low to very low* respectively. Given the type of development proposed, effects on landscape elements are likely to be of more relevance than effects on aesthetic character or landscape condition and quality. Given the nature of the landscape elements potentially affected by pipeline construction then the susceptibility to change is assessed overall as being *low*.

#### 9.5.1.5 *Overall Landscape Sensitivity*

Landscape Value for the pipeline corridor as a whole is assessed as being *medium – high value*. Susceptibility to change is assessed as being *low*. Combining these values, the overall landscape sensitivity is assessed as being *medium*.

## 9.6 **Assessment of Potential Effects and Mitigation**

### 9.1.13 *Potential Effects*

The potential landscape and visual effects of constructing and operating a pipeline may be broadly defined as follows:

- landscape effects:
  - direct effects upon the landscape fabric i.e. specific landscape elements within, and adjacent to, the pipeline route, e.g. grasslands, field boundaries (hedgerows, hedgebanks, dry stone walls, and fences), trees, woodlands, and watercourses;
  - effects on the overall pattern of the landscape elements, which give rise to the landscape character of the site and its surroundings; and
  - effects upon any special interests in and around the site such as landscapes that are internationally, nationally, or locally designated for special protection.
- visual effects:
  - direct effects of the development upon views in the landscape; and
  - overall effect on visual amenity.

After construction, the degree and duration of any landscape or visual effect will be determined by the nature of the landscape crossed. For example, arable land, permanent or temporary grasslands, hedgerows and woodlands respectively take an increasing length of time to re-establish following reinstatement. However, these effects are likely to be only temporary in duration. This is due to the mitigation measures that will be incorporated during the pipeline planning and construction phases and which will become well-established in the landscape. During operation of the pipeline, the only potential effect on landscape and visual amenity is that caused by the restrictions on new or replacement planting in close proximity to the pipeline.

The main effects that will result from construction are as follows:

- loss of: agricultural grasslands; improved, semi-improved and unimproved grasslands and arable crops, and during construction, due to turf and topsoil stripping within the working width.



- loss of field boundaries relating to the removal of trees and vegetation, and dismantlement and removal of walls and fences within the working width.
- loss of vegetation including trees, woodlands, plantations and watercourse bankside vegetation within the working width.
- construction activities affecting roads, railways and other hard surfaces.
- loss or disruption or changes to those landscape elements which combine to create unique character, and which form the key characteristics of distinct identified landscape character areas and types, and which contribute to the value of designated landscapes.
- visual effect of the working width caused by the loss of the elements and features listed above, prior to reinstatement and re-establishment. Three sections of the proposed pipeline are of greater visibility; the first approximately 900m positive of RDX01, the second 100m positive of RVX03 and the third in the vicinity of Beacon Hill approximately 800m negative of RDX04.
- temporary visual effects caused by the presence of construction machinery and plant, construction compounds, and laydown areas and construction traffic.

#### 9.1.14 Mitigation

One of the objectives of reinstatement of the pipeline route is to return the visual and physical integrity of the landscape, as closely as possible, to its previous condition. Over the past twenty years reinstatement techniques have evolved and improved so that high standards can now be achieved.

Visual effects and effects to designated landscapes and to landscape character are the consequences of the direct effects of construction activities on specific landscape elements. The measures to mitigate the visual effects and effects to designated landscapes and landscape character are those same measures used to mitigate the effects on these specific landscape elements. Therefore the mitigation measures for both landscape and visual effects are considered together.

In relation to trees and other vegetation that may be affected by the construction of a pipeline, it should be noted that, as a matter of best practice, consideration will be given to the guidance contained within the following standards and guidelines:

- *Trees in Relation to Design, Demolition and Construction- Recommendations*, BS 5837:2012;
- *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*, NJUG October 2007;
- *Protecting our water, Soil and Air: A Code of Good Agricultural Practice for Farmers, Growers and Land Managers the*, DEFRA June 2011, Updated 2013; and
- *Steel Pipelines for High Pressure Gas Transmission IGE/TD/1 Edition 5*.

Further details and site-specific measures to mitigate the effects on specific landscape elements affected by construction and operation of the pipeline route – namely watercourses, grasslands, hedgerows, trees and woodlands – are dealt with below and in more detail within Sections 6 and 7.



### 9.6.1.1 *Specific Landscape Elements*

#### **Agricultural Grasslands and Arable Land**

The greatest opportunity to minimise the visual effect of a pipeline is presented during the route-planning phase. Pipelines are routed across agricultural land as far as is practicable. Agricultural land, comprising arable land, grassland and silage is typically the easiest to reinstate, provided that land drainage is replaced, topsoil carefully handled and fields re-seeded (see Section 6). The visual effect within these fields will be significant only during the year of construction.

#### **Field Boundaries**

The most significant landscape features that may be affected by the construction of a pipeline are the field boundaries, which may include hedgebanks, mature hedgerows and associated hedgerow trees, dry stone walls, and fences. Such linear features are impossible to avoid and breaches can visually emphasise the route of the pipeline within the landscape. These features also form important habitats and wildlife corridors.

Wherever possible a pipeline route will be fine-tuned to avoid hedgerows and, in particular, hedgerow trees. Gaps or weak points within hedgerows will be selected as the crossing point wherever possible. Typically pipeline construction works will require the removal of short sections of hedgerow as described in Section 3.

Hedgerow reinstatement will be undertaken using indigenous species, which will be protected by timber and wire, rabbit-proofed fences on both sides. Any sections of hedgerow severed by the pipeline will be reinstated during the planting season following construction. All new planting will be subject to maintenance and a replacement-planting programme to ensure successful establishment.

Where the pipeline is routed through field boundaries such as dikes and fences, these will be carefully dismantled and stored, then carefully replaced after construction using the stored materials. Fences will be reconstructed with new materials in the appropriate style.

#### **Trees and Watercourses**

In addition to hedgerows, the pipeline route crosses other areas featuring mature vegetation, including watercourses, tree-lined lanes, tracks and roads. Such features form important visual focal points along the route and are sensitive to pipeline construction.

During the route-planning phase, pipeline routeing through tree lines is generally avoided as far as possible. Where this is unavoidable, a pipeline will be routed to avoid mature trees and follow natural gaps in the vegetation, for example by aligning the pipeline route with existing gaps. Where tree removal is unavoidable, replacement trees will be planted on a 2:1 basis with monitoring and replacement for failures for the first season, subject to agreement with consultees and landowners/occupiers, and compatibility with ecological objectives.

Where the route is in close proximity to trees in hedgerows, on the banks of watercourses and along tree-lined lanes, tracks and roads, every effort will be made to reduce the working width to avoid individual mature trees and their roots. All practicable measures will be taken to keep tree and vegetation removal to a minimum.

The guidance in *Trees in Relation to Design, Demolition and Construction-Recommendations*, BS 5837:2012, will be followed and measures such as the erection of protective fencing will be used in order to minimise effects to trees and their roots.

Where a pipeline is routed across sensitive features such as watercourses, a crossing point will be chosen that avoids, as far as possible, the need to remove any mature trees. Areas of dense or sensitive vegetation will also be avoided. The minor watercourses located along the proposed pipeline route will typically be crossed using dry, open-cut methods. The banks of watercourses will be carefully reinstated to their original condition and profile as far as possible. Bank-side and marginal vegetation and topsoil will be removed, stored separately, and replaced in the area from which they were removed.

### **Roads and other Hard Surfaces**

The pipeline crosses a number of minor roads in addition to the A75. Where the pipeline is routed across minor roads, open-cut techniques will typically be used. Affected elements will be reinstated after construction using suitable materials, typically of the same characteristics as those removed. In the case of the A75, non-open-cut techniques will be used to avoid disruption to traffic (See Section 3).

## **9.7 Summary of Residual Effects and Significance**

### **9.1.15 Landscape Elements**

Landscape elements considered as part of this assessment relate to agricultural grasslands and arable land, field boundaries, trees, woodlands, watercourses, roads and other hard surfaces. Table 9-9 provides the sensitivities of those different landscape elements. Taking into account the mitigation measures discussed in Section 9.1.14, the magnitude of effect on the different landscape elements and the residual significance of effect are indicated in Table 9-10.

### **9.1.16 Landscape Character, Designated Landscapes and Visual Amenity**

The effects on landscape character and designated landscapes are assessed as being temporary, indirect and reversible. Indirect influences on landscape character are caused by those directly affecting certain, specific landscape elements, which combine to form distinct landscape character, and contribute to the scenic quality of the designated areas.

With implementation of the mitigation measures described in Section 9.1.14 above, the magnitude of effect caused by the operation of the pipeline on landscape character and designated landscapes is assessed as being *small*, reducing to *negligible* over time during the Operational Phase which is and not significant.

### **9.1.17 Visual Effects**

Visual effects are assessed as being temporary, direct and reversible. Visual effects would be a consequence of the construction of the pipeline directly affecting certain specific landscape elements.

For the majority of its length, the proposed pipeline will affect the landscape only in the short-term i.e. during construction and for a short period afterwards. The proposed route crosses mostly agricultural land. The working width of the pipeline will be visible through the landscape during construction, when sections of field boundaries,

other vegetation and topsoil are removed, resulting in the temporary disruption of these features.

Once constructed, the visibility of the proposed pipeline will be much reduced over time. Along the proposed pipeline route corridor there are few sensitive visual receptors with available views of the proposed route. Those visual receptors that may be affected by The Project consist of a number of scattered farmsteads and residential properties, along with properties within the settlement of Terregles. The sensitivity of these visual receptors affected by the pipeline route may be assessed as being *high*. Collochán Loch may also be affected during pipeline construction, with its sensitivity being assessed as *high*. Users of the local roads may also be affected particularly where the proposed route crosses or passes close to these features, and the sensitivity of such visual receptors may be assessed as being *medium*.

Sensitive restoration of landscape features will ensure that there are no permanent long-term visual effects during operation of the pipeline. Mitigation measures include the reinstatement of affected field boundaries and additional planting at field boundaries where gaps exist (subject to the Pre-Entry Agreement). This will ensure there are no long-term visual effects once such planting becomes established. The pipeline will be buried underground and will not be a visible feature within the landscape once construction is completed.

With the implementation of the mitigation measures described in Section 9.1.14 above, the magnitude of residual effects caused by the operation of the pipeline on visual amenity is assessed as being *medium to small*, reducing to *negligible* over time during the Operational Phase which is and not significant.

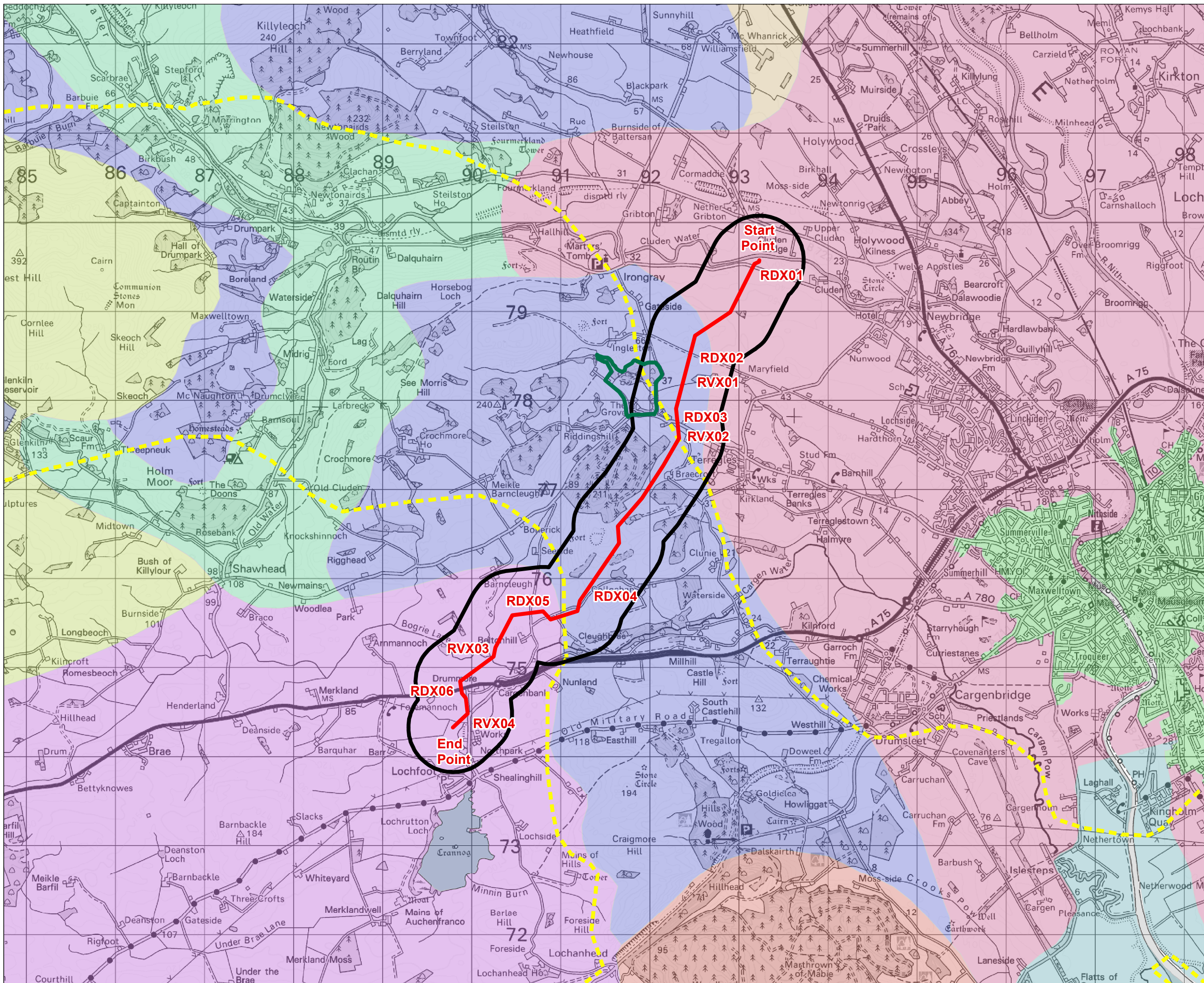
**Table 9-10 Summary of Impacts and Mitigation Measures**

Aspect	Impact	Proposed Mitigation Measures	Residual Effects
<b>During Construction</b>			
Agricultural grasslands	Turf stripped; topsoil stripped; visual	Sensitive routeing Careful soil handling and reinstatement of soils	Agricultural grasslands – <i>negligible (not significant)</i>
Arable fields	Topsoil stripped; visual	The use of non-open-cut techniques, and horizontal directional drilling, to avoid sensitive features where practicable such as field boundaries, trees, woodland and watercourses.	Agricultural grasslands – <i>negligible (not significant)</i>
Field boundaries	Trees and vegetation removed; walls and fences dismantled and removed; visual		Dense, tall, mature hedgerows – <i>moderate to minor (slightly significant)</i> . Gappy, low, less dense hedgerows – <i>moderate/minor to negligible (slightly significant to not significant)</i> . Fences and dykes – <i>negligible (not significant)</i>
Trees, woodlands and water-courses	Trees and vegetation removed; visual		Trees and Woodlands – <i>major/moderate to moderate/minor (potentially significant)</i> . Watercourses – <i>moderate to minor (slightly significant)</i> .

Aspect	Impact	Proposed Mitigation Measures	Residual Effects
Landscape character (including designated landscapes)	Trees and vegetation removed; walls and fences dismantled and removed; visual		<i>Minor to negligible (not significant)</i>
Visual	Soil stripped; trees and vegetation removed; fences dismantled and removed		During construction – <i>moderate to moderate/minor (slightly significant)</i> .
Cumulative	Soil stripped; trees and vegetation removed; fences dismantled and removed		<i>Minor to negligible (not significant)</i> . <i>Minor to negligible (not significant)</i> . During construction – <i>moderate to moderate/minor (slightly significant)</i> .
<b>During Operation</b>			
Field boundaries	Trees and vegetation removed; walls and fences dismantled and removed; visual	Replacement planting with locally prominent species of local provenance where practicable Re-seeding/re-turfing Replacement/or reinstatement of fences in vernacular style	Dense, tall, mature hedgerows - <i>Minor (not significant)</i> over time as replacement planting establishes and matures.  Gappy, low, less dense hedgerows – <i>Minor (not significant)</i> over time as replacement planting becomes established, and matures.  Provision of replacement planting and compensatory planting would result in a positive and beneficial effect, serving to reinforce and/or enhance the existing landscape elements and character.
Trees, woodlands and water-courses	Trees and vegetation removed; visual		Trees and Woodlands – <i>Minor (not significant)</i> over time as replacement planting becomes established, and matures.  Watercourses – <i>not significant</i> over time as replacement planting establishes and matures.

Aspect	Impact	Proposed Mitigation Measures	Residual Effects
Landscape character (including designated landscapes)	Trees and vegetation removed; walls and fences dismantled and removed; visual		<p><i>Not significant</i> over time as replacement planting becomes established, and matures.</p> <p>Provision of replacement planting and compensatory planting would result in a positive and beneficial effect over time, serving to reinforce and/or enhance the existing landscape elements and character.</p>
Visual	Soil stripped; trees and vegetation removed; fences dismantled and removed		<p><i>Minor (Not significant)</i> post-construction over time as re-seeded/re-turfed grasslands and replacement planting becomes established, and matures.</p>
Cumulative	Soil stripped; trees and vegetation removed; fences dismantled and removed		<p><i>Not significant</i> over time as replacement planting becomes established, and matures.</p> <p><i>Not significant</i> over time as replacement planting becomes established, and matures.</p> <p>Provision of replacement planting and compensatory planting would result in a positive and beneficial effect over time, serving to reinforce and/or enhance the existing landscape elements and character.</p> <p><i>Not significant</i> post-construction over time as re-seeded/re-turfed grasslands and replacement planting becomes established, and matures.</p>





**Legend:**

- Proposed Pipeline Route
  - 1km Area of Search
  - Regional Scenic Area
  - Non-Inventory Garden and Designed Landscape
- Landscape Character Areas**
- Coastal Flats
  - Coastal Granite Uplands
  - Drumlin Pastures
  - Foothills
  - Inland Loch
  - Intimate Pastoral Valleys
  - Lower Dale (Valley)
  - Middle Dale (Valley)
  - Upland Fringe
  - Urban

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

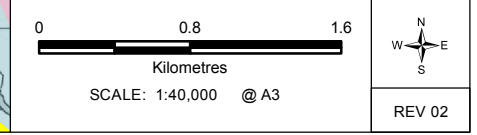


Rev	Date	Description	Drn	Chk	App
02	06/05/2015	Updated Route	FC	CN	CF
01	14/04/2015	Updated Logo	FC	CN	CF
00	03/03/2015	First Draft	FC	CN	CF

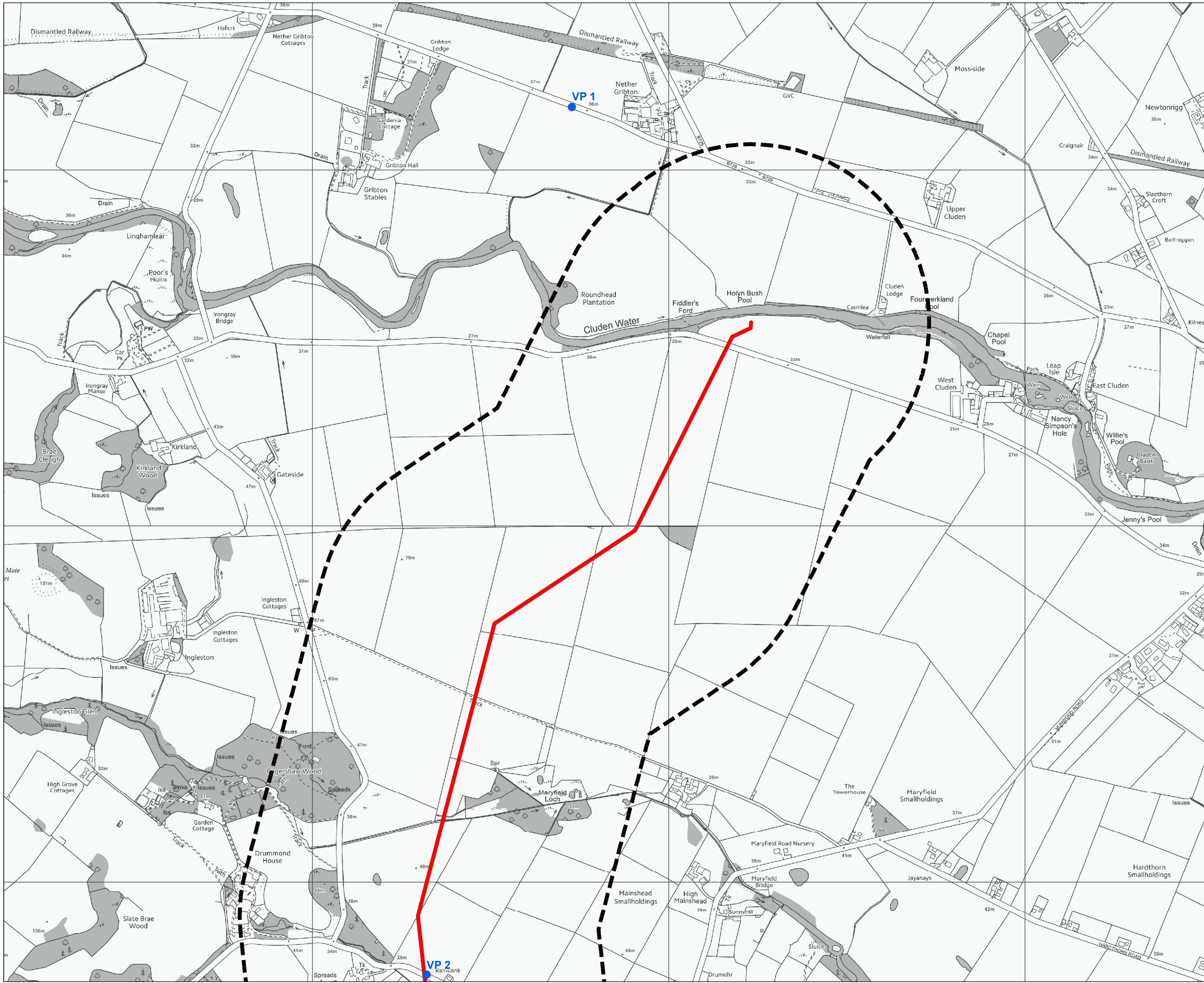
**Cluden to Lochfoot Pipeline**



TITLE:  
**Figure 9.1 - Landscape Character and Landscape Designations**

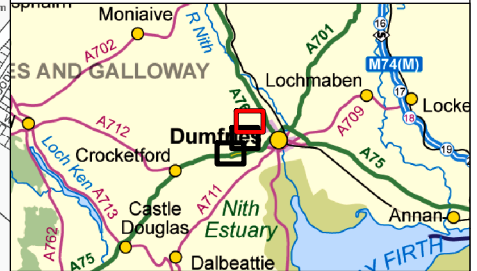






- Legend:**
- Proposed Pipeline Route
  - 1km Area of
  - Viewpoint Location

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

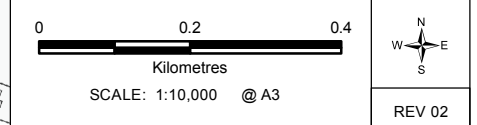


Rev	Date	Description	Drn	Chk	App
02	06/05/2015	Updated Route	FC	CN	WH
01	14/04/2015	Updated Logo	FC	CN	WH
00	04/03/2015	First Draft	FC	CN	WH

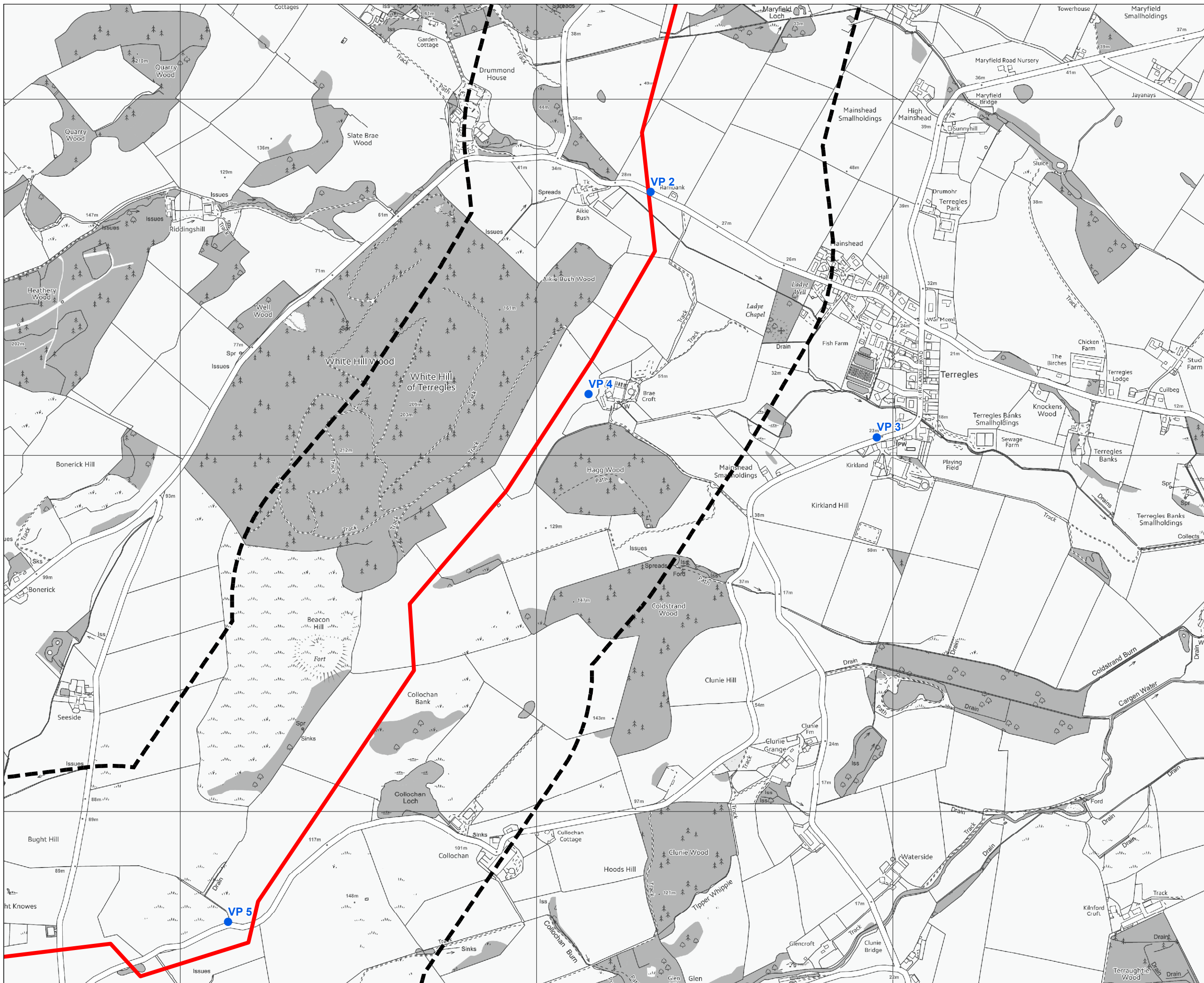
**Cluden to Lochfoot Pipeline**



TITLE: **Figure 9.2 - Viewpoint Locations**  
 Map 1 of 3



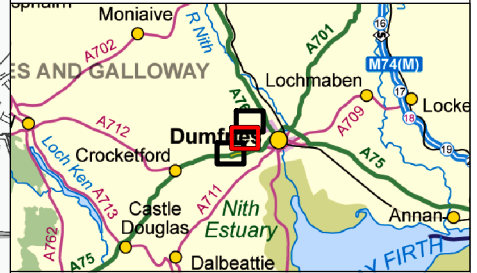




**Legend:**

- Proposed Pipeline Route
- 1km Area of
- Viewpoint Location

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

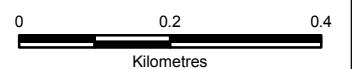


Rev	Date	Description	Drn	Chk	App
02	06/05/2015	Updated Route	FC	CN	WH
01	14/04/2015	Updated Logo	FC	CN	WH
00	04/03/2015	First Draft	FC	CN	WH

**Cluden to Lochfoot Pipeline**



TITLE: **Figure 9.2 - Viewpoint Locations**  
 Map 2 of 3

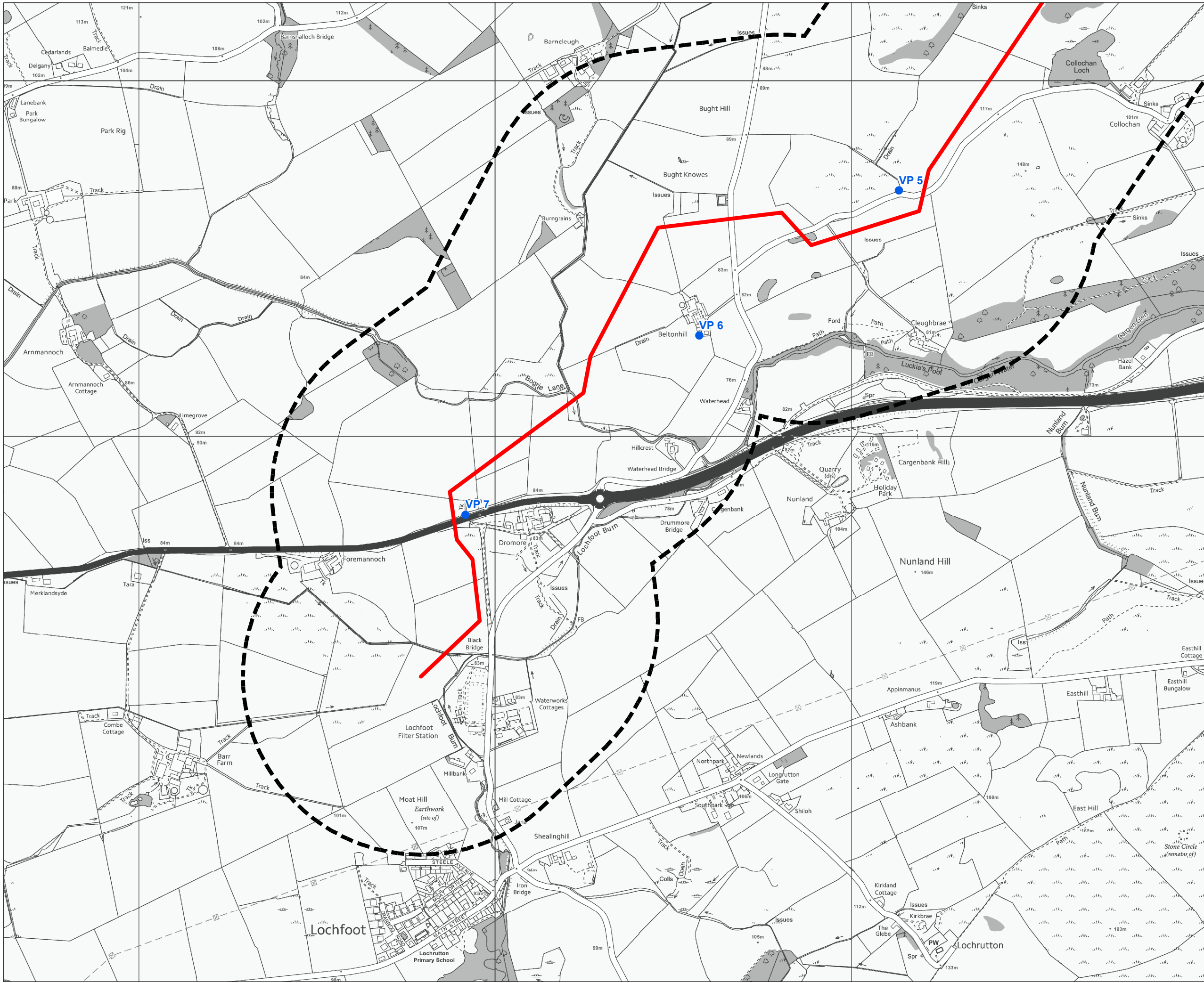


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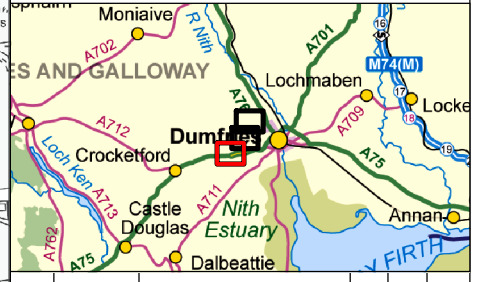
REV 02





- Legend:**
- Proposed Pipeline Route
  - 1km Area of
  - Viewpoint Location

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

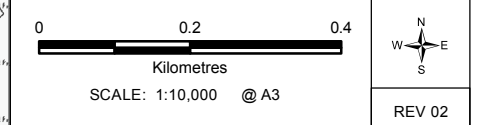


Rev	Date	Description	Drn	Chk	App
02	06/05/2015	Updated Route	FC	CN	WH
01	14/04/2015	Updated Logo	FC	CN	WH
00	04/03/2015	First Draft	FC	CN	WH

**Cluden to Lochfoot Pipeline**



TITLE: Figure 9.2 - Viewpoint Locations  
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## 10 TRAFFIC AND TRANSPORTATION

### 10.1 Introduction

This Section of the ES deals with traffic generated by the construction of the pipeline. Traffic generated will be associated almost exclusively with pipeline construction as there will be little traffic generated during pipeline operation. The impacts of pipeline construction on traffic and the transport network are detailed, along with the measures that will need to be taken to mitigate these impacts. Legislation and policy context is also provided.

#### 10.1.1 Key Legislation

Key legislation covering traffic is listed in Table 10-1.

**Table 10-1 Key Traffic Legislation**

Topic	Act/Regulation	Key Relevant Provisions
Road works	<i>Transport (Scotland) Act 2005</i>	The Act provides directions as to the timing of road works to avoid unnecessary disruptions.  It provides directions as to the positioning of apparatus in roads to prevent disruption to traffic.
Works in public highways	<i>New Roads and Street Works Act 1991 (NRSWA)</i>	Approval from the street authority is required under the <i>New Roads and Street Works Act 1991</i> , to lay services, including gas pipelines, in the public highway. Highway work must be carried out in accordance with the notified programme.  Different periods of notice may be prescribed for different descriptions of works.
Driving restrictions	<i>Road Traffic Act 1991</i>	Dangerous, careless and inconsiderate driving practices are offences under this Act.  Failure to comply with road restrictions imposed by a highway authority is an offence.
Traffic signs	<i>Traffic Signs (Temporary Obstruction) Regulations, 1997</i>	These regulations give provision for authorisation to place traffic signs and to define the design of traffic signs.
Road closures; road improvements, and recovery of costs	<i>Highways Act 1980</i>	The Act gives provision for enforcement of maintenance of highways.  The Highways Authority is given powers under this Act to recover expenses for repair of highways caused by the transport of excessive weights along the highway, or caused by extraordinary traffic.  If a person, without lawful authority or excuse damages a highway, he or she is guilty of an offence.  Precautions must be taken doing works in or near highway in order to maintain public safety.  Approval is required from the Highways Authority under Section 278 for the installation of 'passing spaces' or other works to improve access. Work

Topic	Act/Regulation	Key Relevant Provisions
		<p>must be undertaken to published standards using a contractor approved by the Highways Authority.</p> <p>Approval is required for closures of roads and other Public Rights of Way.</p>

The location and design of temporary traffic signs and traffic controls, including traffic lights, must be approved by the highways authorities.

Where necessary, notifications of road closures will be made in accordance with the *New Roads and Street Works Act 1991*.

### 10.1.2 Policy Guidance and Local Planning Policies

The *Transport (Scotland) Act 2005* placed a duty on the Scottish ministers to create Regional Transport Partnerships (RTPs) covering the whole of Scotland. The pipeline corridor lies wholly within the South West of Scotland Regional Transport Partnership (SWestrans), one of seven RTPs. Each of these partnerships has the responsibility of creating a Regional Transport Strategy (RTS), which is the strategic planning document for improving transport within the respective RTP area. SWestrans RTS has been approved, while other transport policy and guidance is provided in the Dumfries & Galloway Local Development Plan.

The Scottish Executive's Scottish Planning Policy 17, Planning for Transport, provides the policy context for transport policy creation. The Scottish Executive has also produced further guidance in Planning Advice Note (PAN) 75 – Planning for Transport and Transport Assessment and Implementation: A Guide. These documents have been consulted in the formulation of this Section.

## 10.2 Consultation

Table 10-2 summarises the consultation responses that have been received to date in relation to the traffic assessment methodology presented in this section.

**Table 10-2 Traffic Consultation Responses**

Consultee	Previous Consultation	Comment	Response to Consultation
Dumfries and Galloway Council	<p>Meetings held on: 15.03.2007 03.07.2007 20.11.2007 24.11.2014 27.02.2015</p> <p>Scoping Letter issued re Traffic and Transport, 17.02.2015</p>	Minimise impacts on local country roads	To ensure appropriate traffic management measures are in place
Transport Scotland	Scoping Letter issued 17.02.2015		

## 10.3 Assessment Methodology and Uncertainty

### 10.3.1 Establishment of Baseline Environment

The following web pages have been searched for information on potential road schemes, railway lines and cycle routes:

- <http://www.scotland.gov.uk> (Scottish Executive);
- <http://www.transportscotland.gov.uk> (Transport Scotland); and
- <http://www.sustrans.org.uk/> (Sustrans).

Real-time, traffic-flow data has also been obtained from Transport Scotland for the key network links likely to be affected by The Project.

### 10.3.2 Identification and Assessment of Impacts and Mitigation Measures

#### 10.3.2.1 Predicted Impacts

With respect to potential disruption to existing traffic flows, published guidance suggests that projected changes in traffic of less than 10% create no discernible environmental impact (Institute of Environmental Assessment, 1993). Whilst these criteria largely apply to permanent development sites (i.e. the operational phase of a development) they provide a suitable reference against which to predict the potential temporary impact from construction traffic.

With respect to all other potential traffic and transportation impacts, these have been identified and assessed having regard to consultee responses, the requirements of the highways authorities, the magnitude of the impact, and the sensitivity of the receptor.

An assessment has also been made of the significance of residual impacts, i.e. those impacts that are predicted to remain after the mitigation measures outlined in this Section have been implemented. When making an assessment of significance, the magnitude of change and the importance/sensitivity of the receptor have been taken into account.

Table 10-3 details the categories that have been used when classifying overall significance.

**Table 10-3 Significance of Impact**

Impact	Description	
Very significant	Permanent change to traffic flows or the road network, which could have an extensive effect, and including areas remote from the development area	Significant impacts where monitoring may be required
Significant	Permanent or medium to long-term change to traffic flows or the road network with changes to areas remote from the site (over several years)	
Moderate	Short to medium-term changes to traffic flows or the road network just outside the accepted limits of normal variation with little or contained off-site effects detectable (over a period of several months)	
Slight	Change only just detectable within the site and surrounding areas over a short timescale (over a period of days or weeks)	

Impact	Description
None	An impact causing effects that are not readily noticeable

### 10.3.3 *Uncertainty and Technical Difficulties Encountered*

No particular difficulties were encountered.

## 10.4 **Baseline Overview**

The pipeline route is shown on Figure 1.2 of Section 1. Road crossings are marked as ‘RDX’, rivers as ‘RVX’, and watercourses as ‘WX’.

### 10.4.1 *Transport Network*

#### *Road*

The A75(T) and A76(T) form the trunk-road network serving the pipeline route area and are the responsibility of the Scottish Executive. These roads are supplemented by a network of A and B class roads, including the A710, A780 the B729. In addition to these there is a comprehensive network of minor roads, farm access roads and tracks along the pipeline route.

Since the area is principally rural, the majority of roads servicing The Project are minor. In some areas, the road network may be constrained by alignment and width.

#### *Rail*

Both local network and main line rail services operate in the area. The West Coast Main Line (WCML) service runs between Glasgow and London, with the local network linking Dumfries and Ayr with main line stations. None of these lines lie within the pipeline corridor.

### 10.4.2 *Existing Traffic Flows*

Transport Scotland provided monthly mean count baseline traffic flows for the A75(T) and A76(T) for the period January 2011 to September 2014. For the purposes of this assessment, seven-day average flows were used in order to accommodate the potential for weekend working during construction. In addition, the seven-day average for June 2013 was selected as a neutral month and recorded higher volumes than in June 2014. Table 10-4 details the baseline flows for June 2013.

**Table 10-4 A75/A76 Seven-day Average Traffic-flow Data, June 2013**

Location (Route Number)	ADF (All vehicles)	ADF (HGVs)
A75(T) W of U225N Garroch Loaning (ATCSW022)	10,589	2,404*
A76(T) Dumfries Glasgow Road (JTC00378)	12,672	1,940

Traffic Data provided by Transport Scotland, March 2015

Notes for Table 10-3:

ADF – Average daily flow

HGV – Heavy goods’ vehicle

A75(T) W of U225N Garroch Loaning traffic flow site, grid reference 292770 575145

\*A75 HGV volumes calculated by reference to data recorded at Crocketford, grid reference 295763 578074

A76(T) Dumfries – Glasgow Road traffic flow site, grid reference 283100 572690

## 10.5 Assessment of Impacts

### 10.5.1 Construction Traffic Movements

#### 10.5.1.1 Traffic Flow Impacts

##### **Material, vehicle and plant requirements**

During construction, a pipeline construction yard will be required. The construction yard will contain site offices for management and supervisory staff relating to the pipeline construction, and storage areas for both equipment and line-pipe. The location of the yard will be determined as an integral part of The Project, as part of the detailed design, and so the yard's true location is not known at this time. However, for the purposes of this assessment, it is assumed that a pipeline construction yard will be close or adjacent to either the A75 or A76.

Steel line-pipe will be delivered from the steel mills/pipe coaters to the pipe laydown area. Dependent on the source of the line-pipe, transport would be either:

- by road from another part of the UK;
- by boat to an appropriate port, then by road; or,
- by rail.

Site access will be by public roads utilising wherever possible A and B classified roads. The A75 and A76 trunk roads will form the backbone of the traffic routes. Both routes will provide good access onto the local road network within the vicinity of the pipeline route.

Potential material and plant requirements during construction and commissioning comprise:

- delivery of steel pipe sections to the pipe stores and the working width;
- transported materials, including:
  - pipe bedding material, usually sand, to protect the pipe in the trench;
  - concrete for pipeline protection slabs;
  - stone where required to lay a base for the Site Establishment Areas, pipe laydown areas and access points to the working width;
  - gravel and plastic piping for pre- and post-construction drainage;
  - other construction materials such as bog-mats and bridge sections; and
  - waste materials that are required to be transported away for disposal/recovery/re-use, including any excess spoil and generated waste.
- transport of workers to the Site Establishment Areas is usually by private car because pipelines are routed through rural areas. The majority of workers will be transferred from the Site Establishment Areas to their various working locations along the pipeline working width via minibus and 4x4 vehicles.

It has been anticipated that approximately 184 vehicles and/or pieces of plant will be used during the construction of the Cluden to Brighouse Interconnector, from



bulldozers to 4x4 vehicles (see Section 3.3.7.2). It is anticipated that not all the HGVs will be required at any one time nor will they require access to the working width from only one entrance. However, for the purposes of this assessment the realistic worst-case scenario of using the full complement of vehicles and pieces of plant has been assumed.

Transportation requirements will be higher during the early part of the construction programme when 36-inch (914mm) diameter steel line-pipe will be delivered from a coating mill outside the immediate area to a temporary pipe laydown area. Overall, a large number of HGV movements will be required to deliver pipe, plant, equipment and materials during construction. However, these items are required at different times during construction and will be delivered to different locations along the 7.2km route (and wider consented pipeline) so spreading impacts over the wider area.

### 10.5.1.2 Predicted Impact

The materials, vehicle and plant requirements described above are anticipated to generate the traffic volumes (ADF) detailed in Table 10-5. Table 10-4 also gives the expected increase in both general and HGV traffic movements on the A75 and A76(T) during this period, due to delivery of pipe.

Predicted baseline traffic flows for 2016 for the A75(T) and A76(T) have been calculated with reference to the TEMPRO database, published by the DfT, which predicts a growth factor for the Dumfries area of approximately 0.7% between 2013 and 2016.

**Table 10-5 Predicted Traffic Increase, Pipe Delivery to Pipe Laydown Areas, (2016 assumed)**

Route Number/ Location	ADF (All vehicles)	ADF (HGVs)	Construction Traffic ADF (HGVs)	% Increase (All vehicles)	% Increase (HGVs)
A75(T) W of U225N Garroch Loaning (ATCSW022)	10,662	2,420	50 (45)	0.5	1.9
A76(T) Dumfries Glasgow Road (JTC00378)	12,759	1,953	50 (45)	0.4	2.3

Data provided by Transport Scotland and Dumfries and Galloway Council, March 2015.

Table 10-6 details the expected increases in both general and all HGV traffic movements on the A75(T) and A76(T) during the construction period.

**Table 10-6 Predicted Traffic Increase During Construction During 2016**

Route Number/ Location	ADF (All vehicles)	ADF (HGVs)	Construction Traffic ADF (HGVs)	% Increase (All vehicles)	% Increase (HGVs)
A75(T) Crocketford (JTC00375)	10,662	2,420	150 (70)	1.4	2.9
A76(T) Dumfries Glasgow Road	12,759	1,953	150 (70)	1.2	3.6

Route Number/ Location	ADF (All vehicles)	ADF (HGVs)	Construction Traffic ADF (HGVs)	% Increase (All vehicles)	% Increase (HGVs)
(JTC00378)					

Data provided by Transport Scotland and Dumfries and Galloway Council, March 2015

As can be seen from the results above the greatest impact in terms of traffic flows relates to changes in flows resulting from all construction related HGVs on both road links. Delivery of pipe to the pipe laydown area is considered likely to have less impact. Overall, however, these figures lie well below the 10% assessment criteria. In this regard, whilst it is anticipated that *slight to moderate* impacts may result from disruption to the road network and traffic flows, such impacts are considered unlikely to be significant (see Table 10-3).

It should be noted that aside from impacts on traffic flows any disruption or hazard created by turning/crossing plant or machinery on public roads may also cause temporary, *slight to moderate* impacts.

### 10.5.1.3 Other Traffic and Transportation Impacts

There is the potential for temporary disruption to users and/or temporary loss of amenity to pedestrians because of crossing of roads, farm tracks, access roads and public rights of way.

The crossing of main A75 road shall be undertaken using trenchless techniques, and so no significant impacts are anticipated with respect to traffic movements. Crossings of minor and farm access roads, tracks and footpaths are usually made by open-cut methods, and so *slight to moderate* impacts are predicted.

During the course of construction there is the potential for the road network to become damaged due to traffic movements and pipeline installation. Although it is anticipated that the risk of such damage is small, should it occur then *moderate to significant* impacts might result depending upon the extent of damage incurred.

### 10.5.2 Operation Traffic

Once the Main Works Contractor (MWC) has completed and the works are demobilised from site then traffic levels will revert to original levels. Few potential impacts from traffic are expected during operation, except for pipeline surveillance. Potential impacts during operation are from:

- pipeline checks from the air (usually by helicopter) approximately every two weeks. Checking from the air is subject to air-traffic control restrictions and weather constraints. The former could preclude helicopter operations in some areas, in which case air checks should be substituted by surface inspections;
- ground checking, involving light vehicles and pedestrians (no special provisions are anticipated); and
- ad hoc operations and maintenance activities.

However, no significant impacts are anticipated to arise from the operation of the pipeline after it is installed.

## 10.6 Mitigation Measures

### 10.6.1 Construction

#### 10.6.1.1 Traffic Flow

Public roads will be used for moving materials and construction machinery, but where possible, the working width itself will be used to transport materials from the approved site access locations to their final destinations to minimise traffic flows on public highways.

The MWC will also produce a Traffic Management Plan to control and minimise the impacts of construction traffic on roads and other road users. The Traffic Management Plan will be designed to:

- establish the type of construction traffic permitted to use access routes to the working areas, including particular restrictions (height, weight, etc.) and sensitive receptors;
- indicate areas of limited or no access to construction traffic;
- identify any restrictions on traffic that is crossing, entering or leaving the working width at each road crossing point;
- detail the traffic-control measures (e.g. stop-go boards, traffic lights and signage) required at road crossings, the Site Establishment Areas, and pipe dumps;
- ensure that areas of restricted or no access are adequately signed;
- inform all personnel involved in The Project, of the routes that they can and cannot use for construction access; and
- satisfy the highways authorities that all possible steps have been taken to reduce the impact of the use of construction traffic on the local communities.

The Traffic Management Plan will be discussed and agreed with the local highway authority and the emergency services.

It will be a condition of the pipeline construction contract that the MWC complies with the Traffic Management Plan. The project management team will monitor compliance closely.

#### 10.6.1.2 Plant

Mitigation measures for minimising the impacts on roads and road users of transporting pipe, plant and equipment are:

- minimising the distance being travelled by road by using local sources of plant and equipment, and delivering items direct to the working width, not to the Site Establishment Areas;
- utilising the working width to move plant and equipment along the pipeline route as far as possible;
- agreeing routes with the highways authority to minimise traffic congestion and avoid less suitable roads and/or roads with restrictions; and

- using approved routes, for the transport of material and plant to the working width, to minimise road impacts, and abiding by any restrictions agreed in the Traffic Management Plan to further reduce impacts.

The precise location of the pipe laydown areas and access arrangements will be discussed and agreed with the local highway authority, the local planning authority and SEPA so as to avoid floodplains and groundwater protection zones, where possible. Once sites have been agreed, any necessary planning consents will be obtained.

The location and construction of temporary access roads will take account of the need to minimise the risk of sediment release to watercourses and other environmental impacts, including those on local archaeology and ecology.

### 10.6.1.3 *Materials*

Mitigation measures for minimising the impacts on roads and road users from transporting materials are the following:

- sourcing materials locally, where available;
- minimising the amount of sand required by screening the excavated trench material and using it to pad the pipe, where possible;
- minimising the requirements for stone by using existing areas of hardstanding for Site Establishment Areas and pipe laydown areas, where available;
- minimising the requirement for the disposal of excess spoil from trench excavation by regrading it within the working width, subject to there being no conflict with: the achievement of restoration objectives; the compatibility of materials, and the approval of the local planning authority, SEPA and SNH; and
- minimising the generation of other wastes by re-using material on site, where suitable, with the approval of SEPA and the local planning authority with regard to waste-management licensing and planning legislation, as required.

### 10.6.1.4 *Other Traffic and Transportation Mitigation Measures*

#### **Road and Watercourse Crossings**

Subject to ground conditions allowing, it is intended to cross beneath A-classified roads by utilising trenchless crossing techniques. The use of such trenchless crossing methods will ensure that general traffic movement along these major routes will not be hindered.

In cases where an open-cut crossing of track, road or watercourse is required to lay the pipeline, such an open-cut crossing will usually take one day to complete. The pipe will be laid at sufficient depths of cover beneath stream/riverbeds and roads to meet the current GNI standards and the requirements of the relevant authorities. This will ensure safe operation of the pipeline and continued safe use and maintenance by the relevant authorities for the crossing. Method Statements for all watercourse crossings, including proposals for any sheet piling and dewatering, will be discussed and agreed in advance with SEPA.

Any street works that are considered necessary will be carried out in accordance with the statutory requirements of the *New Road and Street Works Act 1991*, and the conditions called for by the Highways Department of Dumfries & Galloway Council.

The creation of potential traffic hazards, due to plant and vehicles crossing or turning onto and off the working width, will be minimised by erecting adequate warning signs, installing traffic controls where advised by the highways authorities and imposing traffic or turning restrictions, where necessary.

Temporary off-road parking will be provided for construction vehicles at road crossings, and vehicles will not be allowed to park on verges.

### **Road Damage**

When it is necessary for tracked plant to cross roads, the road surface will be protected using tyres or similar surface protection. Prior to construction, a survey of the proposed road crossings and the local road network will be undertaken by the MWC to identify those roads that are not suitable for use by heavy construction traffic, thus minimising the chance of road damage further. (This survey will be fed into the Traffic Management Plan.) The MWC will also consult with the local highways authorities and the emergency services to identify low bridges, weight restrictions, sensitive routes, etc. The survey will include a record of road conditions and any defects found. A follow-up survey will be conducted on completion of construction and agreement reached with the highways authority on the extent of any damage caused by construction traffic. Any damage attributable to pipeline works will be repaired.

### **Personnel Movements**

The following mitigation measures for transporting personnel will be taken:

- maximising the use of minibuses to move construction workers along the working width; and
- encouraging workers to car-share.

#### **10.6.2 Operation**

No mitigation measures are required for traffic and transportation during operation of the pipeline.

## **10.7 Summary of Residual Impacts and Significance**

With respect to impacts upon existing traffic flows, whilst considered not significant, some temporary disruption is likely to occur during the delivery and movement of pipe sections to the pipe laydown areas and consequently to the working width. This is also true of other construction-related traffic. However, the development and implementation of the Traffic Management Plan during construction will ensure that any effects of this temporary disruption are minimised further; therefore only *slight* residual impacts are anticipated. Any potential disruption or hazard created by turning/crossing plant or machinery is considered likely to cause *slight* residual impacts.

The crossing of roads other than A roads (on which no significant impact is predicted due to construction methods) such as farm access roads, tracks and drives, is likely to be made using open-cut methods. Following the implementation of best practice construction methods and mitigation above, a *slight* residual impact on users of roads (other than A roads) is anticipated.

Damage to the highway network will be minimised through the employment of the requirements of the Traffic Management Plan. In addition, any damage incurred will



be monitored and repaired, where required, in agreement with the highways authority. With such measures in place, a *slight* residual impact is anticipated.

A summary of impacts, proposed mitigation measures, and residual impacts are detailed in Table 10-7.

**Table 10-7 Summary of Impacts and Mitigation Measures**

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
<b>During Construction</b>			
Construction Traffic	The greatest impact in terms of traffic flows relates to changes in flows resulting from all construction related HGVs on both road links. Overall, however, these figures lie well below the 10% assessment criteria. In this regard, whilst it is anticipated that slight to moderate impacts may result from disruption to the road network and traffic flows, such impacts are considered unlikely to be significant.	<p>Public roads will be used for moving materials and construction machinery, but where possible, the working width itself will be used to transport materials from the approved site access locations to their final destinations to minimise traffic flows on public highways.</p> <p>The MWC will also produce a Traffic Management Plan to control and minimise the impacts of construction traffic on roads and other road users.</p> <p>The Traffic Management Plan will be discussed and agreed with the local highway authority and the emergency services.</p>	Development and implementation of the Traffic Management Plan will ensure that any effects of this temporary disruption are minimised further; therefore only <i>slight</i> residual impacts are anticipated. Any potential disruption or hazard created by turning/crossing plant or machinery is considered likely to cause <i>slight</i> residual impacts.
Other Construction Impacts	<p>The crossing of main A75 road shall be undertaken using trenchless techniques, and so no significant impacts are anticipated with respect to traffic movements. Crossings of minor and farm access roads, tracks and footpaths are usually made by open-cut methods, and so slight to moderate impacts are predicted.</p> <p>During the course of construction there is the potential for the road network to become damaged due to traffic movements and pipeline installation. Although it is anticipated that the risk of such damage is small, should it occur then moderate to significant impacts might result depending upon the extent of damage</p>	<p>As above, and;</p> <p>Prior to construction, a survey of the proposed road crossings and the local road network will be undertaken by the MWC to identify those roads that are not suitable for use by heavy construction traffic, thus minimising the chance of road damage further. (This survey will be fed into the Traffic Management Plan.)</p>	<p>Following the implementation of best practice construction methods and mitigation above, a <i>slight</i> residual impact on users of roads is anticipated.</p> <p>Damage to the highway network will be minimised through the employment of the requirements of the Traffic Management Plan. In addition, any damage incurred will be monitored and repaired, where required, in agreement with the highways authority. With such measures in place, a <i>slight</i> residual impact is anticipated.</p>

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
	incurred.		
<b>During Operation</b>			
Operational Traffic	Potential impacts during operation are from: <ul style="list-style-type: none"> <li>• pipeline checks from the air (usually by helicopter) approximately every two weeks. ;</li> <li>• ground checking, involving light vehicles and pedestrians;</li> <li>• ad hoc operations and maintenance activities.</li> </ul>	No mitigation proposed	No Residual Impact

## 10.8 References

Dumfries & Galloway Council, 2014, Local Development Plan

Institute of Environmental Assessment, 1993 Guidelines for the Environmental Assessment of Road Traffic

New Roads and Street Works Act 1991

Scottish Executive, 2005, Scottish Planning Policy 17 – Planning for Transport

Scottish Executive, 2005, Planning Advice Note 75 – Planning for Transport

Scottish Executive, 2005, Transport Assessment and Implementation: A Guide

South West of Scotland Transport Partnership, 2006, Regional Transport Strategy

Transport (Scotland) Act 2005

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## 11 EMISSIONS

### 11.1 Introduction

In this Section solid wastes, liquid effluent, discharges to watercourses, emissions to air, light and radiation and unplanned emissions and spillages that may arise from the construction, commissioning and operational phases of the pipeline are considered. In addition, the impacts of noise and vibration are discussed.

### 11.2 Consultation

Table 11-1 summarises the consultation responses that have been received to date in relation to the emissions assessment methodology presented in this section.

**Table 11-1 Emissions Consultation Responses**

Consultee	Previous Consultation	Comment	Response to Consultation
Scottish Environmental Protection Agency (SEPA)	Meetings held on: 15.03.2007 03.07.2007 20.11.2007 25.11.2014 09.03.2015	Concern re management of surplus material given the rocky nature of the ground.	To ensure appropriate waste management measures are in place to avoid, reduce or minimise waste Use of Regulation 19 Waste Exemption Licence to minimise transportation of uncontaminated material.
Scottish Natural Heritage (SNH)	Meetings held on: 15.03.2007 02.07.2007 03.07.2007 20.11.2007 21.11.2007 25.11.2014 25.02.2015	Concern re management of surplus material given the rocky nature of the ground.	To ensure appropriate waste management measures are in place to avoid, reduce or minimise waste. Use of Regulation 19 Waste Exemption Licence to minimise transportation of uncontaminated material.

### 11.3 Legislation and Policy Context

#### 11.3.1 Key Legislation

Legislation relevant to emissions is summarised in Table 11-2 below.

**Table 11-2 Key Legislation**

<b>Topic</b>	<b>Act/Regulation</b>	<b>Key Relevant Provisions</b>
Statutory nuisances	Part III of the <i>Environmental Protection Act 1990</i> , as amended by the <i>Noise and Statutory Nuisance Act 1993</i>	Part III of the legislation allows local authorities and the general public to take action to secure the abatement of statutory nuisances. This relates to pipeline construction, as statutory nuisances include: noise, dust and air emissions, for example.
Waste	Section 75 of the <i>Environmental Protection Act 1990 (EPA 1990)</i> and the <i>Waste (Scotland) Regulations 2011 (as amended in 2012)</i>	Waste definitions.
	<i>EPA 1990</i> , Section 34	Anyone keeping, treating or disposing of waste is subject to the Duty of Care.
	<i>Environmental Protection (Duty of Care) (Scotland) Regulations 2014</i> & <i>Environmental Protection (Duty of Care) Regulations (Scotland) (amendment) 2003</i> & <i>Environmental Protection (Duty of Care) Regulations (amendment) 1996</i>	Waste transfer notes must be supplied for each waste movement and kept for two years by the waste producer. The exemption for “special waste” in Scotland remains.
	<i>Waste Management Licensing (Scotland) Regulations 2011</i>	The deposit, keeping, treatment or disposal of waste is required to be licensed. The majority of pipeline activities are usually exempt from licensing under the regulations. However, the exemptions are prescriptive, and SEPA will be contacted to register the necessary exemptions.
Waste Electrical & Electronic Equipment	Waste Electrical & Electronic Equipment (WEEE) Regulations 2006 & WEEE Regulations 2013	Waste electrical and electronic equipment must be sent to Approved Authorised Treatment Facilities.
Special waste	<i>Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations, 1991 as amended</i>	All vehicles carrying waste must register with SEPA.
	<i>EPA 1990</i> as amended by the <i>Environment Act 1995</i>	Section 62 of the <i>EPA, 1990</i> , relates to the keeping or disposal of dangerous or difficult waste.

Topic	Act/Regulation	Key Relevant Provisions
Special waste	<p><i>EC Landfill Directive (91/31/EC), Landfill (Scotland) Regulations 2003 &amp; Waste Management Licensing (Scotland) Regulations 2011</i></p>	<p>These regulations banned some hazardous wastes from landfill; banned disposal of hazardous and non-hazardous waste together; require pre-treatment of most hazardous wastes before they can be land-filled, and allows hazardous wastes to be disposed of only at sites designed to take them. Landfill permits for such sites must be issued by 2007.</p>
	<p><i>Special Waste Regulations, 1996 as amended; European Hazardous Waste Directive 91/689/EC</i></p>	<p>The regulations apply to all movements of Special Waste (as defined by the regulations). Special Wastes generated during pipeline construction are listed in Table 14-2.</p> <p>New Hazardous Waste Regulations, expected to come into force in 2005, will increase the amount of waste classified as 'hazardous', to include, for example, fluorescent tubes and batteries. The regulations will implement the European Hazardous Waste List.</p>
	<p><i>Control of Substances Hazardous to Health Regulations, (COSHH) Regulations 2002, as amended</i></p>	<p>The regulations provide a legal framework for controlling exposure to 'very toxic, toxic, harmful, corrosive, or irritant' gases, vapour, liquids, fumes, dusts, solids, and substances that may have chronic or delayed effects.</p>
Water	<p><i>Water Environment and Water Services (Scotland) Act 2003</i></p>	<p>The Act transposes the provisions of the Water Framework Directive into national law and provides legal framework for the protection, improvement and sustainable use of surface waters and groundwater.</p> <p>The Act outlines duties to:</p> <ul style="list-style-type: none"> <li>• protect and improve the water environment;</li> <li>• promote efficient water use;</li> <li>• have regard to the social and economic impacts of exercising its functions;</li> <li>• act in the best way to contribute to the achievement of sustainable development;</li> <li>• promote sustainable flood management; and</li> <li>• co-ordinate the delivery of its functions with others.</li> </ul>
	<p><i>Water Environment (Controlled Activities) Regulations, 2011 , as amended 2013 &amp; Water Resources (Scotland) Act 2013</i></p>	<p>The regulations introduced controls over activities in order to protect and improve Scotland's water environment, including wetlands, rivers, lochs, transitional waters (estuaries and saline lagoons), coastal waters and groundwater.</p> <p>Controls discharges of effluent to public sewers.</p> <p>Controls engineering works in on or near a watercourse.</p> <p>Controls abstraction of water.</p>

Topic	Act/Regulation	Key Relevant Provisions
Radioactive substances	<i>Radioactive Substances Act 1993, as amended by the Environment Act 1995</i>	Those who keep or use mobile radioactive apparatus are required to register details of their operations.
	<i>Ionising Radiations Regulations, 1999</i>	The regulations set out requirements for X-ray testing of pipe welds.
Noise	<i>Control of Pollution Act, 1974 as amended by the Environmental Protection Act, 1990 and the Noise and Statutory Nuisance Act 1993</i>	Noise generated on construction sites is controlled under Sections 60–61 of the <i>Control of Pollution Act 1974</i> .  Section 60 of the <i>Control of Pollution Act 1974</i> , gives Local Authorities the power to serve notices imposing requirements on the way in which construction activities are undertaken.  Under Section 61 of the <i>Control of Pollution Act 1974</i> , the developer or contractor can apply in advance for approval of construction methods.
Oil storage	<i>Water Environment (Oil Storage) (Scotland) Regulations, 2006</i>	These regulations govern the storage of oil in tanks that are not in buildings.

## 11.4 Assessment Methodology and Uncertainty

### 11.4.1 Establishment of Baseline Environment

Information has been collated from a wide range of statutory and non-statutory bodies through consultation relating to issues within the pipeline corridor, a 1km-wide area centred on the pipeline route. This has been used to help define the route and ensure that the design and construction of the pipeline avoids or minimises adverse impacts. Information on pollution incidents, contaminated land, and contaminated water and landfill sites has been collated and reviewed (see S6). As specified below, the noise impact from the construction works have been assessed using absolute fixed thresholds and do not relate to an existing noise level. Therefore a noise survey has not been required in order to identify the existing noise environment.

### 11.4.2 Identification and Assessment of Impacts and Mitigation Measures

#### 11.4.2.1 General

The identification and assessment of impacts has been made with reference to information received from the consultees and any particular issues highlighted by them. This is interpreted using professional judgement and experience based on the undertaking of previous pipeline projects.

An outline assessment of the expected noise levels from construction operations has been prepared using the current best estimate of activities, scheduling and plant utilisation based on experience gained from similar pipeline installations. The information and noise source data presented in BS 5228-1: 2009+A1:2014 ‘Code of practice for noise and vibration on construction and open sites’ forms the basis of the noise levels quoted in this document.



### 11.4.2.2 Assessment of Significance of Impacts

#### Construction Noise and Transport Noise and Air Emission

Appendix E of BS 5228 provides example methodology for construction assessment criteria. As noise effects will be temporary with construction progressing along the pipeline route, it is considered that a fixed noise threshold of significant impact of 70 dB (A) for daytime (07:00 to 19:00) as suggested within BS 5228 (Sections E.2) is appropriate for this assessment. Where works are anticipated to be continuous into the night-time, a lower threshold level of 55 dB(A) has been considered, which relates to the noise insulation trigger levels in BS 5228 (Section E.4).

Short-term noise impacts as a result of construction traffic have been assessed using prediction methodology within Calculation of Road Noise (CRTN, DTO, 1988) and criteria within the Design Manual For Roads and Bridges (DMRB, Highways Agency, 2011), which includes criteria that a minor impact as an increase in traffic in the short-term of 1.0-2.9 dB(A). Traffic figures from Section 10 have been converted to 18 hour flows to calculate the  $L_{A10\ 18\ hour}$  noise level 10 metres from the road noise source, with and without construction traffic.

With respect to traffic air emissions, guidance from the Institute of Environmental Assessment (now IEMA) on the scope for environmental impacts from traffic flow changes for new development, suggests that impacts could potentially be significant if:

- traffic flows or HGV flows increase by 30% or more, or
- traffic or HGV flows increase by 10% or more where sensitive receptors are present.

These assessment criteria provide the basis for an assessment of significance in relation to construction road traffic air emissions.

#### Other Emissions

When making an assessment of significance, the magnitude of change and the importance and/or sensitivity of the receptor have been taken into account. These assessments will be made on a qualitative basis. An assessment has also been made of the significance of residual impacts, i.e. those impacts that are predicted to remain after the mitigation measures outlined in this Environmental Statement have been implemented. Table 11-3 details the categories that have been used when classifying overall significance.

**Table 11-3 Classification Criteria**

Impact	Description	
Very significant	Permanent change brought about through construction emissions, which could have an extensive effect and include areas remote from the development area.	<i>Significant Impacts where monitoring may be required</i>
Significant	Permanent or medium to long-term change brought about through construction emissions, with changes to areas remote from the site (over several years).	
Moderate	Short to medium-term changes brought about through construction emissions, just outside the accepted limits of normal variation with little or contained off-site effects detectable (over a period of several months).	

Impact	Description
Slight	Change brought about through construction emissions only just detectable within the site and surrounding areas over a short timescale (over a period of days or weeks).
None	An impact causing effects that are not readily noticeable.

### 11.4.3 *Uncertainty and Technical Difficulties Encountered*

No particular difficulties have been encountered.

## 11.5 **Baseline Overview**

Dust, waste and aqueous emissions to the environment have the potential to affect the baseline environment described within each of the technical Sections presented in this ES document. For this reason the description of baseline has not been detailed here but can be reviewed in each technical Section separately in conjunction with the relevant predicted impacts described in Section 11.6 below. As discussed, the baseline noise environment is not required for the assessment of impacts.

## 11.6 **Assessment of Impacts**

### 11.6.1 *Construction and Commissioning*

#### 11.6.1.1 *Waste and Water*

During construction, a number of potential wastes and water emissions will be generated, consisting of but not restricted to:

- the generation of wastes requiring off-site disposal, the majority of which will be non-hazardous in nature. This will include surplus subsoil/rock anticipated due to the rocky nature of the ground;
- sewage;
- the discharge of water, either from dewatering activities (e.g. the dewatering of trenches where water has accumulated), or the discharge of water used during the hydrostatic testing of the pipeline.
- surface-water run-off containing sediment from the working width;
- unplanned releases such as spills of potentially hazardous materials including diesel fuel, hydraulic and engine oils, chemicals and wet concrete.

Table 11-8 below itemises the wastes that can arise from pipeline construction, (including sewage wastes). As can be seen, a significant variety of wastes are typically generated during construction. If not handled appropriately the generation of such wastes could result in *significant* impacts upon the immediate and surrounding environments of the pipeline.

As described in Section 6, two of the watercourses in the vicinity of The Project are classed as high quality. With the imperative requirement of the *Water Environment and Water Services (Scotland) Act 2003*, and *Water Environment (Controlled*

*Activities) Regulations, 2011, as amended 2013*, to protect and improve the water environment, due care will be required in order to ensure that the requirement to protect the water environment is adhered to. Hydrostatic testing of the pipeline may require the abstraction and discharge of significant volumes of water from and to nearby watercourses. In addition, with steep slopes along part of the pipeline route, and seasonally high rainfall, sediment run-off from the working width into adjacent watercourse, once topsoil has been removed, could result in potentially significant impacts. A number of chemicals, fuels, lubricants and other potentially hazardous substances will be required for the construction of the pipeline. Such substances will largely be stored and used within the Site Establishment Areas, however, as with wastes generated from construction, significant impacts could result if such substances were not stored and handled in an appropriate manner.

Whether from dewatering of trenches, surface water run-off, or accidental or unplanned releases of potential hazardous aqueous substances, there is the potential for *significant* impacts upon the immediate and surrounding environments of the pipeline to occur.

#### 11.6.1.2 Releases to Air, Dust, and Transfer of Mud to Highways

During construction, there is the potential for contaminated emissions to air to be generated, consisting of but not restricted to:

- releases of combustion emissions to air from construction vehicles, plant and equipment have the potential to impact on health, affect ecosystems and contribute to global warming;
- potential dust generation from earthworks and vehicles passing over dry ground can affect vegetation growth, cause soiling of property and affect public amenity; and
- a one-off release of natural gas during purging of the pipeline during commissioning.

In addition to emissions to air, the transfer of mud onto public highways can pose a potential safety hazard to traffic, and also requires consideration.

With respect to emissions to air from construction traffic on the surrounding road network, it can be seen from Section 10 that all anticipated increases in traffic are predicted to be no greater than four percent. This lies well below the assessment criteria of ten percent or more in terms of air quality, and so no significant impacts on air quality are anticipated. Potential emissions to air from construction plant on site will also contribute to the general emission releases to air during construction. However, such plant will typically be located remotely from potentially sensitive receptors for the majority of the works. Allied to the level of emissions released and numbers of plant machinery and vehicles used, emissions are not expected to result in significant impacts.

Dust emission from construction can arise from the following activities:

- vehicles trafficking along the working width;
- topsoil stripping and trench excavation;
- soil handling and storage; and

- transporting materials.

It is difficult to predict the level of nuisance that may arise from dust emissions from site as this very much depends upon the prevailing weather conditions from day to day. Whilst dry and windy conditions are likely to cause more of a nuisance across a wider area, high levels of rainfall will offset these conditions considerably by lowering the soil moisture deficit and damping down dust arising from site.

It is anticipated that dust emissions will arise from construction operations. Once airborne, dust will generally travel down-wind before resettling. The distance travelled by the dust depends primarily on wind speed and particle size. For example, smaller particles and strong winds result in greater dilution effects, but mean that the dust is dissipated and deposited over a larger area. Dust problems, however, will typically occur within several hundred metres of their point of generation. As the pipeline route lies in an area that has a prevailing climate of high rainfall any potential emissions of dust are likely to be significantly offset. Therefore, it is considered that impacts, although not likely to be significant, are likely to be *slight to moderate* due to their short-term nature.

There will be an increased risk of mud being transferred by vehicular movements onto public highways, and via surface water run-off, due to the high rainfall. Such deposits are likely to cause a nuisance if not controlled sufficiently, and *slight to moderate* impacts are anticipated.

#### 11.6.1.3 Surplus Spoil

Due to the rocky nature of the ground at certain points along the proposed pipeline route there is potential for surplus spoil to arise as this would not be suitable for use as back fill. At these locations subsoil and topsoil would need to be transported in from a licensed facility, with the rocky material being disposed of in line with Regulation 19 Waste Exemption Licence.

#### 11.6.1.4 Light and Ionising Radiation

The working width will be generally unlit at night. However, in poor light conditions during normal working hours and when 24-hour operations are being undertaken, temporary lighting units powered by portable generators will be used where necessary to ensure safe working conditions and/or safe site security. Although located in a rural area with little existing night-time lighting, impacts resulting from lighting requirement are likely to be very short term and localised, and so only *slight* impacts are predicted.

Automatic ultrasonic testing will be used to test the welds on the pipeline. X-ray testing will be used only to test the tie-in welds. Radiation emissions will therefore be produced. X-ray testing of pipe welds will be carried out in accordance with the *Ionising Radiations Regulations, 1999*, and accompanying *Code of Practice*. All construction workers involved in the operation will follow relevant health and safety regulations and guidelines. There will be no radiation emissions during testing and commissioning of the pipeline; overall, *no significant* impacts are anticipated from X-ray testing.

#### 11.6.1.5 Noise and Vibration

Noise emissions during pipeline construction arise from four main types of activities:



- noise generation from plant and equipment during ‘general’ pipeline construction activities;
- noise generation from plant and equipment used to construct ‘special crossings’ of roads and watercourses;
- noise from compressors and generators during pipe integrity testing; and
- noise arising from traffic on the local road network.

Potential impacts from these operations are described in more detail below. The following aspects of the construction and operation of The Project have not been considered within this assessment as they would not be anticipated to have a significant effect on local sensitive receptors:

- noise from Site Establishment Areas will be intermittent and low;
- given the large distances from construction activities to sensitive receptors, vibration is not considered as a potential impact; and
- maintenance noise from ‘pigging’ will be intermittent and very low.

#### Noise Levels from General Pipeline Construction

Noise levels associated with each construction stage, based on the best estimate of plant at this stage of planning, are listed in Table 11-4. These values have been calculated using the procedures described in BS 5228, and relate to standard pipeline construction. Plant noise levels have been taken from empirical data within BS 5228-1: 2014.

In practice, noise levels will fluctuate dependent upon the operating time for each machine and on the combination of machinery being used at any one time. However, the noise levels shown in Table 11-4 assume all machinery will be working 100% of time on site. In addition, the noise levels assume flat, open soft ground with no barriers to attenuate the noise.

**Table 11-4 Typical Noise Levels in  $L_{Aeq}$  dB associated with General Construction Activity**

Operation	Plant	BS5228 Ref	No#	Noise Level In $L_{Aeq}$ free field at distance ‘x’ m (dBA)					
				10	60	120	180	300	400
Fence, Topsoil stripping Right of Way	Excavators	2014: C.2.14	10	89	68	60	56	50	47
	Bulldozers	2014: C.2.12	3	86	64	57	52	47	44
	Operation Total			91	69	62	57	52	49
Pipe stringing	Tracked Mobile Crane	2014: C.3.29	2	73	52	44	40	34	31
Welding	Welding + generator (on D6 Twinarc or similar)	2014: C.3.31	3	78	56	49	44	39	36

Operation	Plant	BS5228 Ref	No#	Noise Level In $L_{Aeq}$ free field at distance 'x' m (dBA)					
				10	60	120	180	300	400
	Generator (on Weld rigs)	2014: C.3.33	9	62	40	33	28	23	20
	Operation Total			78	56	49	44	39	36
Trench excavation	Excavators	2014: C.4.63	4	83	62	54	50	44	41
Lowering pipe	Lorry with lifting sideboom	2014: C.4.53	8	86	65	57	53	47	44
Backfilling	Bulldozer	2014: C.5.14	2	89	68	60	56	50	47
Reinstatement	Roller	2014: C.5.26	2	80	59	51	47	41	38

The significance of the predicted noise levels can be calculated by comparing each one to the assessment criteria discussed in Section 11.4.2.2. It is assumed that the general pipeline works would be standard daytime hours only (07:00 – 19:00).

#### Noise Levels from Specialist Construction Techniques

Specialist construction techniques may be required for certain sections of the pipeline in order to cross roads and watercourses. These crossings can be undertaken in a number of ways, all of which have different associated noise levels.

Noise effects of the common crossing techniques:

a) Thrust Boring

The thrust-boring technique requires the construction of thrust and reception pits on either side of the obstacle to be crossed. In stable ground conditions it may be possible to excavate these pits with battered sides, if so, noise will only arise from the use of an excavator. If, however, ground conditions are poor or space is limited, then temporary sheet piling may be installed. Piling is usually of short duration, i.e. 2–3 days per pit and not more than 4–6 days per crossing. Following completion of the piling, the excavation and boring activities will be the main source of noise. Noise levels associated with these activities are presented in Table 11-4. The piling is of short duration and is normally undertaken during daytime hours only. Appropriate methods such as ‘silent piling’ are now common practice and will be employed where necessary to reduce piling noise levels substantially. Dependant on the ground stability of the soil, the Auger boring element of these works could be a 24 hour operation. It is intended to use this trenchless method of construction to cross beneath the trunk roads and some of the busier secondary roads. Minor crossings are predicted to take approximately 1 week to complete. Major road crossings are predicted to be completed in 6 weeks encompassing 2 weeks of mobilisation, 3 weeks of crossing and 1 week of demobilisation.

b) Dry, Open-cut

This adapted, open-cut method will be used at watercourses to minimise sedimentary disturbance whilst maintaining water flow. The noise levels associated with this activity are typically comparable to those from the standard open-cut technique. At larger watercourses, or where soil conditions are poor, sheet piling may also be required. Piling that may be required is similar in its duration and degree of disturbance to that at thrust-bore crossings. The mitigation measures taken are the same as those used for the thrust-boring method.

The predicted noise-level estimates associated with typical plant used for these methods of pipeline construction activity have been interpolated from BS 5228 as listed in Table 11-5.

**Table 11-5 Predicted Noise Levels from Crossing Activities**

Operation	Plant	BS5228 Ref	No#	Noise Level In $L_{Aeq}$ , free field at distance 'x' m (dBA)					
				10	60	120	180	300	400
Sheet piling	Conventional sheet piling	C.3.8	1	88	67	59	55	49	46
Auger boring	Boring	C.3.14	1	83	62	54	50	44	41
Open cut	Excavator	C.2.14	1	79	58	50	46	40	37

**Testing and Commissioning**

Prior to operation, the pipeline will be pressure tested using water (hydrostatic testing). Noise emissions from hydrostatic testing are mainly associated with the pumps and compressors needed to fill and pressurise the pipeline at the test ends. Diesel-driven reciprocating pumps are likely to be used. This activity will run for 24 hours a day for three to four days. At night, diesel generators may be required at selected locations along the route for security lighting.

The combined noise levels for one diesel pump (BS 5228 Ref: C.4.88) and one generator (BS 5228 Ref: C.4.86) using guideline values from BS 5228-1:2014 are predicted at various distances. Predictions are shown in Table 11-6.

**Table 11-6 Combined Noise Levels from One Diesel Pump and One Generator**

Distance from Source (meters)	Noise Level $L_{Aeq,T}$ dB(A)
10	70
60	49
120	41
180	37
400	28

On completion of the hydrostatic testing, the pipeline will be swabbed to remove residual water. Noise will be generated by the venting of compressed air from the pipeline during this operation. Venting will take place over relatively short periods of time, however, it can give rise to high noise levels. The pipeline will be dried using super dry air. Silenced compressor-driven units will be used, the location of which has yet to be established.

### **Noise Impacts**

Table 11-7 overleaf lists all potentially sensitive receptors that may be affected by construction noise (based upon all properties that lie within approximately 500m of the route). For each property, or complex of properties, the closest façade of the nearest building has been measured from the pipeline. In addition, the closest road crossing and watercourse to each dwelling has been noted. Those properties for which the assessment criterion may be exceeded are also noted in Table 11-7.

### **General Pipeline Construction Impacts**

From the table it can be seen that the noise levels do not exceed 70 dB(A) at the closest properties to the pipeline route. As the noise from general construction will still be audible, the impacts are anticipated to be *slight*, but not significant.

Standard noise measurements and calculations used by acousticians are based upon the response of the human ear. Therefore, an assessment of potential impacts upon wildlife is not possible, using this same convention. A qualitative approach has therefore been used, based upon studies relating to the subject matter.

Even though the proposed pipeline is deliberately routed away from any known sites of significant ecological importance, the effect that noise may have on wildlife should be considered. Studies in this field are fairly scarce, although there have been some studies involving sonic booms from jet aircraft. This research concluded that the response of birds to such noise is greater than that of other animals, but that all species adapt fairly rapidly to such noises. The results indicated that most species exhibited a rapid startle reflex, but which soon abated without any further sign of distress.



**Table 11-7 Potentially Sensitive Receptors**

Property Name	Co-ordinate Location	Distance from Pipeline (m)	Distance from nearest Road/Watercourse Crossing (m)		Exceedance of 70 dB(A) Criteria (Exceedance of 55 dB(A) night-time Criteria)		
			Road (type)	Watercourse (type)	General Construction	Specialist Techniques	Hydro-testing
Cluden Lodge	293600 579650	370	430 (minor)	1900 (minor)	No	No	No
Maryfield	293000 578300	600	890 (minor)	650 (minor)	No	No	No
Rambank	292380 577730	60	60 (minor)	80 (minor)	No	No (Yes)	No
Aikie Bush	292150 577730	160	160(minor)	190 (minor)	No	No	No
Drummond House	291820 577850	480	480(minor)	510 (minor)	No	No	No
Mainshead	292780 577560	450	500 (minor)	480 (minor)	No	No	No
Brae Croft	292200 577200	60	530 (minor)	490 (minor)	No	No	No
Collochan	291760 575970	330	630 (minor)	1760 (minor)	No	No	No
Burngrains	290240 575660	200	410 (minor)	500 (minor)	No	No	No
Cleughbrae	291170 575290	340	370 (minor)	960 (minor)	No	No	No
Belton Hill	290540 575390	120	260 (minor)	420 (minor)	No	No	No
Waterhead	290690 575100	350	510 (minor)	460 (minor)	No	No	No
Waterhead Bridge	290480 574990	270	630 (both minor and major)	270 (minor)	No	No	No
Cargenbank	290550 574820	430	660 (major)	430 (minor)	No	No	No
Dromore	290080 574790	180	180 (major)	350 (minor)	No	No	No
Foremannoch	289560 574680	340	340 (major)	410 (minor)	No	No	No
Waterworks Cottages	290000 574270	180	500 (major)	180 (minor)	No	No	No
Millbank	289870 574090	240	650 (major)	440 (minor)	No	No	No
Mill Cottage	290000 573970	410	790 (Major)	290 (minor)	No	No	No

The noise from sonic booms is clearly different from that generated by all types of construction activities, which is a much lower-level noise. The reaction of animal and avian species to construction noises will be less than that to sonic booms. Any disturbance due to sudden noises is further reduced because of the slow build-up of noise as the spread of construction encroaches into an area. However, apart from the startle reflex, it is considered that no other detrimental reactions will occur. Due to the likely short-term nature of any noise disturbance, impacts upon wildlife are considered likely to be *slight*, but not significant.

### Specialist Construction Techniques

For the purposes of assessing impacts arising from the employment of specialist construction techniques, the assumption has been made that only activities in constructing the main watercourse and major road crossings will be undertaken using techniques requiring piling (see Section 3). It is also assumed that all minor watercourse crossings will be achieved without the requirement for piling. Based upon these assumptions, Table 11-7 shows that the assessment criteria would not be exceeded during the daytime period. Should Auger boring be required during the night-time due to instable ground conditions, exceedences of the threshold are predicted at Rambank. As this night-time exceedance would be associated with a minor crossing, construction activity would only be for a likely duration of 1 week and therefore the impact would be *slight*, but not significant.

For all other properties no exceedance is reported and therefore no significant impact would be predicted.

### Hydrotesting Impacts

The precise location for hydrotesting will not be known until the detailed design phase of The Project and will be selected taking account of the consented interconnector pipeline. Hydrotesting a 36-inch pipeline requires the availability of a significant watercourse in order to ensure that sufficient water is available and that the impacts of abstraction are kept to a minimum. Therefore, whilst hydrotesting may not occur in the immediate vicinity of The Project, a worst-case assumption has been made that hydrotesting may occur in close proximity to the River Cluden, which is considered to be the only watercourse in close proximity to The Project likely to be able to service hydrotesting requirements. With reference to the predicted noise levels from the diesel pump and generator, Table 11-7 shows no exceedance of the assessment criteria in terms of hydrotesting during the daytime or night-time and, whilst *slight* impacts might arise from the venting of compressed air, impacts are considered likely not to be significant.

### Construction Traffic Noise

The results of the traffic calculations are presented in Table 11-8.

**Table 11-8 Impact of Construction Traffic Noise**

Route Number/ Location	Predicted Noise $L_{A10, 18 \text{ hour}}$ Noise Levels 10 m from road noise source (dBA)		
	Baseline	Construction	Difference
A75(T)	70.3	70.4	0.1
A76(T) Dumfries Glasgow	71.8	71.9	0.1

Route Number/ Location	Predicted Noise $L_{A10, 18 \text{ hour}}$ Noise Levels 10 m from road noise source (dBA)		
	Baseline	Construction	Difference
Road			

Based on the DMRB short term criteria, the results show that the increase in traffic noise would be negligible along both the routes assessed and therefore not significant.

### 11.6.2 Operation

Few potential impacts are expected during normal operation of the pipeline due to its continuously welded construction and high level of integrity. In particular, the pipeline operates as a completely closed system and during normal operations there will be no releases of gas to the atmosphere.

*Slight* potential impacts will arise from:

- the use of an intelligent pipeline internal gauge ('pig') to internally clean the pipe will generate small quantities of waste material requiring appropriate disposal. Any dust removed by 'pigging' will be disposed of in accordance with the *Special Waste Regulations, 1996*, as amended;
- minor controlled releases of natural gas to air during pigging operations; and
- emissions from the helicopter and ground checks of the pipeline carried out to monitor any third-party activity that may cause damage to the pipeline.

In the unlikely event of a major release of natural gas from the pipeline, the concentration would be high in the immediate vicinity of the leak. However, risk assessments by the gas supply industry have demonstrated the frequency of such an occurrence to be extremely low for the pipeline industry. Any released gas will be dispersed into the atmosphere by diffusion and wind action, and should pose no major threat to health, except for a very localised cooling effect at the source of the gas leak. The most immediate risk would be that of an explosion or fire in the unlikely event that the natural gas is ignited; however, this is considered an extremely remote possibility.

Overall, no significant impacts are anticipated from the operation of the pipeline.

## 11.7 Mitigation Measures

Appropriate mitigation measures for the reduction and potential elimination of the potential impacts identified above are well established for pipeline construction and are described below.

### 11.7.1 Waste Generation

Wastes generated during the construction, commissioning and operational phases of a pipeline are described in Table 11-9. The table also lists the recycling and re-use options that will be employed to minimise the disposal requirements – where re-use is planned, the appropriate exemptions from the need for a Waste Management Licence

will be registered with SEPA and any planning consent requirements assessed. The table covers both Non-hazardous and Special Wastes.

Wastes will be segregated in order to prevent co-storage of incompatible materials and mixing of Non-hazardous and Special Wastes, and to maximise re-use or recycling opportunities. All wastes will be stored in containers suitable for the nature of the waste materials and appropriately labelled for subsequent removal off site. At the Site Establishment Areas and elsewhere, wastes will be stored on areas of hardstanding or on an impermeable surface, to minimise the potential for contamination, and covered to prevent the generation of litter and accumulation of water around waste materials. Any spillages will be cleared promptly. All waste carriers will be appropriately licensed for the waste carried, and in the event of disposal, waste will be disposed of only at sites licensed to receive and dispose of such waste.

Where appropriate a Regulation 19 Waste Exemption Licence will be sought to dispose of material which is not contaminated.

A Waste Management Plan will be prepared. An important aspect of the plan will be the collection and control of waste on site. Waste will be regularly collected from the working width and placed in covered skips or similar containers.

Special Wastes will be segregated and disposed of in accordance with the *Special Waste Regulations, 1996*, as amended. Burning of waste is prohibited.

**Table 11-9 Potential Wastes Generated by the Construction of the Pipeline**

Activity	Waste Generation	Treatment or Disposal Options
<b>Construction of the Site Establishment Area (SEA)</b>		
SEA preparation	Hedge cuttings and wood	Chip for use as mulch for reinstatement.
SEA construction	Office rubbish, paper, packaging, etc.	Recycle.
	Engine/hydraulic oils, batteries, and fluorescent tubes.	To drum or containerise and recycle.
	Rubbish from yard and site	Collect in covered skips or tipper trucks and send unrecoverable material to a licensed waste disposal site.
	Scrap metal	Sold as scrap for subsequent recycling.
	Sewage	The Site Establishment Areas will seek connections to existing sewer systems, if these are available, subject to the consent of the sewage undertaker. Cess-pits will be used where a foul drainage system is not available. These will be emptied regularly and treated and the sewage disposed of off site.  However, if septic tanks or water treatment plants are used, the appropriate license will be obtained from SEPA and buildings regulation approval sought from the Local Planning Authority, as relevant. All sewage arrangements will be in accordance with Pollution Prevention Guidance PPG04.
	Surface water	Pass water through a separator and discharge in agreement with SEPA. The separator will be cleaned out regularly with waste removed, and the water treated off site .
	Vehicle wash	Only clean water will be used – no wash fluids will be added. The requirement for discharge consents for used water will be confirmed with SEPA.
SEA reinstatement	Workshop waste, e.g. paints, oil, etc.	To double bag; store in covered skips or containers, and send to a licensed waste disposal site, in accordance with the Duty of Care.
	Concrete foundations, etc.	Send to a licensed waste disposal site.



Activity	Waste Generation	Treatment or Disposal Options
<b>Pipeline Construction</b>		
Working width preparation	Hedges, timber, brush, fence posts, wire, etc.	Chip hedge plants to produce mulch; other items to be disposed of in accordance with landowners' requirements and Waste Regulations.
	Herbicides	Only approved contractors will be permitted on site; appropriate application and inventory management should prevent the generation of herbicide waste.
	Bog mats	Bog mats will be re-used on future projects by GNI or sent for recycling to a licensed waste-treatment facility if damaged or worn beyond re-use.
Pipe-stringing and bending	Pipe-bands and end caps	Collect in covered skips or tipper trucks and send to licensed waste disposal site; re-use end caps, e.g. as drip-trays.
Welding, inspection and coating	Spent welding rods, epoxy coatings, grinding wheels, visors, shot-blast, photographic chemicals, other solvents and chemicals	Materials that do not constitute a Special Waste on disposal will be re-used, where possible. Double bags for solid waste, and sealed containers for liquid waste; store in covered skips or containers and send to licensed waste disposal site, in accordance with the Duty of Care and the <i>Special Waste Regulations, 1996</i> , as appropriate.
Trenching, lowering and laying	Pumping discharge	Pump onto land or into local soakage trenches, wherever possible, in accordance with 'Permit to Pump' and SEPA requirements. If discharge to watercourses is unavoidable, use suitable filtration/settlement techniques and obtain all necessary licenses.
	Contaminated land (if found)	Treat on site, under a mobile plant licence or Waste Management Licence, or dispose of off-site at an appropriately licensed facility in accordance with the <i>Special Waste Regulations, 1996</i> .
Backfilling and grading	Surplus spoil and/or rock	Crush rock for re-use as backfill if suitable. Spread surplus spoil within the working width on a field-by-field basis, subject to there being no conflict with the achievement of restoration objectives, materials being compatible, and the agreement of the landowner. Offer to landowner subject to any waste management licensing and planning consent requirements, or take to licensed waste disposal site/municipal recycling facility.
Reinstatement	Temporary stone roads	Offer to landowner, subject to any waste management licensing and planning consent requirements, or take to licensed waste disposal site.

Activity	Waste Generation	Treatment or Disposal Options
	Temporary fencing, gates, troughs, etc.	Re-use elsewhere within land holding.
Hydrostatic testing	Water	Transfer between test sections where possible. Discharge of post-test water under SEPA license.
Fabrication of other equipment	Paint, shuttering and cement	Appropriate off-site disposal according to nature of material.
Micro-tunnelling and horizontal directional drilling (HDD)	Slurry/spoil	Pass through desander; recycle slurry; recycle and ultimately dispose of waste, using road tankers, at a licensed waste disposal site; dispose of solids, using road truck tippers, at a licensed waste disposal site.
Auger boring and pipe jacking	Spoil and rock cuttings	Dispose of waste, using road truck tippers, at a licensed waste disposal site.
Auger boring and pipe jacking (continued)	Water from excavations	Install well-pointing and discharge water to drain, or pump it out and into ground using a filtration medium in accordance with SEPA requirements and any necessary Conservation Notice and discharge consent.
Mess huts; miscellaneous sources	Canteen refuses, safety equipment, etc.	Collect solid waste in covered skips; separate collected liquid wastes, including cooking oils, in (recovered) drums; send residual waste to licensed waste treatment/disposal site.
Mobile site toilets	Sewage	Appoint waste management contractor to dispose of sewage.

### 11.7.2 *Discharges to Water*

In excavating trenches where groundwater is close to the surface, there may be a requirement to pump the water out and dispose of it. Water will be discharged to land or local soakage trenches, wherever possible, to minimise silt run-off. Where it is necessary to discharge the water to a surface watercourse or drain, this will be done in agreement with SEPA following settling and filtration. All pumping operations will be controlled under a 'Permit to Pump' system.

Prior to being discharged to any watercourses, all surface water from any hardstanding at the Site Establishment Area will be passed through trapped gullies or an oil interceptor suitable to drain the site, as outlined in SEPA's Pollution Prevention Guideline PPG03. Should construction works reveal contaminated ground or groundwater, any trench water will, following consultation with SEPA, either be treated or disposed of in accordance with license conditions.

Where there is a slope from the pipeline route down to a watercourse or highway, bunds, grips, barriers or straw-filled ditches will be constructed to prevent, as far as possible, sediment laden run-off from the working width flowing into the watercourse or onto the highway. Coir matting, designed to trap silt, may also be used, as necessary. A pre-construction survey will be completed to identify areas potentially vulnerable to run-off. This information will be used to develop a Water Management Plan.

During pressure testing the pipeline will be filled with water that should be abstracted and discharged safely. Preferred abstraction and discharge locations will be agreed with SEPA. The water will be tested for contaminants prior to and after testing and the rate of discharge controlled in accordance with the requirements of SEPA. No chemicals or additives will be added to the hydrotest water.

Potential impacts on water resources and mitigation are discussed in Section 6. The prevention of water pollution from hydraulic oils, diesel and concrete mix is described below with respect to unplanned events.

### 11.7.3 *Unplanned Emissions and Spillages*

Fuel quantities used will be registered at the site offices, and fuels will be stored in designated areas. Fuel tanks, unless manufactured as self-contained bunded tanks, will be imperviously bunded to contain 110% capacity of the combined capacities of the containers. All fuel stores will be sited at least 10m from any watercourse and 50m from any borehole or well.

Tanks will be clearly labelled to display the fuel-holding capacity. Bunds will be constructed in accordance *Water Environment (Oil Storage) (Scotland) Regulations, 2006* and PPG 02, *Above Ground Oil Storage Tanks*. Accumulated rainwater will be routinely emptied from the bund and, if contaminated, it will be disposed of at a suitably licensed waste disposal facility. Concrete will be contained and carefully handled during pouring activities. All hazardous materials will be stored away from surface waters. Refuelling will be carried out a minimum of 30m from any watercourse and 50m from any borehole or well.

Liquid chemicals will be stored in bunded enclosures that have an impermeable base. Drums will be stored on proprietary spill control pallets or in a bunded area designed to contain 110% of the total capacity of chemicals.

Drip trays or plant “nappies” will be placed under all plant when not in use.

Prior to the start of construction, an Emergency Response Plan will be prepared and agreed with SEPA. Measures to be put in place according to the Emergency Response Plan will include:

- the presence of trained emergency crews, 24-hours a day;
- the availability of spill kits and booms on site;
- bunding requirements for hazardous materials;
- response procedures; and
- awareness training for all staff.

All spillages to ground or watercourses will be reported to the statutory authorities and recorded as part of incident notification procedures.

#### **11.7.4 Releases to Air**

Most machinery used on site will be powered by diesel engines. In order to minimise emissions, all vehicles and items of plant and equipment will be correctly adjusted and maintained. Drivers and plant operators will be instructed during induction talks to turn off their engines when not in use. Emissions from traffic to and from the site areas will be minimised by appropriate route selection and other measures described in the Traffic Management Plan (see Section 10).

#### **11.7.5 Dust Generation and Mud on Roadways**

Construction activities and vehicle movements can cause dust agitation in addition to that already caused by the wind. Ambient dust can be generated as a result of vehicle movements and typical construction activities (e.g. stripping, levelling and compacting). Construction dust emissions will be temporary, restricted to permitted working hours, and will vary in frequency and location (i.e. they will not be continuous).

Construction practices will be developed and agreed with the Dumfries & Galloway Council to control dusts. These will include standard dust containment and suppression techniques such as ensuring potential dust-generating materials are moistened, sheeted or shielded from wind, and construction vehicle movements on the working width are subject to speed restrictions. Road sweepers will be used to minimise the accumulation of dust deposits on public highways. The frequency of sweeping will be increased depending on site-specific conditions and visual observation.

#### **11.7.6 Light and Ionising Radiation**

Any lighting required on site will be positioned to have regard to any site-specific restrictions imposed, e.g. for protected animal species. They will be designed and positioned in such a way as to minimise glare to road users and residents and minimise noise from any associated generators. Directional lighting or lighting with shrouds will prevent upward glare and illumination and minimise the light impact beyond the working area. In the event of lighting units being used for overnight works, local residents will be given adequate warning.

## 11.7.7 *Noise and Vibration*

### 11.7.7.1 *General Pipeline Construction*

In order to minimise noise impacts on sensitive receptors, the MWC will be required to:

- regulate noise emissions from site in accordance with the appropriate standards e.g. British Standard 5228:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites;
- maintain close liaison with nearby residents in order to ensure that they are aware of the timing and duration of activities;
- confine construction activity to 0700–1900hrs Monday to Friday and 0700–1600hrs on Saturdays. However, the requirement to work on Sunday cannot be excluded. If extended working hours are required they will be discussed with the Dumfries & Galloway’s Environmental Health Department in advance;
- maintain plant regularly, ensure it is accurately adjusted and that noise abatement measures (e.g. covers/barriers) are fully operational and used correctly on site; and
- implement mitigation measures as necessary in order to prevent disturbance due to noise, for example:
  - o rational programming of inherently noisy operations and avoiding unnecessary congregation of plant and machinery in any one location;
  - o screening or enclosure of fixed plant, such as compressors (‘silent’ running type);
  - o use of inherently quieter techniques as practicable; and
  - o where necessary, the use of alternative plant will be considered.

In addition, it is important to note that terrain, buildings and vegetation characteristics have not been accounted for in calculating potential noise impacts of The Project. It is, therefore, highly likely that such features out in the field will attenuate some of the noise impacts reported in this Section significantly. Any mitigation measures, developed for the purpose of attenuating noise and agreed with the Dumfries & Galloway Environmental Health Department, will take account of natural attenuation present between construction activities and the sensitive receptors identified.

### 11.7.7.2 *Special Crossings*

Noise during construction of special crossings will only be produced for relatively short periods of time (between one to six weeks, depending on the size of the crossing).

The need to continue operations on a 24-hour basis will also be kept to a minimum, and any night-time working will be the subject of detailed discussion and agreement with the Environmental Health Department. The MWC will consult the Dumfries & Galloway Environmental Health Department to agree any further mitigation measures required for such crossings should night-time works be required. These measures will



also take account of natural attenuation present between construction activities and the sensitive receptors identified.

Particular attention will also be paid to keeping local residents informed of these activities.

#### *11.7.7.3 Testing and Commissioning*

All residents in the vicinity of the test points will be notified prior to the commencement of tests, and appropriate noise attenuation measures will be implemented to minimise noise emissions from the test sites. The MWC will also liaise with the Environmental Health Department.

Super-silenced compressors will be used where necessary and pumps will be shielded where required by straw bales or other barriers from the nearest houses.

In order to minimise disturbance, whenever possible venting will be carried out during normal working hours only or using silencers.

#### *11.7.8 Operation*

Material collected during pigging operations will be collected and tested to determine appropriate disposal requirements. Any dust will be disposed of as Special Waste.

### **11.8 Summary of Residual Impacts and Significance**

A detailed summary of any residual impacts and their significance, following implementation of the mitigation measures identified, are described below and quantified/qualified in Table 11-10.

#### *11.8.1 Waste and Water*

Waste generation will be minimised, wastes will be recovered or recycled where practical and handled in accordance with regulations and best practice to ensure that impacts will be not significant.

Trench water will be discharged to land wherever possible and in strict accordance with the Permit to Pump system. The method and location of discharge for hydrostatic testing will be agreed in advance with SEPA. The residual impact of pollution of surface water from these sources is therefore expected to be not significant.

Because of the relatively steep slopes along parts of the route, and the high rainfall, potentially there could be some local sediment release to watercourses during the construction period. Risk Assessments will be carried out and, if surface water receptors of high sensitivity are identified close to steep slopes, enhanced silt-control methodologies will be agreed with SEPA. Surface water of high sensitivity will be subject to monitoring to confirm the efficacy of the measures employed.

Oil will be stored according to *Water Environment (Oil Storage) (Scotland) Regulations, 2006* and PPG02. Plant will be regularly maintained and checked for leaks. Crews will be trained in refuelling and the use of spill kits.

Overall, with the employment of mitigation, residual impact on ground and surface water is expected to be *slight* and, therefore, not significant.

### **11.8.2 Releases to Air, Dust, and Transfer of Mud to Highways**

Pumps and plant will be regularly maintained, spatially separated and will change location as construction progresses. Therefore, emissions from plant and machinery are, therefore, expected to be not significant.

The impact of the release of natural gas to air during purging is predicted to be not significant, as it is a one-off release during the lifecycle of the pipeline.

Water will be used to dampen the running track in areas where dust is problematic. In addition, low speed limits on the working width for all vehicles will limit dust production. The residual impact of dust is therefore expected to be not significant.

Public highways will be road swept frequently. The residual impact is therefore expected to be not significant.

### **11.8.3 Radiation**

No residual impacts relating to light and radiation are anticipated.

### **11.8.4 Noise and Vibration**

Working hours will be regulated, plant maintained regularly and used with any abatement equipment, such as covers, in place. Close liaison will be maintained with local residents and EHOs. Additional noise-attenuation measures, such as barriers, will be used as necessary, in close proximity to noise-sensitive locations, if overnight work is needed or when particularly noisy operations are underway. The residual impact of general construction activities is therefore predicted to be *slight* and not significant.

Specific measures will be developed and agreed with Dumfries & Galloway Environmental Health Department in relation to all special crossings requiring piling; impacts are accordingly anticipated to be *moderate* and not significant following the employment of such measures.

**Table 11-10 Summary of Impacts and Mitigation Measures**

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
<b>During Construction</b>			
Waste generation (typical wastes generated by pipeline construction).	Waste requiring transportation off site and subsequent treatment or disposal.	Recovery and recycling where practical, subject to waste management licensing and planning consent requirements; storage and disposal in accordance with legislation and the Duty of Care.	None
Contaminated land and contaminated groundwater from contaminated land.	Spreading of existing contamination to clean areas; disturbance of contaminated groundwater; releases of contaminated water to controlled waters during construction and off-site disposal of contaminated land.	Contaminated land will be assessed, treated and/or disposed of in accordance with the detailed mitigation measures to be agreed with SEPA.	None
Silty trench or excavation water.	Pollution of surface waters by dewatering trenches can result in silt clogging fish gills, smothering eggs, and killing fish.	Discharge of water to land or local soakage trenches under Permit to Pump and in accordance with license conditions.	Slight
Run-off to watercourses or highways.	Pollution of surface waters by silty run-off can result in silt clogging fish gills, smothering eggs, and killing fish.	Construction of grips, barriers, and straw-filled ditches across the working width; risk assessments and detailed methodologies will be agreed with SEPA to minimise risk; risk assessments and methodologies will be incorporated into a Water Management Plan.	Slight
Water discharge from hydrostatic testing.	Potential pollution of surface waters if contaminated; reduction in oxygenation levels.	No dosing of water will be required; method and location of discharge to be agreed in advance with SEPA with use of settling methods to be considered; control rate of discharge and aeration in accordance with SEPA requirements..	Slight
Pipe trench acting as a conduit for groundwater.	Migration of any contaminants; increase or decrease in level of water table; off-site flooding.	Installation of water stops.	Slight
Fuel, oils, and cement mixtures.	Potential pollution of ground and surface waters or soil; and health implications to fauna.	Careful storage in facilities constructed in line with PPG 02. Stringent controls on storage and refuelling.	Slight

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
		Plant will be regularly checked for leaks and well maintained. Drip trays / plant “nappies” under plant, when not in use. Crews will have spill kits and be inducted in their use. An Emergency Response Plan will be produced in consultation with SEPA. Waste oils will be recycled.	
Contaminated air emissions from Vehicles and combustion plant.	Releases from construction plant and vehicles that are usually diesel-powered.	Regular maintenance of pumps and plant, checking for leaks, etc. Switching off engines when not in use. Traffic management in accordance with the Traffic Management Plan.	None
Dust	Deposits of dust on crops can reduce yields Nuisance to local residents.	Enforced 15mph speed limits on the working width for all vehicles. Use of water to dampen the running track to reduce dust production in areas where dust is problematic.	None
Mud	Mud on public roads is hazardous to road users.	Grips, barriers, etc., used to control sediment run-off. Use of vacuum road sweepers will minimise the risk to other road users.	None
Light	Light pollution affecting local residents or highway users.	Minimal use of lighting; when it is required, it will be suitably located and screened to ensure that it has minimal impact on road users and residents; shrouds will be used to prevent upward glare and to diffuse light.	None
Radiation	Radiation sickness. Infertility	Staff will be inducted to ensure that they are aware of the dangers of radiation. When welds are being x-rayed, an exclusion zone will be set up and a warning siren sounded. The radiation source will be stored in a suitable locked cage.	None

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
		See also Pigging During Operation.	
Noise during general pipeline construction	Disturbance caused to local residents, walkers and horses.	Regulate emissions in line with BS 5228. Identify noise-sensitive locations, principally dwellings. Liaise closely with residents and EHOs. Construction will be confined to 0700–1900hrs Monday to Friday and 0700–1600hrs Saturday as far as practicable (work outside these hours will be agreed in advance with EHOs). It will be ensured that plant is efficiently maintained. Use of additional noise-attenuation measures (e.g. noise barriers) if necessary, in close proximity to sensitive locations; and if overnight work is required or particularly noisy operations are planned, such as rock ‘pecking’.	Slight
Construction of special crossings Piling	Disturbance caused to local residents, walkers and horses.	Liaison with EHOs and local residents. Reduction of the need for 24-hour working as far as practicable. Use of additional noise-attenuation measures, e.g. noise barriers, if necessary.	Slight
Noise during hydro-testing and commissioning	Disturbance to local residents, walkers and horses possible for a limited number of 24 hr days.	Residents will be notified. Use of super silenced equipment where necessary. Venting will be carried out (as far as possible) during normal working hours. Use of additional noise-attenuation measures, e.g. noise barriers, if necessary, in close proximity to sensitive locations.	Slight



<b>Aspect</b>	<b>Impact</b>	<b>Proposed Mitigation Measures</b>	<b>Residual Impact</b>
Temporary traffic noise increases	Disturbance to local residents	Very low impact – no mitigation is required.	None
<b>During Operation</b>			
Pigging activities during operation.	Small quantities of waste requiring disposal.	Handling in accordance with waste regulations. Disposal of any dust in accordance with the <i>Special Waste Regulations, 1996</i> .	Negligible/Slight
Purging	One-off release of natural gas to air with global warming potential.	None available.	None
Unplanned release during operation.	Release of natural gas to air with global warming potential.	Pipeline is a completely sealed system with limited valves, pumps and flanges where fugitive losses can occur. Very low risk of a major unplanned release .	Negligible/Slight

## 11.9 References

BS 5228-4: 1992 'Noise control on construction and open sites – Part 4: Code of practice for noise and vibration control applicable to piling operations.

BS 5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.

Calculation of Road Traffic Noise (CRTN), Department of Transport, Welsh Office, 1988.

Design Manual for Roads and Bridges (DMRB), Highways Agency, 2011.

Institute of Environmental Assessment (1993) Guidelines for the Environmental Assessment of Road Traffic, Guidance Notes No. 1.

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## 12 SOCIO-ECONOMICS

### 12.1 Introduction

The EIA has been undertaken during the initial design phase of The Project and therefore some of the technical aspects of the construction and operation have yet to be determined. Where an alternative option could cause additional impacts, these are discussed within the relevant sections. In addition, the EIA has taken a precautionary approach to adopt conservatism in the assumptions made and any scenarios assumed, so that a reasonable ‘worst-case’ scenario was assessed. Therefore, inherent uncertainties are accounted for and subsequent modifications to The Project during the detailed design phase are less likely to fall outside of the assumed envelope of the assessment parameters.

### 12.2 Consultation

Table 12-1 summarises the consultation responses that have been received to date in relation to the socio economic assessment methodology presented in this section.

**Table 12-1 Socio Economic Consultation Responses**

Consultee	Previous Consultation	Comment	Response to Consultation
Dumfries and Galloway Council	Meetings held on: 15.03.2007 03.07.2007 20.11.2007 24.11.2014 27.02.2015	Minimise impact on Public Rights of Way	MWC will seek temporary closures

### 12.3 Legislation and Policy Context

The pipeline route corridor lies wholly within Dumfries & Galloway Council. Relevant local policies are detailed in Section 4 (Planning).

### 12.4 Assessment Methodology and Uncertainty

#### 12.4.1 Establishment of Baseline Environment

In order to assess the socio-economic impacts of the pipeline, several sources of information, such as the Dumfries & Galloway Local Plan 2014, websites and Ordnance Survey (OS) maps were reviewed for the pipeline corridor, a 1km-wide area of search centred on the proposed pipeline route. Consultation letters seeking information and general comments on the pipeline were issued to statutory and non-statutory consultees, as described in Section 1.

## 12.4.2 Identification and Assessment of Impacts and Mitigation Measures

When making an assessment of significance, the magnitude of change and the importance and/or sensitivity of the receptor have been taken into account.

### 12.4.2.1 Significance of Impact

With respect to potential socio-economic impacts, these have been identified and assessed having regard to consultee responses, the requirements of the local authorities, the magnitude of the impact and the sensitivity of the receptor.

An assessment has also been made of the significance of residual impacts, i.e. those impacts that are predicted to remain after the mitigation measures outlined in this ES have been implemented. When assessing significance, the magnitude of change and the importance/sensitivity of the receptor have been taken into account.

A large magnitude change would be one that is likely to cause a direct adverse permanent or long-term impact on the integrity/value of the receptor whereas a small change would be one that is likely to have a minor adverse impact on a receptor but recovery is expected in the short term.

Table 12-2 details the categories that have been used when classifying overall significance.

**Table 12-2 Significance of Residual Impacts**

Impact	Description	
Very significant	Permanent change to relevant social receptors or the economy, which could have an extensive effect and include areas remote from the development area	<i>Significant Impacts where monitoring may be required</i>
Significant	Permanent or medium to long-term change to relevant social receptors or the economy with changes to areas remote from the site (over several years)	
Moderate	Short to medium-term changes to relevant social receptors or the economy just outside the accepted limits of normal variation with little or contained off-site effects detectable (over a period of several months)	
Slight	Change only just detectable within the site and surrounding areas over a short timescale (over a period of days or weeks)	
None	An impact causing effects that are not readily noticeable	

### 12.4.2.2 Mitigation Measures

Potential impacts and mitigation measures were identified from information received from data collection, consultations, and experience of typical impacts associated with pipeline construction and appropriate mitigation measures previously employed successfully.

### 12.4.2.3 Assessment of Significance of Residual Impacts

An assessment has been made of the significance of residual impacts, i.e. those impacts that are predicted to remain after the mitigation measures outlined in this ES have been implemented, using the process described previously.



### 12.4.3 *Uncertainty and Technical Difficulties Encountered*

Due to the peripheral location of the pipeline corridor (a rural location with limited thoroughfares), the potential impact that pipeline construction may have on tourist attractions in the wider area is minimal. Dumfries and Galloway as a whole is popular with tourists, and the network of minor roads and lanes means that there are variable travel routes to, and through, the area. Consequently, the impact of the proposed pipeline route on travel routes in the area remains uncertain but is unlikely to be significant.

## 12.5 Baseline Overview

### 12.5.1 *Population*

The entire pipeline route lies within the boundaries of Dumfries & Galloway Council. Dumfries and Galloway covers an area of 6,370 square kilometres, with a population of 150,270 people as of 2013 (National Records for Scotland, 2014). The region is divided into four local districts: Nithsdale, Stewartry, Wigtown, and Annandale and Eskdale. The pipeline route lies largely within Nithsdale with a very small proportion within Stewartry. The Nithsdale area accounts for nearly forty per cent of the total population, and it will be this area that is most affected by The Project.

Table 12-3 gives details of the main population centres adjacent to the proposed pipeline route.

**Table 12.3 Local Populated Settlements**

City/Town/Village Name	Distance to Pipeline	Description of Settlement	Local Facilities
Dumfries	2.5km	District centre	PSC
Terregles	250m	Village	H, PF
Lochfoot	500m	Village	Sc, H, PO, S

Key to local facilities:

H	Hall	S	Shop
Sc	School	PF	Playing field
PO	Post office		
PSC	Principal service centre		

### 12.5.2 *Tourism and Recreation*

Dumfries and Galloway offers a wide range of activities to visitors including nature reserves, golf courses, caravan parks, as well as scenic countryside including woodlands and an attractive coastline. In 2011, 0.87 million tourists visit the area, with an average stay of 4.65 nights (Visit Scotland. 2012). Table 12-4 shows the five most popular visitor attractions in Dumfries and Galloway for 2011. However, none of these attractions are located in the area of search.

**Table 12-4 Top Five Tourist Attractions in Dumfries and Galloway (2011)**

Name and Location of Attraction	Number of Visits
Gretna Green Famous Blacksmith's Shop, Gretna Green	723,576
Mabie Forest, Dumfries	135,000
Dalbeattie Forest, Dalbeattie	105,000

Name and Location of Attraction	Number of Visits
Marbie Far, Park, Dumfries	73,913
Cream o’Galloway, Castle Douglas	65,900

Source: Visit Scotland, 2011

### 12.5.3 Core Paths and Cycle Routes

Core paths form key public access routes as part of the Land Reform (Scotland) Act 2003 and are typically the most popular routes within the wider path network.

Information from Dumfries and Galloway Council (Dumfries & Galloway Council 2015) confirms that there are two core paths within the Area of Search, shown in Figure 12.2. The two paths crossed are:

- no. 71 - Terregles to Riddlington Transmitter (via White Hall) – Arduous woodland walk; and
- no. 478 – Maxwelltown to Glenkiln – Farm track.

### 12.5.4 Employment

The general employment profiles of Dumfries and Galloway are displayed in Figure 12.1 and Table 12-5.

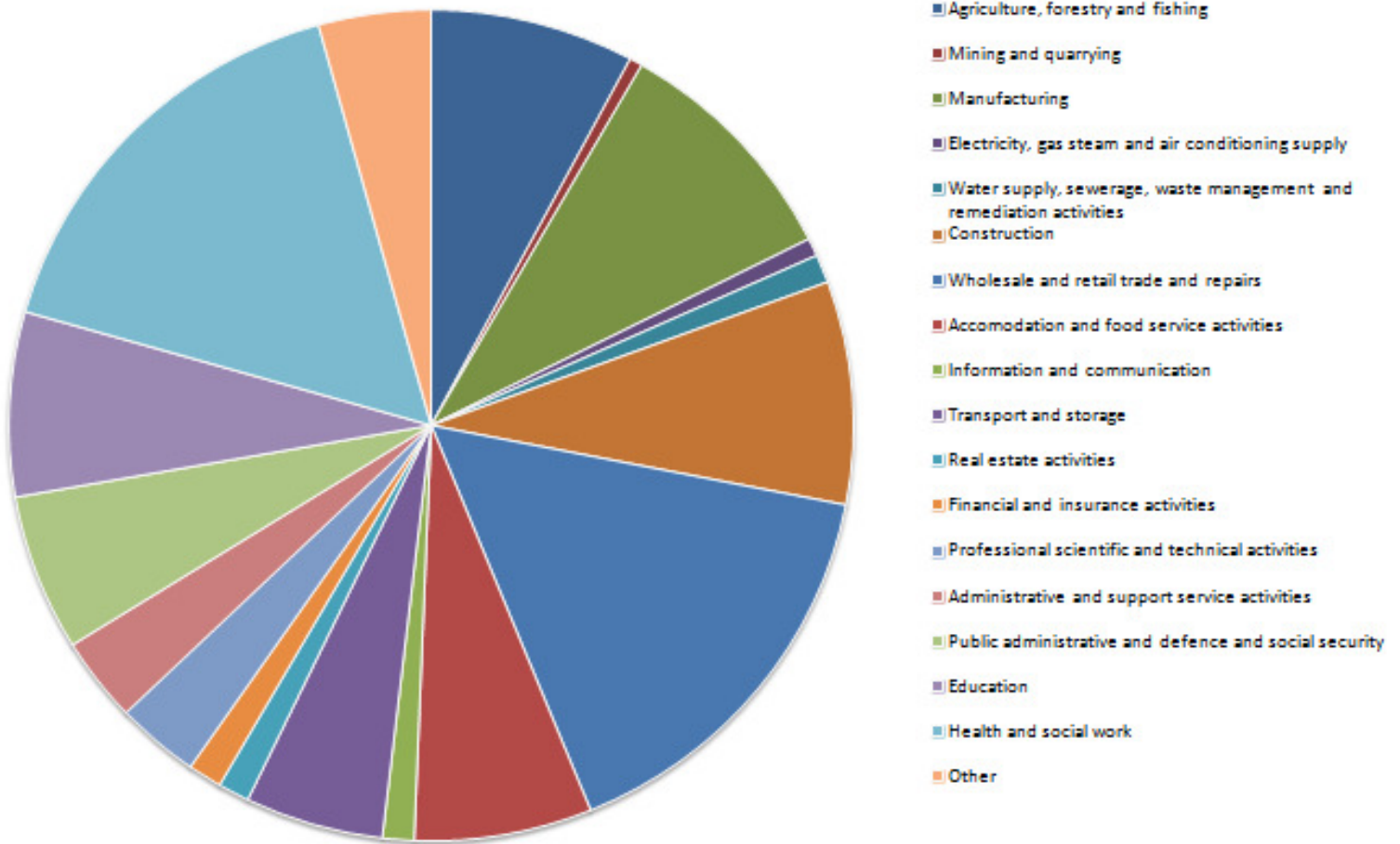
Dumfries and Galloway’s biggest employment sector is wholesale and retail trade and repairs, which employs almost 9,300 (16.8% of all employee jobs compared to the Scottish average of 13.3%). Dumfries and Galloway also has significant employment levels in health and social work (18%), manufacturing (13.45%) with agriculture, hunting and forestry (9%) providing significant, predominantly rural, employment (Census data Scotland, 2011).

A significant area of land in Dumfries and Galloway is rough grazing, and forestry covers more than a quarter of the region. The area has a significant concentration of dairy farms and a substantial milk-processing sector.

The predominately rural areas through which the pipeline route runs are sufficiently close to Dumfries and the main transport network to facilitate commuting for adult members of local communities to travel to and from work. Therefore it is likely that a significant number of rural residents living in these areas work in Dumfries and the surrounding towns in a wide range of employment sectors.

Figure 12.1 Employment Structure

Industries of employment



**Table 12-5 Industry of Employment**

Industry of Employment	Dumfries & Galloway	Scotland
All persons aged 16–74 in employment (excluding full-time students)	70,075	2,163,035
% Agriculture and ,forestry and fishing	7.8	1.7
% Mining and quarrying	0.5	1.4
% Manufacturing	9.3	8
% Electricity and gas and steam and air conditioning supply	0.7	0.8
% Water supply; sewerage, waste management and remediation activities	1.1	0.8
% Construction	8.7	8
% Wholesale & retail trade and repairs	15.8	15
% Accommodation and food service activities	6.8	6.3
% Information and communication	1.2	2.7
% Transport and storage	5.3	5
% Financial and insurance activities	1.3	4.5
% Real estate activities	1.2	1.2
% Professional scientific and technical activities	3.2	5.2
% Administrative and support service activities	3.3	4.3
% Public administration and defence and social security	6.1	7
% Education	7.2	8.4
% Health and social work	16.3	15
% Other	4.3	4.9

Source: Census data Scotland, 2011

Agriculture (together with fishing and forestry) account for more than 33% of businesses in Dumfries and Galloway (Crichton Institute, 2014).

Tourism is of vital importance to Dumfries and Galloway and it is estimated that tourism directly employs some 8,150 people with an estimated annual value of £269 million. During 2011 it is estimated that UK residents took 830,000 tourist trips to Dumfries and Galloway, stayed an estimated total of 250,000 nights and spent £183 per person in the area (Visit Scotland, 2011).

Unemployment in Dumfries and Galloway has reduced in recent years from 9.8% in May 1990 to 8% in 2013; this is above the Scottish average of 7.8%. Significant pockets of unemployment exist in specific parts of the area, for example 2.9% in Nith and 5.2% in North West Dumfries of the population are unemployed (Crichton Institute, 2014). This area also features in the top 10% of the Scottish Index of Multiple Deprivation.

## 12.6 Assessment of Impacts

### 12.6.1 *Economy*

It is likely that there will be temporary positive impacts on the local economy arising from construction of the pipeline. Benefits will arise directly from the construction phase of The Project over the course of several months. A moderate, short-term, positive impact on local suppliers of, for example, construction plant, fencing, re-instatement materials, fuel, consumables, aggregates and seed mixes is anticipated to occur.

Dumfries and Galloway has a high dependence on tourism. Any impact on tourism is likely to occur during construction works, particularly in the summer months. However, this is likely to be short term and limited in extent with slight negative impacts due to noise levels and potential dust nuisance, moderate, negative visual impacts, and slight to moderate impacts on traffic for a limited period.

Agriculture, fishing and forestry provide significant, predominantly rural, employment, which will be impacted upon during construction works. Where the pipeline crosses farmland there will be short-term temporary adverse effects with the addition of some minor delays on the roads. However, compensation will be agreed with regard to farmers' claims for crop loss, and other matters and impacts are predicted to be slight.

In summary, the economic effects of the proposed pipeline will be largely beneficial with an increase in demand for goods and services. In particular, hotels, guesthouse and bed-and-breakfast accommodation will benefit from the contractors working on the pipeline. In the long term, there may be limited employment opportunities. Some impacts upon tourism may be experienced but these are considered unlikely to be significant due to the short-term nature of The Project.

No further mitigation measures are required with regard to economic impacts.

### 12.6.2 *Workforce Patterns and Sources of Employment*

It is anticipated that a labour peak of up to 350 personnel on site will occur during the busiest period for the Interconnector pipeline as a whole, including all contractors and subcontractors (Table 12-6). Whilst it is unlikely that the full 350 personnel will occupy The Project for the full period of construction it is possible that most personnel will be working in the general locale at some point during construction. The labour force required to construct the pipeline will consist of a mix of highly specialised workers, semi-skilled staff and others. These personnel include welders, plant operators, inspectors, supervisors, and management staff.

The majority of the skilled workforce such as welders and inspectors are likely to be sourced from outside the immediate area. Positions such as drivers, plant operators and labourers will be sourced where possible from local contractors and companies. Although a large percentage of the staff employed by the Mains Work Contractor (MWC) and GNI will be taken from the permanent staff of those organisations, some local staff and site labour may be recruited. Typically, local employment opportunities could cover preparation of the pipe stores, haulage, fencing, drainage and security, together with unskilled support across all other disciplines. This will result in a slight to moderate temporary positive impact on workforce patterns and sources of employment.

Employment prospects associated with this gas pipeline are as follows:

- direct employment – employees will largely comprise skilled and semi-skilled construction workers employed over several months; long-term operational staff (employed in care and maintenance duties) will be few;
- indirect employment – local firms will be able to provide services, goods and materials (other than specialised steel line-pipe and fittings) for the construction phase, whilst long-term needs will be met by local firms in the supply of some goods and in carrying out specialised maintenance work; and
- induced employment – local employment and businesses will be supported by persons employed directly and indirectly because of The Project, who would spend part of their income in the local area.

Generally, pipeline construction is only of short-term benefit to the immediate area. However, The Project, together with the Interconnector is an important part of GNI’s long-term development proposals providing an important contribution to sustaining and improving the natural gas infrastructure in Ireland.

Overall, it is anticipated that during construction there will be some slight benefit for the local economy, particularly from the utilisation of local service industries and accommodation for the workforce. However, due to the temporary nature of the work, any effect is likely to be negligible.

No mitigation measures are required with regard to workforce patterns and sources of employment.

**Table 12-6 Typical Direct Pipeline Construction Workforce Levels**

Direct Workforce	Job Descriptions	No:
GNI (UK) Ltd Management Team	Construction Manager, assistants and inspectors	10
Pipeline Contractor’s Management Team	Site Manager, Construction Manager, Engineering Manager, and departmental staff	39
Contractor Workforce	Fencing crew, operators, and supervisor	20
	Top-soil stripping team, banksmen and foreman	15
	Stringing team and supervisor	18
	Pipe-bending team and supervisor	12
	Crossing, sheet-piling and boring teams, etc.	15
	Welding team and supervisors	55
	Pipe-coating team and supervisor	12
	ND-testing team and supervisor	12
	Pipe-trenching team, banksmen and supervisor	15
	Pipe-laying team, tie-in crew, banksmen and supervisors	40
	Backfill and re-profiling team, banksmen and foremen	17
Land-drainage team and supervisor	12	



Direct Workforce	Job Descriptions	No:
	Reinstatement, fencing, hedging and wall-building teams, etc.	38
	Yard team, General deliverymen (fuel and materials' deliveries), etc.	18

### 12.6.3 Tourism and Recreation

#### 12.6.3.1 Tourist Accommodation

Given that a high proportion of the workforce will come from outside the local area, there will be a requirement for temporary accommodation such as at hotels, guesthouses and caravan parks. This is likely to have a moderate positive impact on the local economy.

Temporary living accommodation will be required locally, such as B&Bs, hotels, and self-catering facilities, which generally have below average occupancy rates. This will inject money into the local economy during the period of pipeline construction. Table 12-7 gives details of the accommodation available and the occupancy rates. No mitigation measures will be required in respect of tourism accommodation.

**Table 12-7 Accommodation and Occupancy Rates in Dumfries and Galloway Area for 2013**

	Hotel Room Occupancy (%)	Guest House B&B Room Occupancy (%)	Self-catering Unit Occupancy (%)	Hostel Bed Occupancy (%)	Caravan & Camping Pitch Occupancy (%)
<b>January</b>	46	16	19	21	-
<b>February</b>	56	25	25	30	-
<b>March</b>	62	30	29	43	-
<b>April</b>	65	38	41	43	26
<b>May</b>	75	57	53	56	41
<b>June</b>	80	63	55	56	49
<b>July</b>	80	70	67	59	60
<b>August</b>	86	76	76	67	59
<b>September</b>	80	61	54	50	38
<b>October</b>	73	42	49	42	-
<b>November</b>	62	28	25	30	-
<b>December</b>	52	17	25	23	-
Annual average for Dumfries and Galloway	46	37	44	-	-
Annual/seasonal average for all Scotland	68	45	55	45	45

\* Monthly figures relate to Scotland. Source (Visit Scotland, 2013)

#### 12.6.4 Sites/Areas of Tourism and Recreation

Based on consultations to date, it is anticipated that the impact on existing and proposed future areas of tourism as a result of the pipeline construction and operation will not be significant.

The landscape of Dumfries and Galloway, and its use for outdoor recreation is, however, generally a significant tourist attraction. Therefore, the visual impact of The Project must be managed using the mitigation measures described in Section 9.

### **12.6.5 Core Paths and Cycle Routes**

The proposed pipeline route crosses two identified core paths, shown in Figure 12.2. The two paths crossed are;

- no. 71 - Terregles to Riddlington Transmitter (via White Hall) – Arduous woodland walk; and
- no. 478 – Maxwelltown to Glenkiln – Farm track.

*Minor* temporary, negative and reversible effects on core paths are anticipated during the construction phase. These effects will arise from the temporary closure of the core path for approximately one to two days while the right of way for the pipeline is established. Users of the core paths may experience some noise, dust and visual amenity effects during the construction phase of The Project. Methods of mitigation to limit this effect are described in Section 12.7.

## **12.7 Mitigation Measures**

It is considered likely that short-term positive impacts will result from The Project in terms of the local economy, and so no mitigation is required in that regard.

The main adverse impacts will be experienced by tourism and recreation for the short term that the pipeline is constructed. These impacts primarily relate to disturbance to users of those undertaking general recreational pursuits.

Potential noise and dust nuisance impacts upon recreational pursuits will be dealt with via the measures described in Section 11, which largely consist of employing best practice measures during construction. With respect to impacts upon visual amenity, the reinstatement of the land through re-seeding/re-turfing grasslands, and replacement planting of trees and hedgerows will serve to offset any temporary impacts experienced during construction.

Core paths crossed by the pipeline route will be subject to temporary closure as the pipeline right of way is established. Core paths would be maintained through the construction phase of The Project, with cautionary signage implemented where appropriate in accordance with Policy CF4 (Dumfries and Galloway Council, 2014).

GNI will ensure that the relationship with local residents, landowners/occupiers and other interested parties is well managed and that any concerns are dealt with effectively and speedily. The success of The Project, in practical terms, depends in part on receiving the support of the landowners/occupiers and other directly affected parties. During the detailed design and construction phases of The Project, GNI will therefore ensure that regular contact and consultation with all parties potentially affected by The Project is maintained.

Other measures include:

- compensation – in regards to farmers' claims for crop loss and other matters;