

Designing the Future

Dumfries Southern Bypass STAG 2 Appraisal

Report for SWestrans

In Association With Ironside Farrar



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Introduction

SWestrans Partnership and Dumfries and Galloway Council have been investigating options for improved transport links in the Dumfries South area. To do this an appraisal consistent with the Scottish Transport Appraisal Guidance (STAG) has been undertaken.

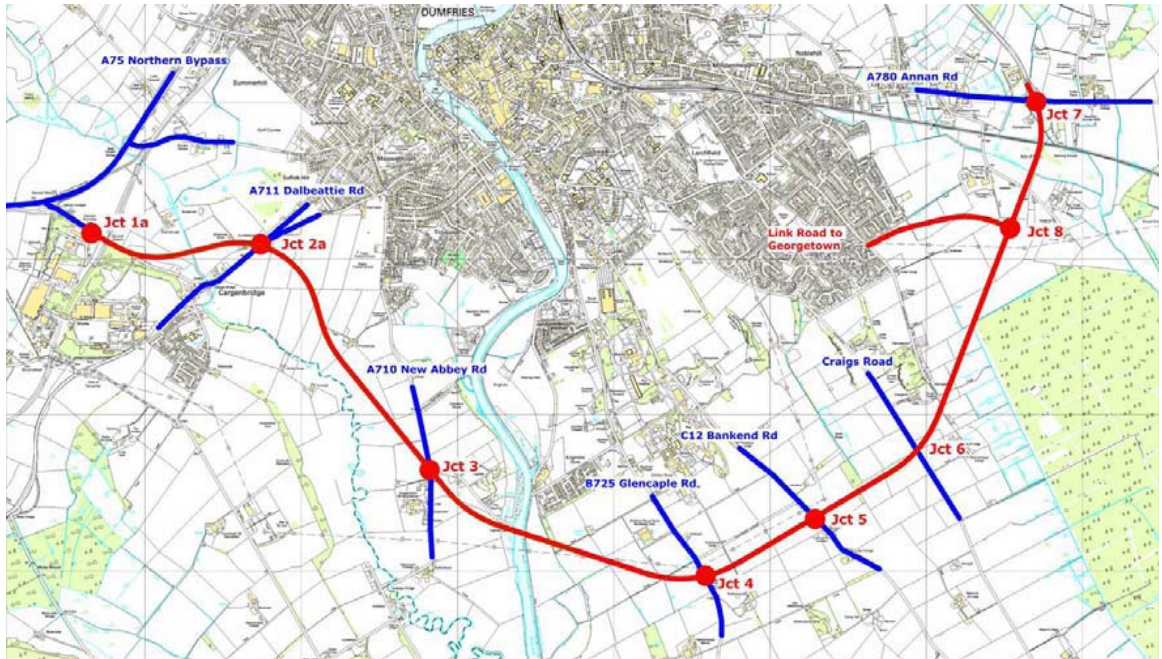
Proposals for enhanced links to the Dumfries South area have been under consideration for a number of years and have enabled a detailed assessment of the benefits and disbenefits to be carried out.

A key focus of the work to appraise improved transport links in this area has been the scope to improve the accessibility of the Crichton area and Dumfries and Galloway Royal Infirmary (DGRI). The area currently suffers from restricted access as a result of the River Nith to the west and physically constrained junctions south of Dumfries town centre. Also, people have to travel through parts of Dumfries town centre to gain access to it which is causing pressure at a number of key junctions, restricting traffic flow, causing congestion and impeding buses.

Given these problems we considered how a Southern Bypass could assist in improving access to these areas by providing a more direct link and removing through traffic from Dumfries town centre. Alternative options including improvements to public transport and other road based proposals were considered but deemed to not offer the same benefits as a Southern Bypass. However, it is likely that complementary measures will be required within Dumfries in order to ensure the benefits which are accrued by the scheme are 'locked in' and not simply eroded by induced traffic.

Possible alignment of the Dumfries Southern Bypass

Work has been undertaken to survey the area where a Southern Bypass would be constructed in order to define a preferred alignment. This work included identifying alternative route alignments, assessing the topography of the area, the consideration of hazards and potential 'showstoppers'. The preferred route alignment is shown below.



Appraisal of the Dumfries Southern Bypass

STAG has defined a set of key criteria against which proposals must be assessed. These are:

- Environment;
- Safety;
- Economy;
- Integration;
- Accessibility and Social Inclusion; and
- Implementability.

The appraisal is carried out in two parts, an initial Part 1 appraisal where impacts are assessed at a high level followed by a more detailed assessment undertaken through the Part 2 appraisal.

The findings from the Part 1 appraisal are summarised in the table below.

Table 1 Initial Appraisal

Environment	Safety	Economy	Integration	Accessibility and Social Inclusion	Implementability
x	x	✓✓	✓	✓	✓✓
KEY	✓✓✓ Major Positive Impact	xxx Major Negative Impact			
	✓✓ Moderate Positive Benefit	xx Moderate Negative Impact			
	✓ Minor Positive Benefit	x Minor Negative Impact			
	O Neutral				

In addition, the scheme was found to perform well against the objectives of the Regional Transport Strategy. In light of these findings it was recommended that the Southern Bypass be subjected to more detailed Part 2 appraisal. The findings from this work are outlined below.

Environment

Through a reduction in through traffic flows particularly in the vicinity of St Michael’s Street/Nith Bank, the scheme will provide a major positive benefit in terms of noise and vibration if the Crichton site was accessed from the preferred alignment. This benefit will be even greater as a result of the traffic generation from the planned development of the Crichton site - only 25% of the site is currently developed with the remaining 75% development proposed from 2009. The decrease in noise and vibration at of St Michael’s Street/Nith Bank has to be balanced against increased traffic on the new route, however population in this corridor is lower and there would be less properties potentially affected.

Impacts on air quality is an important consideration to ensure human health is protected against the adverse effects of long term exposure to air pollution as well as acute effects associated with high pollution episodes. The Dumfries Southern Bypass would remove a large proportion of traffic accessing the DGRI/Crichton area from St Michael Street/Nith Bank, relieving congestion and therefore pollution. The change in traffic flows from the existing routes through Dumfries to the Southern Bypass will shift the air pollution to the new alignment. The reduction in pollution in Dumfries Town Centre has to be balanced against increased traffic emissions on the new route, but population affected is lower.

There are likely to be some adverse impacts on water arising from the scheme which will be at their most significant during the construction phase. The most substantial impact is likely to be in relation to flooding. It is anticipated that mitigation measures will be able to alleviate the majority of impacts on water.

Impacts on biodiversity, ecology and nature conservation are anticipated to range between neutral, negative slight and negative moderate although the exact implications will be dependent upon undertaking detailed design of the route alignment.

Summary

It is anticipated that there will be significant negative impacts on landscape and visual amenity. Landscape impacts will be most acute at the River Nith crossing, within the Regional Scenic Area and at the Craigrudge cutting. Visual impacts will affect a number of residential properties, particularly those with close range views.

Impacts on land-use, agriculture and soils are generally expected to be negligible although some adverse impacts are expected in terms of the loss of agricultural land and resultant impact on farm viability as well as on rights of way.

The effects on cultural heritage are expected to vary between neutral and minor once appropriate mitigation measures are put in place.

Negligible impact is expected on geology.

The results of the environmental appraisal are summarised in the following table.

Table 2 Environment Appraisal

Noise & Vibration	Air Quality	Water	Geology	Biodiversity	Landscape & Visual	Land-use, agriculture & soils	Cultural Heritage	Overall
✓✓✓	✓✓✓	x	O	xx	xxx	x	x	x

Safety

The analysis of safety requires consideration of accidents and personal security. The assessment of accidents identified that the bypass is expected to have a minor negative impact. This is due to the increase in vehicle kilometres travelled when the bypass is constructed.

Pedestrians and cyclists are not directly affected by the construction of the bypass but are likely to experience benefits from a less congested town centre which improves the safety of the environment for them. However, complementary measures are likely to be required in order to ensure that freed up capacity is not lost to induced traffic, which would neutralise any positive impacts for pedestrians and cyclists.

Assessment of security found that there is likely to be a neutral impact arising from the construction of the Southern Bypass as long as high standards of design are incorporated.

The safety appraisal is summarised in the table below.

Table 3 Safety Appraisal

Accidents	Security	Overall
x	O	x

Summary

Economy

The economic appraisal is carried out under two headings:

- Transport Economic Efficiency (TEE); and
- Economic Activity and Locational Impacts (EALI).

Transport Economic Efficiency

The TEE analysis has been informed by extensive traffic modelling. This has confirmed a transfer of traffic from the congested town centre onto the Southern Bypass.

Table 4 TEE Appraisal Summary

	£k, in 2002 Prices
Consumer Benefits/Disbenefits	
Travel Time	89849
Vehicle Operating Costs	4761
Net Consumer Benefits	94610
Business Benefits/Disbenefits	
Travel Time	131344
Vehicle Operating Costs	8982
Private Sector Provider Impacts	Nil
Other Business Impacts	Nil
Net Business Impacts	140326
Carbon Benefits	807
Present Value of TEE Benefits (PVB)	235743

Reference to the above table shows that the Southern Bypass scheme is predicted to provide substantial benefits in and around Dumfries town centre.

Cost to Government

Taking these figures into account, our analysis calculated construction costs of the Dumfries Southern bypass to be in the region of **£35 Million¹**, to which we then applied an optimism bias of 44% which would bring total costs to **£51 Million**. These figures are in 2008 prices.

Additionally, an allowance of **£4.6 Million** should be made to cover maintenance costs over the 60 year period.

¹ All costs are quoted in 2002 prices

Economic Activity and Locational Impacts

We have concluded that the Dumfries Southern Bypass would have a positive impact on the regional economy, and that some of these impacts will be net positive at the “All Scotland” level.

If the continuing development of the Crichton site is supported by the Bypass then this will have positive impacts on expansion of the region’s service sector, which in turn would impact positively on the GVA. There may also be more limited, but nevertheless positive, impacts on the region’s residential and tourist markets and the Bypass will contribute to securing Dumfries’ competitiveness vis-à-vis Carlisle.

The overall economic appraisal is summarised in the table below.

Table 5 Overall Economic Appraisal

Transport Economic Efficiency (TEE)	Economic Activity and Location Impacts (EALIs)	Overall
✓✓✓	✓✓	✓✓✓

Integration

The Southern Bypass would have no significant effect on transport interchange in the area. It will relieve the town centre though and therefore make it easier to interchange between public transport services.

Appraisal against established land-use planning policy in the area found that the Southern Bypass would complement the land-use policies or, at worst, have a neutral effect. As such, there are no “showstoppers” where the development of the Southern Bypass is in contradiction to existing policies.

Assessment of integration with existing transport policy documents found that the Regional Transport Strategy supports the implementation of the scheme. It was concluded that the Southern Bypass would complement national transport policies, or at worst, have a neutral effect.

Wider integration benefits were linked to improved traffic movement in the town centre which would facilitate more active travel for access to and from public transport. This would have benefits for health. In addition, the bypass is expected to contribute to improving rural life by enhancing the quality of life for the car dependent population in the area.

Overall, the integration appraisal is summarised below.

Table 6 Integration Appraisal

Transport Integration	Transport & Land-use Integration	Policy Integration	Overall
0	✓	✓	✓

Accessibility and Social Inclusion

Access to public transport is unlikely to be improved by the construction of the Southern Bypass however reliability and efficiency of existing public transport services would be improved due to the diversion of through traffic away from Dumfries town centre.

The Southern Bypass might cause severance along its route but the areas affected have relatively little interaction across the proposed alignment and appropriate means of providing connectivity, underbridges for example, can be provided where necessary.

The proposal will have a beneficial effect on local accessibility as traffic is diverted away from the town centre. This will allow for better access on local routes, with particular benefits for the north and west of Dumfries which will exhibit reduced traffic levels. The north and west of Dumfries are currently the most deprived parts of the town.

However, it is important to note that the construction of the Southern Bypass, in relieving congestion in Dumfries town centre, may release suppressed demand which has the potential to erode any benefits which are accrued. As such, it is necessary to ensure complementary measures are in place to address this issue, and to 'lock in' those benefits which are generated.

Accessibility analysis has shown that the Southern Bypass facilitates access to the Dumfries South area with an improvement in journey times for trips originating south-west of the town centre. The vast majority of households in the region would experience improved access to employment from the construction of the Southern Bypass whilst the remainder would see no change.

Furthermore, development to the south of Dumfries is likely to increase in future, and it is possible that this expansion will result in a series of uncoordinated residential and commercial streets which may become an 'informal' bypass as traffic utilises these streets to reroute around the town centre. Dumfries Southern bypass would ensure a mechanism is in place to manage such flows, and to keep future areas of development free from such traffic.

The findings from the appraisal of accessibility are summarised in the following table.

Table 7 Accessibility and Social Inclusion Appraisal

Community Accessibility		Comparative Accessibility		Overall
PT Network Coverage	Local Accessibility	People Groups	Locations	
O	O	✓	✓✓	✓

Implementability

There are no obvious technical challenges associated with building the Southern Bypass. All aspects would be feasible to implement using existing design standards and technology and any particular challenges for road infrastructure are already well-known. Whilst it is possible that site-specific difficulties might emerge during detailed design and subsequent construction, these are not foreseen at this stage.

There are no known operational disbenefits associated with the proposal. Indeed, the traffic relief in the town centre is expected to produce operational benefits by improving flow and reducing congestion.

Although it is anticipated that there would be general public support for the scheme, there may be difficulty in obtaining the level of finance required in the current economic climate and as a result of reduced public spending. As such, a robust business case is of great importance.

Conclusions and Recommendations

The discussion and appraisal undertaken to date is summarised in the Table below. This demonstrates that the proposed Southern Bypass would have positive benefits against most of the Government and Planning Objectives, and only minor negative environmental impacts overall.

The conclusions reached on the basis of this appraisal indicate that although there are some minor disbenefits, overall there are many significant benefits associated with the scheme. The modelling undertaken confirmed a significant transfer of traffic from the congested town centre onto the Southern Bypass which is further reflected in the TEE analysis with a BCR of 6.442.

Based on the foregoing, our recommendation would be to proceed with the detailed design stage for the Dumfries Southern Bypass, focusing on the route alignment. Further consideration should be given to ensure any road capacity subsequently released in the town centre environs is exploited with complimentary traffic management measures in order to ensure that the benefits accrued are 'locked in'.

Table 8 Summary of Detailed Appraisal

		Dumfries Southern Bypass	
Planning Objectives	[RTP 1] Improve transport links within Dumfries and Galloway and provide fast, safe and reliable journey opportunities to significant markets including the national economic centres of Edinburgh and Glasgow, as well as England and Northern Ireland	✓✓✓	
	[RTP 2] Contribute to improved economic growth and social inclusion in the region whilst minimising the environmental impacts of transport	○	
	[RTP 3] Support the National transport target of road traffic stabilisation	×	
	[RTP 4] Add value to the broader Scottish economy and underpin national economic growth	✓✓	
	[RTP 5] Assist in getting visitors/tourists to the region from other parts of Scotland, England, Ireland and beyond	✓✓	
	[RTS6] Making it possible for more people to do business in and from Dumfries and Galloway by providing sustainable connections to key business centres in the Central Belt and other locations such as Ayrshire and Cumbria	✓✓	
	[RTS7] Support vibrant places that provide employment, healthcare, educational and other services that people need and want, so that their quality of life is maximised	✓✓	
	[RTS8] Reduce the constraint of peripherality, both between the region’s main settlements and its outlying areas, and between the region and its external markets	✓✓	
	[RTS9] Capitalise on improvements to critical long distance corridors to create new transport services, nodes and development opportunities for Dumfries and Galloway	○	
	[RTS10] Pursue certain transport schemes in the context of local and national economic development, while at the same time recognising wider context of economic, social and environmental imperatives	○	
STAG Criteria	Environment	○ to ×××	
	Safety	×	
	Economy	✓✓✓	
	Integration	✓	
	Accessibility/Social Inclusion	✓	
Implementability		✓	
✓✓✓	Major Benefit	×	Minor Disbenefit/impact
✓✓	Moderate Benefit	××	Moderate Disbenefit/impact
✓	Minor Benefit	×××	Major Disbenefit/impact
○	No Benefit/Impact		

1 Introduction and Summary of STAG 1

1.1 Introduction

- 1.1.1 SWestrans is considering options for improved transport links to the Dumfries South area. Before any such proposal can be progressed further, a full Scottish Transport Appraisal Guidance (STAG) appraisal is required, both at STAG Part 1 and STAG Part 2 level. The proposed new transport infrastructure will be appraised against the Government's five main objectives of Environment, Safety, Economy, Integration, and Accessibility and Social Inclusion.
- 1.1.2 This Report documents the STAG Part 2 Appraisal. The appraisal has been prepared in accordance with STAG Guidance and is intended to inform decision-makers in Dumfries and Galloway Council and SWESTRANS about the next steps they wish to take regarding the Southern Bypass.
- 1.1.3 The production of this appraisal started prior to the STAG "refresh" of June 2008; it therefore follows the previous version of the guidance (from 2005), although wherever possible the opportunity has been taken to incorporate best practice from the refresh.

1.2 Background

- 1.2.1 Dumfries and Galloway is essentially a rural community where car ownership and usage is high. Many of those working, studying or visiting the Crichton, DGRI and surrounding developments are generally car drivers and reside outwith Dumfries or in residential communities on the outskirts of Dumfries.
- 1.2.2 The Dumfries South area is expected to undergo a considerable transformation in the near future. In December 2004, we undertook the Dumfries South Study, on behalf of Dumfries and Galloway Council, to investigate current travel patterns and future interventions.
- 1.2.3 The main aspiration for the Crichton is to develop the site as a centre for education and business. The Dumfries and Galloway Royal Infirmary (DGRI) and Maternity Unit lies north of the Crichton. The DGRI is the key provider of health care in the area and is a busy general hospital. In addition, the Local Plan indicates that the Nithsdale residential area will grow significantly.
- 1.2.4 The area currently suffers from restricted access as a result of the River Nith to the west and physically constrained junctions south of Dumfries town centre. A large proportion of trips to the area are currently being made by private car. Also, as the majority of trips access the site from the north, they are required to travel through parts of Dumfries town centre to gain access. This is currently bringing pressure to a number of key junctions in Dumfries, restricting traffic flow and impeding buses.

1 Introduction and Summary of STAG 1

- 1.2.5 At present, the main access point to the Crichton area is via St. Michael Street and Nith Bank, which is currently a very congested area of the road network. In August 2006 a gridlock situation occurred when the schools re-opened after the summer holidays. St. Michael Street was reported to be at the centre of the problem with cars queuing back in connecting streets. Whitesands, Craigs Road, Brooms Road and Glebe St were amongst those affected. This event prompted renewed calls for a Southern Bypass for the town.
- 1.2.6 In recent years, Dumfries and Galloway Council has successfully obtained funding for a number of traffic management and integrated transport measures which have been successfully implemented within the context of the Scottish Executive's Public Transport Fund.
- 1.2.7 Given the level of growth planned for the Crichton Site and the surrounding area, and the demand for travel to the nearby DGRI, it is evident that those measures will remain short term unless steps are taken to address the medium and longer term travel aspirations of the area.

1.3 Previous Studies

- 1.3.1 In 2004, we undertook the Dumfries South Study on behalf of Dumfries and Galloway Council. The following aims were identified from the outset of this study:
- provide information on travel patterns and travel requirements and desires of users of the Study area;
 - provide assessment tools capable of assessing the current and future traffic impacts of the continued development of the southern sector of Dumfries; and
 - identify and assess schemes or policies which will contribute to the sustainable development of the southern sector of Dumfries.
- 1.3.2 The Study included an extensive consultation exercise, the development of a SATURN traffic model, an assessment of the transport network and the consideration transport improvements.

Transport Improvements

- 1.3.3 In considering the transport problems in the south of Dumfries, solutions were identified which are sustainable and could be developed within Government transport policy objectives and the Council's policies.
- 1.3.4 Therefore, solutions were considered that would contribute to an overall strategy for transport which ensures that car dependency is minimised and the opportunities to use non-car modes is maximised. However, the consultation exercise highlighted that many users of the southern sector area are generally car drivers and will continue to be so. We, therefore, considered measures which could assist car drivers whilst offering opportunities to develop and promote better public transport services and the use of cycling and walking as modes of transport.

1 Introduction and Summary of STAG 1

- 1.3.5 It was therefore considered that the first and most major intervention that would be considered is the **provision of a southern link road or bypass extension**. This would provide a more direct link to the Crichton area and could assist in removing a large volume of traffic from the Dumfries south road network and the town centre. The removal of this traffic would then enable a number of other measures to be considered, including:
- revised traffic signal timings or traffic management to reflect the altered traffic patterns;
 - additional bus priority measures including bus lanes, protected bus stops, bus priority signals etc; and
 - additional facilities for cyclists.
- 1.3.6 Other solutions identified to address the issues highlighted during the consultation exercise include the introduction of park and ride facilities, a high quality bus interchange, park and walk facilities on the outer fringe of Dumfries town centre, parking charges (both in the town centre and at the Health sites), parking management and restrictions, the provision of dedicated staff buses, additional lighting, walking and cycling provision and signage. Softer measures include the introduction of a formal car sharing scheme and staggered working hours.

Initial Appraisal of Southern Bypass

- 1.3.7 Having identified the **potential importance of a Dumfries Southern Bypass** within an overall strategy for transport improvements in south Dumfries, transport modelling (using the 2004 Dumfries SATURN Model) and an economic appraisal were undertaken to determine whether there was merit in considering such a project further.
- 1.3.8 The 2004 Dumfries SATURN Model, updated as part of the Dumfries South Study, provided the base for the traffic modelling undertaken for future years with the inclusion of planned development growth.
- 1.3.9 The results of the modelling showed that under low or high economic growth conditions the Southern Bypass offered a highly positive economic contribution and a satisfactory benefit to cost ratio. More information on the original work to study a possible Southern Bypass is provided in the Pre-Appraisal Report.
- 1.3.10 The study concluded that even though the costs might increase as the scheme was developed in more detail (although 44% optimism bias was already included) and the benefits of the scheme might reduce as off peak modelling or more refined forecasting for future years was considered, **the early indications were that a southern link road scheme would be very worthwhile economically.**

1.4 Existing and Future Problems, Constraints and Opportunities

- 1.4.1 The original Dumfries South Study had established existing and future problems as they were in 2004. The Pre-Appraisal Report revisited these problems to ensure that the original conclusions remained valid.

1 Introduction and Summary of STAG 1

1.4.2 The current and future problems, constraints and opportunities can be summarised as follows:

- inadequate existing route capacity;
- increasing propensity to travel;
- Dumfries and Galloway has a high mode share for car-based travel;
- car availability is high, and is on the increase;
- large queues of traffic inhibit and impede efficient bus service provision;
- unreliable journey times for both car and bus;
- lack of diversionary routes in the event of road closures;
- lack of capacity to cater for future demand;
- need to travel through the town centre even when accessing peripheral health, business and education facilities south of the town; and
- opportunities to further develop Crichton site and wider southern Dumfries area.

1.4.3 As a consequence of these trends:

- congestion in Dumfries town centre is already significant and will continue to increase;
- disbenefits for the local economy, as increased congestion is likely to deter potential investment; and
- increasing difficulties accessing health services, education facilities and job opportunities.

1.4.4 It is against this background that it is necessary to identify suitable study objectives and potential interventions to support these objectives.

1.5 Region Specific Points of Note

1.5.1 Due to the geographic peripherally of the area, coupled with the predominantly rural nature of the region itself, there are high levels of car dependency throughout Dumfries and Galloway. The town of Dumfries is pivotal to the economy of the entire region, as such high quality access routes are crucial to the long term development of the area.

1.5.2 These issues have led to the existing pressures on the local road network around the town of Dumfries as traffic is funnelled into the regional capital. At present there are obvious capacity constraints in the Nith Bank area and also on the two bridges which provide access into the city centre from the west. The Nithsdale local plan highlighted traffic congestion in the south and west of the town.

1.5.3 Throughout the course of the Dumfries South Study, the Pre Appraisal Report and the STAG Part 1 appraisal we conducted extensive traffic modelling. The results of this modelling suggest that the introduction of a bypass is not predicted to generate new trips. Any new trips will be a result of new development in the vicinity, however, the Council will seek proposals to promote sustainable travel for any emerging trips (and suppress the number of car trips) during the development planning application process.

Nithsdale Local Plan

- 1.5.4 The current Nithsdale Local Plan covers the period up to 2009 and outlines land availability for development in and around Dumfries. During the preparation of this document thorough investigation into land-use was undertaken before identifying areas with development potential in the short, medium and long-term. This analysis highlighted that in the short and medium term sufficient sites are available to satisfy future development aspirations, however, in the long-term it is recognised that there may be a shortage of potential sites.
- 1.5.5 The reason for this is two-fold: firstly, undeveloped sites in the centre of Dumfries or situated to the north, which at first glance seem suitable, serve as flood plains for the River Nith. Secondly, development of a number of sites, located to the south and west of Dumfries Town Centre, are currently not included in the Local Plan as traffic congestion in the vicinity of these areas is too severe.

1.6 Transport Planning Objectives

- 1.6.1 Within STAG, a distinction is made between two classes of objectives. Transport Planning Objectives are those objectives established or adopted for the purpose of the study, and which are therefore study-specific. STAG criteria, on the other hand, refer to the five appraisal objectives set out in the National Transport Strategy. These are the over-arching criteria against which competing schemes for public funding may be measured.
- 1.6.2 STAG section 3.6 (Established Policy Directives) recommends policy directives which are already established should be considered during the Objective Setting process.
- 1.6.3 The original Regional Transport Strategy (March 07) for the South West of Scotland Transport Partnership defines its transport objectives within a framework of broader economic, social and environmental objectives. The Pre-Appraisal Report identified the RTS transport objectives specifically related to the provision of a Southern Bypass along with justification for inclusion. A series of tabulations were then presented which set out the relevant policies and objectives before synthesising these into study-specific planning objectives as follows (all to be achieved by 2021):
- [RTS1] Improve transport links within Dumfries and Galloway and provide fast, safe and reliable journey opportunities to significant markets including the national economic centres of Edinburgh and Glasgow, as well as England and Northern Ireland;
 - [RTS2] Contribute to improved economic growth and social inclusion in the region whilst minimising the environmental impacts of transport;
 - [RTS3] Support the National transport target of road traffic stabilisation;
 - [RTS4] Add value to the broader Scottish economy and underpin national economic growth;
 - [RTS5] Assist in getting visitors/tourists to the region from other parts of Scotland, England, Ireland and beyond;
 - [RTS6] Making it possible for more people to do business in and from Dumfries and Galloway by providing sustainable connections to key business centres in the Central Belt and other locations such as Ayrshire and Cumbria;

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- [RTS7] Support vibrant places that provide employment, healthcare, educational and other services that people need and want, so that their quality of life is maximised;
- [RTS8] Reduce the constraint of peripherality, both between the region's main settlements and its outlying areas, and between the region and its external markets;
- [RTS9] Capitalise on improvements to critical long distance corridors to create new transport services, nodes and development opportunities for Dumfries and Galloway; and
- [RTS10] Pursue certain transport schemes in the context of local and national economic development, while at the same time recognising wider context of economic, social and environmental imperatives.

1.7 Optioneering

- 1.7.1 Having established the problems, constraints and opportunities to be tackled, and a framework of Planning Objectives for appraisal, the Pre-Appraisal Report went on to review possible interventions.
- 1.7.2 Sustainable travel is a major consideration for all transport planning, and there is now a marked presumption in favour of schemes which focus predominantly on public transport and minimise interventions which will tend to support or increase car usage.
- 1.7.3 However, the Pre-Appraisal Report demonstrated the relative importance of the car in supporting current travel patterns, which is unsurprising in a predominantly rural region such as Dumfries and Galloway. Investigations for the Regional Transport Strategy have shown that only half of the region's population have access to an hourly (or better) bus service and that three quarters of residents had not used a local bus service in the last month.
- 1.7.4 Accordingly, whilst accepting the need to tackle the challenges of an increasing car culture the RTS seeks to identify a satisfactory balance which supports:
- the deeply rural communities, for whom the car represents a necessity; and
 - the reliance of the regional economy on its strong road links to the Loch Ryan ports.
- 1.7.5 With this in mind we felt that our first option development task was to tackle the question:
- Can the objectives of the study better be addressed by a public transport-based approach rather than a roads-based one?
- 1.7.6 Therefore, the Pre-Appraisal stage identified potential public transport interventions and carried out an initial sift of the generic options (ie, road-based or PT), based on the STAG Criteria and Transport Planning Objectives. This indicated that whilst investment in public transport alternatives may have minor benefits, the value achievable through a road-based intervention is much greater.
- 1.7.7 This reflected the results of the consultation undertaken for the Dumfries South Study, which placed considerable emphasis on the need to address congestion in and around Dumfries. On that basis we feel that we are justified in focusing exclusively on a road-based intervention, as identified following the Dumfries South Study.

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- 1.7.8 Note that a roads-based intervention need not exclude public transport improvements – in fact improved traffic flow in the centre of Dumfries would have positive benefits for bus service speeds and reliability.

1.8 Road Based Alternatives to the Southern Bypass

- 1.8.1 Road based options in and around Dumfries are particularly limited due to the geography of the area and the associated traffic problems on the bridges crossing the River Nith. The concept is to unlock key areas in the south east of Dumfries which include the hospital sites; Dumfries and Galloway Royal Infirmary and the Crichton Estate, and Georgetown to the east.

- 1.8.2 With this in mind we explored 3 road based alternatives to the Southern Bypass:

- Eastern Access Routes;
- Western Access Route; and
- Alternative Access Route.

- 1.8.3 The existing situation was shown to be sub-optimal in the course of the Dumfries South Study. None of the above options are considered to offer a viable solution to the problems identified and, therefore, we now consider the development of a Southern Bypass.

1.9 Options for Southern Bypass Alignment

- 1.9.1 Following the decision to focus exclusively on a road-based intervention in the form of a new Southern Bypass, the Pre-Appraisal report examined alignment options.
- 1.9.2 An indicative Southern Bypass alignment was agreed with Dumfries and Galloway Council as part of the Dumfries South Study. Since this study, additional work has been undertaken to survey the area in order to define a preferred alignment. This work included identifying alternative route alignments, topography of the area, consideration of hazards and potential 'showstoppers'.
- 1.9.3 The Pre-Appraisal report considered the potential route alignments for each section of the Southern Bypass and identified the preferred option to be taken forward to STAG1 appraisal, as indicated in Figure 1.1.

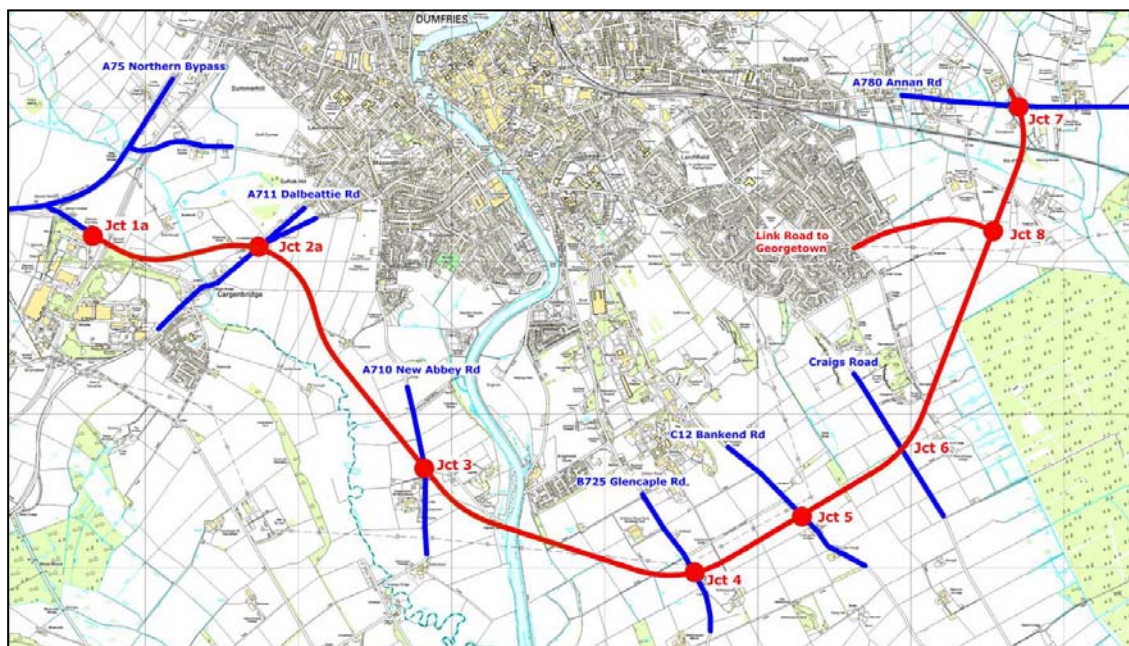


Figure 1.1 Dumfries Southern Bypass Alignment

1.9.4 We then undertook the full STAG part 1 appraisal appraising the identified option as per the guidance against:

- Environmental concerns;
- Safety;
- Economy;
- Integration;
- Accessibility and Social Inclusion; and
- Implementability.

1.10 Compliance with STAG

1.10.1 The introduction of STAG was intended to renew the emphasis on objectivity throughout the transport planning and appraisal process – and in particular ensure that a wide range of multi-modal solutions were identified for the transport problems of a particular area.

1.10.2 The STAG philosophy is also used to help fine-tune particular proposals which have emerged from an over-arching multi-modal investigation. This general approach is illustrated in the following figure. This report complies fully with the STAG philosophy – it is the result of a multi-modal investigation (the Dumfries South Study), it has double-checked for non-road based solutions during the pre-appraisal process, and it has appraised the emerging solution against appropriate transport planning objectives and the five STAG criteria.

1 Introduction and Summary of STAG 1

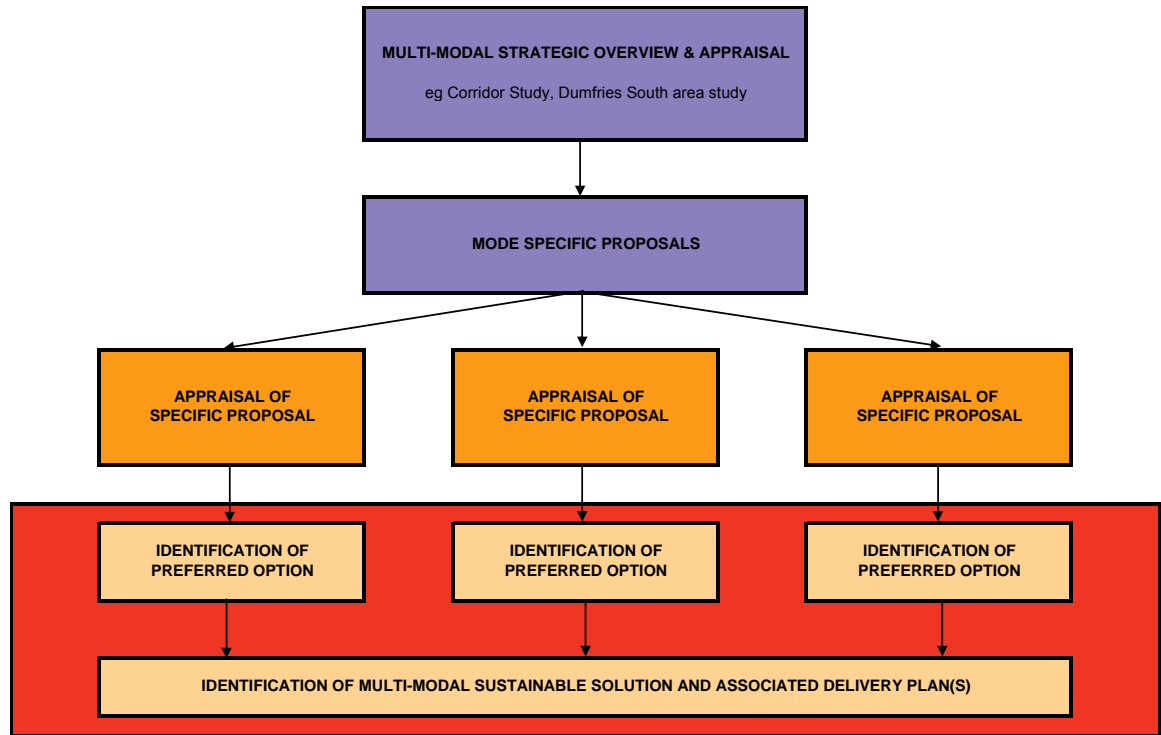


Figure 1.2 Application of STAG in the Project Development Cycle

1.11 Conclusions and Recommendations from STAG part 1

- 1.11.1 Throughout the STAG part 1 approach we appraised the Southern Bypass against the relevant criteria at the end of each specific chapter. These appraisal conclusions have been brought together in Table 1.1. Conclusions illustrate that the proposed Southern Bypass would have positive benefits against most of the STAG Criteria and Planning Objectives, and only minor negative environmental impacts overall.

Table 1.1 Summary of STAG Part 1 Appraisal

STAG Criteria	Environment	x
	Safety	x
	Economy	✓✓
	Integration	✓
	Accessibility/Social Inclusion	✓
Planning Objectives	Improve transport links within Dumfries and Galloway and provide fast, safe and reliable journey opportunities to significant markets, including the national economic centres of Edinburgh and Glasgow, as well as England and Northern Ireland	✓✓✓
	Contribute to improved economic growth and social inclusion in the region whilst minimising the environmental impacts of transport	O
	Support the National transport target of road traffic stabilisation	x
	Add value to the broader Scottish economy and underpin national economic growth	✓✓
	Assist in getting visitors/tourists to the region from other parts of Scotland, England, Ireland and beyond	✓✓
	Making it possible for more people to do business in and from Dumfries and Galloway by providing sustainable connections to key business centres in the Central Belt and other locations such as Ayrshire and Cumbria	O
	Create vibrant places that provide employment, healthcare, educational and other services that people need and want, so that their quality of life is maximised	✓✓
	Reduce the constraint of peripherality, both between the region's main settlements and its outlying areas, and between the region and its external markets	✓✓
	Capitalise on improvements to critical long distance corridors to create new transport services, nodes and development opportunities for Dumfries and Galloway	✓✓
	Pursue certain transport schemes in the context of local and national economic development, while at the same time recognising wider context of economic, social and environmental imperatives	O
Implementability		✓✓
KEY	✓✓✓ Major Positive Impact	xxx Major Negative Impact
	✓✓ Moderate Positive Benefit	xx Moderate Negative Impact
	✓ Minor Positive Benefit	x Minor Negative Impact
	O Neutral	

1 Introduction and Summary of STAG 1

- 1.11.2 On this basis we concluded that a more detailed STAG Part 2 appraisal should be taken forward, building on the considerable detail already identified in the STAG part 1 report.

Recommendations

- 1.11.3 We recommended taking forward the Dumfries Southern Bypass for more detailed appraisal. Based on the scoping undertaken for this initial appraisal, particular emphasis should be placed on investigating:

- the overall balance of environmental impacts, given that some potentially major negative impacts were identified;
- the overall impacts of flooding, including any benefits from reduced traffic in the town centre;
- linking the project with the future direction of local planning and to the overall development plan;
- co-ordination between this project and other key projects identified in the Regional Transport Strategy, so that they all “pull in the same direction”;
- clearly linking delivery of the Southern Bypass to the complementary measures set out in the Dumfries South Study and, particularly, the Regional Transport Strategy;
- the potential value to the Dumfries and regional economies;
- more detailed investigation of potential costs and benefits to refine the benefit/cost ratio; and
- the impact of predicted traffic flows on accidents across the region’s road network.

1.12 Structure of this Document

- 1.12.1 This report follows on from the previously circulated STAG Pre-Appraisal and Part 1 report dated August 2007, the conclusions of which are set out above.
- 1.12.2 This STAG Part 2 appraisal report generally follows the order set out in the latest ScoTAG guidance, although we have moved the discussion of implementability forward in the order so that it immediately precedes our discussion of Risk and Uncertainty, as this appears a more logical position. STAG rightly emphasises the importance of consultation throughout the appraisal process, and accordingly we open this reporting with a brief overview of the approach to consultation adopted, before moving on to each of the five STAG criteria in turn.

2 Participation and Consultation

2.1 General Arrangements for Consultation

- 2.1.1 We arranged to undertake consultation with stakeholders and the public, as well as with statutory consultees.

2.2 Statutory Consultees

- 2.2.1 As part of the environmental appraisal, we undertook consultation with the statutory consultees and received responses from:

- Scottish Water;
- Scottish Natural Heritage;
- Historic Scotland; and
- the Scottish Environmental Protection Agency.

- 2.2.2 These are provided in the accompanying Environmental Note. Where relevant their particular comments are referenced in the Environmental Appraisal (Chapter 3), and their comments reflected in the conclusions reached.

2.3 Public Consultation

- 2.3.1 The consultation took place in Dumfries customer service centre between 10am and 4pm on 5, 6 and 7 March 2009. There were a series of screens on display outlining the proposed new plans as well as a representative each from SWestrans and MVA Consultancy on hand to answer any questions and discuss the project should anyone wish. Visitors were then asked to fill in a questionnaire either on site or if they wished it could be returned by post at a later date.
- 2.3.2 By the end of the response period 311 questionnaires had been returned along with some specific letters.
- 2.3.3 The general feeling at the consultation was in favour of the bypass in principle, with most people feeling that it should have been in place long ago, most notably before the local development of the Crichton area on the southern site of the city - the hospital and university campus were seen as key sources of congestion.
- 2.3.4 Other concerns were that the original northern bypass should have been made dual carriageway and with less roundabouts as these factors prevented it from working properly.

Spread of Respondents

- 2.3.5 The first question established where the respondent came from in order to find an affected range of influence of the bypass. The results are shown in the map below and as expected most respondents come from the Dumfries area (172 within a 2 mile radius of the town centre).

2 Participation and Consultation

- 2.3.6 Question 2 identified an age range of the respondents. The two lower brackets (under 18 and 18-24) evidently did not respond to the public appraisal, yet they are the people most affected by the outcomes as they will live with it the longest. Interest in the appraisal gradually increased with age until the lower limit of 45 where the classes above this shared an equal proportion of returned forms.
- 2.3.7 Perhaps surprisingly, over 55's showed an equal level of interest as the under 55's yet by the time a bypass would come into effect (no sooner than 2020) most if not all of these people would be retired and wouldn't have to use the road network at peak periods, making them less affected by congestion issues.

General Feeling Towards the Proposed Bypass

- 2.3.8 Public feeling towards the bypass proposal was overwhelmingly good with 85% of the sample responding favourably to the idea, 11% being against, and 4% undecided. Taking into account location of the respondent along with their general feeling we can see that most of the people against the bypass did come from the south or centre of the city and would be most directly affected by the proposal.

Likely Benefits of a Bypass

- 2.3.9 The first part of question 4 consisted of four benefits which the questionnaire outlined explicitly and the respondent was asked to agree or disagree whether these were likely benefits. Of the 311 returned questionnaires, 79% indicated the bypass would ease congestion, coupled with 86% feeling that journey times would be reduced. 58% of respondents thought that the proposed bypass would reduce noise and pollution while only 40% felt that the proposed idea would reduce road accidents.
- 2.3.10 Additional to these four suggested benefits, respondents were asked whether they could think of any other likely benefits the scheme would bring. These were quite varied although some of the major thoughts were as follows:
- the bypass would ease congestion in other parts of Dumfries and Galloway (23%);
 - there would be better access to specific points of interest in Dumfries, such as the hospital, university etc. (19%) as well as reduced journey times to the same (17%);
 - the scheme would help stimulate an economic development and encourage growth and tourism (12%);
 - there would be better access to the road network (7%) and also reduced congestion and journey times through the town centre (4%);
 - the bypass would reduce emissions in the town area (3%) and make the town look more attractive (3%) as well as just generally improve Dumfries (2%); and
 - there would be a reduction in stress levels leading to less road rage accidents (3%) and the area would be safer for pedestrians and cyclists (8%).
- 2.3.11 Further details of responses may be found in Appendix D.

Concerns over a Possible Bypass

2.3.12 This was an open question and as such, a variety of answers were returned. The most common answer was that people had no concerns (29%), followed by the feeling that the bypass was needed now, and the proposed wait of 10 years was just too long (14%). Essentially, the principal concern was not about providing the bypass as such, but more about how long delivery would take.

2.3.13 Some of the other concerns are highlighted below.

- the bypass would not be aesthetically pleasing and would increase pollution in the town, therefore detracting from the towns appeal (12%);
- the cost and/or funding could be an issue (9%) or the money could be better spent elsewhere (3%);
- it would result in more congestion (6%) or have little effect on same (3%);
- the bypass would encourage growth away from the town and have a negative economic impact on the centre (4%);
- some respondents queried why the bypass was not linked to other projects, such as the development of a new hospital and university in the south end of the town which was a source of congestion through the city centre (1%);
- there were concerns regarding the route (1%) and proximity to existing housing (2%); and
- some respondents felt that construction would raise issues, such as the effect on disruption of traffic (1%), the need to stick to budget (1%), the need to work around an existing gas pipeline (1%) and the fact that the route would cross flood plains (1%).

2.3.14 Some of these concerns assume a detail of design which the project had not yet reached, and at the consultation effort was made to explain exactly what was being assessed and what stage the scheme was at. For instance, when people had questions about funding it was explained that funding had not been obtained as this scheme at present was not part of the Local Development Plan. Similarly, only a **general** proposed route was shown at the consultation (i.e. a thick red line with no level of detail), and where concerns were raised or any degree of accuracy was assumed (such as seeing how close it would come to a specific person's house) it was carefully explained that this was a proposed route and at this moment no level of detail existed and people should not get caught up in the finer details.

2.3.15 Some attendees at the display indicated that the proposal would have an effect on their property. This was subsequently followed up by SWestrans staff.

Additional Comments on the Proposed Bypass

2.3.16 The final question sought additional comments about the proposed scheme and the responses varied between criticism, questions and proposed alternatives. One of the overriding feelings was that this should have been done long ago (27%), preferably before the re-location of the college and other developments in Crichton (6%), and that the current proposed timeline is too long (7%).

2 Participation and Consultation

- 2.3.17 General support was voiced (3%) for the scheme and was evident in responses such as Dumfries would be brought into the 21st Century (2%), it would become a more attractive town (2%), the bypass would improve the town in general (2%), and that the town centre would be re-opened (1%).
- 2.3.18 Money also became a predominant issue here, with concerns ranging from the fact that funding could be a problem (2%), more money should be invested in other places (5%) such as Public Transport (2%), and why should the public be expected to pay for it (1%)?
- 2.3.19 Some respondents expressed concern over the scheme in that they felt not enough consideration was given to alternatives (5%), or that they felt a bypass was an unimaginative response to the problem (1%).
- 2.3.20 The potential effect on pedestrians and cyclists was an area raised, with a need for safer walking/cycling routes identified (1%) as well as shorter routes (1%), or just general interest in the topic (1%).
- 2.3.21 The actual route to be taken was also discussed, with priority access to Royal Infirmary being a focal point (1%), or the route alignment needing to be re-examined (1%).
- 2.3.22 As well as this, the actual design of the bypass was an area of concern, with respondents feeling a need for 'proper engineering' (6%) i.e. upgrade to dual carriageway, effective roundabouts for HGV (1%). Some people also felt the plan should be introduced in sections rather than opening the whole bypass (4%) to ease congestion sooner.
- 2.3.23 Impact on future growth was hinted at with the need to include land within the bypass as part of the Local Development Plan (1%), no building being allowed outside the bypass (1%) to prevent negative economic impact on the town and 'new build' houses should cease until the bypass is ready (1%).
- 2.3.24 One last issue that was raised was that local people felt a need to be kept informed (1%) and concern was raised that this hadn't particularly happened up to this point.

2.4 Additional Written Responses

- 2.4.1 As well as the questionnaire responses, some organisations/individuals sent in their own responses in writing, adding their own views on the proposed bypass, the scheme to date, and other issues of concern. As these were generally more in depth than the questionnaire catered for they have been treated separately. An outline of these responses follows.
- 2.4.2 A landowner with the benefit of significant local knowledge noted that a number of locations on the possible alignment suffer from localised flooding and indicated possible minor route alterations to circumvent these areas. SWestrans have noted these concerns, which will be fed into any further design stages.
- 2.4.3 One respondent felt that the location of the Royal Infirmary made the Dumfries Bypass a concern for the whole region and that the views of those outside the town should be included in any consultation. It should be noted that the session was announced on local radio and there was no stipulation of needing to live in the town: everyone was more than welcome to attend.

2 Participation and Consultation

- 2.4.4 Secondly they felt that rather than a complete bypass, perhaps a stretch between the eastern end of the current bypass towards the Crichton area would be sufficient.
- 2.4.5 **The** University of the West of Scotland (which has a campus located in Crichton) conveyed the general feelings amongst university staff and students as having limited support for the bypass but greater support for alternative measures such as improving the bus service, or improving the rail service (potentially reinstating a stop at Thornhill).
- 2.4.6 Dumfries and Galloway Council's **Planning, Housing and Environment Services Committee** and the **Nithsdale Area Committee** supported the idea of the Southern Bypass and felt that the benefits of such a scheme would assist economic regeneration in Dumfries and Galloway and address significant traffic management issues in the local area.
- 2.4.7 A number of **local landowners** expressed concern over the lack of communication of specific plans, especially as the location of their land was directly affected by the bypass either by going through it or being close enough to experience increased noise and environmental pollution and the subsequent decrease in property value.
- 2.4.8 They were also anxious that problems with the northern bypass (too close to the town, subdividing major housing developments from the town centre, inability to cope with traffic etc.) would be repeated in the southern scheme.
- 2.4.9 A **local farm owner** expressed a range of concerns (which can be found in the appendices) which are broadly outlined as follows:
- general disturbance;
 - effect on local environment through pollution, noise, disturbance of local wildlife etc.;
 - compensation for land, legal fees, annoyance factor, loss of earning potential; and
 - concerns over local access to town
- 2.4.10 A team Leader (Investment) at **Loreburn Housing Association** Ltd expressed interest in implementation of new housing in conjunction of the new bypass
- 2.4.11 **Denhill Developments Limited** expressed agreement with the need for a Southern Bypass, citing previous recommendations for expansion to the south and west of the town. They suggest that the best way forward is the implementation of a bypass along with an integrated approach to housing within the bypass.

2.5 Conclusion

- 2.5.1 The majority of people who attended the consultation are in favour of a bypass **in principle**. They still have concerns however, most notably environmental impact, route and design choice, funding issues and perhaps most importantly, how does it affect individuals, especially local residents/land owners who live near or on the proposed route.
- 2.5.2 However, this is balanced by the overwhelming agreement that something needs to be done and the fact that a bypass seems like a viable option which will address congestion in the town centre, promote expansion through economic growth and generally make transport easier, most notably in the vicinity of the Crichton and Royal Infirmary.

3 Environment

Government Objective

To protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy.

3.1 Introduction

3.1.1 Ironside Farrar was commissioned as part of our team to undertake environmental assessment under STAG Part 2 for the Dumfries Southern Bypass. The assessment focuses on the proposed corridor for the scheme as per Figure 3.1. This section sets out the Environmental Appraisal of the scheme proposal addressing the potential impacts of a new bypass on the environment and addressing issues of environmental risk, environmental mitigation and environmental performance.

3.2 Sources of Information

3.2.1 Environmental information for the STAG Part 1 was obtained through a desk study of the proposed corridor and included information from the following sources:

- SEPA Website – information on flooding, water quality, groundwater etc;
- SNH Website – SiteLink information on protected species and designated sites;
- National Biodiversity Network (NBN) Gateway Website – protected species data;
- PastMAP Website - digital datasets for cultural heritage sites; and
- UK National Air Quality Archive Website- air quality data.

3.2.2 This data was reviewed as part of the STAG 2 and an assessment made of the likely environmental constraints and issues of the proposed corridor. The following additional sources were used as part of the assessment:

- Dumfries and Galloway Council 'STAG Part 1 Report', 2007;
- Dumfries and Galloway Council 'SWestrans SEA Environmental Report', 2007;
- Air Quality in Scotland – Scottish Government funded source for information on air quality across Scotland;
- Scottish Executive 'Scottish Noise Mapping' – website providing information on the noise maps produced for Scotland;
- Historic Scotland – Spatial Data Website for information on Cultural Heritage;
- Ecological walkover survey undertaken by ECOS Countryside Services to check for ecological value, European protected species and habitats;

3 Environment

- General walkover of the proposed corridor by Ironside Farrar with Dumfries and Galloway Design Services engineers; and
- Topographical Survey maps of the route provided by D&G Council.

3.3 Consultations

3.3.1 Consultations were undertaken with a number of Statutory and Non-Statutory consultees in early 2008. Ironside Farrar requested further information from the following consultees on specific issues identified at STAG1:

- Scottish National Heritage (SNH);
- Scottish Environmental Protection Agency (SEPA);
- Historic Scotland;
- Health and Safety Executive (HSE);
- Scottish Government Rural Payments and Inspections Directorate (SGRPID);
- Scottish Water;
- D&G Council Archaeologist; and
- D&G Planning and Environment.

3.3.2 Consultation responses are presented in Appendix D. Information provided by the consultees has been taken into account as part of this report and within the recommendations for mitigation and further assessment.

3.4 Assumptions Made During Assessment

3.4.1 It is important to set out the assumptions made as part of the assessment process. The STAG part 2 assessment assumes the following:

- the Dumfries Southern Bypass would likely be subject to project level EIA;
- the Dumfries Southern Bypass will be subject to screening with SNH at project level to assess the likely impacts on European Designated sites; and
- mitigation suggested as part of the STAG would be refined by the EIA process and would be included as part of contractual agreements for the construction and operation of the bypass.

3.5 Relationship of STAG to Other Assessment Methods

3.5.1 The requirement for various tiers of environmental assessment is based in UK legislation:

- Environmental Assessment (Scotland) Act;
- Environmental Impact Assessment (Scotland) Regulations 1999; and
- The Conservation (Natural Habitats, &c.) Amendment (No.2) (Scotland) Regulations 2007.

Strategic Environmental Assessment (SEA)

- 3.5.2 A Strategic Environmental Assessment is a requirement under the Environmental Assessment (Scotland) Act 2005. SEA assesses the likely significance of environmental effects of public sector strategies, plans and programmes. The Dumfries Southern Bypass was included in the South West of Scotland Regional Transport Strategy as a potential intervention. This Strategy required SEA and this assessment highlighted that the project would likely require EIA and Appropriate Assessment (AA) (see below) before the project could be implemented.
- 3.5.3 The SEA stated that the project had the potential for the following environmental impacts:
- impacts of the proposed corridor on the Upper Solway Flats and Marshes, which are designated as Site of Special Scientific Interest (SSSI), the Upper Solway Flats and Marshes Special Protection Area (SPA) and the Solway Firth Special Protection Area (SPA);
 - major adverse impacts on: biodiversity, geology, water and cultural heritage; and
 - air quality improvements to Dumfries Town Centre - reassignment of transport to the Dumfries Southern Bypass from Dumfries should not have a negative impact on CO2 emissions.

Environmental Impact Assessment (EIA)

- 3.5.4 Environmental Impact Assessment is a requirement under the Environmental Impact Assessment (Scotland) Regulations 1999, as amended by the Environmental Impact Assessment (Scotland) Regulations 2002 (SSI 2002/324) Environmental Impact Assessment looks at project level impacts.
- 3.5.5 EIA of the proposed scheme may be required to assess in detail the environmental impacts of the proposed corridor and would be required to be undertaken as an integral part of scheme appraisal and design.
- 3.5.6 The process of EIA is used as a means of informing the decision-making process throughout design to avoid potentially significant impacts where practicable and by incorporating mitigation measures to reduce or offset any predicted adverse environmental impacts.
- 3.5.7 An Environmental Statement (ES) would document the environmental impact assessment process and would record the predicted environmental impacts. The purpose of the document is to ensure that the statutory and non-statutory bodies with interests in the environment and the public are fully informed of the proposals.

Appropriate Assessment (AA)

- 3.5.8 European Directive 92/43/EEC (The Habitats Directive) requires competent authorities to carry out an Appropriate Assessment (AA) of plans and projects that, either alone or in combination with other plans and projects, are likely to have a significant effect on European designated sites. The Habitats Directive was transposed into GB law by the 'Conservation (Natural Habitats, &c.) Regulations 1994' which came into force on 30 October 1994 with amendments to the Regulations in 2004 and 2007.

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- 3.5.9 The regulations require that where an authority concludes that a development proposal is likely to have a significant effect on a European site, even if the development is outwith the European site boundary, an appropriate assessment of the implications for the nature conservation interests of the site must be undertaken. This means that Dumfries & Galloway Council, as competent authority has a duty to:
- determine whether the proposal is likely to have a significant effect on the site either individually or in combination with other plans or projects; and if so, then
 - make an appropriate assessment of the implications (of the proposal) for the site in view of that site's conservation objectives.
- 3.5.10 SNH raised the issue of AA in their response to the environmental report submitted for the SEA of the South West of Scotland Regional Transport Strategy. SNH stated that given the likely impacts of the Dumfries Southern Bypass on the Upper Solway Flats and Marshes Special Protection Area (SPA) and the Solway Firth Special Protection Area (SPA) were uncertain, further assessment would be required at individual project level.
- 3.5.11 It is recommended that the issue of Appropriate Assessment is raised with SNH as part of any screening/scoping exercise for an Environmental Impact Assessment.
- 3.5.12 The scheme cannot be consented unless the Appropriate Assessment concludes that the project will not adversely affect the integrity of the Natura Site. If there is uncertainty whether there will be no adverse affect on the integrity of the site, approval can only be given subject to the provisions of Regulations 49 and 53 of the Habitats Regulations i.e. that there are no alternatives or there is a case for Over-Riding Public Interest.

3.6 STAG Environmental Assessment Methodology

- 3.6.1 The assessment of environmental impacts within a STAG appraisal should follow the process outlined below:
- Baseline information - collection of relevant background information;
 - STAG Part 1 – to filter out unsuitable proposals by identifying any major adverse environmental impacts. The outcomes are summarised in the Part 1 Appraisal Summary Table (AST); and
 - STAG Part 2 – a more in-depth environmental assessment of those proposals which have passed through the Part 1 successfully, including the identification of appropriate mitigation measures. The outcomes are summarised in the Part 2 AST.

3.6.2 The STAG 2 assessment focuses on the significant beneficial and adverse impacts that may arise as a consequence of the proposal. The assessment considers the following:

- reference to environmental objectives at National, Regional and Local levels;
- knowledge and experience of the assessment team and project experts;
- use of standard checklists for determining impact significance;
- desk studies and review of published information;
- consultations;
- ecological survey/walkover to establish issues; and
- comparison with other similar transport projects.

Impact Magnitude

3.6.3 When considering the nature of the impacts on the environment the STAG guidance states the importance of considering the type of impact:

- Direct - arises as a result of the proposal;
- Indirect - arises from measures implemented to accommodate proposal;
- Secondary / Induced - arise from a development induced by the proposal;
- Short / Medium / Long Term - the duration of any effects arising from the proposal, less than 1 year are classed as short, over 5 years as long;
- Permanent / Temporary - whilst considering implemented mitigation, is a change reversible or not;
- Positive / Negative - are the measured effects on the environment, resources and receptors beneficial or adverse;
- Cumulative - arise as a result of a number of effects; and
- Synergistic - similar to cumulative, but the ultimate impact is greater than the sum of the individual impacts separately.

3.6.4 Each specialist topic within the STAG has different criteria for predicting environmental impacts and their magnitude but each records impact on a seven point scale as shown below. The assessment methods used will be described in greater detail within each of the sections of this report.

- Negative Major;
- Negative Moderate;
- Negative Minor;
- Neutral;
- Positive Minor;
- Positive Moderate; and
- Positive Major.

Receptor Sensitivity

3.6.5 The sensitivity of the receptor should be assessed as major, moderate or minor. The method for this will be specific to the environmental medium under consideration.

Significance of Impact

3.6.6 Impact magnitude and receptor sensitivity are combined to indicate significance. Impact significance range is described in terms of major/ moderate/ minor/ negligible and combinations (e.g. minor-moderate), adverse and positive. The table below indicates a potential matrix.

Table 3.1 Potential Significance of Impact Matrix

		Value / Sensitivity			
		High	Medium	Low	Negligible
Magnitude	Major Negative	Major Adverse	Moderate Adverse	Minor Adverse	Minor Adverse
	Moderate Negative	Moderate Adverse	Moderate Adverse	Minor Adverse	No Significant Effect
	Minor Negative	Minor Adverse	Minor Adverse	No Significant Effect	No Significant Effect
	Negligible	No Significant Effect	No Significant Effect	No Significant Effect	No Significant Effect
	Minor Positive	Minor Beneficial	Minor Beneficial	No Significant Effect	No Significant Effect
	Moderate Positive	Moderate Beneficial	Moderate Beneficial	Minor Beneficial	No Significant Effect
	Major Positive	Major Beneficial	Moderate Beneficial	Minor Beneficial	Minor Beneficial

3.7 Proposed Scheme Corridor

3.7.1 The consideration of alternative routes was part of a Pre-Appraisal report on the proposal for a Dumfries Southern Bypass. This report identified the preferred option to be taken forward to STAG1 appraisal. The STAG 1 appraisal looked at the issues at a strategic level in relation to the proposed corridor. The STAG Part 2 considers the proposed corridor as shown on Figure 3.1 in greater detail.

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- 3.7.2 The proposed corridor connects into the existing network east of the A75 Northern Bypass to the west of Dumfries, and in the west to the A780 Annan Road. The corridor passes through farmland to the south of Dumfries and crosses the Cargen Pow, and then the River Nith at Kingholm Quay. It crosses the Glasgow to Carlisle Rail line and the Dow Lochar before joining the A780. The bypass will be single carriageway with a 60mph speed limit.

3.8 Environmental Information

- 3.8.1 This section sets out the Environmental Appraisal of the Scheme Proposal addressing the potential impacts of a new bypass on the environment and addressing issues of environmental risk, environmental mitigation and environmental performance.
- 3.8.2 The proposals for an improved transport link to the Dumfries South area have been under consideration for a number of years. Therefore the following environmental assessment of the proposed corridor provides greater detail on likely impacts and mitigation where possible.

3.9 Noise and Vibration

- 3.9.1 To estimate the impact of the Dumfries Southern Bypass on the traffic noise levels we utilised the outputs from the Dumfries SATURN model and calculated L10(18hr) traffic noise levels based on the methodology given in Calculation of Road Traffic Noise (1988). This methodology is recommended in DMRB Volume 11, Section 3, Part 7.
- 3.9.2 Noise levels were calculated on a link-by-link basis for the whole study area. The value calculated was the basic noise level at the source with appropriate correction for percentage of HGV and average speed. No correction was applied for gradient, road surface, roadside development, the effect buildings, the presence of screening, the type of ground cover, reflection and propagation. The noise levels calculated are therefore not suitable for absolute noise assessment, but are designed to be used to compare different schemes.
- 3.9.3 The SATURN model available for the noise assessment is not geo-rectified, ie the model road network does not accurately represent the geographical road alignment on the ground. For this reason the noise level calculations cannot be used to estimate the number of households affected by the change in noise levels. We, therefore, used an alternative approach to assess the impact of the Dumfries Southern Bypass on different parts of the network. We aggregated the road links into three areas and calculated the difference in total noise levels between the Reference Case and the Do Something scenarios. The three areas considered are:
- Area 1 - the wider Dumfries road network;
 - Area 2 - A-roads and other roads of regional significance (including the Southern Bypass); and
 - Area 3 - Dumfries Town Centre.

Table 3.2 shows the results of the total noise level comparison.

Table 3.2 Total Noise Level Comparison

Area	Reference Case	Do Something	Diff. dB(A)	% Diff.
	Total Noise Level L _{10(18hr)} dB(A)	Total Noise Level L _{10(18hr)} dB(A)		
1	43388.9	42791.1	-597.8	-1%
2	4373.9	5270.7	896.8	21%
3	20014.9	19720.8	-294.1	-1%

- 3.9.4 The table shows that the Dumfries Southern Bypass would provide a minor positive impact in terms of noise levels on the wider road network and the Town Centre. An increase in the noise level is predicted on the A-roads and other roads of regional significance, including the Southern Bypass. ***Positive Minor Impact in the Town Centre and wider area with a Negative Major Impact on the regional distributor roads.***

3.10 Air Quality

- 3.10.1 Local Authorities in the UK have been required to routinely review and assess air quality in their area since December 1997 under the National Air Quality Strategy (NAQS). This involves measuring air pollution and trying to predict how it will change over the next couple of years prior to repeat monitoring. The aim of the review is to make sure that the national air quality objectives will be achieved throughout the UK by the deadlines set under the NAQS. This strategy covers a range of pollutants produced by traffic and transport e.g. Nitrogen Dioxide and PM₁₀.
- 3.10.2 Air Quality objectives have been adopted to protect human health from the adverse effects of long term exposure to air pollution as well as acute effects associated with high pollution episodes. The objectives and dates for compliance are presented in Table 3.2.

Table 3.3 Summary of objectives outlined in the Air Quality Limit Values (Scotland) Regulations 2003

Pollutant	Objective	Averaging time	Date to be achieved by
Benzene	5 $\mu\text{g m}^{-3}$	running annual mean	01/01/11
Carbon monoxide (CO)	10 mg m^{-3}	running 8 hour mean	301/01/05
Lead (Pb)	0.5 $\mu\text{g m}^{-3}$	annual mean	01/01/05
Nitrogen dioxide (NO ₂)	200 $\mu\text{g m}^{-3}$ (105ppb) not to be exceeded more than 18 times a year	1 hour mean	01/01/10
	40 $\mu\text{g m}^{-3}$ (21ppb)	annual mean	01/01/10
Particles (PM ₁₀)*	50 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	24 hour mean	01/01/05
	40 $\mu\text{g m}^{-3}$	annual mean	01/01/05
	50 $\mu\text{g m}^{-3}$ not to be exceeded more than 7 times a year	24 hour mean	01/01/11
	18 $\mu\text{g m}^{-3}$	annual mean	01/01/11
Sulphur dioxide (SO ₂)	350 $\mu\text{g m}^{-3}$ not to be exceeded more than 24 times a year	1 hour mean	01/01/05
	125 $\mu\text{g m}^{-3}$ not to be exceeded more than 3 times a year	24 hour mean	01/01/05
	266 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	15 minute mean	01/01/05

*PM₁₀ is approximately equivalent to the ISO thoracic fraction (ie those particles small enough to penetrate to the lung) and represents a log normal sampling efficiency (with respect to particle size) with a median cut off of 10 μm aerodynamic diameter.

- 3.10.3 There are currently no Local Air Quality Management Areas in Dumfries². Consultants routinely monitor air pollution in Dumfries and Galloway on behalf of Dumfries and Galloway Council to check compliance with acceptable levels of Nitrogen Dioxide and. The air quality monitoring station in Dumfries forms part of the UK Automatic Urban and Rural Network for air quality monitoring monitoring for for NO_x/NO₂.
- 3.10.4 With increasing traffic flows and congestion in the vicinity of Michael's Bridge/Street/Nith Bank, it is likely that air quality will deteriorate as traffic levels increase to the DGRI/Crichton University Campus. Currently there are no exceedences of either NO₂ or PM₁₀ based on the 2005 predicted results as per Tables 3.3 and 3.4 below, however, there are predicted exceedences of PM₁₀ in 2010³ These figures do not take into account the additional proposed development in the area nor the traffic generation as a result of this growth which would yield higher emissions. This may result in a greater number of air quality threshold exceedances which may be avoided through the provision of a Southern Bypass coupled with sustainable transport within Dumfries.

² <http://www.airquality.co.uk/archive/index.php>

³ Bureau Veritas, 'Local Air Quality Management – Updating and Screening Assessment', May 2006.

Table 3.4 DMRB results for nitrogen dioxide at significant junctions in Dumfries

Receptor Location/Junction	Predicted (2005) Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)	Predicted (2010) Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)
Edinburgh Road/A75	13.4 (24.3)	10.5 (18.2)
Brooms Road/Annan Road	24.0 (37.3)	18.8 (28.8)
Brooms Road/Leaffield Road	22.2 (33.7)	17.3 (25.9)
St Michael Street/St Michael Street Bridge Road	23.1 (35.4)	17.9 (27.1)
Nith Bank/Craigs Road	19.8 (28.8)	15.5 (22.2)
Buckleuch Street/Glasgow Street	24.5 (38.2)	19.0 (29.2)
Buckleuch Street/Whitesands	24.8 (38.7)	19.4 (30.1)
Objective/EU Limit Value	40	40

Table 3.5 Calculations for PM₁₀ at Significant Junctions in Dumfries

Receptor Location/Junction	2005	2005	2010	2010
	Predicted Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Number of Exceedences of 50 $\mu\text{g}/\text{m}^3$ as a 24-Hour Mean	Predicted Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Number of Exceedences of 50 $\mu\text{g}/\text{m}^3$ as a 24-Hour Mean
Edinburgh Road/A75	15.9	0	13.0	0
Brooms Road/Annan Road	21.9	6	18.1	1
Brooms Road/Leaffield Road	20.6	4	17.2	1
St Michael Street/St Michael Street Bridge Road	21.4	5	17.7	1
Nith Bank/Craigs Road	19.4	3	16.7	1
Buckleuch Street/Glasgow Street	22.7	8	18.6	2
Buckleuch Street/Whitesands	22.9	8	18.7	2
Objective	40	35	18	7

3.10.5 To quantify the emissions impact of the Dumfries Southern Bypass would exhibit on the Dumfries road network, we utilised a SATURN model in conjunction with our emissions software ENEVAL. To enable us to evaluate and understand the emissions impacts to a greater extent we disaggregated the network into the following 3 specific areas:

- the wider Dumfries road network;
- Dumfries Town Centre; and
- A-roads and other roads of regional significance (including the Southern Bypass).

3.10.6 Annual regional emissions calculations for CO, NOX, HC, PM10 and CO2 are based on the methodology for overall impact assessment as defined in Annex 2 Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, February 2003 (Reference [1]). Following the latest version of the DMRB guidance (May 2007), the Carbon Dioxide emissions have been replaced by emissions of Carbon. Table 3.5 below presents the annual emissions by:

- Carbon Monoxide (CO);
- Hydrocarbon Pollutants (HC);
- Oxides of Nitrogen (NO_x);
- Particulate Pollutants (PM₁₀); and
- Carbon.

Table 3.6 Annual Emissions by Area (Tonnes)

Area	CO	HC	NO _x	PM ₁₀	Carbon
2020 Reference Case					
Wider Area	201.86	22.98	53.68	2.35	3.50
Regional Roads	102.89	10.27	48.55	2.26	2.83
Town Centre	64.10	7.74	17.05	0.63	0.97
Total	368.85	40.98	119.29	5.24	7.30
2020 Do Something (with Bypass)					
Wider Area	171.09	19.66	52.12	2.22	3.30
Regional Roads	137.12	13.94	61.65	2.80	3.56
Town Centre	54.22	6.86	16.85	0.59	0.89
Total	362.43	40.46	130.61	5.61	7.76
Difference (DS-RC)					
Wider Area	-30.77	-3.32	-1.57	-0.13	-0.20
Regional Roads	+34.23	+3.67	+13.10	+0.54	+0.73
Town Centre	-9.88	-0.88	-0.21	-0.05	-0.07
Total	-6.42	-0.53	+11.33	+0.36	+0.46

3.10.7 In summary, the Dumfries Southern Bypass would provide a positive impact in terms of emissions on the wider road network and the Town Centre in particular. The change in traffic flows from the existing routes through Dumfries onto the regional distributor roads and the Southern Bypass will shift the displace out of the town centre.

- 3.10.8 The reduction in pollution in Dumfries Town Centre has to be balanced against increased traffic emissions on the new route, but population affected is lower. ***Positive Major Impact in the Town Centre and wider area with a Negative Minor Impact on the regional distributor roads.***

3.11 Water Quality, Drainage and Flood Defence

Introduction

- 3.11.1 There are three watercourses within the preferred alignment of the Dumfries Southern Bypass: The River Nith, the Cargen Pow and the Dow Lochar. Each of these watercourses and their floodplains is crossed by the proposed corridor alignment.

Methodology

- 3.11.2 The assessment for water quality, drainage and flooding was based on the following:
- Desktop investigation using OS maps, British Geological Survey maps including:
 - Hydrology Map of Scotland (British Geological Survey (BGS), 1988);
 - Groundwater Vulnerability Maps (SEPA 2005);
 - BGS Lochmaben Scotland Sheet 10W Drift Edition, 1:50,000 scale; and
 - BGS Thornhill Scotland Sheet 10E Drift Edition, 1:50,000 scale;
 - consultations with relevant statutory bodies (SEPA, Scottish Natural Heritage, Scottish Water);
 - guidance from DMRB Volume 11 Section 3 Part 10 (HA 216/06) Road Drainage and the Water Environment;
 - water quality data from SEPA;
 - SEPA Indicative Flood Map;
 - Nith Catchment Management Plan, SEPA;
 - review of Scottish Water utilities and existing drainage within the area as supplied by Scottish Water;
 - Scottish Planning Policy (SPP) 7 Planning and Flooding;
 - Planning Advice Note (PAN) 61 Planning and Sustainable Urban Drainage Systems;
 - PAN 79: Water and Drainage;
 - Sustainable Urban Drainage Systems. Design Manual for Scotland and Northern Ireland. CIRIA C521; and
 - Sustainable Urban Drainage Systems. Best Practice Manual. CIRIA C523.

3.11.3 The assessment comprises several interconnected components:

- description of current water environment: quality, quantity and location of surface water and groundwater features;
- consideration of potential impacts arising from proposed scheme during construction and operation;
- descriptions of proposed mitigation measures; and
- assessment of residual impact significance.

3.11.4 The significance of impacts on water quality and drainage was determined using the criteria provided below in Tables 3.6 and 3.7, i.e. impact significance determined by a combination of receptor sensitivity and impact magnitude.

3.11.5 The qualitative assessment of sensitivity of all water resources took into account the environmental importance of several attributes including:

- conservation value;
- scale;
- rarity;
- substitutability;
- flood risk;
- vulnerability; and
- economic value (abstractions, use of river).

3.11.6 Table 3.6 defines the criteria that were used to assign receptor sensitivity.

Table 3.7 Receptor Sensitivity Criteria

Sensitivity	Example Criteria
Major	<ul style="list-style-type: none"> ■ A watercourse with pristine/near pristine (River A1/A2) quality; ■ Water quality which does not affect diversity of species of flora and fauna; ■ All sites with international and European nature conservation designations, eg SPAs SACs, EC designated freshwater fisheries; ■ All nature conservation sites of national importance designated by statute including SSSIs and National Nature Reserves; ■ Large scale importance of resource; ■ Rare resource; and ■ Irreplaceable within an acceptable timeframe.
Moderate	<ul style="list-style-type: none"> ■ A watercourse with a measurable degradation in its water quality as a result of anthropogenic factors, a Class B (river); ■ Water quality has only limited impact upon the species diversity of flora and fauna in the watercourse; ■ All non-statutory designated sites of regional or local importance; and ■ Medium scale importance of resource.
Minor	<ul style="list-style-type: none"> ■ Poor water quality resulting from anthropogenic factors, Classes C and D; and ■ Major change in the species diversity of flora and faune due to the significant change in the water quality.

3.11.7 Table 3.7 defines the criteria used to evaluate impact magnitude.

Table 3.8 Impact Magnitude Criteria

Magnitude	Criteria	Example
Major (adverse)	Loss of attribute	<ul style="list-style-type: none"> ■ Major shift away from the baseline conditions; ■ Fundamental change to water quality, e.g. downgrading from Class A to C or D, or from B to D; ■ Loss of an EC designated Salmonid fishery; and ■ Pollution of potable source of abstraction.
Moderate (adverse)	Impact on integrity of attribute or loss of part of attribute	<ul style="list-style-type: none"> ■ A significant shift from the baseline conditions that may be long-term or temporary; ■ Results in a change in the ecological status of the watercourse, e.g. downgrading one class; and ■ Loss in productivity.
Minor (adverse)	Minor impact on attribute	<ul style="list-style-type: none"> ■ Minor shift away from the baseline conditions; and ■ Changes in water quality are likely to be relatively small or be of a minor temporary nature such that watercourse ecology slightly affected e.g. minor but measurable change within a class
Negligible	Impact will occur but of insufficient magnitude to affect the use/integrity	<ul style="list-style-type: none"> ■ Very slight change from the baseline conditions such that no discernible effect upon the watercourse’s ecology results; ■ No change in classification; and ■ No increase in flood risk

3.11.8 Table 3.8 presents the matrix for the derivation of the significance of impact from receptor sensitivity and impact magnitude.

Table 3.9 Significance of Impact Matrix

		Receptor Sensitivity		
		Minor	Moderate	Major
Magnitude of Impact	Major	Moderate	Moderate/Major	Major
	Moderate	Minor/Moderate	Moderate	Moderate/Major
	Minor	Negligible	Minor	Minor/Moderate

Legislation & Guidance

- 3.11.9 The Water Framework Directive (2000/60/EC) is a major piece of European legislation. Its overall objective is to bring about the effective co-ordination of water environment policy and regulation across Europe in order to:
- Prevent deterioration and enhance status of aquatic ecosystems, including groundwater;
 - Promote sustainable water use;
 - Reduce pollution; and
 - Contribute to the mitigation of floods and droughts.
- 3.11.10 The Directive came into force in December 2000 and is transposed into Scots Law through the Water Environment and Water Services (Scotland) Act 2003 (WEWS) and Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR). Historically, the main European legislation that has been concerned with groundwater protection is the Groundwater Directive (80/68/EEC). This Directive is expected to be revoked by the Water Framework Directive in 2013.
- 3.11.11 CAR regulates discharges to the water environment, including groundwater, through a system of authorisation; licences (for the highest discharges such as larger sewage discharges) registrations for discharges of lower risk (such as small-scale sewage discharges) and general binding rules (for low risk discharges such as small-scale Sustainable Urban Drainage Systems (SUDS)).
- 3.11.12 To help meet these needs, the Government has set standards for water quality. The Scottish Environment Protection Agency (SEPA) is responsible for monitoring, maintaining and enforcing these standards. SEPA's Groundwater Protection Policy for Scotland (Dec 2003) provides a general framework for the management and protection of groundwater in Scotland.
- 3.11.13 Since April 2006, CAR also establishes SEPA control regimes over aquatic engineering activities. There are a range of levels of authorisation depending on the works to be carried out, but for any permanent river diversion, straightening, channelization, re-sectioning > 2m and any culverting for land gain, a complex licence will be required.

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- 3.11.14 The WEWS includes amendments to Section 1 (duty of Scottish Water to provide for sewerage) of the Sewerage (Scotland) Act 1968 (c.47) ("the 1968 Act") regarding construction standards for SUDS. For all new developments SUDS are now required for surface water systems which provide attenuation and treatment prior to return, by natural dissipation where possible, to the water environment.

Baseline Information

Surface Water Features

- 3.11.15 There are three main watercourses within the proposed corridor: The River Nith, Cargen Pow and Dow Lochar. These watercourses are shown in Figure 3.2

River Nith

- 3.11.16 The Nith catchment covers an area of approximately 1,230 km² and is the largest river in south west Scotland. The River Nith is tidal up to Dumfries and discharges into the estuary of the Solway Firth. The water quality in the Nith is classified by SEPA as being A2 (good). The River Nith is an important river for salmon and sea trout in Scotland, and provides a habitat for a wide range of other species. The ecological importance of the Nith and the Solway Firth is discussed in the Ecology Section 3.13.



Cargen Pow

- 3.11.17 The Cargen Pow is a tributary of the River Nith located to the SW of Dumfries. The tributary is crossed by the proposed route at Cargenbridge and joins the main river at Islesteps. The Cargen Pow was designated by SEPA as a designated sensitive area for Urban Waste Water Treatment in 2006. A new reed-bed system has recently been constructed in the vicinity of Islesteps, close to the point where the proposed corridor crosses the Cargen Pow.

Dow Lochar

- 3.11.18 The Dow Lochar lies to the west of Dumfries and the proposed bypass corridor. The Dow Lochar joins the Lochar Water before directly discharging into the Nith Estuary and Solway Firth.

Un-named Ditches & Field Drains

- 3.11.19 The proposed corridor crosses a number of field drains and drainage ditches. These will need to be addressed during the detailed design of the bypass to ensure adequate drainage is maintained.

Marsh/Wetland Areas

- 3.11.20 There is saturated marshy ground associated with the river floodplains, where the water collects prior to discharge into the field drains/ ditches and watercourses.

Water Quality in Dumfries and Galloway

- 3.11.21 According to the Scottish Environment Protection Agency (SEPA) Water Classification Scheme, Dumfries and Galloway has a good level of water quality in relation to Scotland as a whole with 40.6% of rivers being of 'excellent' quality and 41.1% being classed as 'good' under the SEPA system of water quality classification where:

- A1 – Excellent;
- A2 – Good;
- B – Fair;
- C – Poor;
- D – Seriously Polluted; and
- U – Unclassified.

- 3.11.22 The water quality of both the River Nith and the Cargen Pow which are crossed by the proposed corridor are classed as A2 (good) whilst the Dow Lochar is classed as C (poor). The Cargen Pow is classed as eutrophic and is therefore sensitive to nitrate pollution.

- 3.11.23 The overall sensitivity of the water resource to impacts is assessed as major.

Flooding

- 3.11.24 Scottish Planning Policy SPP7 Planning and Flooding advises that new built development should be secure against flooding from all causes with an acceptable risk, that the development should be sustainable in relation to flooding and drainage, and that the development should have no adverse impact on the flood risk elsewhere. SPP7 further advises that undeveloped land at what is termed 'medium to high' risk of flooding is generally not suitable for new development and that land that has the potential to provide floodwater storage should not be developed if the loss of storage would adversely impact on flood risk elsewhere.

- 3.11.25 Both land regarded as being at medium to high risk of flooding and land that might be regarded as functional floodplain because of its importance as potential floodwater storage are defined as land with an annual probability of flooding no greater than 0.5%, more usually known as the 200 year return period event.

- 3.11.26 From the SEPA Flood Map (Indicative 1:200 year) there is both river and estuarine flooding affecting the Nith and river flooding on the Cargen Pow. The Dow Lochar also suffers from river flooding during this flood return period. The SEPA Map is given in Figure 3.3. In accordance with SEPA's recommendations given the potential flood risk of the area, a route-specific flood risk assessment will be required.

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- 3.11.27 There are an additional number of small watercourses that are not shown on the floodmap, but that SEPA advise could pose a flood risk and would also need to be considered as part of a detailed flood risk assessment for the site.
- 3.11.28 Much of the land in the vicinity of the proposed route is defined as being functional flood plain. As described above, the flood plain already experiences flooding thus the road would likely need to be constructed on embankments for flood protection. Storage of flood waters along the proposed corridor will also need to be considered as part of the detailed design.
- 3.11.29 The sensitivity of the floodplain to change for the purpose of assessment is major.

Drainage

- 3.11.30 Much of the area along the length of the proposed route is associated with both the Cargen Pow and the River Nith. At the eastern extent of the proposed route the Dow Lochar is crossed. Information provided by Scottish Water and SEPA has been used to inform the assessment of the baseline drainage situation.
- 3.11.31 The topography of the study area produces an overall drainage direction from the north to the south towards the Solway Firth.
- 3.11.32 To the south of the proposed route at the cross-over of Bankend Road, there is a Waste Water Treatment Works, a possible destination for rain water run-off from the route. The proposed route crosses a series of drainage pipes and channels within the cultivated areas of the route, both of which would allow road- run-off to be easily contained.
- 3.11.33 Existing Scottish Water utilities are likely to require protection or diversion as part of the detailed design for the bypass:

Sewers

- Garroch Loaning – Pumping Line;
- Cargenbridge - Pumping Line;
- Airds Point Strategic Trade Effluent Pumping Line from DuPont;
- Millburn Surface Water; and
- Sewage Pumping Line (Private) from Shell Garage and Little Chef.

Water Mains

- Garroch Loaning;
- A711 Dalbeattie Road;
- A710 New Abbey Road;
- Junction of Stanehouse Loaning with Glencaple Road (B725);
- Bankend Road;
- Cairn of Craigs;
- Georgetown Road;

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- Newfield; and
- Junction with A780/A75.

3.11.34 Drainage for the proposed bypass will be an important consideration for the detailed design given the importance of the proposed corridor in terms of flood attenuation and linkages between drainage and groundwater/surface water quality.

3.11.35 The sensitivity of the existing drainage to change for the purpose of assessment is major.

Groundwater

3.11.36 Much of the groundwater in the floodplains of the Cargen Pow and the Nith is classed as vulnerable by SEPA as part of their groundwater vulnerability mapping with much of the region being 'most vulnerable' or classification 1. The floodplain of the River Dow Lochar is less vulnerable and the areas of land in between these floodplains within the preferred alignment are Class 3 and are therefore of medium sensitivity.

3.11.37 This vulnerability is a result of the importance of the aquifers in the region: "The Permian basin of Dumfries is one of Scotland's most important aquifers. "Groundwater from the aquifer provides much of the town's domestic and industrial water supply, through both private abstractions and public supply. The aquifer also provides water for two large fish farms, various dairy and arable farms and a mineral water company." The location of the aquifer is shown on Figure 3.4.

3.11.38 There are two groundwater monitoring sample points in operation in the vicinity to the preferred bypass alignment at Larchfield (NGR 9803 7505) and Crichton B (NGR 9783 7326). These show high exceedance levels for phosphate, ammonia (both sites) and nitrate (Crichton only). This pollution is attributed to agriculture on the surrounding land and the application of nutrients e.g. fertiliser.

3.11.39 The sensitivity of the groundwater for the purpose of assessment is major.

Environmental Impacts

3.11.40 The proposed scheme includes the development of a new southern bypass for Dumfries. This will involve the replacement of some of the natural land cover with the road and any proposed junctions which will increase the impermeable surface area. The proposals will incorporate SUDS offering a level of retention and treatment. No surface water drainage will discharge from the road directly into any watercourse.

Surface Water Quality & Groundwater Quality

3.11.41 Based on the guidance available, potential impacts on surface water quality and groundwater quality are identified as:

During the construction phase potential impacts include:

- earthworks and construction may pollute nearby watercourses with sedimentary material or construction materials;
- earthworks may mobilise pollutants in soil and allow them to contaminate nearby water resources through surface water run-off and percolation to groundwater;
- earthworks may alter the hydrology of nearby water features resulting in changes to flood risk;
- accidental physical damage to banks/ stream beds may affect flow characteristics;
- pollution from accidental spillage of fuels, hydraulic fluids and lubricants;
- pollution due to vandalism of stores or plant;
- contaminated groundwater may pollute surface water bodies;
- foul drainage from washroom facilities, wheel washing, etc. impacts on receiving waters;
- works to culverts may allow sediment/ construction materials to pollute watercourses; and
- temporary diversion of watercourses to allow culvert work to take place may impact on the ecological quality of the watercourse and free passage of fish and mammals.

During the operational phase potential impacts include:

- increased volume and rate of surface runoff from impermeable road surface affecting flow characteristics or causing soil erosion;
- pollution of groundwater (and eventually receiving watercourses) from accumulated contaminants in runoff from these surfaces e.g. litter, fuel, dust, surfactants, pesticides and herbicides, salt;
- changes to the permeability of surface cover may impact on the underlying hydraulic regime and groundwater recharge;
- surface drainage schemes may alter the flow characteristics of nearby watercourses and the water levels in nearby marshy areas;
- contaminants in routine run-off or accidental spillage from the road could reach groundwater or migrate to nearby surface waters;
- the distributor road will have greater impermeable surface area than the natural ground cover and thus greater volume of run-off;
- road drainage arrangements such as new outfalls may alter flow characteristics of receiving waters; and
- road drainage arrangements may alter water levels in surrounding marsh/ bog areas.

Flooding

3.11.42 The threat of flooding will directly impact on the proposed corridor in terms of specification for the road and the crossing points. The lengths of route across the floodplains could be at risk of flooding, whilst all bridges/crossing points will have to be designed to accommodate flood flows taking into account current and future climate scenarios. Approximately 1.5km of the preferred alignment lies within land classed as floodplain and may be a constraint to the final alignment.

Drainage

3.11.43 Any major development has the potential to affect the water environment, both directly on site and indirectly in the wider catchment area. Impacts can be divided into effects on surface water and groundwater. The road design should include a strategy for a sustainable drainage system (SUDS). The SUDS approach specific to the road should outline proposed design criteria and objectives and provides for a number of retention ponds to both attenuate and treat surface water flows during the construction and operational phases, in accordance with SEPA requirements. An increase in the rate of river levels rising has been attributed to the increase in hardstanding, including roads, within river catchments. Thus, the efficacy of any attenuation system to be incorporated into the scheme should be ensured prior to completion of the proposed corridor.

Summary of Environmental Impacts

3.11.44 Potential impacts are likely to be at their most significant during the construction phase. The impacts of the proposed scheme on the water environment and drainage are summarised in Table 3.9 below.

Table 3.10 Summary of Impacts on Water Quality and Drainage

Receptor	Sensitivity	Magnitude	Character/ Probability	Impact Significance
Surface Water Quality	Major	Minor	Adverse, Temporary, Mitigated, Minor Risk	Minor/Moderate
Groundwater Quality	Major	Minor	Adverse, Temporary, Mitigated, Minor Risk	Minor/Moderate
Flooding	Major	Moderate	Adverse, Temporary, Mitigated, Minor Risk	Moderate
Drainage	Major	Minor	Adverse, Temporary, Mitigated, Negligible Risk	Minor/Moderate

Mitigation

- 3.11.45 In progressing the Dumfries Southern Bypass it is important that impacts to the water environment are acknowledged and detailed assessment undertaken at the appropriate stages to inform road design.

Flood Risk

- 3.11.46 A flood risk assessment should be undertaken at the detailed design stage. Provided the recommendations of this are adopted, there should be negligible impact on the flood storage capacity of the proposed corridor.
- 3.11.47 The SUDS features as outlined below will be designed to ensure adequate capacity to address the flood risk.

Proposed Drainage - SUDS

- 3.11.48 In view of the importance of maintaining water quality of the Nith, Dow Lochan and Cargen Pow considerable care will need to be taken with the design of the drainage to prevent pollutants entering the water system. Planning Advice Note (PAN) 79 Water and Drainage provides advice on good practice in relation to the provision of water and drainage in a planning context. PAN 61 provides guidance for Planning and Sustainable Drainage Systems.
- 3.11.49 Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Drainage Systems (SUDS). These systems are more sustainable than conventional drainage methods because they:
- manage runoff flow rates, reducing the impact on flooding;
 - protect or enhance water quality;
 - are sympathetic to the environmental setting;
 - provide a habitat for wildlife in urban watercourses; and
 - encourage natural groundwater recharge (where appropriate).

Bridges / Crossings

- 3.11.50 Appropriate design for bridges will be required to accommodate flood conditions and ensure that the road remains in use during periods of flood. Dumfries and the main roads connecting Dumfries to elsewhere in the region are often severely affected by the effects of flooding resulting from the low lying nature of the terrain as the topography descends down from the Southern Uplands to the coast and from the effects of tidal flooding of the River Nith.
- 3.11.51 No design information is available at this stage on potential bridge crossings, although it is anticipated that these will fully span the watercourses without the need for supporting pillars within the waterbodies themselves.

Swales/Detention Ponds

- 3.11.52 Drainage proposed for the Dumfries Southern Bypass would likely include swales and detention ponds i.e. linear grassed drainage features to remove pollutants and to convey to ponds or basins for further treatment.

Generic Mitigation

- ensuring continued consultation with SEPA on the proposed corridor and in particular the crossings of the River Nith, the Cargen Pow and the Dow Lochar;
- all measures implemented will ensure that surface water quality will not be adversely affected to satisfy the requirements of the Water Framework Directive and the River Basin Management Plans which are part of the implementation for the Water Framework Directive in Scotland under the Water Environment and Water Services Act (Scotland) 2003;
- SEPA Pollution Control Guidance and Best Practice measures implemented;
- SUDS schemes should ensure water attenuation and discharge does not impact on attenuation of floodplains;
- water crossings should be designed in liaison with SEPA and Best Practice Guidance; and
- all actions should be compliant with SPP7 Planning and Flooding.

Construction Phase Mitigation

- 3.11.53 During earthworks and prior to and during construction of the SUDs and drainage system, there is a risk of escape of sedimentary material and construction-related pollutants, e.g. cement, to the existing drainage system. The works will disturb areas of ground, introducing a risk of mobilising contaminants, although contamination is not thought to be an issue. Substantial levels of cut and fill may be required for the development. This will increase the requirements for excavation, disturbance and potential contact with contaminated soils.
- 3.11.54 This assessment assumes full compliance with SEPA pollution prevention guidance/CIRIA guidance which will reduce the risk of a pollution incident:
- works in, near or liable to affect watercourses, Pollution Prevention Guidance (PPG) note 5;
 - working at construction or demolition sites, PPG 6;
 - control of water pollution from construction sites, CIRIA Report C532 (2001); and
 - control of water pollution from linear construction sites, CIRIA Report C648 (2006).
- 3.11.55 During operation there should be appropriate SUDS implemented to attenuate and treat run-off from road surfaces. SUDS should be designed given the sensitivity of the groundwater resource and the proximity to sensitive watercourses.

Residual Impacts

- 3.11.56 Development of the magnitude of the Dumfries Southern Bypass introduces the potential of pollution/ sedimentation/ disruption of downstream watercourses, water bodies and groundwater and might impact on private water supplies if no mitigation measures are taken.
- 3.11.57 SEPA and SNH will be fully consulted on outline designs and proposals in order to ensure their guidance is followed regarding final design and operational procedures.
- 3.11.58 When the detailed designs are in place, further site walkover will be conducted and more detailed assessment made of any water features likely to be impacted. This will enable appropriate mitigation procedures (and possibly design changes) to be adopted which are specific to the relevant elements of the water environment.
- 3.11.59 The residual impacts provided in Table 3.10 assume that all recommendations for mitigation at the detailed stage are committed.

Table 3.11 Summary of Residual Impacts on Water Quality and Drainage

Impact	Impact Significance	Comment
Surface Water <ul style="list-style-type: none"> ■ Construction ■ Operation 	Negligible adverse temporary, fully mitigated Negligible adverse, permanent, mitigated, small scale	Assumes compliance with pollution prevention guidelines and appropriate SUDS.
Groundwater <ul style="list-style-type: none"> ■ Construction ■ Operation 	Negligible/ minor adverse temporary Negligible	Assumes compliance with pollution prevention guidelines and appropriate SUDS
Flooding	Minor adverse, permanent alterations to floodplain, could be beneficial if additional flood storage is provided.	Assumes flood risk assessment recommendations adopted
Drainage	Negligible adverse temporary	Assumes full compliance with pollution prevention guidelines and appropriate use of SUDS

3.12 Geology

Introduction

- 3.12.1 Geology and soils play an important part in determining the environmental characteristics of an area. The underlying geology has a major influence on landform, and rock provides parent material from which soils are formed. Road schemes may have a direct effect on the geology and soils of a locality. In addition, the historic use of the land can influence the local ground conditions, particularly in cases where previous or existing uses generate ground contamination. The objective of this section is to undertake sufficient assessment of the project to identify any significant impact on geology and soils, and in particular the environmental issues associated with any contaminated land.
- 3.12.2 This chapter presents baseline conditions in terms of the solid strata, covering drift deposits and ground contamination. The assessment focuses on predicting impacts in relation to the existing ground conditions. This chapter reviews the existing information on geology and soils and potential impacts of the proposed scheme. The objective of this section is to undertake sufficient assessment of the Dumfries Southern Bypass proposed corridor to identify significant impacts on geology and soils, and in particular the environmental issues associated with any contaminated land in the area.

Methodology

- 3.12.3 Geological information has been compiled and reviewed using the following sources:
- British Geological Survey (BGS) geological maps. Scotland Sheet 31 (W), solid and drift editions, 1:50,000 scale;
 - Relevant soil survey Maps of Scotland;
 - SNH SiteLink – digital database which allows search of protected sites; and
 - Royal Society for Nature Conservation - Regionally Important Geological Sites (RIGS).

Magnitude of Impacts

- 3.12.4 Table 3.11 defines the criteria that were used to assign receptor importance.

Table 3.12 Receptor Importance Criteria

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality and rarity on a regional or national scale	Geology <ul style="list-style-type: none"> ■ Site protected under EU or UK legislation, e.g. SSSI, SPA, SAC, Ramsar site
High	Attribute has a high quality and rarity on a local scale	Geology <ul style="list-style-type: none"> ■ Site protected under UK legislation, e.g. SSSI
Medium	Attribute has a medium quality and rarity on a local scale	Geology <ul style="list-style-type: none"> ■ Site protected under local designation e.g. SINS or RIGS
Low	Attribute has a low quality and rarity on a local scale	Geology <ul style="list-style-type: none"> ■ Site not protected

3.12.5 Table 3.12 defines the criteria used to evaluate impact magnitude.

Table 3.13 Impact Magnitude Criteria

Magnitude	Criteria	Example
Major (adverse)	Loss of attribute and/or quality and integrity of the attribute	<ul style="list-style-type: none"> ■ Major shift away from the baseline conditions. Permanent Change. ■ Extensive change to the systems or processes or features that form the basis for a geological/ geomorphological SSSI designation
Moderate (adverse)	Impact on integrity of attribute or loss of part of attribute	<ul style="list-style-type: none"> ■ A significant shift from the baseline conditions that may be long-term or temporary. ■ Moderate change to the systems or processes or features that form the basis for a geological/ geomorphological SSSI designation
Minor (adverse)	Results in some measurable change in attribute quality or vulnerability	<ul style="list-style-type: none"> ■ Minor shift away from the baseline conditions that may be short-term or temporary. ■ Minor change to the systems or processes or features that form the basis for a geological/ geomorphological SSSI designation
Negligible	Results in effect on attribute but of insufficient magnitude to affect the use or integrity	<ul style="list-style-type: none"> ■ Very slight change from the baseline conditions such that little or no discernible effect upon the geology, geomorphology or soils results ■ No change to the systems or features that form the basis for a geological/ geomorphological SSSI designation

3.12.6 Table 3.13 presents the matrix for the derivation of the significance of impact from receptor importance and impact magnitude.

Table 3.14 Significance of Impact Matrix

		Receptor Sensitivity		
		Minor	Moderate	Major
Magnitude of Impact	Major	Moderate	Moderate/Major	Major
	Moderate	Minor/Moderate	Moderate	Moderate/Major
	Minor	Negligible	Minor	Minor/Moderate

Baseline Information

Solid and Drift Geology

- 3.12.7 The solid geology of the region is composed mainly of Ordovician/Silurian sedimentary greywacke and shale (sands and muds). Further ground investigation will be required at detailed design stage to ensure that there are no geological constraints.

Floodplains

- 3.12.8 The proposed corridor crosses two floodplains; the River Nith and the Cargen Pow (the proposed corridor actually crosses at the Cargen water which flows into the Cargen Pow). The route also crosses the 'Dumfries Aquifer' which will need to be safeguarded from any engineering work required.

Protected Sites

- 3.12.9 There are no sites designated for their importance in relation to geology or geomorphology and therefore there are no constraints with regard to natural heritage protection.

Topography

- 3.12.10 The proposed corridor descends fairly rapidly between Bankend Road and Craigs Road and could present engineering problems at the detailed design stage. Ground Investigations would be required for STAG 2/EIA Assessment to determined detailed ground conditions and the likely impacts.

Groundwater

- 3.12.11 The groundwater regime at the site and impacts of the proposed development upon it are covered in full in Section 3.11: Water Quality, Drainage and Flood Defence.

Environmental Impacts

- 3.12.12 Potential impacts arising on or from geology are identified as:
- loss or disturbance to important geological features;
 - loss or sterilisation of mineral reserves;
 - mine workings/ stability issues; and
 - contaminated land issues.
- 3.12.13 The geology of the area is considered to be of minor sensitivity, with no features of geological interest present. Impacts will be of a minor magnitude, so that the significance of impacts on geology will be minor.
- 3.12.14 Detailed cut and fill balance calculations will be required as part of the detailed design.
- 3.12.15 A comprehensive Geotechnical investigation will be required once the proposed corridor has been finalised. No information is available on potential mineral reserves, mine workings or stability.

Mitigation

- 3.12.16 Mitigation will be required to protect soil conditions on site, to allow the establishment of vegetation in accordance with the landscape design proposals. Mitigation measures for the protection of soils should be to follow good practice methodologies with special reference to over compaction, drainage and soil erosion. Cut and Fill balance calculations should aim to reduce the impacts of construction of the scheme.
- 3.12.17 Although no contamination has been identified at this stage, site investigations will be required to establish any contamination issues. Appropriate health and safety measures should be adopted to reduce the exposure of site workers to contaminated material.

Impact Summary - Geology

Impact magnitude:	Minor
Impact character:	Temporary, adverse, local
Receptor sensitivity:	Minor
Impact significance:	Negligible

3.13 Biodiversity, Ecology & Nature Conservation

Introduction

- 3.13.1 The aim of the ecology section is to collate and summarise all the available data and to evaluate it in the context of the proposed development. Based on the evaluation of data this section provides a preliminary assessment of the significance of impacts, with mitigation and a summary of potential residual impacts. Further ecological assessment is likely to be required at the detailed design stage.

Legislation & Guidance

3.13.2 Relevant Designations and Guidance includes:

- *Habitats Directive (EC 92/43/EEC)*, protects endangered or vulnerable habitats and species on European-wide basis;
- *1979 EC Wild Birds Directive*, as per habitats Directive, for birds only;
- *Conservation (Natural Habitats Etc) Regulations 1994*, transposes habitats and Birds Directives into UK Law;
- *Nature Conservation (Scotland) Act 2004*, identifies a duty to further the conservation of biodiversity;
- *United Kingdom Biodiversity Action Plan (UKBAP)*, this Plan implements the Government's commitment to the Earth Summit in Rio de Janeiro in 1992. It identifies priority habitats and species for the UK;
- *Scottish Biodiversity Strategy*, the Scottish Governments' strategy for the conservation and enhancement of biodiversity in Scotland;
- *Scottish Biodiversity 100 List*, the Scottish Governments' priority list for biodiversity action;
- *Trunk Road Biodiversity Action Plan*, the Scottish Executives' review publication.
- *Dumfries & Galloway Biodiversity Action Plan, 1999*, implements UKBAP and Scottish Government biodiversity initiatives at local level;
- *Natural Heritage Futures – Western Southern Uplands and Inner Solway*, this recent publication by Scottish Natural Heritage provides a vision of sustainable land use and development. It seeks to reverse trends in decreasing diversity, loss of habitat and loss of local character. The key priorities are an integrated approach to all land uses and the need for dialogue to ensure this co-ordinated approach;
- *Population Status of Birds in the UK: Birds of Conservation Concern 2002-2007*, this document is newly published by the RSPB and identifies UK bird species in terms of conservation concern with Red List species being of highest concern;
- *Protected Sites, Wildlife and Countryside Act 1981*, and later amendments, and *Nature Conservation (Scotland) Act 2004*;
- *Protected Species*, there is a legal obligation to ensure that protected species and their shelters are not disturbed or damaged. Species-specific legislation has been enacted and may be relevant if protected species are found during surveys; and
- *Other Guidance*, inventory of Ancient, Long-established & Semi-natural Woodland Drainage assessment, a guide for Scotland, SEPA 2005.

Methodology

- 3.13.3 Two walkover surveys were undertaken of the proposed Dumfries Bypass Route in 2008. The first survey, in February 2008, was restricted by access constraints and therefore served to establish the likely ecological interest of the route based on the terrain and local landscapes.
- 3.13.4 A second walkover in early May 2008 allowed some species listing and identification of habitat priorities to supplement the existing data. This has been followed by desktop data collation from consultation and ecological field surveys.

Impact Assessment Criteria

- 3.13.5 An assessment of impacts on ecology and nature conservation requires consideration of the relative value of a site and a judgement as to the severity of any impact on the site.

Assessment of Severity of Effect

- 3.13.6 Effects have been based on the following criteria:

Severe Loss or complete change to an entire site. Loss or severe depletion of a population of an internationally important, rare or protected habitat or species caused by loss of habitat, severance or disturbance.

Moderate Loss or complete change to part of the site, or minor change over an entire site. Loss, or deletion, of a nationally important protected or nationally rare habitat or species through habitat loss, severance or disturbance.

Slight Minor change to part of a site, or loss of a relatively small proportion of a large site. Potential for a slight reduction of a habitat or population locally important, nationally rare or regionally uncommon species, of minimal significance to viability.

Negligible Sites and/or rare and uncommon species not significantly affected.

Neutral No likely change.

Overall Level of Impact

- 3.13.7 The assessment of impact requires consideration of construction as well as operational phases. In this respect change can include disturbance arising from noise impacts.
- 3.13.8 Table 3.14 Ecology & Nature Conservation matrix: Guide to magnitude of impacts.

Table 3.15 Ecology & Conservation Matrix: Guide to Magnitude of Impacts

Severity of Effect	Site Importance					
	International	National	Regional	Local - High	Local - Moderate	Local - Low
Severe	Extremely severe	Very severe	Severe-Very Severe	Moderate Severe	Moderate	Slight
Moderate	Very Severe	Severe	Moderate-Severe	Moderate	Slight-Moderate	Negligible-Slight
Slight	Severe	Moderate	Slight-Moderate	Slight	Slight	Negligible
Negligible	Slight-Moderate	Slight	Negligible-Slight	Negligible-Slight	Negligible	Negligible

Baseline Information

Designated Sites

3.13.9 There are no sites designated for their biodiversity along or directly adjacent to the proposed route. Designated sites are shown on Figure 3.5. The closest designations to the route provided by SNH during consultations are as follows:

- Crichton Gardens and Designed Landscape (GDL) – 500m to the North of the route;
- the Upper Solway Flats and Marshes, which are designated as Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and a Ramsar site are, located some 1300m from the most southerly point of the proposed route. The Solway Firth is also designated as a Special Protection Area (SPA). The boundaries of the SPA are coincident with those of the Upper Solway Flats and Marshes SSSI (SNH, 1978);
- the Kirkconnell Flow SSSI/National Nature Reserve and Solway Mosses North SAC are to the SW of the proposed corridor; and
- the Longbridge Muir SSSI and Solway Mosses North SAC are to the SE of the proposed corridor.

3.13.10 The citations or reason for designation state the following in relation to the SSSI, SPA and SAC:

- the Upper Solway Flats and Marshes, which are designated as Site of Special Scientific Interest (SSSI) is designated on biological grounds due to its populations of breeding birds, natterjack toads and invertebrates and habitats- estuarine saltmarshes or merses (SNH 1988);
- the Upper Solway Flats and Marshes Special Protection Area (SPA) is designated for its coastal and estuarine habitats and the national and international importance for wintering wildfowl and wading birds that these habitat support; and
- the Solway Firth Special Protection Area (SPA) is designated for its populations of over-wintering Annex 1 Species.

Dumfries and Galloway Local Biodiversity Action Plan

3.13.11 The importance of local biodiversity is illustrated in the Dumfries and Galloway Local Biodiversity Action Plan (LBAP, 1999). This plan details a number of species which require conservation status due to human pressures. This includes rare species in close proximity to the preferred alignment such the only known colony of narrow-bordered five spot burnet moth in Scotland on the verge of the A711. Other species which may be impacted upon by the development listed in the LBAP include otter and pipistrelle bat. These species should be considered as part of detailed alignment and mitigation measures during detailed design.

Baseline Conditions for Flora and Fauna

Habitats

3.13.12 The route passes through, or close to the following habitats, as listed below with national alphanumeric codes

- A1.1.2 Woodland, broad-leaved, plantation
- A1.3.2 Woodland mixed, plantation
- A2.1 Scrub, dense
- A2.2 Scrub, scattered
- A3.3 Trees scattered, mixed
- B2.2 Grassland, neutral, semi-improved
- B4 Grassland, improved
- B5 Grassland, marshy
- B6 Grassland, poor-semi-improved
- C3.1 Ruderal, tall
- F1 Swamp

3 Environment

F2	Marginal and inundation
G1	Standing water
G2	Running water
H1	Inter-tidal
J1.1	Arable land
J1.2	Amenity grassland
J1.3	Ephemeral/short perennial
J2.2.2	Hedge, defunct, species-poor
J3.2	Hedge and trees
J4	Fence
J6	Dry ditch
J8	Earth bank

3.13.13 The dominant habit recorded during the walkover surveys was improved grassland reflecting intensive agricultural use. This grassland is species poor due to the composition of the sown ley and with management further reducing species diversity. These leys are enclosed by fences or gappy, flat-topped hedges, most frequently Hawthorn, but occasionally Beech. Scattered shelterbelts are mixed and relatively young with Sycamore and Beech frequent and the open canopy allowing rank mesotrophic grasses to dominate in place of typical woodland field layers and ground flora. Other habitats were small-scale with notable floodwater pasture at Laghall and wet grassland east of Craigend. At the River Nith crossing there are small sections of inter-tidal mudflat exposed at low tide and to the east, by the pylon, a small floodwater pool with common brackish water plant associates.

Protected Species - European

3.13.14 Otter (*Lutra lutra*) records are available for the Cargen Pow and the River Nith catchments which are crossed by the proposed corridor. Otter are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) as well as under the Regulations 39 and 43 of the Conservation (Natural Habitats &c.) Regulations 1994.

3.13.15 A walkover survey was undertaken as part of the STAG 2 assessment found signs of Otter, fresh spraints, on the east bank of the River Nith at Kingholm Quay (NGR NH 97359 73815) in proximity to the crossing but none on the Cargen Pow at the time of visits.

3.13.16 Bats are also protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) as well as under the Regulations 39 and 43 of the Conservation (Natural Habitats &c.) Regulations 1994. They are a priority species in the UK and Dumfries and Galloway Local Biodiversity Action Plan. Along the proposed route are number of mature trees with suitable cavities for roosting bats. Any works on the route where trees are likely to be affected will need to be surveyed for signs of roosts pre-construction and the appropriate

action taken by way of licensing and mitigation where bats are found to be in conflict with the scheme.

Protected Species - UK

- 3.13.17 Badger and their setts are protected in the UK under the protection of Badgers Act and with further legislation by the Nature Conservation (Scotland) Act 2004. They are known from the general area of the proposed route but no signs were recorded during this survey, possibly due to the narrow width of survey corridor, 100m. It is possible that the route passes through the territory of a social group(s) and a full corridor survey in February/March would be required to identify likely impacts any mitigation. Mitigation may have to include Badger underpasses at appropriate points to avoid road casualties arising from road traffic.
- 3.13.18 Water Vole populations have crashed in the UK and this is reflected in populations in the Dumfries area. The National Water Vole Survey of Britain 1996-98 (Vincent Trust 2003) records this species as being absent from the Nith catchment and certainly no signs were identified during walkover surveys on either River Nith, Cargen Pow or Dow Lochar. However if populations are very low then this species could have been missed, particularly on the Pow where there is suitable habitat, due to early season visits. Water Vole are protected under the Wildlife & Countryside Act 1981 as amended and are a priority species in both UK and Local Biodiversity Action Plans. A full survey in August is recommended with a further survey Nov-Jan to locate latrines if signs are positive.
- 3.13.19 Red Squirrel were not identified from any shelterbelts along the route but may be present in Craig's Moss Plantation, which was not surveyed. Risk should be reviewed at the EIA stage of planning.

Other Species

- 3.13.20 Due to timing of surveys higher plant species listings were not recorded, however, two small stands of Japanese Knotweed were recorded on the east bank of the River Nith at Kingholm Quay. These were centred around NH 97449 73369 and comprised a total area of contamination extending to approximately 60 square metres. The presence of this species results in a legal requirement for Dumfries and Galloway Council to adequately address this issue under the Wildlife and Countryside Act, 1981. Managing Japanese Knotweed is the responsibility of the owner/occupier of a site. Prior to any handling and disposal of this alien species advice should be sought from SEPA.
- 3.13.21 On the first visit to the site in February 2008 a total of 600 Pink-footed Geese were recorded feeding and loafing on improved pasture by the Cargen Burn at Priestlands. Further south at Islesteps there were 28 Whooper Swans on the wet flats. The Pinkfeet were probably part of the Solway wintering Icelandic population and are an individual qualifying species for Upper Solway Flats and Marshes SPA. Goldeneye and Redshank were recorded on the River Nith and both are also SPA qualifying species. Advice must be taken from SNH regarding the significance of species and numbers, especially any need to monitor passage and winter bird numbers in the vicinity to the proposed route. There is a likely requirement to assess potential effects in the context of the conservation objectives of local European Sites.

3 Environment

- 3.13.22 Special efforts were made to record signs of Barn Owl, known in the local area. Some trees are suitable for nesting and, as a Wildlife & Countryside act 1981 (as amended) Schedule 1 species a species-specific nest survey undertaken at the same time as the bat tree roost survey will be required at the detailed design stage.
- 3.13.23 Other potential breeding birds recorded during walkovers included, Blackbird, Blue Tit, Buzzard, Carrion Crow, Chiffchaff, Chaffinch, Dunnock, Kestrel, Lapwing, Long-tailed Tit, Mallard, Pied Wagtail, Reed Bunting, Sky Lark, Song Thrush, Starling, Willow Warbler, Wren and Yellowhammer. Others recorded but perhaps not breeding included Black-headed Gull, Common Gull, Curlew, Goldeneye, Greenshank, Herring Gull, Grey Heron, Oystercatcher, Redshank, and Shelduck.

Environmental Impacts

Summary of Known Conservation Interest

- 3.13.24 Desk-top data collation and walkover surveys to date have identified the following sites and species as being of particular importance. The definitions are listed below and interest summarised in Table 3.15.

Table 3.16 Wildlife Evaluation Criteria

Level of Value		Examples
International	Sites:	All awarded, proposed or candidate sites for an international Designation e.g. Special Protection Areas Biosphere Reserves, Special Areas of Conservation
	Species:	Sites which are critical for those species listed as internationally important e.g. in European Habitats Directive or European Bird Directive.
National	Sites:	All notified Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNRs), Marine Nature Reserves (MNRs), any National Conservation Review Grade 1 site. Any site with viable areas of any key habitat identified in the UK Biodiversity Action Plan or Scottish Manual for Local Biodiversity Action Plans.
	Species:	Those given special protection under the Wildlife and Countryside Act 1981 and amendments. All Red Data Book Nationally Notable species. All species listed in the long list of the UK Biodiversity Action Plan. Also those included in the short and middle lists of the UK Biodiversity Action Plan and species listed in the Scottish Manual for Local Biodiversity Action Plans
Regional	Sites:	Any sites with viable habitats identified as priority habitat in a Regional Biodiversity Action Plan. All Listed Wildlife Sites. Any other sites with regionally important habitats not previously identified
	Species:	All species listed as priority species in Regional Biodiversity Action Plans. All Red Data Book Nb and N species. Species which have been identified as scarce in local publications e.g. a local flora, bird atlas
Local	Sites:	Sites with special importance locally for amenity and education and those locally scarce habitats not previously identified e.g. a locally rich ditch, hedgerow or grassland
	Species:	Those with special importance in the parish or neighbourhood e.g. a Rookery or mature native trees

3.13.25 Table 3.16 presents known conservation interests on, or adjacent to, the proposed route.

Table 3.17 Conservation Interests

	Inter-National	National	Regional	Local
Sites				
Solway Firth SSSI/SPA	+			
Upper Solway Flats and Marshes SSSI/SPA	+			
Solway Firth Ramsar	+			
Kirkconnell Flow SSSI and Solway Mosses North SAC	+	+		
Longbridge Muir SSSI and Solway Mosses North SAC	+	+		
Habitats				
Estuaries	+			
Mudflats and sandflats not covered by seawater at low tide	+	+	+	
Arable field margins		+	+	
Hedgerows		+	+	
Wet woodland		+	+	
Rivers and streams		+	+	
Rush pastures		+	+	
Coastal and floodplain grazing marsh				+
Species				
Whooper Swan	+			
Pink-footed Goose	+			
Japanese Knotweed			+	
Narrow-bordered Five-spot Burnet Moth			+	
Barn Owl			+	
Linnet			+	
Reed Bunting			+	
Song Thrush			+	
Starling			+	
Yellowhammer			+	

	Inter- National	National	Regional	Local
Otter	+	+	+	
All Bat species	+	+	+	
Water Vole		+	+	
Red Squirrel		+	+	
Mature trees				+
Inundation wetland				+

3.13.26 The above table is based on available data at the time of reporting and is likely to change on further survey of the proposed route at detailed design stage. It is clear that this stage that there is significant range of sites, habitats and species from estuary and mudflat, two Annex 1 EC Habitats, to features of local wildlife, amenity and landscape importance such as mature trees.

Mitigation

3.13.27 At this stage any suggested mitigation can only be generic with project level mitigation to follow further design, routing and site-surveys.

3.13.28 The project must seek to avoid direct or indirect adverse impact on the initial list of sites habitats and species of nature conservation importance identified in Table 4.13.3. Where effects cannot be avoided then advice must be taken to minimise the magnitude and severity of effect.

3.13.29 Mitigation by good design and best practice during construction can make a significant contribution thorough minimising the design footprint and adopting a sensitive wayleave whereby construction offices, machine compounds and material storage areas are sited away from areas of known interest.

3.13.30 Construction practices must conform to an agreed Code of Construction Practice/mitigation presented in any Environmental Statement and all personnel should be fully informed of obligations with regard to flora and fauna.

3.13.31 If unavoidable effects, after mitigation, are identified then compensation must be considered to offset any loss of biodiversity. A road corridor does offer significant opportunities for the creation of semi-natural habitats using native species especially where new habitat creation adjoins local areas of existing interest. For example, scrub is of greater value if it is created adjacent to existing scrub not affected by the proposal. Compensation can only be effective if new habitat is managed appropriately in the long term.

3.13.32 It is recommended that a Site Biodiversity Action Plan is written for this new section of road and that this plan is adopted by the appropriate authority for funding and implementation.

Residual Impacts

3.13.33 It is not possible, due to lack of information regarding nature conservation interest and final project design, to make specific comment regarding residual impacts. However based on available data the following would appear likely.

- there are no known direct impacts on European Sites and the likely residual effect is neutral or negative slight-moderate;
- the outcome of the appropriate assessment report on indirect impacts relating to European sites i.e. Solway Firth and Upper Solway Flats and Marshes SPAs is likely to be neutral and this is likely due to the small potential area of two EC habitats affected, low potential number of qualifying species affected and the numbers of birds thus far identified;
- the broad routing follows a line that is centred upon intensively managed farmland of lower conservation value suggesting that the residual significance of the main direct effects is likely to be negligible;
- other direct impacts will affect small areas of habitats identified as being of national, regional and local importance and are likely to in the magnitude range negative negligible – slight;
- species level impacts are more difficult to predict due to lack of survey but given the relative size of the footprint they are likely to be in the range negligible-slight; and
- compensatory habitat creation along the road corridor linked to a Site Biodiversity Action Plan could have a long-term positive residual impact on priority action species and might underpin some actions for selected priority habitats.

3.14 Landscape & Visual Amenity

Introduction

3.14.1 Landscape impacts relate to the effects of a development on landscape features, such as topography, vegetation, and built elements, and on landscape character, the “sense of place” which defines a location.

3.14.2 Visual impacts are the effects of a development upon views experienced by individual receptors, which may be people using houses, footpaths, roads, offices, etc, and the effects on the overall visual quality or visual amenity of an area.

Methodology

3.14.3 This assessment broadly follows the methodology outlined in DMRB Volume 11, Section 3, Part 5. This methodology has been somewhat simplified to reflect the more strategic nature of the assessment, and the less detailed proposals which are being assessed.

3 Environment

- 3.14.4 The baseline landscape has been assessed based on its existing character, and any relevant designated landscapes. The quality and the value of the landscape are assessed, based on the importance, rarity and attributes of the landscape. An assessment of the susceptibility of the landscape, i.e. its general vulnerability to change, is made, leading to a judgement of the sensitivity of the landscape to the proposed road development. The visual baseline is assessed based on the visual receptors who currently have views of the corridor, and the quality of their views, again leading to a judgement of sensitivity to visual change. Sensitivity is assessed as low, medium, or high.
- 3.14.5 The physical changes to the landscape, which is likely to arise from the construction, operation, and maintenance of the scheme, are set out. The magnitude of the change to the landscape, and to views, is assessed, and this is combined with the sensitivity to determine the level of impact, as set out in Table 3.17 below.

Table 3.18 Impact Assessment

Sensitivity to Change	Magnitude of Change		
	Large	Medium	Small
High	Major	Moderate-Major	Moderate
Medium	Moderate-Major	Moderate	Minor-Moderate
Low	Moderate	Minor-Moderate	Minor

Note: In terms of the Environmental Impact Assessment (Scotland) Regulations, impacts greater than moderate are usually considered to be “significant impacts”

- 3.14.6 Impacts may be temporary or permanent; they may also be negative or positive. At this stage, no mitigation measures have been proposed, or included in the assessment. A summary of the mitigation measures which should be considered as part of the detailed design is given in 3.14.7 below.

Landscape Baseline

Landscape Character – Regional Landscape Character Assessment

- 3.14.7 The Landscape Character of the area of the proposed corridor is described in the SNH Landscape Character Assessment for Dumfries and Galloway (Land Use Consultants, 1998). The site is within the Dumfries Coastlands regional landscape character, an assemblage of lowland and coastline landscape types forming a coastal belt between the Southern Uplands and the Solway Firth. It is characterised by intensive agriculture, settlement, and transport corridors, and is dissected by several estuaries.
- 3.14.8 At a local scale, the route corridor passes through one landscape character type; Type 6: Lower Dale. However, at the Nith crossing, and between Craigend and the railway crossing, the corridor is close to the boundary with Type 2: Coastal Flats. These character types are mapped at a relatively small scale, and characteristics are likely to overlap at the boundaries. These two character types are therefore described below.

3 Environment

- 3.14.9 The Lower Dale character type covers the lower section of the valley of Nithsdale. The lower dales are wide with generally flat or gently undulating relief. The central sections contain flat flood plains through which the river meanders, with more irregular ground to the valley sides. The landscape is characterised by improved pasture and arable fields, with hedgerows, mature hedgerow trees and shelterbelts. The landscape type is settled, with major towns, and an extensive network of minor and major roads. Road development is noted as a key issue for this landscape type, and recommendations include consideration of road alignment in terms of landform and features, minimising the extent of road lighting, planting new linear woodlands and hedgerows, and minimising embankment spaces.



Lower Dale LCA, Crichton Campus

- 3.14.10 The Coastal Flats character type covers the flat ground along sections of the Dumfries and Galloway coastline. It is further subdivided, with the relevant divisions being Type 2b: Estuarine Flats, covering the Nith Estuary, and Type 2d: Coastal Moss, covering Craigs Moss, to the east of Craigend. The Estuarine Flats form a very flat land edge, and often include sand and mud flats. It is a very exposed landscape, dominated by the presence of water. The landscape is sparsely settled. Power lines and telegraph poles often traverse this landscape and are very visible.



Coastal Flats LCA, Estuarine Flats sub-type at Glencaple

- 3.14.11 Coastal Moss landscapes are also flat, but more detached from the sea. This landscape is dominated by bog and coniferous plantations. As with the Estuarine Flats, the landscape is open and sparsely settled. Road development is noted as an issue, which can completely alter the Coastal Moss landscape character type.

Coastal Flats LCA, Coastal Moss sub-type, Craigs Moss



Landscape Character – Route Description

- 3.14.12 At a more local scale, the landscape character of the corridor can be defined through a detailed description. The corridor begins at an existing roundabout, passing under a large railway viaduct. An industrial facility by the existing road lends an urban fringe quality to the area, although the corridor here branches north over pastoral fields, with some mature trees. The corridor crosses the A711 at the brow of a shallow hill, passing isolated residential properties. It then turns south-east, following the shallow valley of the Cargen Pow. The landscape is mixed arable and pastoral, with post and wire boundaries, and isolated farms. Built-up areas at Cargenbridge and the south-west edge of Dumfries are further back. Beyond the A710, the land becomes flatter, with some hedges and woody vegetation, and overhead powerlines dominate the landscape. A cluster of properties lie close to the Nith at Laghall.
- 3.14.13 The Nith itself is relatively broad at this point, between well-defined banks. Gorse and small trees line the river, and a public footpath runs on the east bank. To the east is the settlement of Kingholm Quay, comprising a range of 20th century housing, with older commercial structures by the river. The corridor passes through a dense, mature shelterbelt, before crossing pastoral fields on rising ground to the B725. After crossing this road, the corridor turns to the north-east, following a minor road across increasingly sloping ground. Mature trees and hedgerows line the numerous minor roads in this area. Several farms and cottages, as well as the buildings of the Crichton Campus, with its mature landscape, are located near the corridor. The corridor crosses another shelterbelt and minor road, passing a small cluster of houses, and crossing the brow of the ridge. Beyond a second minor road, the land descends relatively steeply, with the corridor passing between a group of cottages, to Craigs Moss. Crossing the flat moss, the corridor skirts a commercial plantation, passing over arable farmland to the A75 roundabout, where several residential and commercial properties are scattered around the end of the scheme.

Landscape Designations

- 3.14.14 Nith Estuary National Scenic Area (NSA) is 300m to the south of the proposed corridor at its closest point. National Scenic Areas are areas of land considered of national significance on the basis of their outstanding scenic interest.
- 3.14.15 The area around the NSA is protected by Dumfries and Galloway Council as a Regional Scenic Area (RSA). These areas are valued regionally and locally for their special scenic qualities and the contribution they make to tourism and quality of life. The road corridor passes through the RSA between a point south of Kingholm Quay, to just east of Craigend.
- 3.14.16 There are no sites listed on the Inventory of Historic Gardens and Designed Landscapes, in the vicinity of the road corridor. Landscape designations are illustrated on Figure 3.6.

Baseline Assessment

- 3.14.17 The landscape *quality* of the road corridor varies along its length. Areas of medium to high quality are found in the hilly area between the Nith and Craigs Moss, with intact hedgerows and mature trees. The shallow, pastoral valley of the Cargen Pow is of medium quality, while areas around Cargenbridge, the Nith at Kingholm Quay, and the A75, are of lower quality, due to existing features such as power lines and urban fringe development. Craigs Moss, with its flat landform and commercial forestry, is also of low quality.

3 Environment

- 3.14.18 The area between the Nith and Craigs Moss is locally designated (RSA) and therefore of medium *value*. The Nith itself, with its footpaths, is likely to be locally valued, and has also been assigned medium value. The NSA further south is of high landscape value. Other parts of the corridor are of low value.
- 3.14.19 The *susceptibility* of the road corridor to change in general is relatively low. The lower quality sections at Cargenbridge and the A75 have the capacity to absorb high levels of change without detriment to their character. Along the Cargen Pow, at the Nith crossing, the susceptibility is higher, as changes to landscape features would affect the landscape character of these locations. Through the RSA, the susceptibility is medium-high, as substantial changes may affect the RSA designation.
- 3.14.20 Based on the above assessments, the *sensitivity* of the landscape to road development is generally low, being low-medium along the Cargen Pow between the A711 and A710, medium at the Nith, and across the RSA.

VISUAL Baseline

- 3.14.21 The visual baseline describes the visual receptors which currently have a view of the proposed corridor, and briefly describes the existing view. Visual receptors can include residents, workers, tourists and travellers who will see the corridor and potentially the new road. Their sensitivity to visual change varies as follows:

Table 3.19 Visual Receptors

Receptor Type	Sensitivity
Residential properties	High
Tourists, recreational users	Where the recreational activity is focused on the landscape, e.g. hill walking, viewpoints, high Where the activity is not focused on the landscape, e.g. jogging, sports: low or medium
Workers	Usually Low
Travellers	Depending on the speed and mode of travel, and the context, varies from low to high. For example, a popular tourist drive or cycle route will be high , while a brief glimpse from a motorway will be low .

- 3.14.22 There are few visual receptors over the initial stretch of the corridor, and these include industrial sites at Cargenbridge. There are several properties between Cargenbridge and Dumfries, for example Starryheugh Farm, which have low to medium quality views across the shallow pastoral valley of the Cargen Pow. Beyond the A711, the corridor runs through this valley, and is visible to a number of properties in residential areas of Cargenbridge and Troqueer, as well as Priestlands Farm. Again these have low to medium quality views of the farmland. Around the A710, several properties in Islesteps and Laghall overlook the corridor, with generally low quality existing views, due to the overhead power line, and lower quality landscape around the Nith. There are a number of residential properties at Kingholm Quay, although few overlook the corridor due to dense shelter belts to the south of the housing.
- 3.14.23 Within the RSA, several isolated farms and cottages overlook the corridor, as well as office buildings at the Crichton Campus. A new college is under construction at the south end of the campus, and will also have views of the corridor once complete. The existing views of this medium-high quality landscape are slightly marred by the presence of the overhead power line, although still of medium quality, and are broken up by numerous mature trees and tree belts. East of Bankend Road, further properties on Trohoughton Avenue have medium-high quality views, as the power line diverts north. Properties around Craigend look out over Craigs Moss, with extensive views over the flat land to the low hills beyond. The foreground views, which include the corridor, are of lower quality, and include the forestry and marshy farmland of the moss. Several properties around Isle of Man have similar low quality views, and the corridor is also overlooked by a number of properties in the Georgetown area of Dumfries. Finally, commercial outlets overlook the termination of the corridor at the A75.
- 3.14.24 Traveller receptors include motorists on the A711, A710, B725, Bankend Road, Craigs Road, and the A75 and A780 at the east end of the scheme. Travellers on the Dumfries to Carlisle railway line, cyclists on the National Cycle Route (NCR) 7, and walkers using the footpath along the River Nith, have also been included.
- 3.14.25 Longer distance receptors include those looking up the Nith estuary from the south, such as Kelton, and further south, Glencaple on the east bank and Kirkconnel on the west. From these points, the existing high towers of the power line crossing form a focal point in the view, and little other detail can be made out. There is potential for limited views from Mabie Forest to the south-west, although any views of the corridor will be glimpsed through trees rather than open. There may be more open views of the east part of the scheme from elevated viewpoints such as Torthorwald, to the north-east. The existing view includes much of lower Nithsdale, including Craigs Moss. There will be no views from the bulk of Dumfries, including the town centre.

Assessment of Landscape Impacts

Impacts on landscape character

- 3.14.26 The following section summarises the predicted impacts on landscape character, arising from the road proposals. The assessment follows the methodology outlined in 4.14.2. It is likely that some of these impacts may be partially mitigated through landscape design and planting along the road. However, at this stage no mitigation planting has been proposed or included in the assessment. Potential significant impacts are indicated by bold text.

- 3.14.27 From the existing minor road, to the A711, the proposed road will run at grade or on a low embankment, cutting across the shallow valley of the Cargen Pow. There will be a low bridge over the Cargen Pow, after which the road will rise to a new junction at the A711. There will be a medium to large magnitude of change to this low sensitivity landscape, resulting in a *minor-moderate adverse* impact.
- 3.14.28 Beyond the A711, the road will run at grade, or on a slight embankment, along the relatively flat valley of the Cargen Pow. There will be a medium magnitude of change to this low-medium sensitivity landscape, resulting in a *minor-moderate to moderate adverse* impact.
- 3.14.29 East of the A711, the proposed road will rise up on to substantial embankments, before crossing the Nith, via a new bridge structure, on to further large embankments on the east bank. This will result in a large magnitude of change to this flat landscape. The sensitivity of this area has been assessed as medium, and due to the large scale of the proposals in relation to the existing landscape, this will result in a *moderate-major to major adverse* impact.
- 3.14.30 East of the Nith, the proposed embankments will decrease, and the road runs at grade up to the B725. Part of the mature shelterbelt to the south of Kingholm Quay will be lost. There will be a medium magnitude of change to this area, which is of medium sensitivity, resulting in a *moderate adverse* impact.
- 3.14.31 Beyond the B725, the road will proceed north-east across the undulating ridge, largely at grade, but with a large cutting at Craigs Road, which will be carried on an overbridge. There will be losses of mature trees and hedgerow, particularly at the shelterbelt along Bankend Road. The magnitude of change is predicted to be large, resulting in a *moderate-major adverse* impact, on this medium sensitivity landscape.
- 3.14.32 Between Craigend and the A75, the road will run at grade over the flat landscape, with the exception of an elevated section over the railway line. The magnitude of change is considered to be medium to large, as the road will become a prominent feature within the flat landscape. The sensitivity of this area has been assessed as low, resulting in a *moderate adverse* impact.

Impacts on landscape designations

- 3.14.33 There will be no direct impact on the Nith Estuary National Scenic Area (NSA). However, as the NSA boundary is only 300m from the proposed corridor, there will potentially be indirect impacts on the character of the NSA arising from the presence of the road in the landscape, and traffic noise. Around 2.5km of the proposed route is within 1km of the NSA boundary. There would be a small magnitude of change to this northern corner of the NSA. The NSA is of high sensitivity, and there would be a *moderate adverse* impact at the northern part of the NSA. Within other parts of the NSA, no change is likely to occur.
- 3.14.34 There is a direct effect on the Regional Scenic Area (RSA), where the road will run through it between Kingholm Quay and Craigend. Around 3km of the corridor is within the RSA, including junctions at the B725 and Bankend Road, and the large cutting below Craigs Road. There will be a large magnitude of change to this part of the RSA, resulting in a *moderate-major adverse* impact. Elsewhere in the RSA, no change would be perceived.

Assessment of Visual Impacts

- 3.14.35 The following section summarises the predicted impacts on views, arising from the road proposals. The assessment follows the methodology outlined in 3.14.2. It is likely that some of these impacts may be partially mitigated through landscape design, particularly screen planting along the road. However, at this stage no mitigation planting has been proposed or included in the assessment. A summary of the mitigation measures which should be considered as part of the detail design is given in 3.14.7. Potential significant impacts are indicated by bold text.
- 3.14.36 Properties at the north edge of Cargenbridge, and Starryheugh Farm, will have relatively close range (<300m) views of the site, resulting in medium magnitude of change, and a **moderate-major adverse** impact. Two properties, Milestones House and Curriestanes Cottage, will have very close range (<100m) views of the road embankment, resulting in a large magnitude of change, and **major adverse** impacts. Curriestanes will also have close range views of a new road junction, although this will be in the context of the existing view of the A711. A medium magnitude of change, and **moderate-major adverse** impact, are predicted.
- 3.14.37 East of the A711, housing in Troqueer (400m) and Cargenbridge (1km) will have views of the road, which lies downhill from many of the properties. Magnitude of change is likely to be small to medium, resulting in **moderate** or **moderate-major adverse** impacts. There will be **major adverse** impacts to Priestlands Farm and properties at Laghall, which will have very close range (<100m) views. More distant views from Islesteps (750m distant) will include the road within the context of the urban area, changes are likely to be small, and the impacts *moderate adverse*.
- 3.14.38 Few properties in Kingholm Quay will view the new road directly, although the large new bridge may be visible from some upstairs windows. Despite the loss of part of one shelterbelt, the bulk of the settlement will remain screened. However, those properties which do overlook the corridor will have close range (<300m) views of the bridge and embankments, resulting in a large magnitude of change and a **major adverse** impact.
- 3.14.39 There are relatively few properties with views of the corridor between Kingholm Quay and Craighend, and several that do are partially screened by existing trees. However, there will be a medium or large magnitude of change from several properties, including Acrehead (300m distant), resulting in **moderate-major adverse** impacts, and from the offices at the Crichton Campus (600m distant), resulting in *minor-moderate adverse* impacts. Houses at Trohoughton Avenue, off Bankend Road (100m distant), will see a large magnitude of change and a **major adverse** impact.
- 3.14.40 Properties around Craighend will see the new road at very close range (<100m), as it emerges from the cutting, and in the foreground of their wider view across Craigs Moss. Magnitude of change is likely to be large, resulting in a **major adverse** impact. Residents of those properties in Georgetown (800m distant) which overlook Craigs Moss will see the road crossing this area, together with the link road approaching Georgetown. Magnitude of change is likely to be medium, resulting in **moderate-major adverse** impacts. The road will pass close to properties at Isle of Man, and views will include the proposed railway bridge. Magnitude of change will be large for the nearest properties (150m distant), and the impact will be **major adverse**. There will be a relatively small magnitude of change at the A75,

where the road will tie into the existing roundabout, resulting in a *minor adverse* impact to commercial properties in this location.

- 3.14.41 Motorists on the A711, A710, and A75, assessed as low sensitivity, will see new road junctions, where the new by-pass ties into these roads. The magnitude of change is likely to be perceived as small to medium, resulting in a *minor to minor-moderate* adverse impact. Motorists on the more rural B725, and Bankend Road, will perceive a greater change, amounting to medium, and are likely to be more sensitive (medium sensitivity), resulting in ***moderate adverse*** impacts. Motorists on the quiet Craigs Road (medium sensitivity) will have to pass over a new bridge across a cutting, resulting in a large magnitude of change, and ***moderate-major adverse*** impacts. Rail passengers (medium sensitivity) will pass under a new bridge, and will have little other view of the new road, the magnitude of change will be small and the impact *minor adverse*. Cyclists using the NCR7 (high sensitivity) will see a medium magnitude of change, leading to ***moderate-major adverse*** impacts. Walkers using the River Nith footpath (high sensitivity) will see a large magnitude of change, arising from the new bridge over the river, and leading to a ***major adverse*** impact.
- 3.14.42 Distant views from points to the south, such as Glencaple and Kirkconnel, will include the new Nith crossing, but this will be seen against the existing urban background. The magnitude of change will be small and impacts *minor*. From Mabie Forest and Torthorwald, the change in view will also be small, as the new road will be seen in the context of the existing settlement, and impacts will be *minor* to none.

Mitigation

- 3.14.43 Mitigation measures, including roadside planting and earthworks, may effectively mitigate some of the impacts identified above. Mitigation measures will be developed at the detailed design stage, and have not been considered as part of this assessment. The following section outlines measures which should be considered, and which will help to mitigate the identified impacts.
- 3.14.44 There are problems associated with screen planting on such a flat landscape, in that roadside planting may serve to emphasise the linear feature in the landscape, and may in itself cause visual obstruction of existing views. Earth mounding should be considered, particularly along the shallow Cargen Pow valley, as an effective means of visual screening.
- 3.14.45 Screen planting is recommended to embankments, particularly north-west of the A711, to mitigate close range views from Cairncurran Cottage and Milestones House. Planting to the embankments approaching the Nith crossing, and along the cutting at Craigs Road, will also go some way to mitigating the impact of these interventions. The design of the Nith bridge structure should be carefully considered from the point of view of the estuary landscape, and the proximity of the RSA and NSA, as well as the potential impacts to users of the Nith footpath.

- 3.14.46 Within the RSA, between Kingholm Quay and Craigend, efforts should be made to blend the road into the existing landscape character. This could be achieved through roadside hedge planting, with standard hedgerow trees. Replacement planting to compensate for the loss of shelterbelts at Kingholm Quay and Bankend Road could take the form of roadside woodland belts, which would be more appropriate in this location, and would serve to further screen the road through the RSA. If necessary, the acquisition of additional land to allow planting, should be considered.

Residual Impacts

- 3.14.47 Although mitigation measures have not been agreed or fully assessed, it is likely that significant residual landscape and visual impacts would result from the final scheme.
- 3.14.48 Significant residual landscape impacts are likely at the Nith crossing, and within the RSA in general, and at the Craigs Road cutting in particular. Significant residual visual impacts are likely to affect a number of residential properties, particularly those with close-range views, such as Cairncurran Cottage and Milestones House, Laghall, the south edge of Kingholm Quay, and the houses around Craigend and Isle of Man.

3.15 Land Use, Agriculture and Soils

Introduction

- 3.15.1 The main purpose of this chapter is to:
- provide an account of the land use change that will occur as a result of the proposals;
 - address the wider implications for land use within the vicinity of the site;
 - identify and locate existing services/ utilities infrastructure; and
 - assess significance of impacts on the above.
- 3.15.2 The following elements of land use are considered: agricultural land, services and utilities and adjacent land uses.

Methodology

- 3.15.3 The assessment comprised:
- Desk study/ literature review:
 - Historical maps
 - MLURI land capability maps
 - Consultations:
 - Scottish Executive Environment and Rural Affairs Department (SEERAD)
 - Site visit to confirm formal and informal usage patterns

Impact Assessment

- 3.15.4 Impact magnitude and receptor sensitivity are combined to indicate significance. Impact significance range is described in terms of major/ moderate/ minor/ negligible and combinations (e.g. minor-moderate), adverse and positive. The table below indicates a potential matrix.

Table 3.20 Significance of Impact Matrix

		Receptor Sensitivity		
		Minor	Moderate	Major
Magnitude of Impact	Major	Moderate	Moderate/Major	Major
	Moderate	Minor/Moderate	Moderate	Moderate/Major
	Minor	Negligible	Minor	Minor/Moderate

Baseline Information

Land Capability & Farm Units

- 3.15.5 Land use within the preferred alignment is predominately agricultural with much of the route between Kingholm Quay and Bankend Road classified as 2 or 3₁ (prime quality land) as shown on Figure 3.7. This stretch of the proposed corridor is currently in use as grazing for a high yield dairy herd as part of the SAC Crichton Royal Farm Acrehead Unit shown on Figure 3.8. In addition to actual land loss, a negative impact may also arise from severance of the grazing from the farm buildings.

Infrastructure and Services

Roads

- 3.15.6 The proposed corridor meets a number of existing roads along the length of the route:
- Garroch Loaning;
 - A711;
 - A710;
 - B725;
 - Bankend Road;
 - Glencaple Road;
 - Craigs Road; and
 - A780/A75 Annan Road.

Rail

- 3.15.7 The proposed corridor will need to cross the main Glasgow to Carlisle Rail Line to the east of Dumfries as shown on Figure 3.1.

Utilities

- 3.15.8 As per section 3.11.29 existing Scottish Water utilities are likely to require protection or diversion as part of the detailed design for the bypass:

Sewers

- Garroch Loaning – Pumping Line;
- Cargenbridge - Pumping Line;
- Airds Point Strategic Trade Effluent Pumping Line from DuPont;
- Millburn Surface Water; and
- Sewage Pumping Line (Private) from Shell Garage and Little Chef.

Water

- Garroch Loaning;
- A711 Dalbeattie Road;
- A710 New Abbey Road;
- Junction of Stanehouse Loaning with Glencaple Road (B725);
- Bankend Road;
- Cairn of Craigs;
- Georgetown Road;
- Newfield; and
- Junction with A780/A75.

Overhead Power Lines

- 3.15.9 The proposed corridor passes through a line of overhead power lines following the crossing of the River Nith at Kingholm Quay. It passes under a second string of power lines to the east of Georgetown. It is not known at this stage the exact line of the bypass and whether the route will pass inside or outside the line of pylons.

Community Land Use

3.15.10 Community facilities which may be affected by the proposed corridor include schools, churches and leisure centres within the area. Community severance is primarily concerned with the separation of people from each other and from the facilities and services which they use. Access issues encompass Rights of Way and other footpaths. There are a number of Rights of Way, schools and areas of woodland potentially affected by the proposed corridor:

- Right of Way – National Byway along the B725 Glencaple Road to the south of Dumfries;
- National Cycle Route 74 – Route follows B725 Glencaple Road to the south of Dumfries;
- Right of Way – West bank of the River Nith; and
- Right of Way – East-West on the A710 from Cargenbridge.

Schools

- Cargenbridge Primary School– The school is to the south west of the preferred route (Junction 2 at Curriestanes) in Cargenbridge itself.

Woodland

- Plantation Forestry at Craigs Moss;
- Mabie Forest – Forestry Commission site part of the 7 Stanes mountain biking circuit to the South West of the site. This woodland is 1.5km away from the preferred route at its closest point; and
- There are shelterbelts of trees along the existing roads that will be crossed by the route.

Community Facilities

3.15.11 Dumfries and Galloway Royal Infirmary/Maternity Unit and Crichton University Campus – new access will be provided from the proposed bypass route.

Potential Issues

3.15.12 Potential land issues arising from the proposed development are identified as:

- Land Take - long-term loss of agricultural land;
- Loss of woodland;
- Impact on roads and utilities infrastructure;
- Impact on recreational land use, including rights of way; and
- Impacts on community facilities and schools.

Table 3.21 Summary of Impacts on Land Use, Agriculture and Soils

Receptor	Sensitivity	Magnitude	Impact Significance
Loss of agricultural use/farm viability	Major	Moderate	Moderate/Major
Impacts on Rights of Way/Community facilities/Schools	Major	Minor	Minor/Moderate
Loss of Woodland	Minor	Minor	Negligible
Impact on Road Infrastructure	Minor	Minor	Negligible
Impact on Overhead power lines	Major	Minor	Negligible
Impact on utilities	Major	Minor	Negligible

Mitigation

Generic Mitigation Measures

- 3.15.13 The proposed bypass will result in the loss of agricultural land and potential impacts on land use and receptors such as community facilities and schools. Existing utilities also need to be considered. Measures to minimise the impact of this loss will include:
- Consultation with SGRPID as part of EIA process;
 - Consultation with Utilities companies at detailed design stage;
 - Reducing permanent impacts by reinstating all areas of temporary land take on completion of the works;
 - Minimising disruption to SAC Royal Crichton Farm and ensure severance issues are satisfactorily addressed;
 - Minimising land take in the construction of any junctions with existing roads;
 - Minimising disruption to existing road infrastructure and ensuring public right of ways/cycle routes are unaffected by construction/operation of the route;
 - Identifying and minimising impacts and disruption to sensitive receptors e.g. schools and community facilities; and
 - Minimise the impacts on woodland and areas of shelterbelt planting.

Residual Impacts

- 3.15.14 The final road alignment and detailed design will require a substantial level of land take and subsequent impacts on land use, agriculture and soils. It is anticipated that detailed design and subsequent mitigation will adequately address the likely impacts of the proposed bypass.

Table 3.22 Residual Impacts

Receptor	Impacts before Mitigation	Impacts after Mitigation	Scale/Duration and Nature of Impact
Loss of agricultural use/farm viability	Moderate/Major	Minor	Local-Regional /Direct/Permanent
Impacts on Rights of Way/Community facilities/Schools	Minor/Moderate	Negligible	Local/Temporary/small scale
Loss of Woodland	Negligible	Negligible	Local/Temporary
Impact on Road Infrastructure	Negligible	Negligible	Local-Regional /Temporary
Impact on Overhead power lines	Negligible	Negligible	Local/Temporary
Impact on Utilities	Negligible	Negligible	Local/Temporary

- 3.15.15 Further assessment will be required at the detailed design stage once a final alignment has been established.

3.16 Cultural Heritage

Introduction

- 3.16.1 The aim of this section is to identify the cultural heritage value of the proposed corridor for the Dumfries Southern Bypass. This assessment will provide a comprehensive basis for further discussion and decisions regarding the future of this site and for the formulation of a mitigation strategy in consultation with Historic Scotland and Dumfries and Galloway Council Archaeologist.
- 3.16.2 The objectives to be undertaken in pursuing this study will be focused on assessing the cultural significance of the area to be affected by the development of the proposed bypass, based on the evidence available from desk study/consultations.

Methodology

3.16.3 This section provides baseline information on cultural heritage importance based on the proposed corridor for the Dumfries Bypass. Further, detailed assessment undertaken by a qualified archaeologist will be required as part of the detailed design of the scheme.

3.16.4 Cultural Heritage information has been compiled and reviewed using the following sources:

- Historic Scotland GIS database for Scheduled Ancient Monument data and Listed Buildings data (See Figure 3.9); and
- Dumfries & Galloway Council Archaeological Service. – provided additional local information on potential sites of cultural heritage importance (See Figure 3.10).

Impact Assessment

3.16.5 The criteria used to rate archaeological and architectural heritage sensitivity in the proposed development area are presented in Table 3.23 below.

Table 3.23 Criteria for establishing Archaeological Sensitivity

Sensitivity of receptor	Definition
High	Sites of National Importance, including Category A Listed Buildings; Scheduled Ancient Monuments; and sites on the non-statutory register of other identified sites maintained Dumfries and Galloway Council.
Medium	Archaeological sites or buildings of regional importance, including Category B Listed Buildings.
Low	Archaeological sites or buildings of local importance, including Category C (S) listed Buildings.
Negligible	A badly preserved or extremely common type of archaeological site/building of little value at local, regional or national levels.

Table 3.24 Criteria for classifying magnitude of Physical Impact

Magnitude of impact	Definition
Major	Total loss or major alteration of the site.
Moderate	Loss of one or more key elements of the site.
Minor	Slight alteration of the site.
Negligible	Very slight or negligible alteration of the site.

Table 3.25 Method of rating significance of impact on archaeological/ architectural heritage sites by the development

Magnitude of Impact	Feature Sensitivity			
	Negligible	Low	Medium	High
Major	Negligible significance	Moderate Significance	Major Significance	Major Significance
Moderate	Negligible Significance	Minor Significance	Moderate Significance	Major Significance
Minor	Negligible Significance	Negligible Significance	Minor Significance	Moderate Significance
Negligible	Negligible Significance	Negligible Significance	Negligible Significance	Minor Significance

Legislation and Policy

- 3.16.6 The statutory framework for heritage in Scotland is outlined in the Town and Country Planning (Scotland) Act 1997, as amended in the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997.
- 3.16.7 NPPG5 Archaeology and Planning (SOEnD 1994), NPPG18 Planning and the Historic Environment (SODD 1999) and PAN42 Archaeology-the Planning Process and Scheduled Ancient Monument Procedures (SOEnD 1994a) apply planning policy to ensure protection of cultural heritage interests. The planning guidance expresses a general presumption in favour of preserving heritage remains in situ as opposed to 'preservation by record' (i.e. excavation and recording of finds on the instruction of a suitably qualified archaeologist).

Baseline Information

- 3.16.8 Dumfries and Galloway has a wealth of sites with importance for cultural heritage some of which are potentially directly affected by the development of the bypass. Within the Dumfries and Galloway region there are:
- 17671 archaeology records, of which 8596 are sites noted as planning constraints, and a further 3371 are potential constraints;
 - 3414 Listed Building records – 224 Grade 'A', 1812 Grade 'B', 1378 Grade 'C (S)';
 - 20 Inventory Designed Landscapes;
 - 162 Non-Inventory Designed Landscapes;
 - 38 Conservation Areas; and
 - 34 Archaeologically Sensitive Areas.

Protected Sites

3.16.9 Consultation with Historic Scotland and the Dumfries and Galloway Council Archaeologist yielded information on protected sites which may be affected by the proposed corridor alignment:

Historic Scotland:

- SAM 5738, Curristanes – A large monument to the north and east of the proposed corridor. The current route crosses the existing A711 to the south of the site;
- Category B Listed Building 17516, Garrioch Viaduct – The viaduct passes over the proposed corridor. Historic Scotland state that the development should avoid impacts to the structure and any work required on the viaduct will require Listed Building Consent;
- Category B Listed Building 2628, 83 New Abbey Road, Former Lodge and Gatepiers;
- Category B Listed Building 3827, Kingholm Quay;
- Category A Listed Building 6693, The Crichton, Crichton Farm and associated listed building;
- Category B Listed Building 3838, Craigs House; and
- Category B Listed Building 3822, Netherwood Mains Farmhouse.

Dumfries and Galloway Council Archaeologist

- Scheduled Ancient Monument (SAM) at Curriestanes. Dumfries and Galloway Council Archaeologists states the following: ‘This buried Neolithic cursus has been identified as a crop mark...There is potential for currently unidentified related features to exist outwith the designated area within the vicinity of the monument’.
- MDG 6147 – potential remains of prehistoric burial site;
- MDG 6174 – remains at Laghall Quay;
- MDG 6153 – Bronze Age axe found at this site – possible further interest;
- MDG 6176 – possible remains of a Roman Camp; and
- Non-Inventory Designed landscape at Crichton Estate – impacts should be assessed.

3.16.10 The proposed corridor will need to consider these sites further at the detailed design stage to ensure that direct impacts and indirect impacts are addressed to the satisfaction of Historic Scotland and Dumfries and Galloway Council Archaeologist.

Potential Impacts

Direct Impacts

3.16.11 Potential impacts on known or unknown buried archaeological remains in the case of this development proposal relate to the possibility of disturbing, removing or destroying in situ remains and artifacts during groundbreaking works (including excavation, construction and other works associated with the development) on the site.

Indirect Impacts

3.16.12 Indirect impacts include potential visual effects on the settings of listed buildings and monuments, since their curtilage and amenity (in addition to their physical remains) are protected by legislation.

3.16.13 The following list is not an exhaustive list of all potential impacts.

Table 3.26 Indirect Impacts

Receptor	Sensitivity	Likely magnitude of Impact	Significance of Impact before Mitigation	Likely Significance of Impact after Mitigation
SAM 5738, Curristanes	High	Moderate	Major Significance	Minor
Category B Listed Building 17516, Garrioch Viaduct	Medium	Minor	Minor Significance	Negligible
Category B Listed Building 2628, 83 New Abbey Road, Former Lodge and Gatepiers	Medium	Minor	Minor Significance	Minor
Category B Listed Building 3827, Kingholm Quay	Medium	Minor	Minor Significance	Minor
Category A Listed Building 6693, The Crichton, Crichton Farm and associated listed building	High	Moderate	Major Significance	
Category B Listed Building 3838, Craigs House	Medium	Minor	Minor Significance	Negligible
Category B Listed Building 3822, Netherwood Mains Farmhouse	Medium	Minor	Minor Significance	Minor

Receptor	Sensitivity	Likely magnitude of Impact	Significance of Impact before Mitigation	Likely Significance of Impact after Mitigation
MDG 6147 – potential remains of prehistoric burial site	Low	Moderate	Minor Significance	Negligible
MDG 6174 – remains at Laghall Quay	Low	Moderate	Minor Significance	Negligible
MDG 6153 – Bronze Age axe found at this site – possible further interest	Low	Negligible	Negligible	Negligible
MDG 6176 – possible remains of a Roman Camp.	Low	Moderate	Minor Significance	Negligible
Non-Inventory Designed landscape at Crichton Estate	Low	Negligible	Negligible	Negligible

Mitigation

3.16.14 National planning policies and planning guidance (NPPG5 & PAN42), as well as the local plan policies (Local Plan 2006, Structure Plan 2001), outlined in Section 3.16.6 and 3.16.7 of this report, require a mitigation response that is designed to investigate the potential for archaeological sites within the development area and thence allow the preservation or recording of any significant remains. Planning policy (NPPG18) also advocates the investigation and the recording or preservation of historic building remains.

Residual Impacts

3.16.15 Should any significant archaeological remains be identified by the evaluation then further mitigation would be required to preserve them by avoidance (i.e. altering the development plans) or by record (further excavation). In either case there should be no significant residual impacts on archaeological features.

3.17 Summary of Environmental Impacts

Appraisal Summary Tables

- 3.17.1 An overall summary of the likely impacts of the proposed Dumfries Southern Bypass corridor *before and after mitigation* is provided as part of the Appraisal Summary Tables in Appendix A.
- 3.17.2 Overall impacts after suggested mitigation based on the Stage 2 assessment process can be summarised as follows:

Noise & Vibration - Positive Minor Impact in the Town Centre and wider area, with a Negative Major Impact on the regional distributor roads.

Air Quality - Positive Major Impact in the Town Centre and wider area, with a Negative Minor Impact on the regional distributor roads.

Water Quality, Drainage & Flood Defence – Negligible to Minor Adverse

Geology - Negligible

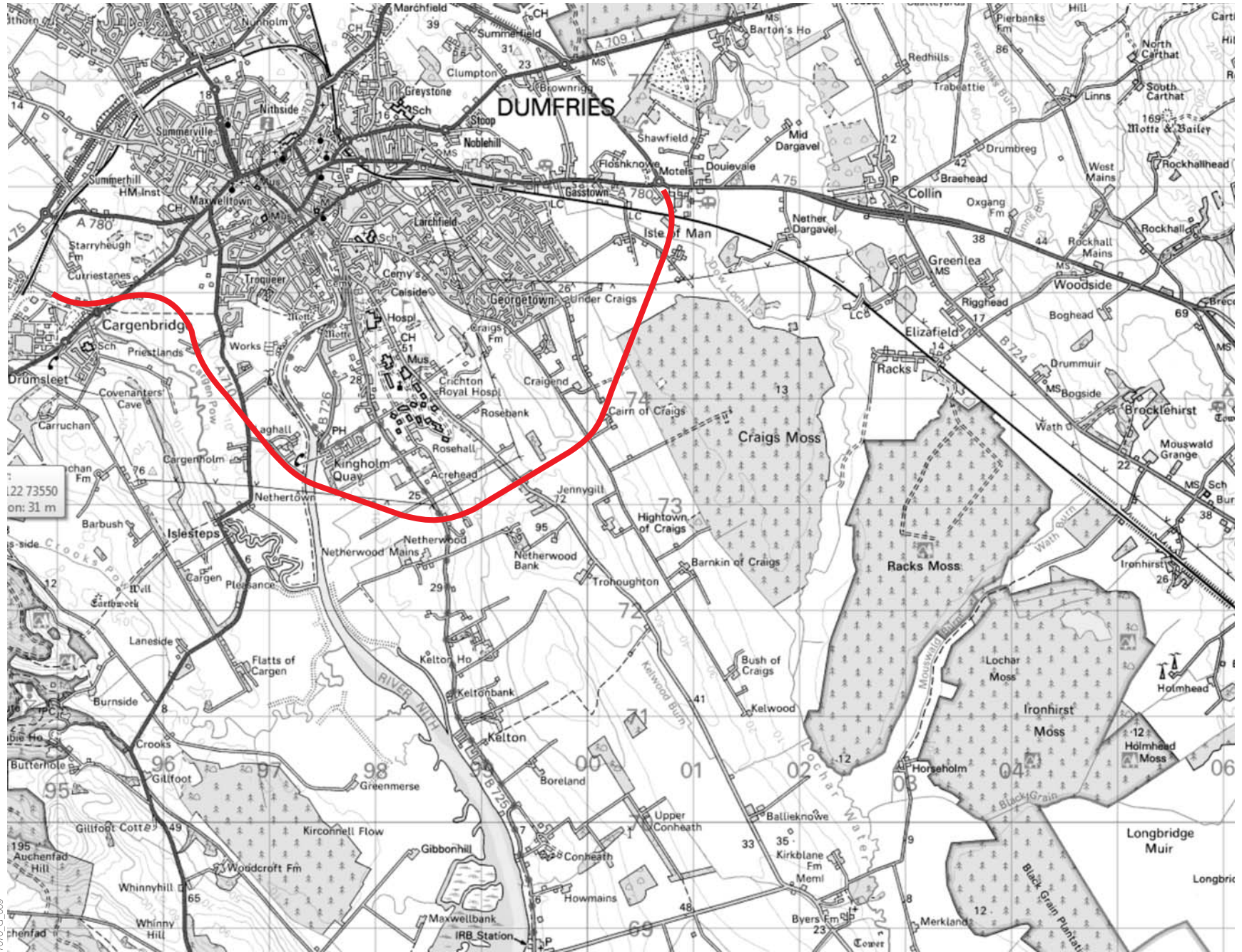
Biodiversity – Neutral to negative-slight

Landscape & Visual Amenity – Slight Moderate to Substantial Adverse

Land Use, Agriculture and Soils – Negligible to Minor Adverse

Cultural Heritage – Negligible to Minor Adverse

- 3.17.3 Further assessment of the detailed design of the proposed bypass will be required to ensure that environmental impacts are fully assessed and detailed specific mitigation committed.
- 3.17.4 As discussed at Stage 1, this project will likely be subject to a programme of further environmental assessment at project level through the Environmental Impact Assessment (Scotland) Regulations 1999. In addition, if shown to have a likely significant effect on the qualifying interest of the Natura 2000 site, this project will be subject to Appropriate Assessment under The Conservation (Natural Habitats, &c.) Regulations 1994 (“the Habitats Regulations”). It will only be progressed if shown not to have an adverse effect on the integrity of a Natura 2000 site or where no alternative solutions and imperative reasons for over-riding public interest apply once necessary compensatory measures have been taken.



 Possible corridor

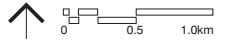


Figure 3.1
Location Plan

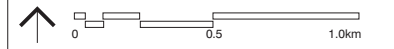
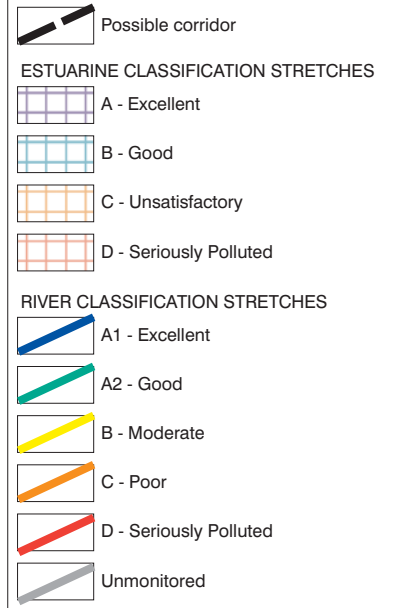
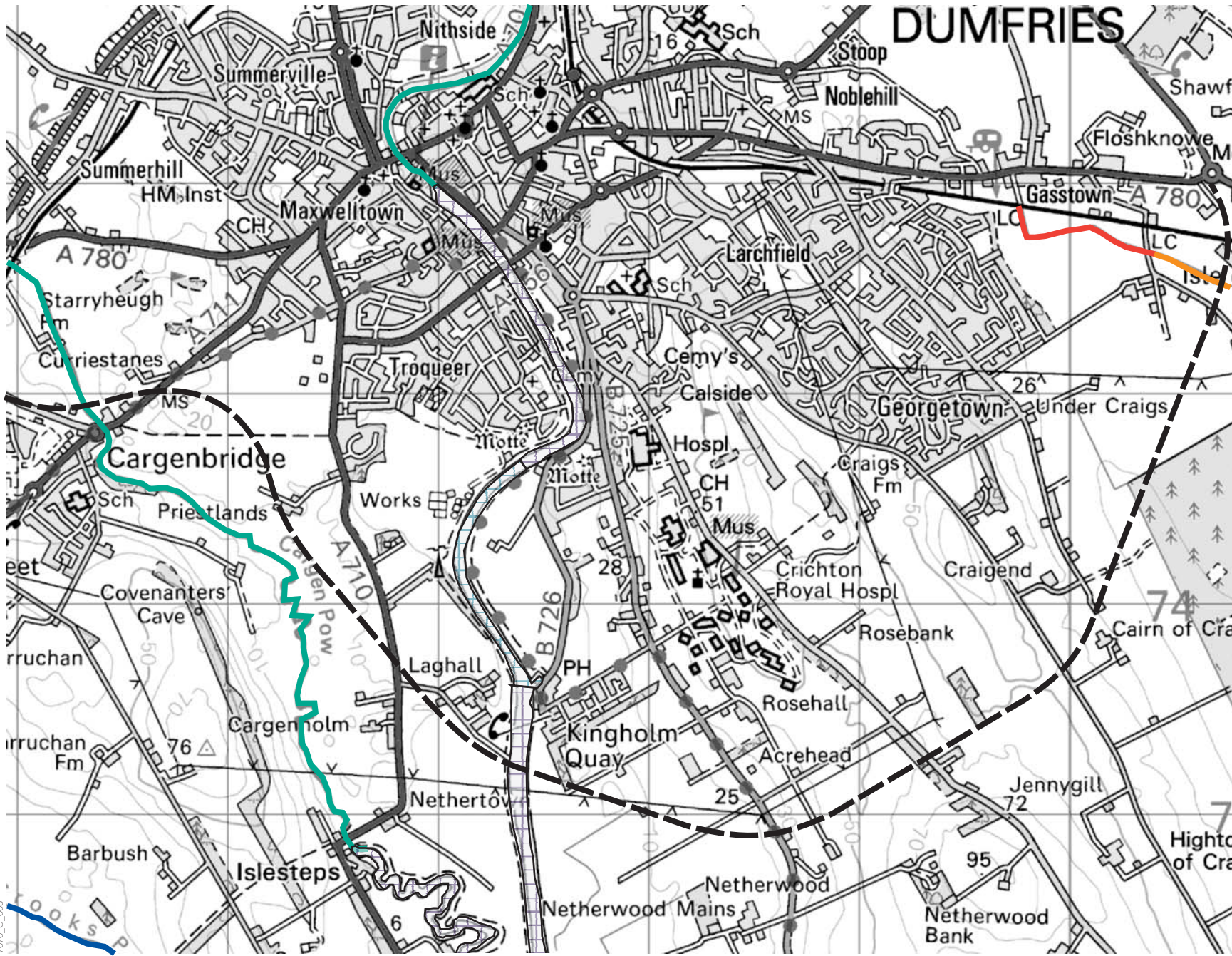


Figure 3.2
SEPA Water Quality
Classification