The Moray Council

Elgin STAG 2 Report
Environmental Assessment
April 2007

Halcrow Group Limited

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Contents

1 Introduction

1.1 *Introduction*

1.1.1 As part of the STAG 2 appraisal an Environmental Appraisal has been undertaken in order to make an in-depth assessment of the proposals which have passed through STAG 1. Through STAG 2 mitigation measures will also be recommended, and the findings will be summarised in the Part 2 AST.

1.1.2 This environmental appraisal considers the likely environmental impacts that will occur during the construction and operation of the proposed route options upon the environmental resource of the local area.

1.1.3 Following the Part 1 STAG it was recommended that the following options were taken forward to STAG 2:

- Traffic Management Options – Minor/Moderate Environment benefits
- Link/Junction Improvements - Minor/Moderate Environment benefits

1.1.4 The qualitative assessment judged that these options were likely to have the greatest benefits in terms of the Government's appraisal criteria. The STAG Part 2 will assess:

- Two link options within Elgin;
- Three bypass options (one north, and two south of Elgin); and
- Two combination options.

1.2 *Principles of Assessing Impacts for STAG*

1.2.1 A full appraisal of the following topics was carried out for the following areas, and a summary of the results will be outlined in the Part 2 ASTs.

- Noise and Vibration;
- Air Quality (Local – PM10 and NO2, Global – CO2;
- Water Quality, Drainage and Flood Defence;
- Geology;
- Biodiversity;
- Landscape and Visual;
- Agriculture and Soils; and

- Cultural Heritage

1.2.2 Both qualitative and quantitative assessment methods have been used where appropriate and the assessment has focused on those significant impacts that arise as a result of the proposals, where impacts are unlikely to be significant then detailed assessment within the Part 2 ASTs may not be necessary.

1.2.3 Consultation has been undertaken with a range of Statutory and Non-Statutory Consultees, and summaries of these responses can be found in Appendix A - Table 1.1 (and an environmental constraints map of Elgin is provided within Appendix B- Figure 1.1.

1.3 ***Methodology***

1.3.1 When considering the nature of the impacts upon the environment the STAG environment guidance states that it is important that the environmental assessment considers whether the impact is likely to be:

- Direct – arises as a result of the proposal itself (e.g. – land take to construct new transport infrastructure);
- Indirect – arises from effects that are associated with measure that are required to accommodate a proposal (e.g. – land take for planting which is required in order to screen a development);
- Secondary/Induced – arises as a result of a development induced by the proposal;
- Short, Medium, or Long Term – the duration of effects, with less than a year representing short term, and over 5 years representing long term;
- Permanent or Temporary – given mitigation measures, is a change reversible or not;
- Positive or Negative – are the effects beneficial or detrimental to the environmental; resources and receptors;
- Cumulative – arises as a result of a number of effects; and
- Synergistic – a type of cumulative effect where the cumulative impact of the combined impact of several proposals exceeds the sum of their individual effects (e.g. several proposals which each encroach minimally on a wildlife site may together affect the site so much that its habitat value is lost).

1.3.2 When assessing the predicted magnitude of impacts on each of the sub-criteria the seven point scale (see below) should be adopted and compared against the value of

the resource (from negligible to high value). Once the impact magnitude has been determined the significance should then be recorded within the AST using the following seven point scale:

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

		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

Table 1-1: Assessment of Significance of Environmental Impacts and Residual Effects

1.4 ***Environment Objectives***

1.4.1 Following a workshop group it was agreed the key objective for this assessment was to 'provide a quicker, safer and more reliable transport system in and around Elgin while accommodating future development'.

1.4.2 With regards the environment there are three sub-objectives which will be considered throughout the assessment:

- To encourage a modal shift from private car to public transport, cycling and walking;
- To mitigate the risks of adverse environmental impacts caused by motorised vehicular traffic in and around Elgin; and
- To ensure the integration of land use and transport.

2 Noise and Vibration

2.1 ***Introduction***

2.1.1 This chapter considers the likely impacts resulting from road traffic noise during the operation of the proposed route options upon the surrounding area.

2.2 ***Assessment Methodology***

2.2.1 The assessment of the route options is based on the methodology outlined for a Part 2 Strategic Level appraisal in STAG.

2.2.2 When assessing options at the Part 2 Strategic Level, STAG recommends that the procedures set out in Guidance on the Methodology for Multi-Modal Study (GMMMS) 4.3.23 be adopted. These procedures use the output from a strategic transport model to calculate traffic noise levels along each of the route options in the 15th year after opening to estimate exposed population for the existing situation, a do-minimum strategy and the proposed strategy.

2.2.3 The number of residential properties and other noise sensitive receptors in the 0-100m, 100-200m and 200-300m bands around each route options has been estimated in accordance with Design Manual Roads and Bridges (DMRB Volume 11 Section 3 Part 7, 1994) Stage 2.

2.2.4 STAG Worksheet N1: Noise – Strategic Level has been used to assist in the assessment of proposals impacts in terms of noise and vibration. In addition to this worksheet and the textual summary contained in this section, STAG highlights the requirement to produce Appraisal Summary Tables (AST).

2.2.5 Whilst every effort has been made to ensure that this report is easily understood, it is occasionally technical in nature; to assist the reader a glossary of terminology relating to noise is contained in Appendix C.

2.3 ***Impact Assessment***

Route Options

2.3.1 Existing situation, a do-minimum scenario and seven route options have been considered in this assessment. These seven route options are:

- Option 4 – Wittet Drive Link
- Option 6 – Morriston Road Link
- Option 13 – Northern Bypass
- Option 14 – Southern Bypass
- Option 15 – Southern Bypass
- Option 16 – Wittet Drive and Southern Distributor
- Option 17 – Morriston Road and Southern Distributor

Road Traffic Noise Level Calculations

2.3.2 Road traffic noise level calculations have been carried out at notional receptors located 10m from the edge of carriageway for the existing situation, the do-minimum strategy and each route option. These calculations have been conducted using the method contained within the *Calculation of Road Traffic Noise* (CRTN) for the opening year 2012 in the absence of the traffic data for the 15th year after opening at the present. The calculations for the existing situation have used 2006 base year traffic flows.

2.3.3 These noise levels are indicative as estimated average noise emission and a number of key assumptions have been made in the calculations:

- Free-field;
- No screening;
- Impervious bituminous road surface; and
- No correction for road gradient.

2.3.4 The results of the noise calculations can be seen in the tables below. The do-minimum levels are compared to the noise levels for each route option, in accordance with STAG 2 appraisal, presented in the tables 2.1-2.8.

Do-minimum	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Existing	Do-minimum	Change
A96 West of Elgin	66.4	66.9	+0.5
A941 Lossiemouth Road North of Elgin	63.1	63.4	+0.3
A96 East of Elgin	66.6	67.1	+0.5
A941 South of Elgin	62.4	63.0	+0.6
A941 Railway Bridge	66.0	66.6	+0.6
Edgar Road at A941	64.0	64.6	+0.6
Maisondieu Road at A941	63.3	64.3	+1.0
Station Road at A941	64.4	65.6	+1.2
Linkwood Road at A941	62.0	63.4	+1.4
New Elgin Road at Edgar Road	64.0	64.3	+0.3
Main Street at Thomhill Road	62.4	62.8	+0.4
Thomhill Road at Main Street	58.4	60.3	+1.9
Bimie Road at Main Street	59.1	60.2	+1.1
Ashgorve Road at Railway Bridge	56.6	57.9	+1.3
Reiket Lane at A96	59.8	60.3	+0.5
A96 West of Pansport Place	66.3	66.2	-0.1
A96 East of Pansport Place	67.5	67.7	+0.2
Pansport Road at A96	63.1	63.8	+0.7
Maisondieu Road at A96	62.1	63.3	+1.2
North Street at A96	64.7	65.1	+0.4
A96 West of North Street	66.4	65.9	-0.5
A96 East of North Street	66.0	66.0	0
Lossiemouth Road South of Lesmurdie Road	63.1	63.1	0
Lesmurdie Road at Lossiemouth Road	60.5	60.9	+0.4
North Street North of Morriston Road	63.5	63.6	+0.1
North Street South of Morriston Road	64.0	64.6	+0.6
Morriston Road at North Street	60.7	62.1	+1.4
A96 East of Morriston Road	66.5	66.6	+0.1
Morriston Road at A96	59.6	60.4	+0.8
Wittet Drive	59.1	57.8	-1.3
South Street at Northfield Terrace	62.9	64.9	+2.0
A96 between Tesco and High Street	66.5	66.1	-0.4
The Wards	60.9	61.0	+0.1
Wards Road West of The Wards	59.8	58.9	-0.9
A96 West of High Street	64.9	63.9	-1.0
Hay Street by Moray College	63.9	65.2	+1.3

Table 2-1: Predicted road traffic noise levels for existing and do-minimum

Option 4 – Wittet Drive Link	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 4	Change
A96 West of Elgin	66.9	66.9	0
A941 Lossiemouth Road North of Elgin	63.4	63.4	0
A96 East of Elgin	67.1	67.1	0
A941 South of Elgin	63.0	63.0	0
A941 Railway Bridge	66.6	66.3	-0.3
Edgar Road at A941	64.6	64.7	+0.1
Maisondieu Road at A941	64.3	64.5	+0.2
Station Road at A941	65.6	65.6	0
Linkwood Road at A941	63.4	63.8	+0.4
New Elgin Road at Edgar Road	64.3	64.1	-0.2
Main Street at Thomhill Road	62.8	62.7	-0.1
Thomhill Road at Main Street	60.3	60.3	0
Bimie Road at Main Street	60.2	60.4	+0.2
Ashgorve Road at Railway Bridge	57.9	58.2	+0.3
Reiket Lane at A96	60.3	60.5	+0.2
A96 West of Pansport Place	66.2	65.7	-0.5
A96 East of Pansport Place	67.7	67.6	-0.1
Pansport Road at A96	63.8	63.7	-0.1
Maisondieu Road at A96	63.3	63.5	+0.2
North Street at A96	65.1	64.8	-0.3
A96 West of North Street	65.9	65.8	-0.1
A96 East of North Street	66.0	65.5	-0.5
Lossiemouth Road South of Lesmurdie Road	63.1	63.1	0
Lesmurdie Road at Lossiemouth Road	60.9	60.9	0
North Street North of Morriston Road	63.6	63.6	0
North Street South of Morriston Road	64.6	64.4	-0.2
Morriston Road at North Street	62.1	60.9	-1.2
A96 East of Morriston Road	66.6	66.8	+0.2
Morriston Road at A96	60.4	58.8	-1.6
Wittet Drive	57.8	n.a.	n.a.
South Street at Northfield Terrace	64.9	63.9	-1.0
A96 between Tesco and High Street	66.1	66.0	-0.1
The Wards	61.0	60.0	-1.0
Wards Road West of The Wards	58.9	60.8	+1.9
A96 West of High Street	63.9	64.0	+0.1
Hay Street by Moray College	65.2	64.4	-0.8
New Link between The Wards and Edgar Road	n.a.	58.7	n.a.
New Link between Wittet Drive and The Wards	n.a.	62.7	n.a.
New Link between A96 and Wittet Drive	n.a.	63.1	n.a.

Table 2-2: Predicted road traffic noise levels for Option 4

Option 6 – Morriston Link	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 6	Change
A96 West of Elgin	66.9	66.4	-0.5
A941 Lossiemouth Road North of Elgin	63.4	63.2	-0.2
A96 East of Elgin	67.1	66.7	-0.4
A941 South of Elgin	63.0	62.5	-0.5
A941 Railway Bridge	66.6	66.1	-0.5
Edgar Road at A941	64.6	64.7	0.1
Maisondieu Road at A941	64.3	63.8	-0.5
Station Road at A941	65.6	64.8	-0.8
Linkwood Road at A941	63.4	63.4	0
New Elgin Road at Edgar Road	64.3	63.9	-0.4
Main Street at Thomhill Road	62.8	62.4	-0.4
Thomhill Road at Main Street	60.3	60.1	-0.2
Bimie Road at Main Street	60.2	60.1	-0.1
Ashgorve Road at Railway Bridge	57.9	57.9	0
Reiket Lane at A96	60.3	60.3	0
A96 West of Pansport Place	66.2	65.6	-0.6
A96 East of Pansport Place	67.7	67.3	-0.4
Pansport Road at A96	63.8	63.3	-0.5
Maisondieu Road at A96	63.3	62.9	-0.4
North Street at A96	65.1	64.9	-0.2
A96 West of North Street	65.9	65.4	-0.5
A96 East of North Street	66.0	65.4	-0.6
Lossiemouth Road South of Lesmurdie Road	63.1	63.0	-0.1
Lesmurdie Road at Lossiemouth Road	60.9	60.6	-0.3
North Street North of Morriston Road	63.6	63.3	-0.3
North Street South of Morriston Road	64.6	64.4	-0.2
Morriston Road at North Street	62.1	61.9	-0.2
A96 East of Morriston Road	66.6	65.3	-1.3
Morriston Road at A96	60.4	60.5	+0.1
Wittet Drive	57.8	54.3	-3.5
South Street at Northfield Terrace	64.9	63.1	-1.8
A96 between Tesco and High Street	66.1	65.5	-0.6
The Wards	61.0	59.6	-1.4
Wards Road West of The Wards	58.9	57.2	-1.7
A96 West of High Street	63.9	63.7	-0.2
Hay Street by Moray College	65.2	64.4	-0.8
New Link between A96 and Pluscarden Road	n.a.	58.5	n.a.
New Link between Pluscarden Road and Edgar Road	n.a.	58.8	n.a.

Table 2-3: Predicted road traffic noise levels for Option 6

Option 13 – Northern Bypass	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 13	Change
A96 West of Elgin	66.9	64.3	-2.6
A941 Lossiemouth Road North of Elgin	63.4	62.9	-0.5
A96 East of Elgin	67.1	64.9	-2.2
A941 South of Elgin	63.0	63.0	0
A941 Railway Bridge	66.6	66.4	-0.2
Edgar Road at A941	64.6	64.5	-0.1
Maisondieu Road at A941	64.3	63.6	-0.7
Station Road at A941	65.6	64.9	-0.7
Linkwood Road at A941	63.4	63.0	-0.4
New Elgin Road at Edgar Road	64.3	64.3	0
Main Street at Thomhill Road	62.8	62.9	+0.1
Thomhill Road at Main Street	60.3	60.2	-0.1
Bimie Road at Main Street	60.2	60.2	0
Ashgorve Road at Railway Bridge	57.9	58.5	+0.6
Reiket Lane at A96	60.3	60.1	-0.2
A96 West of Pansport Place	66.2	64.7	-1.5
A96 East of Pansport Place	67.7	66.4	-1.3
Pansport Road at A96	63.8	63.5	-0.3
Maisondieu Road at A96	63.3	62.8	-0.5
North Street at A96	65.1	64.8	-0.3
A96 West of North Street	65.9	64.7	-1.2
A96 East of North Street	66.0	64.8	-1.2
Lossiemouth Road South of Lesmurdie Road	63.1	62.6	-0.5
Lesmurdie Road at Lossiemouth Road	60.9	60.7	-0.2
North Street North of Morriston Road	63.6	63.0	-0.6
North Street South of Morriston Road	64.6	64.3	-0.3
Morriston Road at North Street	62.1	61.2	-0.9
A96 East of Morriston Road	66.6	64.5	-2.1
Morriston Road at A96	60.4	58.3	-2.1
Wittet Drive	57.8	55.4	-2.4
South Street at Northfield Terrace	64.9	63.3	-1.6
A96 between Tesco and High Street	66.1	64.8	-1.3
The Wards	61.0	60.8	-0.2
Wards Road West of The Wards	58.9	58.7	-0.2
A96 West of High Street	63.9	62.2	-1.7
Hay Street by Moray College	65.2	64.4	-0.8
Bypass (East)	n.a.	63.3	n.a.
Bypass (North)	n.a.	63.1	n.a.
Bypass (South)	n.a.	62.9	n.a.

Table 2-4: Predicted road traffic noise levels for Option 13

Option 14 – Southern Bypass	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 14	Change
A96 West of Elgin	66.9	66.8	-0.1
A941 Lossiemouth Road North of Elgin	63.4	63.4	0
A96 East of Elgin	67.1	64.4	-2.7
A941 South of Elgin	63.0	63.6	+0.6
A941 Railway Bridge	66.6	66.1	-0.5
Edgar Road at A941	64.6	64.4	-0.2
Maisondieu Road at A941	64.3	63.3	-1.0
Station Road at A941	65.6	64.6	-1.0
Linkwood Road at A941	63.4	62.7	-0.7
New Elgin Road at Edgar Road	64.3	64.5	+0.2
Main Street at Thomhill Road	62.8	63.1	+0.3
Thomhill Road at Main Street	60.3	59.7	-0.6
Bimie Road at Main Street	60.2	60.3	+0.1
Ashgorve Road at Railway Bridge	57.9	58.2	+0.3
Reiket Lane at A96	60.3	59.3	-1.0
A96 West of Pansport Place	66.2	64.6	-1.6
A96 East of Pansport Place	67.7	66.3	-1.4
Pansport Road at A96	63.8	63.7	-0.1
Maisondieu Road at A96	63.3	62.4	-0.9
North Street at A96	65.1	64.9	-0.2
A96 West of North Street	65.9	64.6	-1.3
A96 East of North Street	66.0	64.7	-1.3
Lossiemouth Road South of Lesmurdie Road	63.1	63.1	0
Lesmurdie Road at Lossiemouth Road	60.9	60.8	-0.1
North Street North of Morriston Road	63.6	63.5	-0.1
North Street South of Morriston Road	64.6	64.3	-0.3
Morriston Road at North Street	62.1	61.7	-0.4
A96 East of Morriston Road	66.6	n.a.	n.a.
Morriston Road at A96	60.4	60.1	-0.3
Wittet Drive	57.8	53.9	-3.9
South Street at Northfield Terrace	64.9	62.4	-2.5
A96 between Tesco and High Street	66.1	64.9	-1.2
The Wards	61.0	60.4	-0.6
Wards Road West of The Wards	58.9	58.0	-0.9
A96 West of High Street	63.9	62.6	-1.3
Hay Street by Moray College	65.2	64.1	-1.1
Bypass (East)	n.a.	63.8	n.a.
Bypass (South)	n.a.	63.1	n.a.
Bypass (West)	n.a.	63.5	n.a.

Table 2-5: Predicted road traffic noise levels for Option 14

Option 15 – Southern Bypass	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 15	Change
A96 West of Elgin	66.9	63.7	-3.2
A941 Lossiemouth Road North of Elgin	63.4	63.4	0
A96 East of Elgin	67.1	64.5	-2.6
A941 South of Elgin	63.0	63.6	+0.6
A941 Railway Bridge	66.6	66.2	-0.4
Edgar Road at A941	64.6	64.6	0
Maisondieu Road at A941	64.3	63.4	-0.9
Station Road at A941	65.6	64.5	-1.1
Linkwood Road at A941	63.4	62.6	-0.8
New Elgin Road at Edgar Road	64.3	64.4	+0.1
Main Street at Thomhill Road	62.8	63.1	+0.3
Thomhill Road at Main Street	60.3	59.9	-0.4
Bimie Road at Main Street	60.2	60.4	+0.2
Ashgorve Road at Railway Bridge	57.9	58.4	+0.5
Reiket Lane at A96	60.3	59.4	-0.9
A96 West of Pansport Place	66.2	64.4	-1.8
A96 East of Pansport Place	67.7	66.3	-1.4
Pansport Road at A96	63.8	63.7	-0.1
Maisondieu Road at A96	63.3	62.5	-0.8
North Street at A96	65.1	64.9	-0.2
A96 West of North Street	65.9	64.5	-1.4
A96 East of North Street	66.0	64.6	-1.4
Lossiemouth Road South of Lesmurdie Road	63.1	63.2	+0.1
Lesmurdie Road at Lossiemouth Road	60.9	60.8	-0.1
North Street North of Morriston Road	63.6	63.5	-0.1
North Street South of Morriston Road	64.6	64.4	-0.2
Morriston Road at North Street	62.1	61.7	-0.4
A96 East of Morriston Road	66.6	63.4	-3.2
Morriston Road at A96	60.4	59.9	-0.5
Wittet Drive	57.8	53.6	-4.2
South Street at Northfield Terrace	64.9	62.2	-2.7
A96 between Tesco and High Street	66.1	64.8	-1.3
The Wards	61.0	60.5	-0.5
Wards Road West of The Wards	58.9	57.7	-1.2
A96 West of High Street	63.9	62.1	-1.8
Hay Street by Moray College	65.2	63.9	-1.3

Option 15 – Southern Bypass	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 15	Change
Bypass (East)	n.a.	63.7	n.a.
Bypass (South)	n.a.	63.1	n.a.
Bypass (West)	n.a.	64.1	n.a.

Table 2-6: Predicted road traffic noise levels for Option 15

Option 16 – Wittet Drive and Southern Distributor	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 16	Change
A96 West of Elgin	66.9	66.8	-0.1
A941 Lossiemouth Road North of Elgin	63.4	63.4	0
A96 East of Elgin	67.1	67.1	0
A941 South of Elgin	63.0	62.9	-0.1
A941 Railway Bridge	66.6	66.1	-0.5
Edgar Road at A941	64.6	64.4	-0.2
Maisondieu Road at A941	64.3	64.1	-0.2
Station Road at A941	65.6	65.3	-0.3
Linkwood Road at A941	63.4	63.5	+0.1
New Elgin Road at Edgar Road	64.3	63.6	-0.7
Main Street at Thomhill Road	62.8	62.1	-0.7
Thomhill Road at Main Street	60.3	60.9	+0.6
Bimie Road at Main Street	60.2	61.4	+1.2
Ashgorve Road at Railway Bridge	57.9	57.1	-0.8
Reiket Lane at A96	60.3	61.3	+1.0
A96 West of Pansport Place	66.2	65.9	-0.3
A96 East of Pansport Place	67.7	67.5	-0.2
Pansport Road at A96	63.8	63.6	-0.2
Maisondieu Road at A96	63.3	63.1	-0.2
North Street at A96	65.1	64.9	-0.2
A96 West of North Street	65.9	65.8	-0.1
A96 East of North Street	66.0	65.8	-0.2
Lossiemouth Road South of Lesmurdie Road	63.1	63.2	+0.1
Lesmurdie Road at Lossiemouth Road	60.9	60.8	-0.1
North Street North of Morriston Road	63.6	63.6	0
North Street South of Morriston Road	64.6	64.3	-0.3
Morriston Road at North Street	62.1	61.2	-0.9
A96 East of Morriston Road	66.6	66.8	+0.2
Morriston Road at A96	60.4	59.5	-0.9

Option 16 – Wittet Drive and Southern Distributor	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 16	Change
Wittet Drive	57.8	n.a.	n.a.
South Street at Northfield Terrace	64.9	63.7	-1.2
A96 between Tesco and High Street	66.1	66.0	-0.1
The Wards	61.0	59.9	-1.1
Wards Road West of The Wards	58.9	60.5	+1.6
A96 West of High Street	63.9	64.0	+0.1
Hay Street by Moray College	65.2	64.1	-1.1
New Link between The Wards and Edgar Road	n.a.	59.5	n.a.
New Link between Wittet Drive and The Wards	n.a.	62.9	n.a.
New Link between A96 and Wittet Drive	n.a.	63.5	n.a.

Table 2-7: Predicted road traffic noise levels for Option 16

Option 17 – Morriston Road and Southern Distributor	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 17	Change
A96 West of Elgin	66.9	66.8	-0.1
A941 Lossiemouth Road North of Elgin	63.4	63.4	0
A96 East of Elgin	67.1	67.1	0
A941 South of Elgin	63.0	63.0	0
A941 Railway Bridge	66.6	66.0	-0.6
Edgar Road at A941	64.6	65.0	+0.4
Maisondieu Road at A941	64.3	63.7	-0.6
Station Road at A941	65.6	64.8	-0.8
Linkwood Road at A941	63.4	63.8	+0.4
New Elgin Road at Edgar Road	64.3	63.6	-0.7
Main Street at Thomhill Road	62.8	62.3	-0.5
Thomhill Road at Main Street	60.3	60.8	+0.5
Bimie Road at Main Street	60.2	60.9	+0.7
Ashgorve Road at Railway Bridge	57.9	57.8	-0.1
Reiket Lane at A96	60.3	61.3	+1.0
A96 West of Pansport Place	66.2	65.9	-0.3
A96 East of Pansport Place	67.7	67.5	-0.2
Pansport Road at A96	63.8	63.7	-0.1
Maisondieu Road at A96	63.3	62.7	-0.6
North Street at A96	65.1	65.0	-0.1
A96 West of North Street	65.9	65.6	-0.3
A96 East of North Street	66.0	65.8	-0.2

Option 17 – Morriston Road and Southern Distributor	Estimated Basic Noise Level $L_{A10,18hour}$ dB		
	Do-minimum	Option 17	Change
Lossiemouth Road South of Lesmurdie Road	63.1	63.0	-0.1
Lesmurdie Road at Lossiemouth Road	60.9	61.1	+0.2
North Street North of Morriston Road	63.6	63.4	-0.2
North Street South of Morriston Road	64.6	64.5	-0.1
Morriston Road at North Street	62.1	62.2	+0.1
A96 East of Morriston Road	66.6	65.7	-0.9
Morriston Road at A96	60.4	60.8	+0.4
Wittet Drive	57.8	53.4	-4.4
South Street at Northfield Terrace	64.9	63.7	-1.2
A96 between Tesco and High Street	66.1	65.9	-0.2
The Wards	61.0	60.5	-0.5
Wards Road West of The Wards	58.9	57.4	-1.5
A96 West of High Street	63.9	63.7	-0.2
Hay Street by Moray College	65.2	64.6	-0.6
New Link between A96 and Pluscarden Road	n.a.	59.5	n.a.
New Link between Pluscarden Road and Edgar Road	n.a.	59.7	n.a.

Table 2-8: Predicted road traffic noise levels for Option 17

Property Count

2.3.5 In addition to the road traffic noise level calculations, the number of residential properties and other noise sensitive receivers in the 0-100m, 100-200m and 200-300m bands around each route option, in accordance with DMRB Stage 2, has been estimated. The results of the property counts are shown in Tables 2.9-2.15.

Option 4 – Wittet Drive Link	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	236	303	289
Hospital	0	1	0
School	1	0	1
Hotel	2	0	0

Table 2-9: Noise sensitive receptor count for Option 4

Option 6 – Morriston Road Link	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m

Option 6 – Morriston Road Link	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	10	62	197
Hospital	0	0	0
School	0	2	0
Hotel	1	1	0

Table 2-10: Noise sensitive receptor count for Option 6

Option 13 – Northern Bypass	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	25	63	200

Table 2-11: Noise sensitive receptor count for Option 13

Option 14 – Southern Bypass	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	37	160	296

Table 2-12: Noise sensitive receptor count for Option 14

Option 15 – Southern Bypass	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	47	128	243

Table 2-13: Noise sensitive receptor count for Option 15

Option 16 – Wittet Drive and Southern Distributor	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	1132	1123	853
Hospital	0	1	0
School	1	0	1
Hotel	2	0	0

Table 2-14: Noise sensitive receptor count for Option 16

Option 17 – Morriston Road and Southern Distributor	Distance bands from centreline of route option		
	0-100m	100-200m	200-300m
Residential properties	904	884	778
Hospital	0	0	0
School	0	2	0
Hotel	1	1	0

Table 2-15: Noise sensitive receptor count for Option 17

STAG 2 Assessment

2.3.6 The calculated road traffic noise levels shown in Tables 2.1-2.8 have been collated in *Worksheet N1: Noise – Strategic Level.*

2.3.7 This worksheet estimates the population exposed to increase, decrease or no change in traffic noise levels for the existing situation, the do-minimum strategy and each proposed route option for year 2012. Changes in number of people likely to be annoyed by noise over the long term in each zone are also estimated for the do-minimum scenario and the proposed route options.

2.3.8 Due to limited budget constraints it has not been possible to conduct a baseline noise survey in the study area. Where sections of route options pass through rural areas far away from existing road network, the ambient noise levels are likely to be relatively low, and an ambient Leq level of 50 dB (A) has been assumed. In addition, the population exposed to the noise levels estimated using a multiplier of 2.4 occupants per property.

2.3.9 The worksheets have been used to assist in the assessment of proposals impacts and detailed in Appendix C. The assessment of significance noise impacts has been summarized in the table below for each route option.

2.3.10 The following impacts scale, which was set out by the Working Party of the Institute of Acoustics (IOA) and as shown in the table below, has been adopted in this assessment.

Change in Noise Level dB(A)	Significance
Less than 3	No impact
3-5	Minor impact
6-10	Moderate impact
More than 10	Major impact

Table 2-16: Impact scale for comparison of noise levels

Route option	Location	Population exposed approx.	Assessment score
Option 4	**Link between The Wards and Edgar Road**	**70**	**No impact**

Route option	Location	Population exposed approx.	Assessment score
	Link between Wittet Drive and The Wards	185	Negative minor
	Link between A96 and Wittet Drive	2	Negative minor
	Link between Pluscarden Road and Edgar Road	2	Negative moderate
Option 6	Link between A96 and Pluscarden Road	2	Negative moderate
	Link between A96 and Pluscarden Road	2	No impact
	Bypass (East)	0	Negative major
Option 13	Bypass (North)	7	No impact
	Bypass (South)	14	Negative major
	Bypass (East)	2	Negative moderate
Option 14	Bypass (East)	2	Negative major
	Bypass (South)	19	Negative major
	Bypass (West)	2	Negative major
	Bypass (East)	10	Negative major
Option 15	Bypass (South)	46	Negative major
	Bypass (West)	5	Negative major
	Link between The Wards and Edgar Road	1070	No impact
Option 16	Link between Wittet Drive and The Wards	226	Negative minor
	Link between A96 and Wittet Drive	2	Negative minor
	Link between Pluscarden Road and Edgar Road	1070	No impact
Option 17	Link between Pluscarden Road and Edgar Road	2	Negative moderate
	Link between A96 and Pluscarden Road	2	Negative minor

Table 2-17: A summary of noise impacts

Appraisal Summary Tables

2.3.11 In addition to the worksheets and textual summary contained in this section, STAG highlights the requirement to produce Appraisal Summary Table (AST), which outlines the effects on the environment from each route option and the significance of the impacts in qualitative and quantitative terms. These Appraisal Summary Tables are presented in Appendix C.

2.4 Mitigation Measures

2.4.1 The information generated by a Stage 2 assessment is not sufficiently detailed to specify mitigation measures. However, there are a number of measures available

that could be considered as the route design develops. These measures would include: roadside noise barriers, low noise surfacing or speed restrictions.

2.4.2 The effectiveness of such measures would depend to a large extent on the final specifications, however, as a general guide, a well-designed noise barrier will reduce road traffic noise by between 5 and 15 dB. Low noise surfacing will result in noise levels approximately 2.5 dB lower than a standard hot rolled asphalt surface, providing it is used on sections that are free-flowing and where traffic speeds are at least 70 km/hour.

2.4.3 Restricting vehicle speeds is occasionally used to reduce noise and the reduction gained will be dependent on the speed restrictions. Speed restrictions tend to be used on existing roads where a noise problem exists rather than on a new road where there would be no benchmark against which the resultant reduction in noise level could be judged.

2.5 ***Summary***

On the basis of the above, it is considered that the Option 17 – Morriston Road and Southern Distributor will cause fewer negative impacts than the other proposed route options. This conclusion is also reached in Worksheets N1 where it can be seen that the Option 17 would produce a change in the estimated population annoyed of -13.8 which is the lowest number of people likely to be annoyed by noise in comparison with the other proposed route options.

3 Air Quality

3.1 ***Introduction***

3.1.1 This chapter considers the effects of the proposed road schemes on the local air quality of Elgin, and estimates the impact on emissions of greenhouse gases. Section 3.2.1 describes the legislative background for both issues.

3.1.2 The assessment of effects of local air quality considers key pollutants that are indicative of air pollution levels resulting from traffic.

3.1.3 Sections 3.3 and 3.4 describe the effects of each of the projects both in terms of local air quality, and on the emission of greenhouse gases. Only the operational phase is considered.

3.2 ***Methodology***

Relevant Guidance, Designations and Legislation

3.2.1 EU Framework Directive 96/62/EC on ambient air quality assessment and management came into force in November 1996 and had to be implemented by Member States by May 1998. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants. As a Framework Directive it requires the Commission to propose "Daughter" Directives setting air quality objectives, limit values, alert thresholds, guidance on monitoring, siting and measurement for individual pollutants. The Daughter Directives published to date include:

- Directive 1999/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air;
- Directive 2000/69/EC relating to limit values for benzene and carbon monoxide in ambient air; and
- Directive 2002/3/EC relating to ozone in ambient air.

3.2.2 The Air Quality Limit Values (Scotland) Regulations 2001 [Scottish SI No. 2001/225] and four subsequent amendments, together with equivalent legislation for the other parts of the UK, implement Council Directive 96/62/EC on

ambient air quality assessment and management and related Daughter Directives. The obligation for complying with these limit values rests with central government.

National Objectives

3.2.3 Part IV of the Environment Act 1995 sets out a system of Local Air Quality Management (LAQM); it is a component of the UK's approach to managing air quality. Under LAQM local authorities have a duty to make periodic reviews of local air quality against the objectives set by national regulation. Where a local authority's Review and Assessment of local air quality indicates that air quality objectives are not expected to be achieved, local authorities are required to designate Air Quality Management Areas (AQMAs). An Air Quality Action Plan must then be formulated, detailing ways in which the council aims to improve air quality within the AQMA.

3.2.4 The UK Air Quality Strategy was published in January 2000 and describes the Government's strategy for improving air quality in the UK. It is the principle policy framework for LAQM. The Government has more recently announced tighter objectives for benzene and carbon monoxide and a new objective for polycyclic aromatic hydrocarbons (PAHs) in an Addendum to the Air Quality Strategy, published in February 2003.

3.2.5 The Air Quality (Scotland) Regulations 2000 [Scottish SI No. 2000/97] and Air Quality (Scotland) Amendment Regulations 2002 [Scottish SI No. 2002/297] include national air quality objectives which, in most cases, are numerically synonymous with the European limit values although some have earlier compliance target dates. However, the air quality objectives are for specific use by local authorities in undertaking their LAQM duties in pursuit of Part IV of the Environment Act 1995. The statutory status of air quality objectives is that local authorities are required to demonstrate best efforts rather than strict compliance.

Climate Change

3.2.6 Government policy on climate change is set out in the UK's Climate Change Programme. The Programme details how the UK plans to achieve its legally binding Kyoto Protocol target to reduce emissions of six greenhouse gases by 12.5% below base year levels by 2008-2012. The basket of greenhouse gases consists: carbon dioxide (CO2); methane; nitrous oxide; hydrofluorocarbons; perfluorocarbons; and sulphur hexafluoride – each weighted by their Global

Warming Potential (GWP) (relative to carbon dioxide with a GWP of 1). The Government also has a domestic goal to cut CO2 emissions by 20% below 1990 levels by 2010.

Elgin Study

3.2.7 This assessment was carried out in accordance with Scottish Transport Appraisal Guidance (STAG), which recommends the use of the DRMB Screening Method (DMRB) in order to estimate the effect of changing traffic patterns on levels of nitrogen dioxide (NO2) and particulate materials having a (equivalent aerodynamic) diameter of ten microns or less (PM10). NO2 is a respiratory irritant, and PM10 can have wide ranging health effects depending on the chemical composition of the material, thus both are included in the UK Air Quality Strategy.

3.2.8 As part of this strategy, objectives are in place for NO2 and PM10, the objectives for NO2 and PM10 are presented in Table 3-1 below.

Pollutant	Applies to	Objective	Compliance date
NO2	**UK**	**Hourly average concentration must not exceed 200µg/m3 (105ppb) more than 18 times a year. Annual mean should not exceed 40µg/m3 (21ppb).**	**31st Dec 2005**
PM10	**UK**	**24-hour mean concentration should not exceed 50µg/m3 more than 35 times a year. Annual mean concentration should not exceed 40µg/m3.**	**31st Dec 2004**
	Scotland	**24-hour mean concentration should not exceed 50µg/m3 more than 7 times a year. Annual mean concentration should not exceed 18µg/m3.**	**31st Dec 2010**

Table 3-1: UK Air Quality Strategy Objectives for NO2 and PM10

3.2.9 A new road scheme, with associated new traffic patterns, has the potential to affect air quality. These impacts are often perceived to be negative, though in cases where pollution is directed away from heavily populated areas, or where vehicles can proceed at greater speed (with their engines working more efficiently), impacts can be positive. The impact on road schemes on air quality is assessed both in terms of local levels of key pollutants, with regional effects measured in terms of total carbon dioxide (CO2) emissions. The DMRB was developed to assist with the assessments associated with these two elements.

3.2.10 The results establish whether a road scheme should be subjected to a more detailed air quality assessment. For the purposes of this report, seven options were assessed using DMRB for their impact on the air quality of Elgin. These are numbered 4, 6, 13, 14, 15, 16, and 17 according to the convention in the STAG Options Testing Report. For each route, the study area includes all links in the Elgin network where analysis suggests a >10% change in AADT as a result of the proposal. 2012 was chosen as the reference case year for the tests, as relevant committed developments will be completed, and these have been included in the traffic models (along with 2012 volume forecasts) on which this assessment is based.

Baseline Situation

3.2.11 Moray Council's last LAQM Updating and Screening Assessment (carried out by BMT Cordah Limited- June 2006) concluded that there were unlikely to be any exceedences of NO2 or PM10 NAQS objectives at receptors in Elgin due to traffic emissions. There are currently no AQMAs for either pollutant in the Moray Council area.

3.2.12 In the absence of background monitoring data, the baseline NO2 and PM10 concentrations for Elgin have been determined using estimated data mapped for Moray Council from the UK National Air Quality Archive. In this database, estimated background annual mean air pollutant concentrations are presented at a 1km x 1km grid resolution, with OS x, y co-ordinates given for the centre of each square. Using this methodology, a 5km x 5km grid was selected covering the entire town, and 2004 data was extracted from a file for the whole of Moray. These are presented for NO2 and PM10 in Table 3-2 and Table 3-3 below. In the case of Elgin, the background air quality in the town is good, and levels of NO2 and PM10 are comparatively low.

NO_2 ($\mu g/m^3$)	X				
Y	**319500**	**320500**	**321500**	**322500**	**323500**
860500	**1.97**	**2.72**	**3.63**	**3.66**	**3.19**
861500	**3.12**	**4.88**	**6.47**	**6.6**	**5.14**
862500	**3.28**	**5.89**	**7.71**	**7.72**	**5.48**
863500	**3.25**	**5.66**	**7.08**	**7.07**	**4.84**
864500	**1.97**	**3.43**	**4.04**	**3.93**	**2.63**

Table 3-2: Estimated NO2 Concentrations for Elgin Grid

PM10 ($\mu g/m^3$)	**X**				
Y	**319500**	**320500**	**321500**	**322500**	**323500**
860500	**9.36**	**10.3**	**10.7**	**10.7**	**10.2**
861500	**9.79**	**11.1**	**12.2**	**12.3**	**11.4**
862500	**9.99**	**11.9**	**13.5**	**13.4**	**12**
863500	**9.92**	**11.8**	**13.1**	**13.1**	**11.7**
864500	**9.37**	**10.9**	**11.6**	**11.5**	**10.5**

Table 3-3: Estimated PM10 Concentrations for Elgin

3.2.13 The appropriate background levels are selected for each case from the grid according to the location of the link. LAQM TG(03) suggests using the average of adjoining grid squares to the road in question, to avoid double counting their

contribution to background. Correction factors are then applied to the 2004 data to estimate background concentrations for the appropriate year. A speed of 27.36kph was used for links in the 2012 reference case and the predicted speed resulting from the new road scheme was used for each of these. Average Annual Daily Traffic (AADT) data were derived from modelled peak hour traffic flows by applying a conversion factor derived from diurnal traffic distribution data presented in the Road Traffic Statistics for 2005 (published by the DfT in July 2006).

3.3 ***Local Air Quality Assessment***

3.3.1 The generalised assessment of air quality was undertaken to estimate the overall change in people's exposure to concentrations of NO2 and PM10. The methodology parallels the TAG Unit 3.3.3: Local Air Quality Sub-Objective. Properties are counted in 50m bands from the road centre for the Do Minimum (without the scheme) and Do Something (with the scheme) in the opening year 2012. NO2 and PM10 concentrations are calculated using the DMRB Screening Method at 20m, 70m, 115m and 175m from the road centre. Properties in each distance band were estimated from a map of Elgin. Total exposure to each pollutant is calculated for the Do Minimum and Do Something by multiplying the concentration within each band by the number of properties within the corresponding band. The overall Do Minimum score is subtracted from the Do Something score to give the change in exposure with the Scheme. A positive number denotes an increase in concentrations with the Scheme, i.e. deterioration in air quality, and a negative number a decrease in concentrations, i.e. an improvement in air quality.

Option 4 – Wittet Drive Link

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	265	309	254	249	1077
Total properties across all routes (some)	281	317	267	265	1130
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	1836.64	1748.86	1323.73	1252.46	6161.69
Do-something NO_2 assessment					Total assessment NO_2 **(II)**:
across all routes	1904.77	1763.88	1377.7	1324.34	6370.69
Net total assessment for NO_2, all routes (II-I)					209
Number of properties with an improvement					***874***
Number of properties with no change					***0***
Number of properties with a deterioration					***256***

Table 3-4: Option 4 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	265	309	254	249	1077
Total properties across all routes (some)	281	317	267	265	1130
Do-minimum PM_{10} assessment *across all routes*	3046.07	3414.61	2771.55	2710.02	Total assessment PM10 (I): 11942.25
Do-something PM_{10} assessment *across all routes*	3180.12	3479.04	2866.36	2877.61	Total assessment PM_{10} **(II)**: 12403.13
Net total assessment for PM_{10}, all routes (II-I)					460.88
Number of properties with an improvement					***874***
Number of properties with no change					***0***
Number of properties with a deterioration					***256***

Table 3-5: Option 4 Local Air Quality Assessment Scores (PM10)

Option 6 – Morriston Road Link

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	368	410	367	404	1549
Total properties across all routes (some)	371	417	375	408	1571
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	2697.72	2355.59	1911.62	2035.93	9000.86
Do-something NO_2 assessment					Total assessment NO2 (II):
across all routes	2527.04	2300.89	1902.37	2041.83	8772.13
Net total assessment for NO_2, all routes (II-I)					-228.73
Number of properties with an improvement					*1549*
Number of properties with no change					*0*
Number of properties with a deterioration					*22*

Table 3-6: Option 6 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	368	410	367	404	1549
Total properties across all routes (some)	371	417	375	408	1571
Do-minimum PM_{10} assessment					Total assessment PM10 (I):
across all routes	4226.82	4464.42	3945.36	4321.47	16958.07
Do-something PM_{10} assessment					Total assessment PM10 (II):
across all routes	4140.28	4472.8	3977.17	4320.24	16910.49
Net total assessment for PM_{10}, all routes (II-I)					-47.58
Number of properties with an improvement					*1549*
Number of properties with no change					*0*
Number of properties with a deterioration					*22*

Table 3-7: Option 6 Local Air Quality Assessment Scores (PM10)

Option 13 – Northern Bypass Option

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	514	568	496	592	2170
Total properties across all routes (some)	522	576	502	614	2214
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	4293.79	3548.8	2733.52	3064.46	13640.57
Do-something NO_2 assessment					Total assessment NO2 (II):
across all routes	4097.14	3452.49	2675.87	3135.68	13361.18
Net total assessment for NO_2, all routes (II-I)					-279.39
Number of properties with an improvement					*2170*
Number of properties with no change					*0*
Number of properties with a deterioration					*44*

Table 3-8: Option 13 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	514	568	496	592	2170
Total properties across all routes (some)	522	576	502	614	2214
Do-minimum PM_{10} assessment					Total assessment PM10 (I):
across all routes	6217.4	6409.29	5471.14	6497.85	24595.68
Do-something PM_{10} assessment					Total assessment PM10 (II):
across all routes	6138.08	6423.9	5504.18	6675.37	24741.53
Net total assessment for PM_{10}, all routes (II-I)					145.85
Number of properties with an improvement					*2170*
Number of properties with no change					*0*
Number of properties with a deterioration					*44*

Table 3-9: Option 13 Local Air Quality Assessment Scores (PM10)

Option 14 – Southern Bypass (Short) Option

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	531	577	496	543	2147
Total properties across all routes (some)	538	589	531	628	2286
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	4288.59	3660.78	2816.02	2961	13726.39
Do-something NO_2 assessment					Total assessment NO2 (II):
across all routes	4093.66	3627.42	2932.66	3312.85	13966.59
Net total assessment for NO_2, all routes (II-I)					240.2
Number of properties with an improvement					*1836*
Number of properties with no change					*0*

Table 3-10: Option 14 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	531	577	496	543	2147
Total properties across all routes (some)	538	589	531	628	2286
Do-minimum PM_{10} assessment					Total assessment PM10 (I):
across all routes	6386.77	6602.53	5555.98	6060.88	24606.16
Do-something PM_{10} assessment					Total assessment PM10 (II):
across all routes	6348.26	6689.69	5914.22	6953.52	25905.69
Net total assessment for PM_{10}, all routes (II-I)					1299.53
Number of properties with an improvement					*1836*
Number of properties with no change					*0*
Number of properties with a deterioration					*450*

Table 3-11: Option 14 Local Air Quality Assessment Scores (PM10)

Option 16 – Wittet Drive & Southern Distributor Option

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	564	643	528	584	2319
Total properties across all routes (some)	564	643	528	584	2319
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	4014.35	3699.18	2785.63	2988.91	13488.07
Do-something NO_2 assessment					Total assessment NO_2 **(II)**:
across all routes	3760.61	3525.82	2705.63	2932.89	12924.95
Net total assessment for NO_2, all routes (II-I)					-563.12
Number of properties with an improvement					***1720***
Number of properties with no change					***0***
Number of properties with a deterioration					***599***

Table 3-12: Option 16 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	564	643	528	584	2319
Total properties across all routes (some)	564	643	528	584	2319
Do-minimum PM_{10} assessment					Total assessment PM10 (I):
across all routes	6526.14	7155.87	5788.83	6387.3	25858.14
Do-something PM_{10} assessment					Total assessment PM_{10} **(II)**:
across all routes	6392.65	7093.37	5766.83	6372.48	25625.33
Net total assessment for PM_{10}, all routes (II-I)					-232.81
Number of properties with an improvement					***1720***
Number of properties with no change					***0***
Number of properties with a deterioration					***599***

Table 3-13 Option 16 Local Air Quality Assessment Scores (PM10)

Option 17 – Morriston Road & Southern Distributor Option

NO_2, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	571	655	530	569	2325
Total properties across all routes (some)	571	655	530	569	2325
Do-minimum NO_2 assessment					Total assessment NO2 (I):
across all routes	4018.33	3744.14	2778.71	2897.41	13438.59
Do-something NO_2 assessment					Total assessment NO2 (II):
across all routes	3886.79	3731.34	2761.15	2886.11	13265.39
Net total assessment for NO_2, all routes (II-I)					-173.2
Number of properties with an improvement					***1547***
Number of properties with no change					***0***
Number of properties with a deterioration					***778***

Table 3-14: Option 17 Local Air Quality Assessment Scores (NO2)

PM_{10}, SUMMARY OF ROUTES: THE AGGREGATED TABLE	0-50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	571	655	530	569	2325
Total properties across all routes (some)	571	655	530	569	2325
Do-minimum PM_{10} assessment					Total assessment PM10 (I):
across all routes	6581.99	7271.79	5793.29	6204.15	25851.22
Do-something PM_{10} assessment					Total assessment PM10 (II):
across all routes	6568.89	7288.46	5798	6202.87	25858.22
Net total assessment for PM_{10}, all routes (II-I)					7
Number of properties with an improvement					***1547***
Number of properties with no change					***0***
Number of properties with a deterioration					***778***

Table 3-15: Option 17 Local Air Quality Assessment Scores (PM10)

Option	NO_2 Score	PM10 Score	Properties with beneficial impact	Properties with adverse impact
4	**209.0**	**460.9**	**874**	**256**
6	**-47.6**	**-228.7**	**1543**	**22**
13	**-279.4**	**145.9**	**2170**	**51**
14	**240.0**	**1299.3**	**1836**	**450**
15	**157.37**	**1245.4**	**1878**	**162**
16	**-563.1**	**-232.8**	**1923**	**396**
17	**-173.2**	**7.0**	**1547**	**778**

Table 3-16: Summary of Local Air Quality Scores

3.3.2 The data above shows that all of the schemes are estimated to have beneficial impacts in terms of their effect on the number of properties experiencing beneficial effects versus those experiencing negative effects. Each case has a different study area i.e. the number of routes experiencing the required change in AADT, so the number of properties affected by each should be compared only qualitatively.

3.3.3 The net total scores for both NO2 and PM10 for proposals 4, 14 and 15 are positive, indicating a minor detrimental impact on local air quality. However, more properties experience an improvement in air quality than deterioration. This is due to the magnitude of the differences individual properties experience. In these cases the reduction in air quality at adversely impacted properties outweighs the improvement observed at beneficially impacted properties. Options 6 and 16 both benefit wider air quality, and also slightly improve pollution concentrations at more properties than the opposite. Option 17 could also be considered beneficial in both aspects as the PM10 score is essentially neutral. Option 13 benefits a large proportion of properties, with the NO2 score indicating an improvement. The

score for PM10 indicates a slight deterioration for this pollutant, mainly due to the effects of the new route.

3.3.4 Where deteriorations in air quality have been calculated, there is no evidence to indicate that NAQS objectives for either NO2 or PM10 will be breached at receptors in Elgin in 2012 as a result of any of the proposals. The background air quality is excellent in the town, and none of the proposals compromise this. For example, in Option 4, an assessment using DMRB indicates that 5m from the road centre Wittet Drive will see increases for NO2 and PM10 of around 1mg/m^3 (from 5.8 to 6.8) and 0.3mg/m^3 (from 10.8 to 11.1) respectively for the 2012 Do-min and Do-som. These values are small when considered with the relevant objectives (see Table 3.1). This conclusion is supported by the 2006 Moray LAQM Updating and Screening Assessment which forecast no exceedences in Elgin resulting from the existing traffic network.

3.4 ***Greenhouse Gas Assessment***

3.4.1 The change in CO2 emissions has been determined using DMRB Volume 11 Section 3 Part 1, Annex 2 Regional Impact Assessment. The assessment has included all links where there is greater than a 10% change in traffic. The emission of CO2 is calculated for each road in the network with and without the proposal, and a comparison is made. Link length was estimated by measuring each on a 1:25,000 scale map.

3.4.2 Traffic speed for each link was different according to the option, and new stretches of road were assigned their speed limit.

Route Option	2012 Do-min	2012 Do-som	As % of Do-min
4	2227	2293	103.0
6	4697	4386	93.4
13	13776	12404	90.0
14	9843	9736	99.0
15	12200	11947	98.0
16	6037	5383	89.2
17	6910	6158	89.1

Table 3-17: CO2 results

3.4.3 The global CO2 emissions are generally much better for options 16, 17, 13 and 6. This is due to reductions in vehicle km travelled across other links, and also the more efficient speeds produced in other areas of the network. The remaining options do not reduce the CO2 burden produced by the network to a significant degree, with option 4 producing slightly greater greenhouse gas emissions.

3.5 ***Mitigation***

3.5.1 In terms of air quality, the options generally displace air pollution from Elgin and offer savings in CO_2 emissions from the network (only option 4 has greater CO_2 release). Each of the schemes has distinct effects on local air quality, although where changes in concentration of PM10 and NO_2 occur, these are relatively minor. No exceedences of relevant NAQS objectives for either pollutant are expected to result from any of the route options.

Table 3-18: The residual impacts upon air quality as a result of the implementation of recommended mitigation measures

Route Option	Residual Impact	NO_2	PM10	CO_2
Option 4 – Wittet Drive Link	There are minor adverse impacts in terms of NO_2 and PM10 associated with this option. CO_2 emission increases slightly against the do-minimum scenario, and represents a neutral adverse impact.			
Option 6 – Morriston Road Link	There are minor beneficial impacts in terms of NO_2 and PM10 associated with this option. CO_2 emission decreases against the do-minimum scenario, and represents a moderate beneficial impact.			
Option 13 – Northern Bypass	There are minor beneficial impacts for NO_2 and minor adverse impacts for PM10 associated with this option. CO_2 emission decreases against the do-minimum scenario, and represents a moderate beneficial impact.			
Option 14 – Southern Bypass (Short)	There are minor adverse impacts for NO_2 and PM10 associated with this option. CO_2 emission decreases very little against the do-minimum scenario, and represents a neutral beneficial impact.			
Option 15 – Southern Bypass (Long)	There are minor adverse impacts for NO_2 and PM10 associated with this option. CO_2 emission decreases very little against the do-minimum scenario, and represents a neutral beneficial impact.			
Option 16 – Wittet Drive and Southern Distributor	There are minor beneficial impacts for NO_2 and PM10 associated with this option. CO_2 emission decreases against the do-minimum scenario, and represents a moderate beneficial impact.			
Option 17 – Morriston Road Southern Distributor	There are minor beneficial impacts for NO_2 and neutral impacts for PM10 associated with this option. CO_2 emission decreases against the do-minimum scenario, and represents a moderate beneficial impact.			

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

4 Water Quality, Drainage and Flood Defence

4.1 ***Introduction***

4.1.1 The water environment is a critical resource and significant effects on such may be experienced at both the construction and operational phases of infrastructure development. Effects may be, for example, as a result of pollution from oils and lubricants entering watercourses during construction, or as a result of permanently reducing the flood plain area through increased development footprints.

4.1.2 The aim of this chapter is to provide an assessment of the likely impacts upon the water resource within the study area. The potential significant impacts are likely to be related to changes in water quality during the construction phases and the permanent land take from identified flood zones. The potential for contamination of groundwater will also be a potential impact. Specific impacts may include:

- Direct physical impact on the alignment of a watercourse
- Change in fisheries or conservation value
- Impact on surface water quality and its classification
- Impact on the groundwater classification
- Affect on floodplain capacity

4.1.3 The geographical scale of impacts in relation to water quality and flooding will not necessarily be curtailed to site specifics but may of course relate to wider city wide or even Moray wide impacts. For example, a contamination incident occurring while working adjacent to the River Lossie may result in an impact downstream and possibly even into the Moray Firth. The ecological implications of such are discussed in the Ecology chapter.

4.2 ***Baseline Situation***

4.2.1 The baseline situation of the water environment for the Elgin area was established through a site visit by Halcrow Group Ltd on 21 March 2007, a desk based study and a review of SEPA's online data

Water Quality

4.2.2 SEPA has built up an extensive monitoring network designed to represent the quality of all significant waters in Scotland. In 1974 a river quality classification scheme was developed to monitor the quality of all rivers in Scotland and classification is now based on the areas of water biology, chemistry, aesthetics and toxicity. The classification network and results are now available on SEPA's website . Every stretch of waterway is assigned a monitoring point where chemical and ecological surveys are taken and the aesthetic appearance recorded. The quality or "class" of a length of river is calculated from the monitoring point, results and classifications fall into the following categories:

- A1 – Excellent
- A2 – Good
- B – Fair
- C – Poor
- D – Seriously polluted

4.2.3 The following table provides a summary of the SEPA classifications for watercourses within the study area. A sensitivity has been afforded to each of the stretches of water by Halcrow, based on the classification breakdown for each watercourse.

Watercourse	Stretch name	Stretch length (km)	Overall Classification	Sensitivity
Linkwood Burn	Waulkmill	1.66	B	Moderate
	Foths Confluence	2.77	B	Moderate
Tyock Burn	Moycroft	0.69	C	Low
	Playing Fields	0.81	C	Low
	Moray Timber Products	0.54	C	Low
	Wards	0.82	C	Low
River Lossie	Waulkmill	1.33	A2	High
	Moycroft	0.76	A2	High
	Moycroft	0.71	A2	High
	Moycroft	2	A2	High
	Sherriffmills	5.88	A2	Very High
	Sherriffmills	0.64	A2	Very High
	Cloddach	7.94	A2	High
Mosstowie Canal	Whitefields	11.82	A2	Very High
Black Burn	Pittendreich	2.04	A2	High
Spynie Burn	Myreside	3.5	A2	High

Table 4-1: River Classifications

4.2.4 The River Lossie, Linkwood Burn, Black Burn and the Mosstowie Canal are all classed by SEPA as important Salmonid Waters. This classification is determined by a variety of criteria including water temperature, oxygen levels, pH and mineral and chemical concentrations. There will be a requirement to ensure the water quality is maintained at this level.

4.2.5 Groundwater is classed as all water found in the subsurface and is a valuable natural resource. SEPA indicates that groundwater is inextricably linked to surface water in the water cycle as it maintains wetlands and river flow during dry spells and is vital to the maintenance of their rich ecology and biodiversity. SEPA has classified the sensitivity of groundwater resources within Scotland and for the Elgin area the table below indicates the classifications attributed.

	Classification	Scale of Sensitivity
Groundwater	**Vulnerability class - 4b**	**3rd most vulnerable on a scale of 8**
Bedrock Aquifers	**Intergranular Fracture Flow with High Productivity**	**7th highest value in a scale of 10**
Superficial Aquifers	**Intergranular Flow, High Productivity**	**Highest value from a list of 3 within Scotland**

Table 4-2: Groundwater Classifications and Sensitivities around Elgin

4.2.6 It is considered that the groundwater resource in the Elgin area is of a moderately sensitive nature.

Flooding

4.2.7 Much of the river catchment areas around, and within, Elgin are subject to flooding. Indeed, Elgin has a well documented history of flooding, with five significant flood events in the last century. Flood alleviation proposals have been in development by the local authority since 1994, however, to date there has been no significant construction of the scheme and therefore no significant alleviation afforded. Figure 4.1 (Appendix D) illustrates areas estimated by The Moray Council to be at risk of flooding from rivers and watercourses in the study area. Most of the agricultural area to the west and east of Elgin is subject to flooding. Any development proposed within these areas will be subject to stringent controls (refer to SPP7 - Planning and Flooding).

4.2.8 A consultation letter has also been sent to SEPA and the response is summarised in Table 1.1, Appendix A.

4.3 ***Environmental Impacts***

4.3.1 The need to cross watercourses will lead to potential impacts on the water quality and the hydrodynamics of these resources. The more construction activity within the vicinity of watercourses means a greater risk of contamination and pollution. As a result of crossing these watercourses with a highway there may also be a requirement to realign or culvert sections of water, this will alter the natural flow of water and may alter the morphology of riverbeds and riverbanks.

4.3.2 Potential impacts to groundwater will primarily relate to contamination during both construction and/or operation. During construction there will be potential for oil or contaminative spills to soak into the groundwater. During operation there is potential for contaminated surface water run-off from highways to soak into the groundwater.

4.3.3 The floodplain is a natural catchment which is inundated during flood events. Clearly, an obvious impact to development is one of being flooded and the damage an inconvenience this causes. Another impact is one of displacement when a development footprint occupies natural floodplain and displaces the floodwater to elsewhere.

4.3.4 The table below indicates the implications of each of the road options in relation to the 3 main water resources (watercourses, floodplain and groundwater). Given that groundwater sensitivity is similar for the whole area of Elgin an indication of the extent to which each option may impact this resource is provided below. For example, if only existing highway will be utilised there will be no impact to groundwater as existing drainage and SUDS will mitigate any impacts. If only a small section of new highway is required then the impact is classed as low.

		Number of main watercourse crossings	Approx % of new link within floodplain	Groundwater impact
Option 4	**Wittet Drive**	**0**	**0%**	**Low**
Option 6	**Morriston Road**	**3**	**32%**	**Medium**
Option 13	**Bypass north**	**5**	**8%**	**High**
Option 14	**Bypass south short**	**5**	**18%**	**High**
Option 15	**Bypass south long**	**7**	**20%**	**High**
Option 16	**Wittet Drive / Southern Distributor**	**0**	**0%**	**Low**
Option 17	**Morriston Road / Southern Distributor**	**3**	**32%**	**Medium**

Table 4-3: Impacts if Options on Water Resource

4.4 ***Significance***

4.4.1 The environmental impacts indicated in Table 4.4 above can be assessed as having varying degrees of impact. The significance of this impact is based on a number of variables and factors but in simple terms this can be explained as the relationship between the impact magnitude and the receptor sensitivity.

4.4.2 With water quality therefore, consideration must be given to the sensitivity of the water resource to change. A Class A2 watercourse will be far more sensitive to change than a class C watercourse for example. The magnitude of the impact in this case will be judged in relation to the number of times a watercourse may be impacted and the area of development in the floodplain.

4.4.3 Significance of impacts can be altered however depending on what mitigation measures are proposed to be employed. The implementation of a Pollution Prevention Plan during construction for example will reduce the likelihood of spills to watercourses and as a result reduce the significance of potential impacts.

4.5 ***Mitigation***

4.5.1 Mitigation measures should attempt to prevent any adverse effect through (a) complete avoidance, (b) offsetting the effect, or (c) remedying the effect through compensatory measures.

4.5.2 It has been assumed that in the future there will be flood alleviation measures in place and that the flood map identified above will be refined. Flood alleviation could therefore be considered as an indirect, although appropriate and likely, mitigation measure. However, the extent of protection the alleviation scheme will provide is not yet know and how this affects the current flood map illustration is also unknown. For the purposes of this STAG appraisal it has been assumed that the further away from the existing built up area of Elgin the highway proposals are the lesser degree of protection will be afforded in future.

4.5.3 During all aspects of construction and operation of the flood prevention scheme SEPA's Pollution Prevention Guidelines (PPG) - PPG 5: Works In, Near or Liable to Affect Watercourses), PPG 6: Working at Construction and Demolition Sites and PPG23: Maintenance of Structures Over Water should be followed and adhered to.

4.5.4 To ensure against a reduction in water quality, measures must be in place to prevent entry of fuels, cement, concrete or debris into any watercourse. It will also be necessary to appropriately treat and licence any effluent/silt laden water resulting from dewatering activities prior to discharging into a watercourse or sewer. Such measures may include a Pollution Prevention Plan.

4.5.5 Wherever possible, works should be carried out without encroaching into the existing watercourses and where possible set back as far as possible from such. Where it is absolutely necessary to work within watercourse measures should be put in place to ensure the natural burn bed level and materials are retained and the watercourse is not unnecessarily damaged or widened.

4.5.6 During operation there should be appropriate SUDS implemented to treat run-off from road surfaces. SUDS should be designed given the sensitivity of the groundwater resource and the proximity to sensitive watercourses.

Table 4-4: Residual impacts upon water resources following the implementation of recommended mitigation measures

Route Option	Number of main watercourse crossings	Approx % of new link within floodplain	Groundwater impact	Residual Impact	Overall Impact
Option 4 – Wittet Drive Link	0	0%	Low	No watercourses to cross and no section within existing floodplain. Only a small section of new highway is required so existing drainage systems can be utilised for run-off. Impact to water resources after the mitigation measures are implemented provides a Neutral impact	
Option 6 – Morriston Road Link	3	32%	Medium	3 watercourses to cross and all are the A2 quality River Lossie and classified Salmonid water. One third of the new route is identified within the floodplain which is close the urban area. Over 2km of new highway will be required and will need to be drained appropriately to protect sensitive groundwaters. Impact to water resources after the mitigation measures are implemented provides a Minor Adverse impact.	
Option 13 – Northern Bypass	5	8%	High	1 crossing of the A2 quality River Lossie and classified Salmonid water. 2 crossings of the A2 quality Spynie burn and 2 crossings of further smaller unclassified drains to the River Lossie. Little of the route is in the existing floodplain. 8km of new highway will need to be constructed and drained so significant drainage will be required to protect the groundwater resource, this can be fully mitigated however. Impact to water resources after the mitigation measures are implemented provides a Minor Adverse impact.	
Option 14 – Southern Bypass (Short)	5	18%	High	3 watercourses to cross are the A2 quality River Lossie and classified Salmonid water. 1 crossing of the Burn of Linkwood classed as a Salmonid water and grade B quality. 1 further crossing of an unclassified burn. Almost 1.5km of the new highway will be constructed within the floodplain and over 7km of new highway will have to be drained to protect the groundwater resource. Impact to water resources after the mitigation measures are implemented provides a Moderate Adverse impact.	
Option 15 – Southern Bypass (Long)	7	20%	High	3 watercourses to cross are the A2 quality River Lossie and classified Salmonid water. 1 crossing of the Mosstowie Canal grade A2 quality and designated Salmonid water. 1 crossing of the Burn of Linkwood classed as a Salmonid water and grade B quality. 1 crossing of the Black Burn, designated Salmonid water and grade A2 quality. 1 further crossing of an unclassified burn. Approximately 1.7km of the new link will be constructed within the floodplain and 8.5km of new highway will be required to be drained to protect the groundwater resource. Impact to water resources after the mitigation measures are implemented provides a Moderate Adverse impact.	
Option 16 – Wittet Drive and Southern Distributor	1	0%	Low	A majority of this option is existing highway so impacts of the existing infrastructure will be neutral. Impact to water resources after the mitigation measures are implemented will be as option 1 and is considered a Neutral impact.	
Option 17 – Morriston Road Southern Distributor	3	32%	Medium	Much of this option is existing highway so impacts of the existing infrastructure will be neutral. Impact to water resources after the mitigation measures are implemented will be as option 6 and is considered a Minor Adverse impact.	

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

5 Geology

5.1 ***Introduction***

5.1.1 The physical attributes of an area are largely defined by the local underlying geology. The local geology in combination with local soils can play a direct role in influencing how fertile a soil will be, thus directly impacting upon agricultural practises in an area. The underlying geology will also have significant impacts upon the underlying groundwater reserves of an area such as Elgin, again directly influencing land uses such as agriculture and forestry.

5.1.2 This section describes the geology associated with each route option, and the residual impacts that each option will have. Consultation has been undertaken with Scottish Natural Heritage (SNH), and a summary of their response is contained within Table 1.1 (Appendix A).

5.2 ***Baseline Situation***

5.2.1 The baseline situation of the geology for the Elgin area was established through a site visit by Halcrow Group Ltd on 21 March 2007, a desk based study and geological mapping. The hard and drift geology BGS 1:50,000 series maps were used and the BGS 1:625,000 hydrogeology maps.

5.2.2 The baseline geology of the Elgin area can be broken down into separate sections namely:

a) Underlying Geology

5.2.3 The solid geology of the study area delineates a boundary running across the North Western region of the study area (Figure 5.1, Appendix E) in the North West corner of the area there are sedimentary layers – rosebrae beds – old red sandstone. The rest of the study area is designated as sedimentary layers – cornerstone beds – old red sandstone.

5.2.4 The drift geology map is divided along the same line as the solid geology shown in Figure 5.1 (Appendix E) with the North West corner consisting of boulder clays which have low permeability and low leaching potential. The rest of the study area is shown as sand and gravel which is moderately permeable and has a moderate leaching potential, except for some patches in the South West and East of the study area which are highlight as flood plain and undifferentiated alluvium (highly permeable and a high leaching potential).

5.2.5 The British Geological Survey Groundwater Vulnerability map suggests that the study area has a highly permeable solid geology (consisting of sandstone sub-strata) which

is highly productive in supporting large abstractions. The soil classes of the area is defined as having high leaching potential except in the areas of boulder clays which are identified as potentially substantial drift deposits of a low permeability. The impact that the proposed option will have upon groundwater vulnerability are discussed in Section 4.

5.2.6 The Hydrogeology map of Scotland shows that the study area lies on a geological boundary containing locally important aquifer and Upper Red Sandstone aquifer. The impact that the proposed option will have upon hydrogeology are discussed in Section 4.

b) Designated Sites

Site Name	Size	Geological Description
Cutties Hillock SSSI	5.4Ha	The New Red Sandstone rock exposures of the Quarry are used for teaching and research.
Findrassie SSSI	4Ha across 2 sites	A historically important site which yielded the first fossil bones in the Elgin area (1857). These finds were likely from the Triassic Age c.200 million years ago.
Spynie Quarry SSSI	6Ha	This site is rivalled only by the historic Lossiemouth East site in the range of fossil reptiles it has yielded. Spynie Quarry SSSI is regarded as the best site for future finds of the late Triassic Elgin reptiles.

Table 5-1: Designated Geological Features within the Study Area, Site Details Were Obtained From Moray Council[1]

5.2.7 There are three main designated geological sites within the study area and all are of national importance given their status as Sites of Special Scientific Interest (SSSI)

c) Geological Resources

5.2.8 Within the area Quarry Wood is the site of 13 disused quarries and one quarry that remains in use (Leggat Quarry, Sandstone). There is also a disused quarry located on the North East edge of Elgin off Calcots Road. Lochinver Quarry is a sand and gravel quarry that is located to the South West of the Town of Elgin.

5.2.9 Elgin is also home to the former Kirkhill Landfill Site (Grid Ref NJ234634) which closed in 2003. Given the wide study area it is likely that a number of contaminated land sites exist within the vicinity of the seven route options however no detailed

[1] www.moray.gov.uk

information has been obtained for the locations of these sites. Consultation has been undertaken with SEPA, the Health and Safety Executive and Moray Council's Planning and Development Department, a summary of responses can be found in Table 1.1 (Appendix A) and the information provided used to inform the findings in this report.

5.3 ***Impact Assessment***

5.3.1 The value of the geological resource of the area can be separated into sections depending on their value or sensitivity as shown below:

- High Value Resource – Any nationally or internationally designated resource which is geologically sensitive. Can also be classed as high value if the chance of substitution is low.
- Medium Value Resource – Regionally or locally designate sites which are able to be replaced.
- Low Value Resource – Non designated geological sites which can be easily substituted.

5.3.2 The magnitude of the impact combined with the value of the resources will be combined to determine the overall impact significance.

5.4 ***Significance***

5.4.1 The geological resources of the local area will be impacted in different ways by the different route options; the value of the resource combined with its locality in relation to the different routes will be assessed.

5.4.2 The impacts upon the underlying geology of the area will be dependant upon the detailed route alignment, detailed ground conditions, construction methods and the types of engineering structures that are required. As such the impacts upon the local underlying geology are inconclusive for each of the route options. However, given the length of the bypass options there is the potential for impacts upon the future extraction of materials in areas along these routes resulting in minor adverse impacts.

5.4.3 Given the geographical location of the Kirkhill Landfill Site in relation to the proposed route options it is unlikely that there will be any impacts that arise as a result of any of the proposed route options.

(a) Option 4 – Wittet Drive Link

5.4.4 Due to the location of this link it is unlikely that there will be any impacts upon any designated sites or other geological resources within the local area, there will therefore be an overall neutral impact.

5.4.5 There is likely to be some groundbreaking and spoil removal associated with this option given that 600m of this route runs through farmland. These processes are likely to result in minor adverse impacts with no mitigation measures in place.

(b) Option 6 – Morriston Road Link

5.4.6 The closest geological resource to this link is the disused Hospital Quarry located within Quarry Wood 850m west of this option. Given the locality of the geological resource at Quarry it is likely there will be neutral impacts.

5.4.7 Given that groundbreaking and spoil removal processes are likely to take place during the construction of this option there are likely to be minor adverse impacts associated with these processes along the 2440m of this option that run through farmland

(c) Option 13 – Northern Bypass

5.4.8 The northern bypass option has the possibility of impacting a number of nationally important SSSI within the area:

- Cutties Hillock SSSI 1.5km West;
- Findrassie (1) SSSI 800m North West;
- Findrassie (2) SSSI 850m North West; and
- Spynie Quarry SSSI 600m North.

5.4.9 Given the distances between these resources and the proposed option it is unlikely that there will be any adverse effects upon those located within 1km of the option. The disused Hospital Quarry is located 25m from the road option, with a further disused quarry located approximately 750m west of this option; it is likely that Hospital Quarry (low value resource) will suffer minor adverse impacts if no mitigation is implemented given that there are a large number of disused quarries located locally.

5.4.10 The temporary construction activities of groundbreaking and spoil removal are likely to have minor to moderate adverse impacts during construction with approximately 5525m of the route running through farmland and the remaining 2475m running through a forested area.

(d) Option 14 – Southern Bypass (Short)

5.4.11 The closest geological feature to this option is the disused Hospital Quarry which is located approximately 850m west of the proposed option. There are no designated geological sites within 2km of this option and therefore any impacts are likely to be neutral. However given that the route runs primarily through agricultural land it is

likely that the temporary construction activities of groundbreaking and spoil removal will have minor to moderate adverse impacts.

(e) Option 15 – Southern Bypass (Long)

5.4.12 The closest geological resource to this option is a disused quarry located within Quarry Wood approximately 400m to the North East. There are 13 quarries located within 1100m of the site, of these 12 are disused with the Leggat Quarry 670m North West of the option the only one remaining in use. To the South West of this route there is also the Lochinver Quarry which is still in use for quarrying sand and gravel, but this is located 1km away and is unlikely to be affected by this route option. Even though there are a large number of resources locally given the low value of the resources and the fact that there are no nationally designated resources located nearby the impacts are likely to be minor adverse before mitigation.

5.4.13 Given that the route runs primarily through agricultural land it is likely that the temporary construction activities of groundbreaking and spoil removal will have minor to moderate adverse impacts.

(f) Option 16 – Southern Distributor & Wittet Drive Link

5.4.14 Due to the location of this link it is unlikely that there will be any impacts upon any designated sites or other geological resources within the local area, there will therefore be an overall neutral impact. There are no geologically designated sites within 2km of this link, and of the local geological resource the closest is the disused Hospital Quarry located 1.2km west of the proposed route.

5.4.15 There is likely to be some groundbreaking and spoil removal associated with this option given that 600m of this route runs through farmland. These processes are likely to result in minor adverse impacts with no mitigation measures in place.

(g) Option 17 – Southern Distributor & Morriston Road Link

5.4.16 The closest geological resource to this link is the disused Hospital Quarry located within Quarry Wood 850m west of this option. Given the locality of the geological resource at Quarry it is likely there will be neutral impacts as there are no high value geological resources within 1.5km.

5.4.17 Given that groundbreaking and spoil removal processes are likely to take place during the construction of this option there are likely to be minor adverse impacts associated with these processes along the 2440m of this option that run through agricultural land

5.5 ***Mitigation***

5.5.1 In order to minimise the impacts these routes are likely to have upon the geological resource of the region, a number of mitigation measures can be implemented:

- Given that the potential for impacting upon contaminated land is unknown it is recommended that ground investigation works take place to determine the extent of contaminated land within the area. If it is likely that route options will impact upon contaminated land then further detailed investigations would be needed in line with appropriate guidance (Environmental Protection Act, 1990).
- Pollution Prevention measures require to be put in place such as fuel bunding, oil and chemicals for those materials to be stored on site. This process will aid in reducing the chances of the contamination of land from any chemical spillage.
- The methods for the disposal or re-use of rock and spoil from the site should be examined by the contractor in order to ensure that any waste or contaminated material is disposed of in the appropriate manner in line with the National Waste Strategy .
- Where possible the detailed route options should avoid designated geological sites of national importance such as the geological SSSIs of the area.
- Given that there have been a number of fossil finds in the area previously, an archaeological watching brief should be undertaken in order to oversee any archaeological issues that may arise.

5.6 ***Residual Impacts***

5.6.1 By taking into account the mitigation measures that have been recommended in Section 5.5 the residual impacts upon the geology of the area will be minimised where possible. The potential residual impacts for each route are set out in Table 5-2Table 5-2, however given the lack of information available for contaminated land in the area this cannot be qualified.

Table 5-2: The residual impacts upon the geology of the Elgin area following the implementation of recommended mitigation measures

Route Option	Impact upon the Underlying Geology before Mitigation	Impact upon Designated Sites before Mitigation	Impact upon Geological Resources before Mitigation	Temporary Construction Impacts	Risk of Impacting Upon Contaminated Land	Residual Impact	Overall Impact
Option 4 – Wittet Drive Link					Unknown	Due to the location of this link it is unlikely that there will be any impacts upon any designated sites or other geological resources within the local area, there will therefore be an overall neutral impact, providing there are no impacts upon local contaminated land. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result.	
Option 6 – Morriston Road Link					Unknown	The closest geological resource to this link is the disused Hospital Quarry located within Quarry Wood 850m West of this option. Given the geographical removal of this site from the geological resources of the area it is likely there will be neutral impacts upon the geological resource, providing there are no impacts upon local contaminated land. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	
Option 13 – Northern Bypass					Unknown	The Northern Bypass option runs close to four high value Nationally designated SSSIs which have been designated for geological importance. There are also a large number of disused quarries in the vicinity of the route which will suffer adverse impacts as a result of this option. The overall impact is likely to be neutral to minor adverse following mitigation as a result of future extraction potential, although this could change if contaminated land is discovered. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	
Option 14 – Southern Bypass (Short)					Unknown	The disused Hospital Quarry is the closest geological feature to this option but it is not likely to suffer any adverse impacts given its geographical location in relation to the route. Given the geographical removal of this route from the geological resource it is likely there will be neutral to minor adverse impacts as a result of future extraction potential, unless contaminated land is discovered. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	
Option 15 – Southern Bypass (Long)					Unknown	It is likely that there will be neutral to minor adverse impacts upon the local geology of the region as a result of this option given that there are a large number of low value resources near the western edge of this route and as a result of influencing future extraction potential. No high value National designation will be impacted, and any impacts could change if contaminated material is discovered along the route. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	
Option 16 – Wittet Drive and Southern Distributor					Unknown	Due to the location of this link it is unlikely that there will be any impacts upon the local geology resulting in neutral impacts, providing there are no impacts upon local contaminated land. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	
Option 17 – Morriston Road Southern Distributor					Unknown	Due to the location of this link it is unlikely that there will be any impacts upon any designated sites or other geological resources within the local area, there will therefore be an overall neutral impact, providing there are no impacts upon local contaminated land. Given that groundbreaking and spoil removal are temporary construction impacts it is unlikely there will be any residual impact as a result of these activities.	

Major Adverse		Neutral	Major Beneficial
Moderate			Moderate
Adverse			Beneficial
Minor Adverse			Minor Beneficial

6 Biodiversity

6.1 ***Introduction***

6.1.1 This section describes the ecological and biodiversity features associated with the proposed route options and assesses the potential impact of the route selection upon the natural heritage and suggests mitigation actions where necessary. The development of transport infrastructure has a number of potential effects on biodiversity, including:

- Direct damage to protected species, designated conservation sites or important habitats.
- Fragmentation or reduction in habitat quality or integrity.
- Establishment of barriers to movement and social interaction between populations.
- Disturbance of species and some habitats by noise, light pollution, and contaminated run-off which will affect population dynamics.

6.1.2 A main objective should be to maintain the ecological worth of the project area, by preserving habitat integrity and maintaining robust populations of rare and vulnerable species wherever possible.

6.2 ***Baseline Situation***

Statutory Sites

6.2.1 There are five designated nature conservation sites and several areas of Ancient Woodland within two kilometres of the proposed route options.

a) International Designations

Site	Grid Ref.	Designation	Attribute	Comments
Loch Spynie	**NJ 234661**	**Special Protection Area (SPA)**	**Internationally important roosting population of greylag geese (*Anser anser)***	**3% of the world population 00/01 to 04/05 mean**
		RAMSAR Site	**Also important for roosting numbers of pink-footed geese (*Anser brachyrhnchus)***	**4.5% of world population 00/01 to 04/05 mean**

Table 6-1: International Designations within the Study Area

b) National Designations

Site	Grid Ref	Designation	Attribute	Comments
Loch Spynie	**NJ 234661**	**SSSI**	**Internationally important roosting population of greylag geese (*Anser anser)*** **Also important for roosting numbers of pink-footed geese (*Anser brachyrhnchus)***	**3% of the world population 00/01 to 04/05 mean** **4.5% of world population 00/01 to 04/05 mean**
Cutties Hillock	**NJ184638**	**SSSI**	**Geological - a key locality for its unique fossil reptile fauna of the very late Permian period, approximately 250 million years ago**	
Quarry Wood	**NJ194629**	**SSSI**	**Ancient semi-natural woodlands**	
Spynie Quarry	**NJ 223655**	**SSSI**	**Geological -yielded important specimens of fossil reptiles of the Permian and Triassic periods.**	
Findrassie	**NJ04651,** **NJ 207653**	**SS I**	**Geological -Yielded important fossil reptile evidence of the Permian and Triassic periods.**	**Two sites**

Table 6-2: National Designations within the Study Area

c) Local Designations within the Study Area

Site	Grid Ref	Designation	Attribute	Comments
Wards Wildlife Site	**NJ203619**	**Wildlife Site-Policy L/ENV2 "Non – Statutory Nature Conservation Sites, Local Designations" Of the Moray Local Plan 2000**	**Wetland Habitat of marshy grassland surrounded by neutral grassland. Educational and Community resource**	**Management Plan Management Committee**

Table 6-3: Land Designations within the Study Area

d) Local Biodiversity Action Plan (LBAP)

6.2.2 North East Scotland Biodiversity Partnership has designated 195 local priority species, 80 of which are also included in the UK biodiversity Action Plan Priority Species. Actions for most species are carried out through the appropriate Habitat Action Plans (HAP's.). However, some individual Species Action Plans (SAP's) are being implemented for those species where habitat action alone will not fully address the needs of that particular species. www.nesbiodiversity.org.uk

LBAP Habitats Action Plans	Present in Survey Area
Coastal and Marine	
Coastal Sand Dunes and Shingle	No
Coastal cliffs and Heaths	
Estuarine and Intertidal Habitats	No
Marine Habitats	No
	No
Farmland and Grassland	
Farmland	Yes
Field Margins And Boundary	Yes
Habitats	Yes
Species-rich Grassland	No
Upland Species Rich Grassland	
Woodland	
Broadleaved woodland	Yes
Native Pine Woodland	No
Planted Coniferous woodland	Yes
Wet and Riparian Woodland	No
Wood Pasture, Parkland and	No
Wayside Trees	
Montane, Heath and Bog	
Lowland Raised Bog	No
Blanket Bog	No
Montane	No
Heathland	No
Wetland and freshwater	
Lochs and Ponds	No
Wetland	No
Rivers and Burns	Yes
Urban	
Urban areas	Yes

Table 6-4: Local Habitat Action Plans present within the Study Area - North East Scotland LBAP Habitat Action Plans

LBAP Species Action Plans	Present in Survey area
Aspen Hover Fly	**No**
Daubenton's Bat	**Unknown**
Red Squirrel	**Yes**
Water Vole	**Unknown**
Wych Elm	**Unknown**

Table 6-5: Local Biodiversity Action Plans Species present within the Study Area - North East Scotland LBAP Species Action Plans

e) Other Biodiversity Features

6.2.3 There are other identified or non designated areas of biodiversity interest affected by the proposed route options. These are:

- The River Lossie
- Ancient Woodland Areas

6.2.4 There are also a number of Scottish Wildlife Trust Sites located within or near the study area including:

Grid Reference	Site	Distance (Km)	Comments
NJ188643	Quarrywood	1	Covered under SSSI
NJ194543	Glenlatterach	7.5	
NJ200140	Glenavon	>30	
NJ200300	Ben Rinnes	25	
NJ200530	Moss Of Birnie	8	
NJ205407	Drum Wood	23	
NJ211303	Burnside Of Deskie	>30	
NJ212619	The Wards	0.1	Covered in Section 6.2.1
NJ216707	Moray Golf Course	6	
NJ222665	Spynie Wetland	2	Adjacent to SSSI and SPA and issues covered in Section 6.2.1
NJ231696	Sunbank Quarry	4.5	
NJ237270	Carn Muldonich	>30	
NJ240170	Glenlivet/ Ladder Hills	>30	
NJ245700	Lossie Estuary	8	
NJ258564	Logie Burn	5	

Table 6-6: Scottish Wildlife Trust Sites near Elgin

6.3 ***Impact Assessment***

6.3.1 For the purposes of this section the value of the biodiversity features are classified using the following criteria:

- High Sites of International Importance such as Ramsar Sites, Special Protection Areas (SPA), Special Areas for Conservation (SAC); of National Importance, including National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Ancient Woodland.
- Moderate Sites of Regional or Local importance, including Local Nature Reserves (LNR); Wildlife Sites, Regionally Important Geological Sites (RIGS); Sites of Importance for Nature Conservation (SINCS) and Non-Statutory Nature Reserves.
- Low Undesignated sites which have some local interest.

6.3.2 The interpretation and assessment of the magnitude of the impact on the biodiversity attributes can be categorised as follows:

- High Direct or indirect impacts causing the loss or partial loss of an attribute. This will include separation of habitats and natural communities, causing fragmentation and a consequent reduction in viability. Protected species road kills which may arise from crossing between areas of severed habitat are also included as an identified High Impact.
- Moderate Direct or indirect impacts leading to a significant and apparent change in the ecology. Moderate impacts include the affects upon key habitats, wildlife sites and species within a 500m zone of influence of a selected route though increased noise or run-off.
- Low Direct or indirect impacts leading to little or no impact on the local ecology. This includes affects upon key habitats, wildlife sites and species over 500m from the selected routes.

6.3.3 When assessing the accumulated predicted impacts on the biodiversity features the seven point scale, below, has been adopted.

- Major Adverse
- Moderate Adverse
- Minor Adverse
- Neutral
- Minor Beneficial
- Moderate Beneficial
- Major Beneficial

6.4 ***Route Option and Environmental Impacts***

Option 1 – Wittet Drive Link

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
Wards Wildlife Site	**100m**	**Moderate**	**Moderate**	**Minor Adverse**

Table 6-7: Designated Sites along the Wittet Drive Link

Option 2 – Morriston Road Link

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
Wards Wildlife Site	**750m**	**Moderate**	**Low**	**Neutral**
River Lossie	**0m**	**Moderate**	**Moderate**	**Minor Adverse**

Table 6-8: Designated Sites along the Morriston Road Lin

Option 13 Northern Bypass

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
River Lossie	0m	Moderate	Moderate	Minor Adverse
Kirkhill Wood Ancient Woodland (NJ241628)	250m	High	Low	Neutral
Ancient Woodland (NJ242643)	500m	High	Low	Neutral
Pitgaveny Wood Ancient Woodland (NJ235646)	400m	High	Low	Neutral
Hill of Spynie SSSI	500m	High	Low	Neutral
Loch Spynie SPA RAMSAR SSSI	1250m	High	Low	Neutral
Findrassie SSSI	750m	High	Low	Neutral
Quarry Wood Ancient Woodland	0m	High	High	Major Adverse
Quarry Wood SSSI	0m	High	High	Major Adverse
Cutties Hillock	1000m	High	Low	Neutral

Table 6-9: Designated Sites along the Northern Bypass Link

Option 14 Southern Bypass (Short)

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
Wards Wildlife Site	500m	Moderate	Low	Neutral
"Dunkinty" Ancient Woodland (NJ232616)	600m	High	Low	Neutral
Birkenhill Wood Ancient Woodland (NJ229603)	250m	High	Low	Neutral
Wood of Level Ancient Woodland (NJ220588)	1250m	High	Low	Neutral
Mayne Wood Ancient Woodland (NJ211608)	0m	High	High	Major Adverse
Quarry Wood Ancient Woodland	250m	High	Moderate	Minor Adverse
Quarry Wood SSSI	250m	High	Moderate	Minor Adverse
River Lossie	0m	Moderate	Moderate	Minor Adverse

Table 6-10: Designated Sites along the Southern Bypass (Short)

Option 15 Southern Option (Long)

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
Wards Wildlife Site	500m	Moderate	Low	Neutral
"Dunkinty" Ancient Woodland (NJ232616)	600m	High	Low	Neutral
Birkenhill Wood Ancient Woodland (NJ229603)	250m	High	Low	Neutral
Wood of Level Ancient Woodland (NJ220588)	1250m	High	Low	Neutral
Mayne Wood Ancient Woodland (NJ211608)	0m	High	High	Major Adverse
Quarry Wood Ancient Woodland	0m	High	High	Major Adverse
Quarry Wood SSSI	300m	High	Moderate	Minor Adverse
River Lossie	0m	Moderate	Moderate	Minor Adverse

Table 6-11: Designated sites along the Southern Bypass (Long) Link

Option 16 Southern Distributor & Wittet Drive Link

6.4.1 The first section of this option has been analysed above and the results can be found in this section. Therefore this section will focus upon the southern distributor road which begins on Reiket Lane through to the junction with the A96 to the East side of Elgin

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
"Dunkinty" Ancient Woodland (NJ232616)	**0m**	**High**	**Moderate**	**Minor Adverse**

Table 6-12: Designated sites along the Wittet Drive/Southern Distributor Route

Option 17 – Southern Distributor & Morriston Drive Link

6.4.2 Both sections of this option has been analysed above and the results can be found in this section. This section will therefore be a repetition of the information from these two sections.

Site	Approximate Nearest Distance to Route	Value of Feature	Magnitude of Impact	Impact Statement
"Dunkinty" Ancient Woodland (NJ232616)	**0m**	**High**	**Moderate**	**Minor Adverse**
Wards Wildlife Site	**750m**	**Moderate**	**Low**	**Neutral**
River Lossie	**0m**	**Moderate**	**Moderate**	**Minor Adverse**

Table 6-13: Designated sites along the Morriston Road/Southern Distributor Route

6.5 ***Mitigation***

6.5.1 Mitigation measures for the biodiversity sites feature are listed below

6.5.2 Where the infrastructure options directly impact on a biodiversity feature by destroying severing or otherwise negatively affecting the feature, re-alignment of the

route will offer the best mitigation. This may be the optimal solution for Option 5, the Northern Bypass.

6.5.3 It recommended that further specific species surveys are carried out prior to the construction of the preferred route, especially for Otters, Badgers, Bat species, Red Squirrel, and Water Vole.

6.5.4 To reduce effects of both road kill of species and population isolation, safe links should be maintained across the preferred route, which may include badger tunnels and fencing, otter corridors, squirrel bridges and deer fencing. However further detailed surveys will be required to design and implement the most effective mitigation.

6.5.5 Impact upon aquatic habitats and other biodiversity features can be reduced by following guidelines of best practice.

6.5.6 Sensitive and appropriate landscape design through tree planting and seed mixes can help to establish and replace habitats and reduce the effect of development.

Table 6-14: The residual impacts upon biodiversity following the implementation of recommended mitigation measures

Route Option	Number of Impacted Sites	Feature Value Range	Residual Impact	Overall Impact
Option 4 – Wittet Drive Link	1	Moderate	There is only one designated site that is likely to be impacted and this is The Wards Wildlife site, given the value and the location of the site in relation to the proposed route following mitigation it is likely that the impact will be neutral to minor adverse.	
Option 6 – Morriston Road Link	2	Low to Moderate	Given the proximity of the nearest designated wildlife site, and even though the River Lossie has been designated as Salmonid water it is likely following mitigation that there will be neutral impacts upon the local biodiversity.	
Option 13 – Northern Bypass	10	Moderate to High	There are a large number of biodiversity resources located along this route with two high value resources (Quarry Wood Ancient Woodland and SSSI) directly impacted by the proposed route. Given the proximity and the value of this resource, following mitigation it is likely that there will be moderate to major adverse impacts upon the biodiversity of the area.	
Option 14 – Southern Bypass (Short)	8	Moderate to High	The Mayne Wood Ancient Woodland suffers direct impacts as a result of this route and is one of eight sites impacted by this option. However this is the only site with 250m and as a result following mitigation measures there are only likely to be minor adverse impacts upon the biodiversity in the area.	
Option 15 – Southern Bypass (Long)	8	Moderate to High	The Mayne Wood and Quarry Wood Ancient Woodlands suffer direct impacts as a result of this route option. Given that both these sites suffer direct impacts and a number of other designated sites lie within 300m there are likely to be moderate adverse impacts as a result of this option following the implementation of mitigation measures.	
Option 16 – Wittet Drive and Southern Distributor	2	Moderate to High	The Wards Wildlife Site and Dunkinty Ancient Woodland will both be impacted given their close proximity to the proposed option. It is likely that following mitigation there will be minor adverse impacts on biodiversity with this option.	
Option 17 – Morriston Road Southern Distributor	3	Moderate to High	Dunkinty Woodland is a high value resource that will be directly impacted by the proposed option. The Wards Wildlife Site and River Lossie are also biodiversity features located near this option; following the implementation of recommended mitigation measures it is likely that there will be a minor adverse impact upon the local biodiversity.	

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

7 Landscape and Visual

7.1 ***Introduction***

7.1.1 This chapter deals with two areas of appraisal, the first being the impact on landscape character and quality, and the second being the visual impacts to/from sensitive receptors.

7.1.2 SNH designates the landscape of Scotland into specific character areas, whilst the local authority can also formally designate the landscape depending on its quality. These designations will be referenced below and used as the baseline from which to appraise the proposals.

7.1.3 Receptors which may be sensitive to changes to the visual environment usually comprise of residential properties but may also include workplaces, cultural heritage features or recreational areas. Depending on how sensitive these features are compared with the proximity/prominence of the proposals will determine the impact significance.

7.1.4 The appraisal below was undertaken with reference to the Guidelines for Landscape and Visual Impact Assessment 2nd edition - published in 2002 by The Landscape Institute and the Institute of Environmental Management and Assessment. A desk study was carried out prior to visiting the site and surrounding areas. The appraisal also included investigation of ordnance survey material, the Landscape Character Assessment of Moray and Nairn and of the Local Plan for the area.

7.2 ***Baseline Situation***

Landscape Character

7.2.1 The Elgin area is covered under the Moray and Nairn Landscape Character Assessment produced by Turnbull Jeffrey Partnership [1998] as part of the National Programme of Landscape Character Assessment. The relevant sections of the published assessment are detailed below.

7.2.2 The broad landscape of the Elgin area (5km radius of town) has a designated character type of "Coastal Plain". This is described within the Character Assessment document as "flat to gently undulating, large-scale plain, usually rising to no more than 100m, borders the coast and narrows towards the east. Small rolling hills and valleys mark the transition between the Coastal Plain and the Uplands Landscape Character Type".

7.2.3 Within the broad landscape character types are a number of more specific Landscape Character Areas, the landscape surrounding the built up area of Elgin is designated as

'Coastal Farmland'. The description of this Landscape Character Area indicates a landscape of "wide horizons…[and]… intensive agricultural land use". The attributes of this character area has historically attracted the development of settlements and the main communications routes. Due to the open nature of the landscape and the development pressures many land uses such as housing, roads, railways and industry are highly visible.

7.2.4 The edge of Elgin is well defined by low ridges and Ancient Woodland to the North West and west. Development, however, has breached the original natural enclosure provided by low ridges to the south and north. The meanders of the River Lossie provide some sense of settlement edge to the east and west.

7.2.5 The potential effect on the landscape character associated with new road development is specifically mentioned in the Character Assessment document. Where road development in this character area is required a number of mitigation measures are recommended and these are presented in the mitigation section below.

7.2.6 Relevant designations related to the landscape within the area are detailed in table 7.1 below:

Name	Designation	Location
Innes House	**Garden and Designed Landscape**	**6km to north east**
Elgin South	**Conservation Area**	**Town centre**
Elgin High Street	**Conservation Area**	**Town centre**
Pluscarden	**Area of Great Landscape Value**	**6km to south west**
Gordonstoun	**Garden and Designed Landscape**	**6.5km north-north west**
Quarry Wood	**Ancient Woodland**	**1.5km to west**
	Listed Buildings, National and Scheduled Monuments etc	***See Cultural Heritage – Chapter 9***

Table 7-1: Relevant Designations

7.2.7 For each of the route options it is possible to describe a more specific landscape character and this is presented in table 7.2 below. A sensitivity is provided to each of the local characters given the features present within the vicinity of each route option.

	Route Option	Local Landscape Character	Sensitivity
Option 4	Wittet Drive	Urban residential character. Small section through urban edge.	Low
Option 6	Morriston Road	Undulating grazing/arable land for 1km either end of link with the remainder flat floodplain of River Lossie with grazing/arable farmland use. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Meandering River Lossie has isolated areas of mature riverside planting, this river will need crossed 3 times, as will the Inverness/Aberdeen railway line.	Medium
Option 13	Bypass north	Mature woodland to 3km of western end of link, opening to gently undulating grazing/arable farmland. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Scattered farm steading developments. High voltage overhead power cables and towers run around the northern edge of the built up area of Elgin.	Medium
Option 14	Bypass south (short)	As with option 6, plus: gently undulating grazing/arable farmland. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Scattered farm steading developments. Burn of Linkwood has isolated areas of mature riverside planting, this river will need crossed 2 times, as will the Inverness/Aberdeen railway line.	Medium
Option 15	Bypass south (long)	Mature woodland to 1km of western end of link and 1km to centre of link, opening to gently undulating grazing/arable farmland. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Meandering River Lossie has isolated areas of mature riverside planting, this river will need crossed 3 times, as will the embanked Mosstowie Canal. Burn of Linkwood has isolated areas of mature riverside planting, this river will need crossed 2 times, as will the Inverness/Aberdeen railway line. Numerous farm steading developments are scattered throughout the vicinity.	Medium
Option 16	Wittet Drive / Southern Distributor	Primarily urban residential character. Small section runs along urban edge although planned development will soon enclose the route.	Low
Option 17	Morrison Road / Southern Distributor	Undulating grazing/arable land for 1km either end of link with the remainder flat floodplain of River Lossie with grazing/arable farmland use. Farm fields defined by field drains and wire fences, limited hedgerow/scrub planting. Meandering River Lossie has isolated areas of mature riverside planting, this river will need crossed 3 times, as will the Inverness/Aberdeen railway line. Eastern portion of the route characterised by urban residential development. Small section of the eastern end run along urban edge although planned development will soon enclose the route.	Medium

Table 7-2: Option Specific Local Landscape Character

Visual Environment

7.2.8 There are a number of route options being considered at this stage of the appraisal process and these vary greatly in their environmental context. Some options are contained within the existing build up area of Elgin whereas others are proposed wholly outside of the built up area in the gently undulating agricultural and forestry land. As a result there are contrasting baselines when considering the sensitive visual receptors of each option.

7.2.9 The baseline situation of the visual environment for the Elgin area was established through a site visit by Halcrow Group Ltd on 21 March 2007. A photographic survey from this date recorded key views and features and a desk based study of plans and maps supported the collection of baseline information.

7.2.10 In relation to the Wittet Drive and southern distributor route options views are of an urban residential nature and are characterised by short 'across street' views or 'along street' vistas. The most common views experienced within the rural areas in relation to the remaining options are primarily towards the urban edge or woodland features. Due to the gently undulating topography around Elgin these views are afforded from most of the radial routes into/out of Elgin as well as from the scattered residential/farm dwellings.

7.2.11 It is not yet clear how the road designs may look, or indeed how high elevated structures (such as railway bridges) may need to be. Given this, the zone of visual influence (ZVI) is not known and cannot be accurately assessed. In considering which receptors are sensitive in visual terms a zone has been established of 500m either side of the option alignment. Receptors within this zone with a view to the proposed route are classed as sensitive visual receptors and are indicated in the tables below. Also indicated are receptors outside of this zone which are considered to be notable.

Option 4 – Wittet Drive Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Wittet Drive properties	**The Wards**	**Listed residential property on Wittet Drive**	**Greenwards Primary School**
New residential development off West Road and Wards Road			
Bilbohall Farm			

Table 7-3: Sensitive Receptors along the Wittet Drive Option

Option 6 – Morriston Road Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Bruceland Farm	**The Wards**	**The Grove (Listed)**	**Greenwards Primary School**
Bruceland House	**River Lossie riverside footpath**		**Riverside Caravan Park**
Sunningdale	**High School Playing Fields**		
Allarburn Cottages			
Greenacres			
Norriston Cottages			
Saltire Lodge			
Dunedin Haughland			
Heldon View			

Table 7-4: Sensitive receptors along the Morriston Road Option

Option 13 – Bypass North Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Covesea Grove properties	Oak Wood trails	Andrew's Church (Listed)	Spynie Hospital
Covesea Rise properties	Cycleway (north)		
Myreside Circle (northern) properties			
Newfield Road (northern) properties			
Muirs of Linksfield			
Wester Calcots Farm			
Kirkhill Cottages			
Kirkhill			

Table 7-5: Sensitive receptors along the Bypass North Option

Option 14 – Bypass South (short) Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Bruceland Farm	River Lossie riverside footpath		Elgin Golf Club
Bruceland House	High School Playing Fields		
Sunningdale	Elgin Golf Course		
Allarburn Cottages	Right of Way near A941		
Greenacres	Burn of Linkwood path		
Norriston Cottages			
Saltire Lodge			
Dunedin Haughland			
Hardhillock Avenue properties			
Fairway Avenue properties			
New residential development off Birnie Road			
Glassgreen Farm and Cottages			
Burnside Cottage			
Barmuckity Farm and			

Cottages			

Table 7-6: Sensitive receptors along the Bypass South (Short) Option

Option 15 – Bypass South (long) Sensitive Visual Receptors			
Residential	Users of Recreational Resource	Heritage Feature	Other
Aldroughty Cottages	Oak Wood trails	Pittendreich Bridge (Listed)	Elgin Golf Club
Aldroughty Farm	River Lossie riverside footpaths	Pittendrreich Dovecot (listed A)	
Pittendreich Mill	Mayne Wood trails	Aldroughty House (Listed B)	
Easter Pittendreich properties	Elgin Golf Course		
Saint Mary's	Right of Way near A941		
Mayne Farm	Burn of Linkwood path		
Mayne House			
Mayne Gardener's Cottage			
Hardhillock Avenue properties			
Fairway Avenue properties			
New residential development off Birnie Road			
Glassgreen Farm and Cottages			
Burnside Cottage			
Barmuckity Farm and Cottages			

Table 7-7: Sensitive receptors along the Bypass South (Long) Option

Option 16 – Wittet Drive/Southern Distributor Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Wittet Drive properties	**The Wards**	**Listed residential property on Wittet Drive**	**Greenwards Primary School**
Bilbohall Farm			**The Magic Roundabout Childcare Centre (Thornhill Road)**
Edgar Road residential properties			
Bardon Place (northern) properties			
Glen Moray Drive properties			
Sandy Road properties			
Birnie Road properties			
Thornhill Road properties			
Reiket Lane properties			

Table 7-8: Sensitive receptors along the Wittet Drive/Southern Distributor Option

Option 17 – Morriston Road/Southern Distributor Sensitive Visual Receptors			
Residential	**Users of Recreational Resource**	**Heritage Feature**	**Other**
Bruceland Farm	**The Wards**	**The Grove (Listed)**	**Greenwards Primary School**
Bruceland House	**River Lossie riverside footpath**		**Riverside Caravan Park**
Sunningdale	**High School Playing Fields**		**The Magic Roundabout Childcare Centre (Thornhill Road)**
Allarburn Cottages			
Greenacres			
Norriston Cottages			
Saltire Lodge			
Dunedin Haughland			
Heldon View			
Edgar Road residential properties			
Bardon Place (northern) properties			
Glen Moray Drive properties			
Sandy Road properties			
Birnie Road properties			
Thornhill Road properties			
Reiket Lane properties			

Table 7-9: Sensitive receptors along the Morriston Road/Southern Distributor Option

7.3 ***Impacts***

7.3.1 Given the baseline information presented above it is evident that there could be impacts to both the landscape character attributed to the area and also the sensitive visual receptors. These impacts will be attributed primarily to the operational phase of the proposals and the effect that permanent highway structures and design will have on the sensitive receptors and features. The engineering requirements are not yet known and as a result it is difficult to appraise accurately the potential impacts on landscape features or visual receptors. Such engineering features, however, may include:

- the highway itself

- visually dominant bridges over rivers or railways
- cuttings or embankments
- street lighting (especially in areas that are currently "dark" areas)
- flood protection measures
- removal of existing buildings

7.3.2 The STAG guidelines indicate that impacts to sensitive visual elements and pattern cannot always be avoided and that character and views can easily be damaged or fragmented. Changes to elements which are fundamental to the character of the landscape, for example gently undulating agricultural land and forestry, can affect the sense of place. Inappropriate routing of infrastructure may conflict with the natural grain of the land and as a result require heavy engineering work and features, thus introducing alien features and materials which may be visually intrusive.

7.3.3 The potential for such impacts have been taken into consideration and when appraised against the baseline features (landscape designations, character and visual receptors) a significance can then be attributed to each potential impact, the following section provided a commentary on this process.

7.4 ***Significance***

7.4.1 The significance of an impact is calculated by combining the sensitivity of the receptor with the likely magnitude of the impact. Incorporating a large engineered structure into a regionally sensitive landscape for example, could be classes as having a major negative significance. The table below explains how levels of significance have been determined when assessing the impacts on landscape and views.

Value	Criteria
Major negative	Significant deterioration in the existing view/character
Moderate negative	Noticeable deterioration in the existing view/character
Minor negative	Barely perceptible deterioration in the existing view/character
Negligible	No discernible improvement of deterioration of the existing view/character
Minor positive	Barely perceptible improvement in the existing view/character
Moderate positive	Noticeable improvement in the existing view/character
Major positive	Significant improvement in the existing view/character

Table 7-10: Definition of the Magnitude of Change in Landscape Character and Visual Impact

Landscape Character

7.4.2 The significance of landscape impacts is calculated by combining the sensitivity of the landscape receptor with the likely magnitude of the landscape impact. A sensitivity

has been allocated to each landscape receptor, depending on whether it is of local, regional or national importance. The magnitude of the impact is based on the extent of likely engineering requirements for the highway proposals (number of river and railway crossings, length of link and the extent to which the link is rural or urban). The table below summarises the significance of impacts prior to mitigation.

	Route Option	Landscape Sensitivity	Engineering magnitude		Significance of Impact	
Option 4	**Wittet Drive**	**Low**	**No river crossings, 1 railway crossing, 750m of new highway required. Magnitude - Minor**		**Minor Adverse**	
Option 6	**Morriston Road**	**Medium**	**3 river crossings, 1 railway crossing, 2700m of new highway. Magnitude – Moderate**		**Moderate Adverse**	
Option 13	**Bypass north**	**Medium**	**5 river crossings, 8000m of new highway. Magnitude – Moderate**		**Moderate Adverse**	
Option 14	**Bypass south (short)**	**Medium**	**5 river crossings, 2 railway crossing, 7050m of new highway. Magnitude – Moderate**		**Moderate Adverse**	
Option 15	**Bypass south (long)**	**Medium**	**7 river crossings, 2 railway crossings, 8550m of new highway. Magnitude – Major**		**Moderate Adverse**	
Option 16	**Wittet Drive / Southern Distributor**	**Low**	**No river crossings, 1 railway crossing, 750m of new highway required. Magnitude - Minor**		**Minor Adverse**	
Option 17	**Morrison Road / Southern Distributor**	**Medium**	**3 river crossings, 1 railway crossing, 2700m of new highway. Magnitude – Moderate**		**Moderate Adverse**	

Table 7-11: Significance of Unmitigated Impact on Landscape Character

Visual Environment

7.4.3 The significance of visual impact before mitigation is summarised in this section. Details of the sensitivity of likely visual receptors, the likely magnitude of visual impacts and the significance of the visual impacts before mitigation are presented in table 7.12 below.

7.4.4 A sensitivity has been allocated to each receptor. Residential receptors are considered to be high sensitivity, users of public rights of way with expansive rural views are considered to be high sensitivity receptors. Users of public rights of way with localised or urban edge views, public open spaces or public facilities are considered to be moderate sensitivity receptors. Users of commercial facilities are considered to be moderate sensitivity receptors. Car users on surrounding roads are considered to be

of low sensitivity and the sensitivity of cultural heritage features is based on their proximity and zone of influence to the proposals.

7.4.5 The magnitude of impacts has been determined for each receptor given their proximity to a potential feature (for example - new road, new bridge) and the likely visual impact this may have (it is considered that a new railway bridge will have a more severe impact than an at grade road section, for example).

Option 4 – Wittet Drive Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
Wittet Drive properties		**The Wards**		**Listed residential property on Wittet Drive**		**Greenwards Primary School**	
New residential development off West Road and Wards Road							
Edgar Road residential properties							
Bilbohall Farm							

Table 7-12: The significance of visual impacts along the Wittet Drive Option.

7.4.6 Wittet Drive and Edgar Road properties and the primary school currently experience views of a highway and their sensitivity to change will therefore be low. The newer residential developments will be more sensitive to change and the introduction of a through route. Bilbohall Farm has had a recent introduction of residential development to the north and east and therefore will have a low sensitivity to further change. Users of The Wards will experience only a minor impact due to the site currently being bound on 3 sides by development and access routes.

Option 6 – Morriston Road Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
Bruceland Farm		**The Wards**		**The Grove (Listed)**		**Greenwards Primary School**	
Bruceland House		**River Lossie riverside footpath**				**Riverside Caravan Park**	
Sunningdale		**High School Playing Fields**					
Allarburn Cottages							
Greenacres							
Norriston Cottages							
Saltire Lodge							
Dunedin Haughland							
Heldon View							

Table 7-13: The Significance of Visual Impacts along the Morriston Option.

7.4.7 The residential properties allocated a minor significance are likely to be over 100m away from the proposed route and any significant structures. Greenacre is significantly closer. Any structures required to cross the rivers or railway are likely to be over 200m away from residential properties.

7.4.8 Users of The Wards will experience only a minor impact due to the site currently being bound on 3 sides by development and access routes.

7.4.9 The Grove listed building is a sensitive feature and its setting will be impacted. There is however already the B9010 running past the building although it is likely that a bridge structure would be required for the new highway to cross the River Lossie near this location.

7.4.10 Riverside Caravan Park is located on an undulating site next to the River Lossie. The likelihood of large embankments/cuttings and bridge structures near the caravan park is high and would constitute a major impact to this receptor.

Option 13 – Bypass North Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
Covesea Grove properties		**Oak Wood trails**		**Andrew's Church (Listed)**		**Spynie Hospital**	
Covesea Rise properties		**Cycleway (north)**					
Myreside Circle (northern) properties							
Newfield Road (northern) properties							
Muirs of Linksfield							
Wester Calcots Farm							
Kirkhill Cottages							
Kirkhill							

Table 7-14: The significance of visual impacts along the Northern Bypass Option.

7.4.11 The residential properties allocated a minor significance are likely to be over 100m away from the proposed route and any significant structures. Muirs of Linksfield and Kirkhill Cottages may be closer to the route than 100m so may experience moderate visual impacts.

7.4.12 Users of the Oak Wood trails will likely only experience minor impacts given the restriction on views through the wood. Users of the cycleway adjacent to the A941 will likely only experience minor impacts due to the existing road and power infrastructure in the area.

7.4.13 The listed Andrew's Church is located in a tranquil setting and is afforded some existing screening. The proposed road alignment will introduce a new visual element within the setting of this building and may constitute a major visual impact.

7.4.14 Spynie Hospital would be over 200m south of the proposed route and currently experiences views of the high voltage power lines and towers. Views from the hospital will be less sensitive to change due to this existing infrastructure.

Option 14 – Bypass South (short) Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
Bruceland Farm		**River Lossie riverside footpath**				**Elgin Golf Club**	
Bruceland House		**High School Playing Fields**					
Sunningdale		**Elgin Golf Course**					
Allarburn Cottages		**Right of Way near A941**					
Greenacres		**Burn of Linkwood path**					
Norriston Cottages							
Saltire Lodge							
Dunedin Haughland							
Hardhillock Avenue properties							
Fairway Avenue properties							
New residential development off Birnie Road							
Glassgreen Farm and Cottages							
Burnside Cottage							
Barmuckity Farm and Cottages							

Table 7-15: The significance of visual impacts along the Southern Bypass (Short) Option.

7.4.15 The residential properties allocated a minor significance are likely to be over 100m away from the proposed route and any significant structures. Greenacre is significantly closer, as are Barmuckity Cottages. The properties looking south west on Hardhillock Avenue will have a moderate impact to views as they currently look towards Mayne Wood over farmland, the route will be introduced to this view. The properties overlooking the golf course at Fairway Avenue will have a major visual impact due to the proposals. Any structures required to cross the rivers or railway are likely to be over 200m away from residential properties.

7.4.16 Views from the path along the Burn of Linkwood will be subject to a major impact due to the need for felling the riverbank mature planting and constructing a bridge over the burn.

7.4.17 Users of Elgin Golf Course will be subject to moderate impacts while the users of the clubhouse will be subject to minor impacts.

Option 15 – Bypass South (long) Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
Aldroughty Cottages		**Oak Wood trails**		**Pittendreich Bridge (Listed)**		**Elgin Golf Club**	
Aldroughty Farm		**River Lossie riverside footpaths**		**Pittendrreich Dovecot (listed A)**			
Pittendreich Mill		**Mayne Wood trails**		**Aldroughty House (Listed B)**			
Easter Pittendreich properties		**Elgin Golf Course**					
Saint Mary's		**Right of Way near A941**					
Mayne Farm		**Burn of Linkwood path**					
Mayne House							
Mayne Gardener's Cottage							
Fairway Avenue properties							
New residential development off Birnie Road							
Glassgreen Farm and Cottages							
Burnside Cottage							
Barmuckity Farm and Cottages							

Table 7-16: The significance of visual impacts along the Southern Bypass (Long) Option.

7.4.18 The residential properties allocated a minor significance are likely to be over 100m away from the proposed route and any significant structures.

7.4.19 Aldroughty Cottages will be immediately adjacent to the proposed route and will have immediate views along the length of the route. It is likely that there will be a need for a significant elevated section over the 3 river crossings and railway towards the west end of this route. There are few residential properties within this vicinity however. The renovated Pittendreich Mill will be immediately adjacent to the proposed route and a bridge structure and will have immediate views along the length of the route. Mayne Farm will be immediately adjacent to the proposed route and will have immediate views along the length of the route.

7.4.20 Barmuckity Cottages are significantly closer, as are Aldroughty Cottages, Pittendreich Mill and Mayne Farm. The properties overlooking the golf course at Fairway Avenue will have a major visual impact due to the proposals.

7.4.21 The introduction of the route would have a minor impact on all listed structures within the vicinity.

Option 16 – Wittet Drive /Southern Distributor Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
As with Option 4, plus …..							
Bardon Place (northern) properties						**The Magic Roundabout Childcare Centre (Thornhill Road)**	
Glen Moray Drive properties							
Sandy Road properties							
Birnie Road properties							
Thornhill Road properties							
Reiket Lane properties							

Table 7-17: The significance of visual impacts along the Wittet Drive/Southern Distributor Option.

7.4.22 As with Option 4 plus … All receptors along the Southern Distributor route option currently experience the views of a highway and associated traffic uses. There may be minor impacts associated with the development proposals and any associated traffic management systems or highway upgrades.

7.4.23 The Childcare Centre currently experiences the views of a highway and views associated with traffic uses on Thornhill Road.

Option 17 – Morriston Road/Southern Distributor Significance of Visual Impacts							
Residential		**Users of Recreational Resource**		**Heritage Feature**		**Other**	
As with Option 6, plus …..							
Bardon Place (northern) properties						**The Magic Roundabout Childcare Centre (Thornhill Road)**	
Glen Moray Drive properties							
Sandy Road properties							
Birnie Road properties							
Thornhill Road properties							
Reiket Lane properties							

Table 7-18: - The significance of visual impacts along the Morriston Road/Southern Distributor Option.

7.4.24 As with Option 6 plus … All receptors along the Southern Distributor route option currently experience the views of a highway and associated traffic uses. There may be minor impacts associated with the development proposals and any associated traffic management systems or highway upgrades.

7.4.25 The Childcare Centre currently experiences the views of a highway and views associated with traffic uses on Thornhill Road.

7.5 ***Mitigation***

7.5.1 The above appraisal has concentrated on the operational phase of the transport options as it is considered this will be the phase that decision makers and interested parties will base judgement on. Clearly, there will be a need for construction phases associated with the proposals and these will have associated landscape and visual impacts. These impacts will be of a temporary nature however.

7.5.2 During the operational phase there are a number of mitigation measures that could be employed to minimise the impact of the scheme on the landscape and visual receptors. These measures are described briefly below.

Sensitive design:

7.5.3 Any bridges or engineered structures should be designed and clad appropriately in consultation with SNH to minimise the visual impacts and to blend the structures into the landscape as much as possible.

Street Lighting:

7.5.4 Street lighting along any route in rural areas should be avoided where possible.

Woodland retention:

7.5.5 Retention of woodland structure and boundaries to minimise impact on landscape character.

Additional planting:

7.5.6 At source next to highway or off site near receptors to screen adverse views. Hedgerow planting should be incorporated along the route in rural areas to reduce the dominance of the engineered features and fit the linear structure more comfortably into the agricultural landscape character.

7.5.7 The Moray and Nairn Landscape Character Assessment states that with regards to the development of roads:

7.5.8 *'*The upgrading of main roads within this Character Area would increase the dominance of such linear facilities within the landscape, emphasising the open, flat landscape character which facilitates the construction of such long straight roads in addition, the creation of larger junctions, with lighting and landscaped road embankments and cuttings would draw attention to the presence of the road within the flat landscape. Widening the road and increasing the number of traffic lanes encourages an increase in the speed of travel, and often results in travellers overlooking features such as views of prominent landmarks or the coast.

7.5.9 *'*To reduce the potential adverse visual impacts of new roads, care should be taken not to emphasise the road's presence through the linear planting of trees and shrubs to screen the road, where tree lines are not already a characteristic feature of the landscape. Roads should also be designed to reflect the existing topography and to keep sections of cutting and embankment to a minimum. Where screening is

required for visual and noise abatement close to settlements, the existing pattern, scale and composition of woodlands/shelterbelts should be replicated'.

7.6 ***Residual Impacts***

7.6.1 The urban options (Option 4 and 16) will have minimal or no impact on landscape character. Impact on sensitive visual receptors will be minimal for the urban options also.

7.6.2 The key issue for the rural options is the impact of the engineered structures on views, particularly from residential properties. In general, the longer the route the more structures are required and the more receptors are impacted.

7.6.3 The requirement for mitigation measures depends greatly on the route option chosen, engineering flexibility and the detailed design of structures. The above appraisal, however, has provided a consistent approach for each option and provides a comparison from which to base decision.

	Route Option	Impact on Visual Receptors		Landscape Sensitivity	Impact on Landscape Character	
Option 4	**Wittet Drive**	**Neutral**		**Low**	**Neutral**	
Option 6	**Morriston Road**	**Minor Adverse**		**Medium**	**Minor Adverse**	
Option 13	**Bypass north**	**Minor Adverse**		**Medium**	**Minor Adverse**	
Option 14	**Bypass south (short)**	**Moderate Adverse**		**Medium**	**Minor Adverse**	
Option 15	**Bypass south (long)**	**Moderate Adverse**		**Medium**	**Moderate Adverse**	
Option 16	**Wittet Drive / Southern Distributor**	**Neutral**		**Low**	**Neutral**	
Option 17	**Morrison Road / Southern Distributor**	**Minor Adverse**		**Medium**	**Minor Adverse**	

Table 7-19: Summary of Mitigated Landscape and Visual Impacts

8 Agriculture and Soils

8.1 ***Introduction***

8.1.1 The viability of agricultural farm holdings is likely to be impacted as a result of some of these road options. It is also likely that soils located near to construction will be impacted from run-off and any aerial deposition. Some of the routes that have been selected for appraisal are likely to require land-take from agricultural areas, the other routes that have been selected will have a limited impact given that they are to run through built-up areas.

8.1.2 The aim of this chapter is to provide an assessment of the likely impacts that are likely to impact upon the agriculture and soils of the region. The potential impacts are likely to include the following:

- Severance of fields and farm holdings;
- Impacts upon the financial viability of small holdings; and
- Contamination of local geology and watercourses.

8.1.3 The general approach has been to consider the class and area of agricultural land that will be impacted by each option and the mitigation measures that can be implemented in order to minimise

8.1.4 A consultation letter has also been sent to the Scottish Executive Environment and Rural Affairs Department and the response is summarised in Table 1.1 (Appendix A).

8.2 ***Baseline Situation***

8.2.1 The baseline situation of the agriculture and soils for the Elgin area was established through a site visit by Halcrow Group Ltd on 21 March 2007, and a desk based study.

8.2.2 Elgin is surrounded by a variety of land uses such as Elgin Golf Course, Forestry and Farmland, these land uses can be easily identified through the constraints map (Figure 1.1, Appendix B). With the exception of Elgin town centre itself, farmland makes up the majority of land uses around the town within the study area. At present data on the agricultural classification has not been utilised for all of the proposed routes.

8.2.3 Agricultural land can be broken down into different classes based upon the work undertaken by the Macaulay Institute for Soil Research. These classes are also outlined in Circular 18/1987 and are outlined below.

- Class 1 – Land capable of producing a very wide range of crops;
- Class 2 – Land capable of producing a wide range of crops;

- Class 3.1 – Land capable of producing consistently high yields of a narrow range of crops and/or a moderate yield of a wider range;
- Class 3.2 – land capable of producing a moderate range of cops. Average arable land;
- Class 4.1 – land capable of producing a narrow range of crops. Below average arable land;
- Class 4.2 – land capable of producing a narrow range of crops. Marginal arable land;
- Class 5.1 – land capable of use as improved grassland. Land is well suited to improvement;
- Class 5.2 – land capable of use as improved grassland. Land is moderately suited to improvement;
- Class 5.3 – land capable of use as improved grassland. Land is marginally suited to improvement;
- Class 6.1 – land capable of use only as rough grazing. Land has high grazing value;
- Class 6.2 – land capable of use only as rough grazing. Land has moderate grazing value;
- Class 6.3 – land capable of use only as rough grazing. Land has low grazing value; and
- Class 7 – Land of a very limited value.

8.2.4 Given that the bypass options to the North and South of Elgin are to be primarily running through agricultural land it is likely that there will be significant impacts upon the classes of agricultural land found along the routes. The most significant impacts are likely to be upon Classes 1, 2 and 3.1 which is described in Circular 18/1987 as 'prime quality land'. This can be defined as 'A valuable and flexible national resource and as such should continue to be protected from irreversible development'.

8.2.5 Those land use classes that do not fall within the 'prime quality land' category are not afforded the same level of protection, however, these lower land classes can be important for maintaining the local rural economy.

8.3 ***Impact Assessment***

8.3.1 No matter what the land classification, the owner of the land will always consider that their land is of high value/importance. However, agricultural land can be qualified through referring to the land classification outlined above, and the value of the resource can be outlined as follows:

- High Value Resource – Classes1, 2, and 3.1, any impacts upon these agricultural classes will be deemed major adverse due to their national importance.

- Medium Value Resource – Classes 3.2, 4.1, 4.2, and 5.1, any impacts will be deemed moderate adverse given that these areas are suitable for either crop growing or grassland which is suitable for improvement.
- Low Value Resource – Classes 5.2, 5.3, 6.1, 6.2, 6.3, and 7, these classes are likely to suffer negligible to minor adverse impacts due to their low suitability for improvement or land value.

8.3.2 There is limited information available for the Elgin region for the purposes of this study; therefore there may not be information available on the classes of agricultural land affected by each route option. This assessment will look at the number of farm units impacted as well as the length and area of land take required for each route option.

8.4 ***Significance***

8.4.1 Elgin is surrounded by agricultural land which has the potential to be impacted depending on which option is selected. The severity of the impact will depend upon the classification of the land and the amount of land that will be required to be taken. Land take will be calculated as follows:

Road Length x (Road Width + Footpath/Verge Width) = Land take

8.4.2 The width of the footpath/verge is assumed to be 2.5m on either side of the road, and a 7.3m road width. The finding will then be set out in the environmental worksheets contained within Appendix C of the Scottish Transport Appraisal Guidance (STAG).

8.4.3 The seven different route options will all have similar effects upon the agriculture of the region; these impacts are likely to be:

- Direct land-take; and
- Severance of farm holdings (this can have wider implications upon nearby agricultural land and farming practices).

<u>Option 4 – Wittet Drive Link</u>

8.4.4 This link option runs through residential streets and farmland in two areas, the road layout is pictured in Figure 8.1 (Appendix G).

8.4.5 Approximately 600m of this route runs through farmland, as can be seen in Figure 8.1. Given that this route is approximately 1450m in length, this means that 41% of the route will be through what is currently agricultural land. By using the calculation above we can therefore determine that there will be an area of approximately 7380m2 of agricultural land that will be required for this option.

8.4.6 There are five fields that are likely to be impacted as a result of Option 4, with four of these appearing to be associated with Bilbohall Farm. From the route alignment selected, it is likely that direct land-take will be required, and that all of these fields will suffer severance. Of these fields it is likely that three will suffer significant severance with large areas of land to either side of the route option. This option is also likely to impact upon Tyock Burn which runs from Bilbohall Farm east adjacent to Edgar Road. The impacts upon the local drainage could be seen further afield with impacts upon the drains with The Wards Scottish Wildlife Trust Site.

8.4.7 The land classification for this farmland area has not been obtained for the agricultural land in this area; however, given the severance and land-take that is required, it is likely that there will be a minor adverse impact. This impact could become more severe if the land is classified as a high value resource.

Option 6 – Morriston Road Link

8.4.8 The Morriston Road option runs primarily through farmland on the West edge of Elgin. The River Lossie and the main train line from Elgin to Inverness both cross the fields in this region as well as minor roads connecting outlying houses to the town itself.

8.4.9 The Morriston Road Link is shown in Figure 8.2 (Appendix G) and is approximately 2700m in length, and of this approximately 2440m (90.4%) is farmland that will be impacted by this road option. The total area of agricultural land take will be approximately 30,012m2.

8.4.10 There are 14 fields that appear to be impacted by the Morriston Road Link, and these fields are associated with a number of different farm holdings such as Braceland Farm and Bilbohall Farm. The severance of the smaller fields will mean that only a small area of land is left on either side of the road for farming purposes. The field drain in the southern end of Bilbohall Farm is also likely to be impacted and although the drains in The Wards SWT site are still likely to be impacted, these impacts will no be as severe as those experienced with Option 4.

8.4.11 The agricultural land classification has not been obtained for these agricultural fields, however, given the number of fields and farm holdings that will experience land-take and severance; it is likely that there will be minor to moderate adverse impacts. If the agricultural land is valued as a high resource it is likely that the magnitude of the impact will be more severe.

Option 13 - Northern Bypass

8.4.12 The northern bypass route impacts upon a large amount of farmland to the North of Elgin and crosses the River Lossie to the East of the town. This option crosses

several roads running to and from Elgin town centre, as well as crossing a cycle path running north from Elgin to Lossiemouth.

8.4.13 The northern bypass option is 8000m in length, of which approximately 5525m runs through farmland. This equates to 69.1% of the route, and resulting in a total area of agricultural landtake of 67957.5m2.

8.4.14 Figure 8.3(Appendix G) shows the route of Option 13, along this route a total of 21 fields are likely to be impacted through land-take and severance along the 5525m of road that is proposed to run through the farmland of this area. Given the large area that is to be affected there are also likely to be impacts upon the various field drains and woodland areas located along the route.

8.4.15 Babtie Group prepared a 'Traffic in Elgin' document in 2003 and this made use of data supplied by the Macaulay Institute for Soil Research. In the report the northern route is listed as being 8.3km in length which is longer than the 8km currently proposed. However, given that the lengths are similar, and with no details of the specific route from the Babtie Report these figures will be used as a guide for this assessment. It is estimated that of the 5525m 90% (4972.5m) runs through Class 3.2 agricultural land (Medium Value) and 10% (552.5m) through Class 4.2 (Medium Value).

8.4.16 Given the Medium Value of the resource, the land-take and severance that would take place for this option would likely result in moderate adverse impacts on the agriculture of the area.

Option 14 – Southern Bypass (short) Alignment

8.4.17 The southern bypass (short) option runs through a large amount of farmland, as can be seen in Figure 8.4 (Appendix G). As well as impacting farmland to the South of Elgin, this option also runs through Elgin Golf Club, and crosses the River Lossie at three different points.

8.4.18 The southern bypass option measures 7050m in length, and approximately 5850m runs directly through farmland. This means that approximately 83% of the route runs through farmland, meaning that there will be an agricultural land-take of approximately 71955m2

8.4.19 The option brought forward from STAG 1 is approximately 50m shorter than that detailed in the report by Babtie Group (2003) Report. The agricultural land that is likely to be impacted according to the report is:

- 45% Class 3.1 (2632.5m);
- 48% Class 3.2 (2808m); and

- 7% Class 4.1 (409.5m).

8.4.20 Given that 27 fields are likely to suffer severance and land-take if this Option is implemented, and taking into account the length of the Option there are also likely to be a number of field drains impacted along the route. The agricultural land in the area is valued as medium to high value and therefore the impacts upon this land will be moderate to major adverse. With 45% of the route running through 'Prime Quality Land' the impact that this Option has will be felt on a national scale.

Option 15 – Southern Bypass (long) Alignment

8.4.21 The long option for the southern bypass is shown in Figure 8.5 (Appendix G) and also passes through a large area of farmland, and as with the short bypass it passes through Elgin Golf Club, and Crosses the River Lossie in three places. The total length of this route is approximately 8550m and this is the longest option that is to be assessed.

8.4.22 This bypass option measures 8550m in length and approximately 7250m of the route runs through farmland, this equates to 86% of the total route length. By using the calculation outlined in section 8.4 it is likely that approximately 89175m2 will be required for land-take for this option.

8.4.23 The Southern Bypass (Long) Option will directly impact upon 32 fields which are associated with farm holdings to the South of Elgin. It is likely that many of these fields will be severed and that land-take is also likely to be required. This pacts watercourses and field drains to the south of Elgin leading to wider impacts upon the agricultural land.

8.4.24 The land classification for this farmland area has not been obtained for the agricultural land in this area; however, given the wide severance and land-take that is required and the value of the land along the shorter option, it is likely that there will be moderate to major adverse impacts. These impacts could become more severe if the land is classified as a high value resource.

Option 16 – Southern Distributor & Wittet Drive Link

8.4.25 The southern distributor route follows directly on from the Wittet Drive Link and it does not impact any farmland other than that already discussed for Option 4. This option measures 4650m in length, of which 600m (12.9%) passes directly through farmland. This will lead to an agricultural landtake of approximately 7380m2.

8.4.26 There are five fields that are likely to be impacted as a result of Option 16 (Figure 8.6, Appendix G), with four of these appearing to be associated with Bilbohall Farm.

From the route alignment selected, it is likely that direct land-take will be required, and that all of these fields will suffer severance. The land that is situated directly adjacent to the southern distributor section of this route is likely to be impacted, however no severance will be undertaken, and it is unlikely that any permanent land-take will be required.

8.4.27 This option is also likely to impact upon a field drain that is located in the southern area of the land which appears to be associated with Bilbohall Farm. The impacts upon the local drainage could be seen further afield with impacts upon the drains with The Wards Scottish Wildlife Trust Site.

8.4.28 The land classification for this farmland area has not been obtained for the agricultural land in this area; however, given the severance and land-take that is required along the Wittet Drive part of the route, it is likely that there will be a minor adverse impact. This impact could become more severe if the land is classified as a high value resource.

Option 17 – Southern Distributor & Morriston Road Link

8.4.29 The southern distributor route follows directly on from the Morriston Road Link and it does not impact any farmland other than that already discussed for Option 6. Option 17 measures 5900m and runs through 2440m of farmland, the same amount of farmland as Option 6, which accounts for 41.4% of the route. The area of farmland that will be impacted is approximately 30,012m, as can be seen in Figure 8.7 (Appendix G).

8.4.30 There are 14 fields that appear to be impacted by Option 17, and these fields are associated with a number of different farm holdings. The severance of the smaller fields along the route will mean that only a small area of land is left on either side of the road for farming purposes. The field drain in the southern end of Bilbohall Farm is also likely to be impacted and although the drains in The Wards SWT site are still likely to be impacted, these impacts will no be as severe as those experienced with Options 4 and 6. As with Option 16 the land that is situated directly adjacent to the southern distributor section of this route is likely to be impacted, however no severance will be undertaken, and it is unlikely that any permanent land-take will be required.

8.4.31 The agricultural land classification has not been obtained for these agricultural fields, however, given the number of fields and farm holdings that will experience land-take and severance; it is likely that there will be minor to moderate adverse impacts. If the agricultural land is valued as a high resource it is likely that the magnitude of the impact will be more severe.

8.5 ***Mitigation***

8.5.1 In order to minimise the impacts these routes are likely to have upon the agricultural land of the region, a number of mitigation measures can be implemented:

- Further consultation should be undertaken with the Scottish Executive Environment and Rural Affairs Department (SEERAD) if it is anticipated that large amounts of agricultural land are to be utilised for the final road alignment;
- If agricultural soil is to be excavated then it could be reused for bunding in order to minimise noise and vibration impacts along the route length, and also in any landscaping improvements;
- Where the severance of fields and/or any access routes takes place the provision of alternative access routes should be made in order to minimise the disturbance suffered; and
- There should be a minimisation of land-take wherever possible, especially in areas where 'prime quality land' is likely to be impacted. This land type is primarily found to the South of Elgin along the routes of the two proposed southern bypasses.

8.6 ***Residual Impacts***

8.6.1 By taking into account the mitigation measures that have been recommended in Section 8.5 the residual impacts upon the local agricultural land and soil will be minimised where possible. However, it is important to highlight that each of the seven road options being analysed will require some degree of permanent land-take, and as such any impacts associated with this are unavoidable. The potential residual impacts for each route are set out in Table 8-1:

Table 8-1: The Residual Impacts upon Agriculture and Soils Following the Implementation of Recommended Mitigation Measures

Option	Route Length (m)	Agricultural Land-Take (m^2)	Impact before Mitigation	Residual Impact	Impact After Mitigation
Option 4 – Wittet Drive Link	1450	7380		If this option is adopted there will be severance of 5 farm fields associated with local farm holdings, however, implementation of mitigation measures will help to bring about a neutral impact upon agriculture and soils in this region.	
Option 6 – Morriston Road Link	2700	30,012		This route runs primarily through agricultural land but has a relatively small total land take when compared to other routes. Given that 14 fields will be severed and land-take required this option is likely to have neutral to minor adverse impacts once mitigation measures have been implemented.	
Option 13 – Northern Bypass	8000	67,957.5		Given that there is a large amount of agricultural land required for this option along the length of the route and the presence of several field drains and other watercourses, it is likely that there will be minor to moderate adverse impacts following mitigation measures given the medium value of the resource.	
Option 14 – Southern Bypass (Short)	7050	71.955		Approximately 45% of this route length runs through farmland of national importance so land-take and severance will have more severe impacts. This will be reduced through mitigation measures but there are still likely to be moderate adverse impacts upon the local agriculture.	
Option 15 – Southern Bypass (Long)	8550	89,175		Although land classification is not available for this area, given the large amount of land-take required in an area of potentially nationally sensitive agricultural land it is likely that this area will have the most severe impacts with widespread severance and land-take even following the implementation of mitigation measures with moderate adverse impacts still likely to be seen.	
Option 16 – Wittet Drive and Southern Distributor	4650	7,380		If this option is adopted there will be severance of 5 farm fields associated with local farm holdings along the Wittet Drive section with no further direct impacts likely to be seen along the route of the southern distributor, however, implementation of mitigation measures will help to bring about a neutral impact upon agriculture and soils in this region.	
Option 17 – Morriston Road and Southern Distributor	5900	30,012		The Morriston Road section runs primarily through agricultural land but has a relatively small total land-take when compared to other routes with no further direct impacts likely to be seen along the route of the southern distributor. Given that 14 fields will be severed and land-take required this option is likely to have neutral to minor adverse impacts once mitigation measures have been implemented.	

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

9 Cultural Heritage

9.1 ***Introduction***

9.1.1 Historic buildings and conservation areas located throughout towns and villages have the potential to be impacted by transport schemes. Due to their historic value a deterioration in the structure or setting of a historical resource would have more severe impacts upon the historical environment than it would upon more modern structures.

9.1.2 The aim of this chapter is to provide an assessment of the likely impacts upon the archaeological and cultural heritage resource within the study area. The potential impacts are likely to include:

- Direct physical impacts upon buildings and archaeological remains;
- Increased noise and vibration;
- Severance;
- Loss of visual amenity; and
- Changes to the landscape setting.

9.1.3 The general approach to this assessment has been to consider the effects to statutorily designated sites and non-designated sites. Baseline information for the seven route options has been obtained through Historic Scotland (and their associated Pastmap service), and a site visit by Halcrow Group Ltd on 21 March 2007.

9.2 ***Baseline Situation***

9.2.1 The baseline cultural heritage and archaeology for the Elgin area was established through a site visit by Halcrow Group Ltd on 21 March 2007, and a desk based study including the use of the Historic Scotland Pastmap resource, an online GIS system showing information of archaeological interest.

9.2.2 Within the wider Elgin area the current cultural heritage baseline situation can be set out as follows:

- Listed Buildings (Category A – Cs) – c.348
- Scheduled Ancient Monuments – 6

9.2.3 There are also a significant number of Scottish Sites and Monuments, and National Monuments Record of Scotland Sites located within the Elgin area. Within the centre of Elgin there is a Conservation Area, but this is located approximately 800m east of the closest proposed option and is therefore unlikely to suffer any direct impacts as a

result of any of the options being considered. A constraints map is shown in Figure 9.1 (Appendix H).

9.2.4 A consultation letter has also been sent to Historic Scotland and the response is summarised in Table 1.1 (Appendix A).

9.3 ***Impact Assessment***

9.3.1 For the purpose of this cultural heritage assessment it was deemed necessary to guide the value of the cultural heritage resource by splitting up the features based upon their cultural heritage status and sensitivity.

- High Value Receptors – Scheduled Ancient Monuments, and Category A Listed Buildings
- Moderate Value Receptors – Conservation Areas, National Monuments Record of Scotland, and Category B Listed Buildings
- Low Value – Scottish Sites and Monuments, and Category C Listed Buildings

9.3.2 Throughout the study area there are a large number of cultural heritage features that have to be considered as part of this assessment. However, a significant number of these receptors are located within the centre of Elgin and will therefore not suffer any direct impacts as a result of the proposed options. As there are a large number of cultural heritage features that are to be considered within this assessment, and due to the need to avoid repetition, a summary of the potential impacts is listed below depending upon the impact upon the value of the cultural heritage resource and the likely magnitude of the impact. In determining the likely impact, seven impact magnitudes have been determined in line with the seven point scale:

- Major (Adverse/Beneficial) – direct impacts upon a cultural heritage feature; this could mean that the feature is located directly upon the site of the proposed option. This could result in land-take or severance of a feature. There are also likely to be major impacts within 50m of any proposed option.
- Moderate (Adverse/Beneficial) – could be either direct or indirect impacts as a result of the proposed route options. In order to suffer moderate adverse impacts a feature would need to be located within 50-100 of a proposed route. Impacts are likely to include visual intrusion, changes to the landscape of the area, and noise and vibration impacts.
- Minor (Adverse/Beneficial) – impacts are likely to be similar to those experienced above, but on a less intrusive scale. Minor impacts are likely to occur when cultural heritage features are located between 101-200m from a proposed route option.
- Negligible – between 201-300m from a route section, it is anticipated that there are unlikely to be any impacts upon the cultural heritage features in this band.

9.4 ***Significance***

9.4.1 The seven route options will impact upon different cultural heritage features throughout the study areas. The following tables assess what features will be impacted by each route and what the likely impacts will be.

Option 4 – Wittet Drive Link

- Scheduled Ancient Monuments

9.4.2 Within 300m of the Wittet Drive road corridor there are no Scheduled Ancient Monuments (SAM), the closest SAM is Elgin Castle located approximately 700m east of the proposed option.

9.4.3 Without mitigation measures there are unlikely to be any adverse impacts upon the nearby SAM given the distance it is from the proposed route option.

- Listed Buildings

9.4.4 Within 300m of the Wittet Drive Option there are 11 Listed Buildings ranging from Category A to Category C(s).

Distance from Route	Listed Building Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	1 Category B	LB10	Medium	Moderate to Major Adverse
51 – 100m	2 Category B 1 Category C(s)	LB4, LB5 LB11	Medium Low	Minor to Moderate Adverse
101 – 200m	-	-	-	-
201 – 300m	1 Category A 3 Category B 3 Category C(s)	LB8 LB1, LB6, LB9 LB2, LB3, LB7	High Medium Low	Negligible

Table 9-1: Listed Buildings within 300m of Option 4

9.4.5 With no mitigation measures in place the Listed Buildings located within 100m of the proposed route are likely to suffer adverse impacts ranging from minor to major adverse. The impacts upon LB10 are likely to be the most severe given the resource value and its proximity to the route option. Taking into account Policy BE2: Listed Buildings from the Moray Local Plan Finalised Version (2006) this Option conforms to policy in that there is no change to the character, integrity or setting of the Listed Buildings.

- National Monuments Record of Scotland

9.4.6 Within 300m of the Wittet Drive option there are five National Monument Records of Scotland (NMRS), but none of these are located directly upon the site of the proposed option.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	-	-	-	-
51 – 100m	Possible site of former Stone Circles Archaeological Find	NMRS1 NMRS2	Medium	Moderate Adverse
101 – 200m	Archaeological Finds Archaeological Finds Residential Property	NMRS3 NMRS4 NMRS6	Medium	Minor Adverse
201 – 300m	Cropmark	NMRS5	Medium	Negligible

Table 9-2: National Monuments Record of Scotland within 300m of Option 4

9.4.7 With no mitigation in place it is likely that there will be moderate adverse impacts upon those NMRS closest the route.

- Scottish Sites and Monuments Record

9.4.8 There are four Scottish Sites and Monuments Records (SMR) located within 300m of the Wittet Drive, one of which is located directly upon the site of the proposed route option.

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Gallowhill	SMR1	Low	Major Adverse
1 – 50m	-	-	-	-
51 – 100m	Conet Hills Sheriffmills	SMR2 SMR3		Minor Adverse
101 – 200m	-	-	-	-
201 – 300m	Old Mill	SMR4	Low	Negligible

Table 9-3 : Scottish Sites and Monuments Records within 300m of Option 4

9.4.9 There is likely to be a major adverse impact upon the Gallowhill SMR given that is located directly upon the line of the route. There are three other SMR sites that will possibly impacted although given their location in relation to the route they are unlikely to suffer more than minor adverse effects.

- Summary

9.4.10 SMR1 is the only feature located directly upon the route; this is a site of possible ring-ditches, thought to be dating from the Iron Age. There is one Category B Listed Building that is located within 50m of the route, given the medium value of this resource it is likely to suffer moderate to major adverse impacts if no mitigation is put in place. There are also Category A and C(s) Listed buildings within 300m of the route, although these features are unlikely to suffer significant impacts as a result of this option.

Option 6 – Morriston Road Link

- Scheduled Ancient Monuments

9.4.11 There are no SAMs within 300m of the proposed route, the closest SAM is Elgin Castle and this lies approximately 1.1km to the east of the route. Given the distance between the option and the SAM it is unlikely that there will be any impacts upon Elgin Castle.

- Listed Buildings

9.4.12 Within 300m of the Morriston Link there is only one Listed Building, which is the Category B Listed Grove Residential Home (LB12) which is located approximately 110m from the proposed route. Given the distance between the proposed route and the Listed Building this medium value resource is only likely to suffer minor adverse impacts if no mitigation is implemented. However, the setting of this Listed Building may be affected by this road option and therefore this may not confirm to Local Plan Policy BE2.

- National Monuments Record of Scotland

9.4.13 There are five NMRS located within 300m of the Morriston Road Link, but there are none within 100m of the proposed route.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	-	-	-	-
51 – 100m	-	-	-	-
101 – 200m	Palmerscross Road Bridge Sheriff Mill - Site of 7 Unroofed Buildings	NMRS6 NMRS7	Medium	Minor Adverse
201 – 300m	Cropmark Stone Lined Well Mayne Farm House	NMRS5 NMRS8 NMRS22	Medium	Negligible

Table 9-4: National Monuments Record of Scotland within 300m of Option 6

9.4.14 The closest NMRS sites are only likely to suffer from minor adverse impacts, given that they are located more than 100m from the proposed option, and the sites themselves are only of medium cultural heritage value.

- Scottish Sites and Monuments Record

9.4.15 There are seven Scottish Sites and Monuments Records (SMR) located within 300m of the Morriston Drive option, but they are none located directly upon the site the route is proposed to take.

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Miltonduff	SMR6	Low	Major Averse
1 – 50m	Haughland	SMR5	Low	Major Adverse
51 – 100m	-	-	-	-
101 – 200m	Sheriffmills Haughland 3 Newton Place Bruceland 1	SMR3 SMR7 SMR8 SMR9	Low	Minor Adverse
201 – 300m	Bruceland 2	SMR10	Low	Negligible

Table 9-5: Scottish sites and Monuments Records within 300m of Option 6.

9.4.16 The SMR that will suffer the most adverse impacts without any mitigation will be SMR6 (Miltonduff) this is a site of a former World War Two airfield and there are remains of some buildings on site.

- Summary

9.4.17 The highest value resource near this route option is the Category B Listed Grove Residential Home (Medium value), which is likely to suffer minor adverse effects. The only feature that is likely to suffer major effects will be SMR5 which may be of archaeological significance.

Option 13 - Northern Bypass

9.4.18 There are a large number of cultural heritage features located within this route corridor, although there are a limited number of high value designations with no SAMs and only one Listed Building located within the 300m route corridor.

- Scheduled Ancient Monuments

9.4.19 There are no SAMs located within the 300m boundary around the proposed route for Option 13, the closest SAM is Quarrywood Henge which lies approximately 400m North West of the proposed link road. Given the distance and location of this SAM and the proposed option it is unlikely that there will be any impacts upon this cultural heritage resource.

- Listed Buildings

9.4.20 The only Listed Building that is within the 300m boundary of Option 13 is the Category C(s) Listed Kirkhill Burial Ground. Given that the Category C(s) Listed Building is a Minor Value resource and is located close to the route, it is likely that it will suffer minor adverse impacts if no mitigation is implemented. However, the setting of this Listed Building may be affected by this road option and therefore this may not confirm to Local Plan Policy BE2.

- National Monuments Record of Scotland

9.4.21 There are 24 NMRS located within 300m of this option, but none of them are located on the exact route chosen. There are however 12 sites which are located within 50m of the proposed route, and they are likely to suffer major impacts if this option is implemented with no mitigation.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	3 Newton Place	NMRS8	Medium	Major Adverse
	Glassgreen Ring Ditch	NMRS9		
	Barmuckity Cropmarks and ring-ditches	NMRS28		
	Muir of Linksfield Cropmarks	NMRS38		
	Wester Calcots Enclosure	NMRS45		
	Kirkhill Enclosure (possible)	NMRS46		
	Roman Coin Discovery	NMRS48		
	Kirkhill Cup-markings	NMRS49		
	Kirkhill Farm Steading	NMRS50		
	Kirkhill Archaeological find	NMRS51		
	Kirkhill Enclosure and Cropmarks	NMRS52		
	Kirkhill Cropmarks	NMRS53		
51 – 100m	Woodlands Dovecot	NMRS33	Medium	Moderate Adverse
	Myreside Farm Steading	NMRS34		
	Site of former village – Spynie	NMRS36		
	Muir of Linksfield Piggery	NMRS39		
101 – 200m	Myreside Enclosure	NMRS35	Medium	Minor Adverse
	Linksfield Ring-ditch	NMRS40		
	Calcots Cottage Ring-ditch	NMRS41		
201 – 300m	Newfield House Enclosure	NMRS37	Medium	Negligible
	Former Farmstead	NMRS42		
	Wester Calcots Farmsteading	NMRS43		
	Wester Calcots Cottages	NMRS44		
	Kirkhill Cropmarks	NMRS47		

Table 9-6: National Monuments and Record Sites located within 300m of Option 13

9.4.22 The main features impacted will be the 12 NMRS sites that are located within 50m of the proposed road option. These features will likely suffer major adverse impacts if no mitigation is put in place.

- Scottish Sites and Monuments Record

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Maryfield Wester Calcots Cropmarks Wester Calcots Barrow Kirkhill Cropmarks	SMR36 SMR37 SMR38 SMR42	Low	Major Adverse
1 – 50m	Quarrywood Barmuckity Calcots Cropmarks Roman Coin Discovery	SMR16 SMR28 SMR39 SMR41	Low	Major Adverse
51 – 100m	Oak Wood Woodpark Woodlands Dovecot Myreside cropmarks	SMR29 SMR30 SMR31 SMR32	Low	Moderate Adverse
101 – 200m	Myreside Cropmarks	SMR33	Low	Minor Adverse
201 – 300m	Myreside Cropmarks Myreside Enclosure Wester Calcots Cropmarks	SMR34 SMR35 SMR40	Low	Negligible

Table 9-7: National Monuments and Record Sites located within 300m of Option 13

9.4.23 There are four SMR sites that are located directly upon the route corridor; these sites will suffer major adverse impacts, as will those SMR located within 50m of the route corridor.

- Summary

9.4.24 The only sites that are located directly upon the proposed route are the four SMR sites. These sites are all listed as having possible archaeological significance with features such as cropmarks and ring-ditches recorded. There are NMRS sites within 50m which may also suffer major adverse impacts, but the higher value cultural heritage features such as the SAMs and Listed Buildings are located far enough away from the route as to only suffer minor impacts, or no impacts at all.

<u>Option 14 - Southern Bypass (short)</u>

9.4.25 This route option impacts upon a large number of cultural heritage features in the area with some located directly upon the proposed bypass route.

- Scheduled Ancient Monuments

9.4.26 There are no SAMs located within the 300m boundary around the proposed route for Option 14, the closest SAM is Quarrywood Henge which lies approximately 400m North West of the proposed link road. Given the distance and location of this SAM

and the proposed option it is unlikely that there will be any impacts upon this cultural heritage resource.

- Listed Buildings

9.4.27 There are four Listed Buildings located within 300m of the proposed route that could potentially be impacted if no mitigation has been put in place.

Distance from Route	Listed Building Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	-	-	-	-
51 – 100m	1 Category B	LB12	Medium	Moderate Adverse
101 – 200m	-	-	-	-
201 – 300m	3 Category C(s)	LB14, LB15, LB16	Low	Negligible

Table 9-8: Listed Building Records within 300m of the Southern Bypass (Short) Option.

9.4.28 The Category B Listed Grove Residential Home which being a moderate value resource is likely to suffer moderate adverse affects given its proximity to the proposed road. The three Category C(s) Listed Buildings are all located at the Linkwood Distillery and lie far enough from the proposed road option that they will only suffer negligible impacts as a result of this option. However, the setting of these Listed Buildings may be affected by this road option and therefore this may not confirm to Local Plan Policy BE2.

- National Monuments Record of Scotland

9.4.29 There are 17 NMRS located within the 300m boundary around this route option, with four located between 0-50m from the route itself.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	Glassgreen Ring Ditch Mayne Farm House	NMRS9 NMRS22	Medium	Major Adverse
51 – 100m	Barmuckity Cropmarks	NMRS26	Medium	Moderate Adverse
101 – 200m	Cropmarks Mayne Farm House Barmuckity Cropmarks Barmuckity Cropmarks and ring-ditches Kirkhill Cottages	NMRS10 NMRS22 NMRS27 NMRS28 NMRS29	Medium	Minor Adverse
201 – 300m	Cropmarks Palmerscross Road Bridge Mayne House Gardeners Cottage Mayne House Buildings Cropmarks Dunkinty Residential House Linkwood Distillery	NMRS5 NMRS6 NMRS23 NMRS24 NMRS25 NMRS30 NMRS31	Medium	Negligible

Table 9-9: National Monuments Record of Scotland sites within 300m of Option 14

9.4.30 There are two NMRS sites that are likely to suffer major adverse impacts as a result of this option if no mitigation is put in place. Given that one of these is a residential building it is likely to suffer significant effects.

- Scottish Sites and Monuments Record

9.4.31 There are 18 SMR sites that are located within 300m of this proposed route option, with six of them lying directly upon the chosen route.

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Miltonduff New Elgin Birkenhill Linkwood Broom Bank Barmuckity	SMR6 SMR12 SMR22 SMR23 SMR26 SMR27	Low	Major Adverse
1 – 50m	Glassgreen Glassgreen Main Barmuckity	SMR11 SMR16 SMR21 SMR28	Low	Major Adverse
51 – 100m	Broom Bank	SMR24	Low	Moderate Adverse
101 – 200m	Haughland Linkwood Distillery	SMR7 SMR13	Low	Minor Adverse
201 – 300m	Haughland Bruceland 2 Aldroughty Manor, Elgin Broom Bank and Linkwood	SMR7 SMR10 SMR17 SMR20 SMR25	Low	Negligible

Table 9-10: Scottish sites and Monuments Records within 300m of Option 16, this is excluding those from Table 9.3 which contains those near Wittet Drive.

9.4.32 The most significant impacts will be upon those SMR sites which are located directly on the proposed route section. The impacts will depend on the value of the resource; there will be major adverse impacts upon this low value resource. Some of these sites are of archaeological significance, and SMR6 is the site of a former World War 2 Airfield, and several crash sites surround this area.

- Summary

9.4.33 The most significant resources impacted by this route will be the Category B Listed Building (LB13), and the four medium value NMRS sites that are located within 50m of this route option. These features will suffer major and moderate adverse impacts unless mitigation is put in place.

Option 15 – Southern Option (Long)

9.4.34 This is option is similar in direction to the short bypass (Option 14), however this option departs from the A96 1km further to the west, and rejoins the A96 approximately 300m further west. Many of the cultural heritage receptors impacted will be the same as above, however there will be some differences in features impacted, and the severity of those impacts.

- Scheduled Ancient Monuments

9.4.35 There are no SAMs located within the 300m boundary around the proposed route for Option 15, the closest SAM is Quarrywood Henge which lies approximately 700mNorth East of the proposed link road. Given the distance and location of this SAM and the proposed option it is unlikely that there will be any impacts upon this cultural heritage resource.

- Listed Buildings

9.4.36 Within the 300m route corridor there are five Listed Buildings that have the potential to be impacted as a result of the proposed option.

Distance from Route	Listed Building Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	-	-	-	-
51 – 100m	-	-	-	-
101 – 200m	1 Category A 1 Category B	LB18 LB17	Medium High	Minor to Moderate Adverse
201 – 300m	1 Category B 3 Category C(s)	LB13 LB14, LB15, LB16	Medium Low	Negligible

Table 9-11: Listed Building records within 300m of the Southern Bypass (Long) option.

9.4.37 The most significant impacts will be on the Category A and B Listed Buildings that lie within 200m of the proposed route. The setting of these buildings is likely to be heavily influenced by the road setting. Given the medium to high value of this resource and the distance they are located from the route there are likely to be minor to moderate adverse impacts upon the Listed Buildings. However, the setting of these Listed Buildings may be affected by this road option and therefore this may not confirm to Local Plan Policy BE2.

- National Monuments Record of Scotland

9.4.38 Within the 300m route corridor there are 14 NMRS sites which could be affected by this proposal.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	Glassgreen Ring Ditch Remains of Pittendreich Mill Easter Pittendreich Farmhouse Mayne Farm House	NMRS9 NMRS20 NMRS21 NMRS22	Medium	Major Adverse
51 – 100m	Mayne House Gardeners Cottage Mayne House Buildings Barmuckity Cropmarks	NMRS23 NMRS24 NMRS27	Medium	Moderate Adverse
101 – 200m	Cropmarks Barmuckity Cropmarks	NMRS10 NMRS26	Medium	Minor
201 – 300m	Pittendreich Cottages Cropmarks Barmuckity Cropmarks and ring-ditches Enclosure and possible Barrow Site Cultivation Remains	NMRS19 NMRS25 NMRS28 NMRS32 NMRS33	Medium	Negligible

Table 9-12: National Monuments Record of Scotland sites within 300m of Option 15

9.4.39 There are no NMRS sites that are situated directly upon the route, however, there are four located within 50m of the proposed route. These sites are likely to suffer major adverse impacts if nothing is done to mitigate the impacts. The sites located further from the bypass will suffer minor to moderate impacts without mitigation.

- Scottish Sites and Monuments Record

9.4.40 There are 14 SMR sites that are located within 300m of this proposed route option, with seven of them lying directly upon the chosen route.

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Miltonduff New Elgin Glassgreen Pittendreich and Miltonduff Miltonduff and Easter Pittendreich Birkenhill Linkwood Broom Bank Barmuckity	SMR6 SMR12 SMR16 SMR18 SMR19 SMR22 SMR23 SMR26 SMR27	Low	Major Adverse
1 – 50m	Glassgreen Main	SMR11 SMR21	Medium	Major Adverse
51 – 100m	Manor, Elgin Barmuckity	SMR20 SMR28	Medium	Moderate Adverse
101 – 200m	Linkwood Distillery	SMR13	Medium	Minor
201 – 300m	-	-	-	-

Table 9-13: Scottish sites and Monuments Records within 300m of Option 15

9.4.41 The most significant impacts will be upon those SMR sites which are located directly on the proposed route section. The impacts will depend on the value of the resource; there will be major adverse impacts upon this low value resource. There are a variety of different features in evidence from sites of former plane crashes to Farmsteading buildings that are still in use.

- Summary

9.4.42 The highest value resource lying within 100m of this route corridor are six NMRS sites, the closest Listed Building lies over 100m away and will therefore only be subject to moderate adverse impacts. The route passes through nine SMR sites that lie directly upon the route section and some of these may be of archaeological significance given that there is evidence of cropmarks, Farmsteading buildings that are in use and there is also the possibility of these areas being sites of plane crashes dating from World War Two. These sites will likely suffer major adverse impacts as a result of this option.

<u>Option 16 – Southern Distributor & Wittet Drive Link</u>

9.4.43 The first section of this option has been analysed in Section 9.4a and the results can be found in this section. Therefore this section will focus upon the southern distributor road which begins on Reiket Lane through to the junction with the A96 to the East side of Elgin.

- Scheduled Ancient Monuments

9.4.44 There are no SAMs located within 300m of this option, the closest SAM being Elgin Castle which at its closest is located 1km North of the southern distributor road, but is 700m East of the Wittet Drive link. As a result there are unlikely to be any impacts upon the Sam as a result of this option.

- Listed Buildings

9.4.45 Other than those listed within Option 4 (Section 9.4a) there are no further Listed Buildings within 300m of the southern distributor route. The closest Listed Buildings are located 400m to the South East of the route at Linkwood House; all three of these buildings are Category C(s) and are not likely to be impacted by the proposed scheme. Taking into account Policy BE2: Listed Buildings from the Moray Local Plan Finalised Version (2006) this Option conforms to policy in that there is no change to the character, integrity or setting of the Listed Buildings.

- National Monuments Record of Scotland

9.4.46 There are nine NMRS located within 300m of the southern distributor road; this is excluding those that are located within 300m of the Wittet Drive section, as this information is contained within table 9.2.

Distance from Route	NMRS Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	-	-	-	-
1 – 50m	-	-	-	-
51 – 100m	-	-	-	-
101 – 200m	Archaeological excavations took place at this site, no remains were found.	NMRS12	Medium	Minor Adverse
201 – 300m	Glassgreen Ring Ditch Cropmarks Elgin Cemetery Eight sided pillbox on site of an industrial estate. Old military Building Former military barracks Archaeological excavations took place at this site, no remains were found. Dunkintie Country House	NMRS9 NMRS10 NMRS11 NMRS13 NMRS14 NMRS15 NMRS16 NMRS29	Medium	Negligible

Table 9-14: National Monuments Record of Scotland sites within 300m of Option 16 (excluding those contained within 9.2)

9.4.47 The closest NMRS site to this option is NMRS 12, given that this is located between 101-200m from the proposed option it is unlikely that there will be any adverse impacts to this NMRS, any which occur will only be minor.

- Scottish Sites and Monuments Record

9.4.48 There are five SMR sites located within 300m of the southern distributor option; this does not include the four SMR sites that are located within 300m of the Wittet Drive option as these are contained within table 9.3.

Distance from Route	SMR Impacted	Map Reference	Resource Value	Residual Impact without Mitigation
0m – directly on site	Glassgreen New Elgin	SMR11 SMR12	Low	Major Adverse
1 – 50m	Reiketlaine	SMR14	Low	Major Adverse
51 – 100m	-	-	-	-
101 – 200m	-	-	-	-
201 – 300m	Linkwood Distillery Elgin/Waulkmill/ Barmuckity Glassgreen	SMR13 SMR15 SMR16	Low	Negligible

Table 9-15: Scottish sites and Monuments Records within 300m of Option 16, this is excluding those from Table 9.3 which contains those near Wittet Drive.

9.4.49 There are two SMR sites that lie on the proposed southern distributor route. The Glassgreen site has been subject to archaeological investigations which concluded that this was the site of a former quarry. From the site visit on 21 March 2007 it was evident that the development for which the investigation had taken place had gone ahead, as can be seen in Figure 9.2

Figure 9-1: ***Housing development upon the Glassgreen (SMR11) site***

9.4.50 The New Elgin (SMR12) site is also currently subject to development, even though it is the site of possible cropmarks, ring-ditches and pits. Although these sites are likely to suffer major adverse impacts given their location, the value of the resource is low, and given that there has already been development on these sites the impacts road improvements will have will be limited.

- Summary

9.4.51 The highest value resource to be impacted is a Category B Listed Building, which is likely to suffer major adverse impacts with the upgrading of Wittet Drive, but this is the only resource of medium or higher value which is likely to suffer major adverse impacts. There are SMR sites located directly upon the route, as well as the two from table 9.7 the Gallowhill (SMR1) site will also suffer major adverse impacts as a result of this option.

Option 17 - Southern Distributor & Morriston Drive Link

9.4.52 The first section of this option has been analysed in Section 9.4b and the results can be found in this section, the second Section is described in section 9.4f above. This section will therefore be a summary of the information from these two sections.

- Scheduled Ancient Monuments

9.4.53 There are no SAMs within 300m of the proposed route, the closest SAM is Elgin Castle and this lies approximately 1.1km to the east of the route. Given the distance between the option and the SAM it is unlikely that there will be any impacts upon Elgin Castle.

- Listed Buildings

9.4.54 The only Listed Building that is within the 300m boundary of Option 17 is the Category B Listed Grove Residential Home (LB12) which is located 110m to the east of the route. There are three Listed Buildings located at Linkwood House which lies just outwith the route boundary, but these are unlikely to be impacted at all by this option. Given that the Category B Listed Building is a Moderate Value resource and is located close to the route, it is likely that it will suffer moderate adverse impacts if no mitigation is implemented. However, the setting of these Listed Buildings may be affected by this road option and therefore this may not confirm to Local Plan Policy BE2.

- National Monuments Record of Scotland

9.4.55 There are 14 NMRS located within 300m of this route corridor but none are located within 100m of the route. Given the moderate value of this cultural heritage resource and their location in relation to the corridor there are only likely to be minor adverse impacts upon this cultural heritage.

- Scottish Sites and Monuments Record

9.4.56 There are 13 SMR sites within the route boundary with four lying or, or directly adjacent to the proposed road. Even though there are classed as a low value resource, it is likely that these sites will suffer major adverse affects if no mitigation is undertaken. The SMR that will suffer the most adverse impacts without any mitigation will be SMR6 (Miltonduff) this is a site of a former World War two airfield and there are remains of some buildings on site.

- Summary

9.4.57 The highest value resource near this route option is the Category B Listed Grove Residential Home (Medium value), which is likely to suffer minor adverse effects. The features likely to suffer major effects will be SMR5, SMR6, SMR11 and SMR12 which may be of archaeological significance.

9.5 ***Mitigation***

9.5.1 There are a variety of mitigation measures that can be implemented in order to minimise the impacts each option will have upon the cultural heritage features of the area.

- The best mitigation measure that can be implemented where cultural heritage features are at risk from being severed/severely impacted would be a realignment of the proposed route option. This would be especially important if high value resources were to be destroyed in order for construction to go ahead. Fortunately with regards the seven options that have been brought through to STAG Part 2 there are no high value resources that will require to be severed or demolished.
- Where the natural topography of the study area allows, it should be utilised as much as possible for the final option. By utilising the natural topography of the area there is the potential to minimise the visual impact to, and from cultural heritage receptors. Further benefits could be gained through landscaping such as vegetative screening which will not only be beneficial for visual amenity reasons, but will also help to reduce impacts at sensitive cultural heritage receptors through reducing impacts such as noise and vibration.
- Given that there are a large number of cultural heritage features which surround Elgin there is the possibility of archaeological remains being discovered during the construction of any of the proposed options. This is especially evident given that many of the cultural heritage sites (NMRS and SMR) have been designated due to previous archaeological finds. Taking this into consideration, no matter which route is chosen an archaeological watching brief should be undertaken in order to oversee any archaeological issues that may arise. If the adopted route severs a site thought to be of archaeological/cultural heritage importance then intrusive investigations may be required in order to determine the area and importance of the discovery.
- If any buildings or structures are to be demolished they should be assessed for their cultural heritage significance, and it may also be necessary for a standing building record to be compiled in order to ensure that a record of the structures is maintained.
- During construction it is possible that construction plant, equipment and hoarding may temporarily affect the setting of local cultural heritage features, however, these impacts are only likely to be temporary nature and mitigation

techniques such as using best practice techniques, and equipment that is fitted with silencers can be implemented in order to minimise impacts.

- It is recommended that comments from Moray Council's Archaeological Service are sought as they will hold a detailed sites and monuments record for the area beyond that held in the National Monuments Record.
- The planning and selection of the preferred option should comply with national policy, details can be found in the following documents:
  - (i) Scottish Historic Environment Policy (SHEP) 1
  - (ii) NPPG5
  - (iii) SHEP2
  - (iv) The Memorandum of Guidance on Listed Buildings and Conservation Areas

9.6 ***Residual Impacts***

9.6.1 If the mitigation measures from section 9.5 are implemented then the impact that the proposed options will have upon the cultural heritage of the area will be reduced. The residual impacts for each cultural heritage feature are listed in Table 9-13below.

Table 9-13: The Residual Impacts associated with the Cultural Heritage along the proposed routes

Option	Scheduled Ancient Monuments	Listed Buildings	National Monuments Record of Scotland	Scottish Sites and Monuments Records	Residual Impact	Overall Impact
Option 4 – Wittet Drive Link					The Listed Building within 50m of this route is located on the same street, although mitigation measures will help to reduce impacts, given the location there are still likely to be minor adverse impacts. Those NMRS that are located close to this option will be protected with a watching brief, only two are likely to require this so there will be a neutral impact. SMR1 will be severed by this option, however an archaeological watching brief will help to neutralise any impacts upon this site. There are no SAMs within 300m of this route option. Overall Impact Neutral to Minor Adverse.	
Option 6 – Morriston Road Link					The B Listed Building is over 100m away, planting and screening together with best practice techniques will help to benefit the sites visual amenity. Those NMRS that are located close to this option will be protected with a watching brief, only two are likely to require this so there will be a neutral impact. No SMR sites are directly affected and mitigation measures such as screening can help to improve the setting of these low value resources. There are no SAMs within 300m of this route option. Overall Impact Minor Beneficial.	
Option 13 – Northern Bypass					There are Listed Buildings within 200m however they are far enough from the option to result in a neutral impact following mitigation. There are several NMRS within 50m, through mitigation impacts will be minimised, however given that these are a medium value resource there is still likely to be a minor adverse impact. There are a large number of SMR sites along this route, and although mitigation will help to minimise some effects, it is likely that there will be a minor adverse effect on the setting of some of the 16 along the route. There are no SAMs within 300m of this route option. Overall Impact Minor Adverse.	
Option 14 – Southern Bypass (Short)					The B Listed Building is over 100m away, planting and screening together with best practice techniques will help to benefit the sites visual amenity. There are only four NMRS sites within 50m of the proposed route and through mitigation including a watching brief impacts can be reduced to neutral. There are a large number of SMR sites along this route, and although mitigation will help to minimise some effects, it is likely that there will be a moderate adverse effect on the setting of some of the 18 along the route, with seven directly severed by this route option. There are no SAMs within 300m of this route option. Overall Impact Minor to Moderate Adverse Impact.	
Option 15 – Southern Bypass (Long)					There are Listed Buildings within 200m however they are far enough from the option to result in a neutral impact following mitigation. There are only six NMRS sites within 50m of the proposed route and through mitigation including a watching brief impacts can be reduced to neutral. There are a large number of SMR sites along this route, and although mitigation will help to minimise some effects, it is likely that there will be a moderate adverse effect on the setting of some of the 14 along the route, with nine within 50m or directly severed by this route option. There are no SAMs within 300m of this route option. Overall Impact Minor Adverse.	
Option 16 – Wittet Drive and Southern Distributor					The Listed Building is located on the same street, although mitigation measures will help to reduce impacts, given the location there are still likely to be minor adverse impacts Those NMRS that are located close to this option will be protected with a watching brief, only two are likely to require this so there will be a neutral impact. Appropriate screening will help to neutralise the impact on those SMR sites located within 50m of the proposed site. There are no SAMs within 300m of this route option. Overall Impact Neutral to Minor Adverse.	
Option 17 – Morriston Road Southern Distributor					The B Listed Building is over 100m away, planting and screening together with best practice techniques will help to benefit the sites visual amenity. There are few NMRS sites located near this option and none within 100m therefore appropriate mitigation techniques will help to benefit the setting. Although there are SMR sites nearby these are low value and an archaeological watching brief will neutralise any impacts. There are no SAMs within 300m of this route option. Overall Impact Minor Beneficial.	

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

10 Summary

Table 10-1: Summary Matrix Table

Option	Noise and Vibration	Air Quality			Water Quality, Drainage and Flood Defence	Geology	Biodiversity	Landscape	Visual Amenity	Agriculture and Soils	Cultural Heritage	Comments
		Local		Regional CO_2								
		NO_2	PM10									
Option 4 Wittet Drive Link												The most severe environmental impacts are likely to be noise and vibration, but these will only be moderate adverse affects with many other environmental impacts being neutral.
Option 6 Morriston Road Link												The most severe impacts will be moderate adverse noise impacts; however this option will have benefits to the air quality and cultural heritage along the route.
Option 13 Northern Bypass												Major noise and vibration impacts are the main negative impact, along with moderate to major adverse impacts upon biodiversity. There are also likely to be benefits to some air quality on both a global and local scale.
Option 14 Southern Bypass (Short)												This option sees a number of moderate adverse impacts including visual amenity, agriculture, water quality and cultural heritage whilst also having major impacts through noise and vibration.
Option 15 Southern Bypass (Long)												This option sees a number of moderate adverse impacts including visual amenity, landscape, agriculture, water quality and cultural heritage whilst also having major impacts through noise and vibration.
Option 16 Wittet Drive and Southern Distributor												The most severe environmental impacts are likely to be noise and vibration, but these will only be moderate adverse affects with many other environmental impacts being neutral. And improvements to air quality also being seen.
Option 17 Morriston Road with Southern Distributor												Improvements to air quality and cultural heritage will be offset by moderate adverse impacts upon water quality and also noise and vibration as a result of this option.

Major Adverse		Neutral		Major Beneficial	
Moderate Adverse				Moderate Beneficial	
Minor Adverse				Minor Beneficial	

Appendix A

Consultation Responses

	Consultee	Action	Response
1	Environment and Rural Affairs Department Secretariat The Scottish Executive Room 440 Pentland House Edinburgh EH14 1TY	Letter Sent 04.04.07	No Response Received to Date
2	Scottish Natural Heritage 32 Reidhaven Street Morayshire IV30 1QH	Letter Sent 04.04.07	Phone call received from Shirley Reid 18.04.2007 Advised that the deadline of April 20th would not be met, but that they had plenty to comment on and would have a response to us by May 4th. Also asked for confirmation of all route options which was subsequently sent by Halcrow via email.
3	Historic Scotland Longmore House Salisbury Place Edinburgh EH9 1SH	Letter Sent 04.04.07	Response Received 13.04.2007 All historic environment information is in the public domain and can be accessed via www.pastmap.org.uk; electronic information is also available on request from Richard Strachan. It is recommended that comments from Moray Council's Archaeological Service are sought as they will hold a detailed sites and monuments record for the area beyond that held in the National Monuments Record. The planning and selection of the preferred option should comply with national policy, which in broad terms, place stress on securing the preservation of both the site and setting of important historic environment assets. Details can be found in the following documents: • Scottish Historic Environment Policy (SHEP)1 • NPPG5 • SHEP2 • The Memorandum of Guidance on Listed Buildings and Conservation Areas We would be happy to provide any further comments/advice as necessary as the environmental and route options appraisal progresses, particularly if there appear to be any implications for any nationally important historic environment assets.
4	Scottish Environmental Protection Agency 28 Perimeter Road Pinefield Elgin IV30 6AF	Letter Sent 04.04.07	Response Received via Email 24.04.2007 Your query has been passed onto our Access to Information Team foi@sepa.org.uk who will provide further information on the specific information requests. In relation to any planning issues which may be relevant SEPA Planning Unit North highlight the need to consider the following issues on any proposals to create new roads. Sustainability

	Consultee	Action	Response
			Consideration should be given to the promotion of sustainable transport options and how the proposals would contribute to a sustainable transport network in the Moray area, SEPA would encourage proposals reduce the need to travel where possible and maximise the use of public transport where it is necessary to travel. Air Quality Consideration should be given to the possible effects of new road creation on air quality in and around the Elgin area, in particular whether the proposals could lead to a breach in National Air Quality standards and the need to declare an Air Quality Management Area in the City. Flood Risk Many areas of Elgin are affected by Flood risk and it is essential that this is considered at an early stage in the development of any scheme. Proposals should be considered against SEPA's Indicative River and Coastal Flood Map (Scotland) Flood Maps (available at www.sepa.org.uk) as well as any relevant information held by the Moray Flood Alleviation Group. Drainage SEPA would expect Sustainable Urban Drainage Systems (SUDS) to be incorporated into any design proposals to ensure that surface water is dealt with in a sustainable way that avoids flooding and pollution. This should be done in accordance to PAN 61 and The SUDs Manual (CIRIA C697). Watercourse Engineering With the adoption of the Water Framework Directive (2000/60/EC)(WFD) and the Water Environment and Water Services Act (Scotland) (WEWS Act)2003, SEPA has a general duty to ensure no deterioration in the status of all Scotland's water environment and in particular a duty to achieve good environmental status of water bodies by 2015 through the exercise of its functions. Furthermore aspects of the proposed scheme may also require to be specifically regulated by SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR). SEPA would recommend that where possible the scheme be designed to avoid crossing watercourses. The publication 'The Water Environment (Controlled Activities) (Scotland) Regulations 2005: A Practical Guide' provides very useful advice on CAR and it is recommended that all applicants consult this document which is available both from the website (www.sepa.org.uk/wfd/index.htm)
5	Architecture and Design Scotland Bakehouse Close 146 Canongate	Letter Sent 04.04.07	No Response Received to Date

	Consultee	Action	Response
	Close Edinburgh EH8 8DD		
6	Health and Safety Executive Lord Cullen House Fraser Place Aberdeen AB25 3UB	Letter Sent 04.04.07	No Response Received to Date
7	Forestry Commission Scotland Silvan House 231 Corstorphine Road Edinburgh EH12 7AT	Letter Sent 04.04.07	No Response Received to Date
8	Scottish Wildlife Trust Cramond House Kirk Cramond Cramond Glebe Road Edinburgh EH4 6NS	Letter Sent 04.04.07	Response Received 16.04.2007 In the subject proposal area and surrounding locale, there are a number of Local Nature Conservation Site Systems, SWT requests that these sites are identified and considered in any proposals: • NJ188643 – Quarrywood • NJ194543 – Glenlatterach • NJ200140 – Glenavon • NJ200300 – Ben Rinnes • NJ200530 – Moss of Birnie • NJ205407 – Drum Wood • NJ211303 – Burnside of Deskie • NJ212619 – The Wards • NJ216707 – Moray Golf Course • NJ222665 – Spynie Wetland • NJ231696 – Sunbank Quarry • NJ237270 – Carn Muldonich • NJ240170 – Glenlivet/Ladder Hills • NJ245700 – Lossie Estuary • NJ258564 – Logie Burn
9	Scottish Water Castle House 6 Castle Drive Carnegie Campus Dunfermline KY11 8GG	Letter Sent 04.04.07	No Response Received to Date
10	Moray Flood Alleviation	Letter Sent	No Response Received to Date

	Consultee	Action	Response
	The Wards Elgin Moray IV30 6AA	04.04.07	
11	RSPB 10 Albyn Terrace Aberdeen Aberdeenshire AB10 1YP	Letter Sent 04.04.07	No Response Received to Date
12	Mike Harris Grampian Badger Survey South Skelmanae Croft Strichen Fraserburgh AB43 6QU	Letter Sent 04.04.07	Response Received 05.04.2007 Elgin STAG Part 2 - Environmental Consultation (**Response)** Badgers and otters are widespread around Elgin. Both species could be affected by proposed options 1-7. Badger and otter (and possibly water vole) surveys will be required.
13	Mr Donald Lunan Planning & Development Manager Environmental Services The Moray Council Council Office High Street Elgin IV30 1BX	Letter Sent 04.04.07	No Response Received to Date

Appendix B

Environmental Constraints Map of Elgin

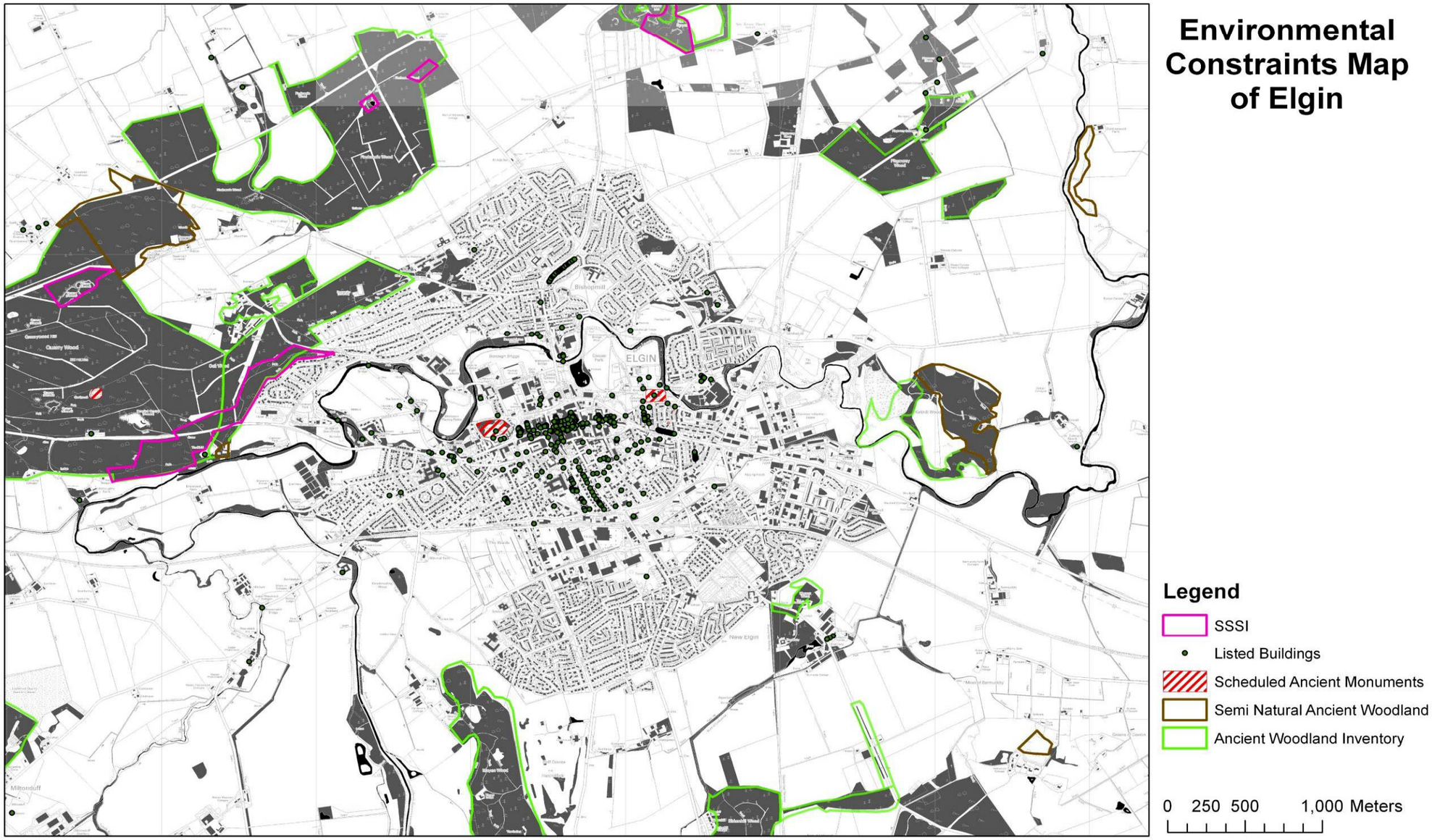

Figure 1-1: Environmental Constraints Map of Elgin

Appendix C

Noise Appendices

Glossary of Terminology

Noise is defined as unwanted sound, and the unit of measurement is the decibel (dB). Noise levels range from the threshold of hearing at 0 dB to levels of over 130 dB at which point the noise becomes painful.

Sound consists of vibrations transmitted to the ear as rapid variations in air pressure. The more rapid the fluctuation the higher the frequency of the sound. However the sensitivity of the human ear varies with frequency. Therefore most every day noise is measured in dB (A), the (A) suffix indicating that the measured level has been modified to allow for this phenomenon. It has been found that changes in noise level when measured in dB (A) most closely correlate with the changes in subjective reaction.

The range of values of pressure over which the ear can hear is enormous and for convenience the decibel scale, which is logarithmic is used as the resulting numbers correspond, generally, to the noise perceived. A change in noise level of 10 dB (A) represents a halving or doubling in perceived loudness.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	**Location**
0 dB(A)	Threshold of hearing
20 to 3 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

Table A-1: Typical Sound Levels found in the Environment

Glossary of Noise Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$Pa).

dB (A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.

L_{Amax} L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

L_{A10} & L_{A90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_{An} indices are used for this purpose, and the term refers to the A-weighted level exceeded for n% of the time. Hence L_{A10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{A90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{A10} index to describe traffic noise.

Façade Level Sound field defined 1 metre from a solid, reflecting surface, such as a building. Typically a façade level is 2.5-3 dB higher than a free-field level.

Free-field Level A sound field determined at a point away from reflective surfaces other than the level ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.

STAG Worksheets N1: Noise – Strategic Level

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 4 - Wittet Drive Link				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		02/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Link between The Wards and Edgar Road	60.9	61.0	0.1					70	2	0.1
Link between Wittet Drive and The Wards	59.1	57.8	-1.3					185	2	-4.8
Link between A96 and Wittet Drive	59.1	57.8	-1.3					2	2	-0.1
Totals	-	-	-					257	-	-4.7
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Link between The Wards and Edgar Road	61.0	58.7	-2.3					70	2	-3.2
Link between Wittet Drive and The Wards	57.8	62.7	4.9					185	2	18.1
Link between A96 and Wittet Drive	57.8	63.1	5.3					2	2	0.3
Totals	-	-	-	Total		Total	-	257	-	15.2

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	70	187			70 people no impact; 187 people negative minor
Reduction in Population Annoyed	187	70			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	-4.7	15.2			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-1 STAG Worksheet N1 for Option 4

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 6 - Morriston Road Link				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		02/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Link between Pluscarden Road and Edgar Road	50.0	50.0	0					2	2	0
Link between A96 and Pluscarden Road	50.0	50.0	0					2	2	0
Link between A96 and Pluscarden Road	56.0	56.0	0					2	2	0
Totals	-	-	-					7	-	0
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Link between Pluscarden Road and Edgar Road	50.0	58.8	8.8					2	2	0.4
Link between A96 and Pluscarden Road	50.0	58.5	8.5					2	2	0.4
Link between A96 and Pluscarden Road	56.0	58.5	2.5					2	2	0.1
Totals	-	-	-	Total		Total	-	7	-	1.0

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	0	7			4 people positive moderate, 2 people no impact
Reduction in Population Annoyed	0	0			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	0	1.0			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-2 STAG Worksheet N1 for Option 6

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 13 - Northern Bypass				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		03/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Bypass (East)	50.0	50.0	0					0	2	0
Bypass (North)	63.4	63.4	0					7	2	0
Bypass (South)	50.0	50.0	0					14	3	0
Totals	-	-	-					22	-	0
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Bypass (East)	50.0	63.3	13.3					0	2	0.0
Bypass (North)	63.4	63.1	-0.3					7	2	0.0
Bypass (South)	50.0	62.9	12.9					14	2	3.7
Totals	-	-	-	Total		Total	-	22	-	3.7

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	0	14			14 people negative major, 7 people no impact
Reduction in Population Annoyed	0	7			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	0	3.7			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-3 STAG Worksheet N1 for Option 13

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 14 - Southern Bypass				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		03/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Bypass (East)	56.0	56.0	0					2	2	0
Bypass (East)	50.0	50.0	0					2	2	0
Bypass (South)	50.0	50.0	0					19	2	0
Bypass(West)	50.0	50.0	0					2	2	0
Totals	-	-	-					26	-	0
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Bypass (East)	56.0	63.8	7.8					2	2	0.4
Bypass (East)	50.0	63.8	13.8					2	2	0.7
Bypass (South)	50.0	63.1	13.1					19	2	5.0
Bypass(West)	50.0	63.5	13.5					2	2	0.6
Totals	-	-	-	Total		Total	-	26	-	6.7

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	0	26			24 people negative major, 2 people negative moderate
Reduction in Population Annoyed	0	0			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	0	6.7			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-4 STAG Worksheet N1 for Option 14

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 15 - Southern Bypass				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		03/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Bypass (East)	50.0	50.0	0					10	2	0
Bypass (South)	50.0	50.0	0					46	2	0
Bypass (West)	50.0	50.0	0					5	2	0
Totals	-	-	-					60	-	0
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Bypass (East)	50.0	63.7	13.7					10	2	2.6
Bypass (South)	50.0	63.1	13.1					46	2	11.9
Bypass (West)	50.0	64.1	14.1					5	2	1.4
Totals	-	-	-	Total		Total	-	60	-	15.9

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	0	60			60 people negative major
Reduction in Population Annoyed	0	0			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	0	15.9			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-5 STAG Worksheet N1 for Option 15

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 16 - Wittet Drive and Southern Distributor				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		02/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Link between The Wards and Edgar Road	58.4	60.3	1.9					960	2	36.5
Link between The Wards and Edgar Road	60.9	61.0	0.1					110	2	0.2
Link between Wittet Drive and The Wards	59.1	57.8	-1.3					226	2	-5.9
Link between A96 and Wittet Drive	59.1	57.8	-1.3					2	2	-0.1
Totals	-	-	-					1298	-	30.8
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km²)	Zonal Population density (persons/km²)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Link between The Wards and Edgar Road	60.3	59.5	-0.8					960	2	-15.4
Link between The Wards and Edgar Road	61.0	59.5	-1.5					110	2	-3.3
Link between Wittet Drive and The Wards	57.8	62.9	5.1					226	2	23.0
Link between A96 and Wittet Drive	57.8	63.5	5.7					2	2	0.3
Totals	-	-	-	Total		Total	-	1298	-	4.6

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	1070	228			228 people negative minor, 1070 people no impact
Reduction in Population Annoyed	228	1070			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	30.8	4.6			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-6 STAG Worksheet N1 for Option 16

Proposal Name:	Elgin STAG Stage 2		Existing and Future Noise Issues:	Option 17 - Morriston Road and Southern Distributor				**Worksheet N1: Noise – Strategic Level**		
Location	Elgin Scotland							Date of Assessment:		03/05/2007
								Assessment Year:		2012
Do-Minimum vs Existing	Existing Average Noise Emission Level (dB)	Do-Minimum Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km^2)	Zonal Population density (persons/km^2)	Population Exposed (numbers of people)	Change in Annoyance Response Function (% popn/dB)	Change in population annoyed (no. of people)
Link between Pluscarden Road and Edgar Road	58.4	60.3	1.9					960	2	36.5
Link between Pluscarden Road and Edgar Road	60.9	61.0	0.1					110	2	0.2
Link between Pluscarden Road and Edgar Road	50.0	50.0	0					2	2	0.0
Link between A96 and Pluscarden Road	56.0	56.0	0					2	3	0.0
Totals	-	-	-					1075	-	36.7
Proposal vs Do-Minimum	Do-Minimum Average Noise Emission Level (dB)	Proposal Average Noise Emission Level (dB)	Change in Average Noise Emission Level (dB)	Length of all relevant transport corridors (km)	Width of Impact Corridor (m)	Area of population exposed (km^2)	Zonal Population density (persons/km^2)	Population Exposed (numbers of people)	Change in annoyance response (% Popn)	Change in Population Annoyed (no. of people)
Link between Pluscarden Road and Edgar Road	60.3	59.7	-0.6					960	2	-11.5
Link between Pluscarden Road and Edgar Road	61.0	59.7	-1.3					110	2	-2.9
Link between Pluscarden Road and Edgar Road	50.0	59.7	9.7					2	2	0.5
Link between A96 and Pluscarden Road	56.0	59.5	3.5					2	2	0.2
Totals	-	-	-	Total		Total	-	1075	-	-13.8

	Do-Minimum vs Existing	Proposal vs Do-Minimum	Spatial/Social Groups Affected	Noise Related Objectives (where appropriate)	Assessment Score
Increase in Population Annoyed	1070	4			2 people negative moderate, 2 people negative minor, 1070 people no impact
Reduction in Population Annoyed	0	1070			
No Change in Population Annoyed	0	0			
Total Change in Population Annoyed	36.7	-13.8			
Key Assumptions:	2.4 occupants per property				
Key Data Sources:					

Table B-7 STAG Worksheet N1 for Option 17

C. Appraisal Summary Table – Noise

Route Option	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
Option 4 – Wittet Drive Link	77 properties on the link between Wittet Drive and The Wards would receive increase in noise level of 4.9dB, 1 property on the link between A96 and Wittet Drive would receive increases in noise level of 5.3dB(A).	Moderate Adverse Impact	A net increase of 15.2 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 6 – Morriston Road Link	1 property on the link between Pluscarden Road and Edgar Road would receive increase in noise level of 8.8dB, and 1 property on the link between A96 and Pluscarden Road would receive increases in noise level of 8.5dB(A).	Moderate Adverse Impact	A net increase of 1.0 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 13 – Northern Bypass	6 properties on the Bypass (South) would receive increase in noise level of 12.9dB (A).	Major Adverse Impact	A net increase of 3.7 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 14 – Southern Bypass	2 properties on the Bypass (East) would receive increase in noise level of 7.8 and 13.8dB (A) respectively, 8 properties on the Bypass (South) would receive increases in noise level of 13.1dB (A), and 1 property on the Bypass (West) would receive increase in noise level of 13.5dB (A).	Major Adverse Impact	A net increase of 6.7 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 15 – Southern Bypass	4 properties on the Bypass (East) would receive increase in noise level of 13.7dB (A), 19 properties on the Bypass (South) would receive increases in noise level of 13.1dB (A), and 2 properties on the Bypass (West) would receive increase in noise level of 14.1dB (A).	Major Adverse Impact	A net increase of 15.9 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 16 – Wittet Drive and Southern Distributor	94 properties on the link between Wittet Drive and The Wards would receive increase in noise level of 5.1dB, 1 property on the new link between A96 and Wittet Drive would receive increases in noise level of 5.7dB(A).	Moderate Adverse Impact	A net increase of 4.6 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM
Option 17 – Morriston Road and Southern Distributor	1 property on the link between Pluscarden Road and Edgar Road would receive increase in noise level of 9.7dB, and 1 property on the link between A96 and Pluscarden Road would receive increases in noise level of 3.5dB(A).	Moderate Adverse Impact	A net decrease of 13.8 would be arise in the number of people annoyed by traffic noise for the 2012 DS situation compared with 2012 DM

Appendix D

Estimated Flood Risk Zones, Sourced from The Moray Council – Crown Copyright Licence No. GD03177

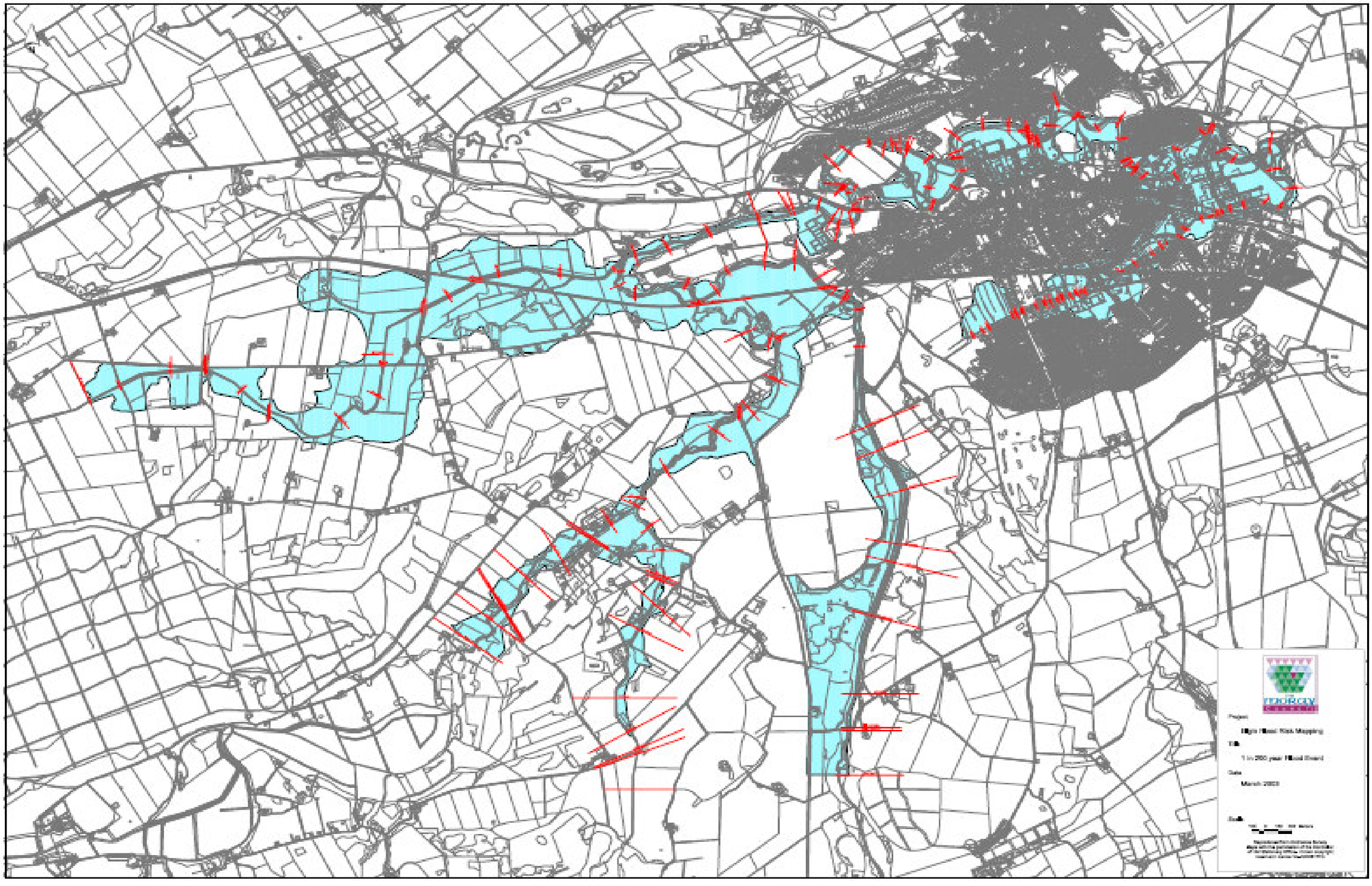

Figure 4-1: 1:200 year Flood Risk Map of Elgin

Appendix E

Approximate Division shown on Solid and Drift Geology Maps

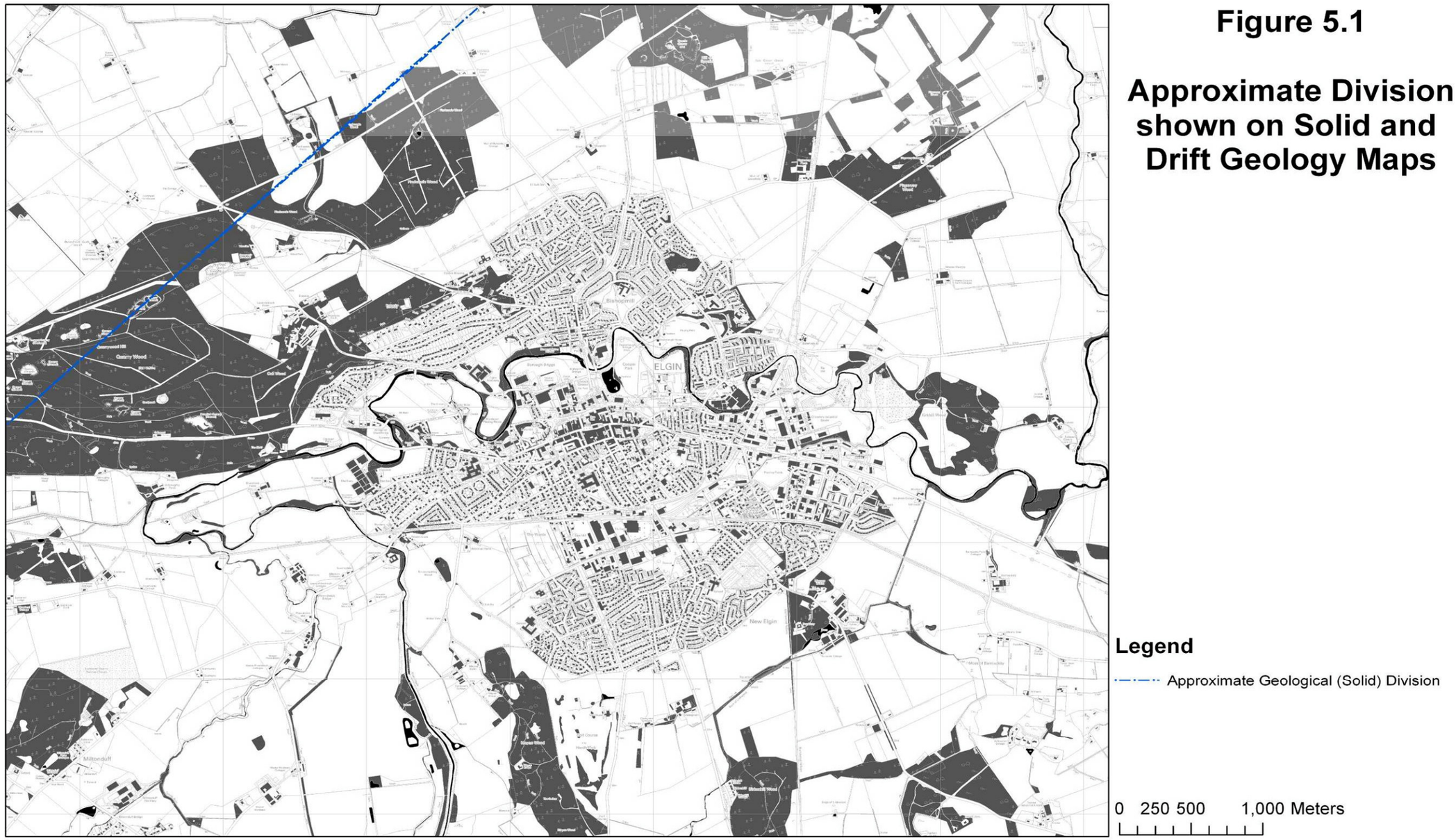

Figure 5.1

Approximate Division shown on Solid and Drift Geology Maps

Figure 5-1: The approximate division that is shown on the solid and drift geology maps

Appendix F

Biodiversity Constraints Map

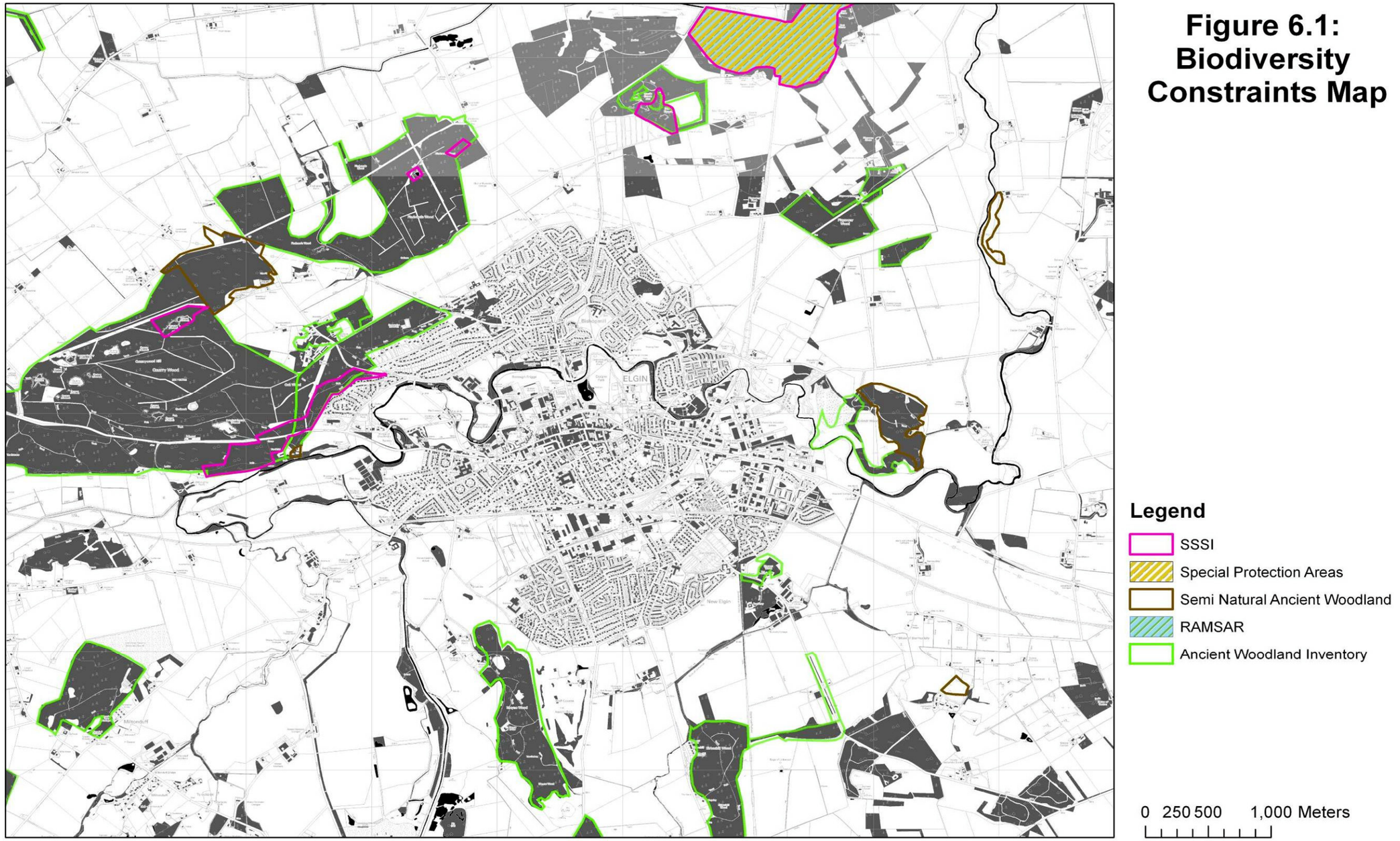

Figure 6.1: Biodiversity Constraints Map

Figure 6-1: Biodiversity Constraints Map of Elgin

Appendix G

Farmland and Agricultural Maps

Figure 8-1: The farmland impacted by Option 4 Wittet Drive

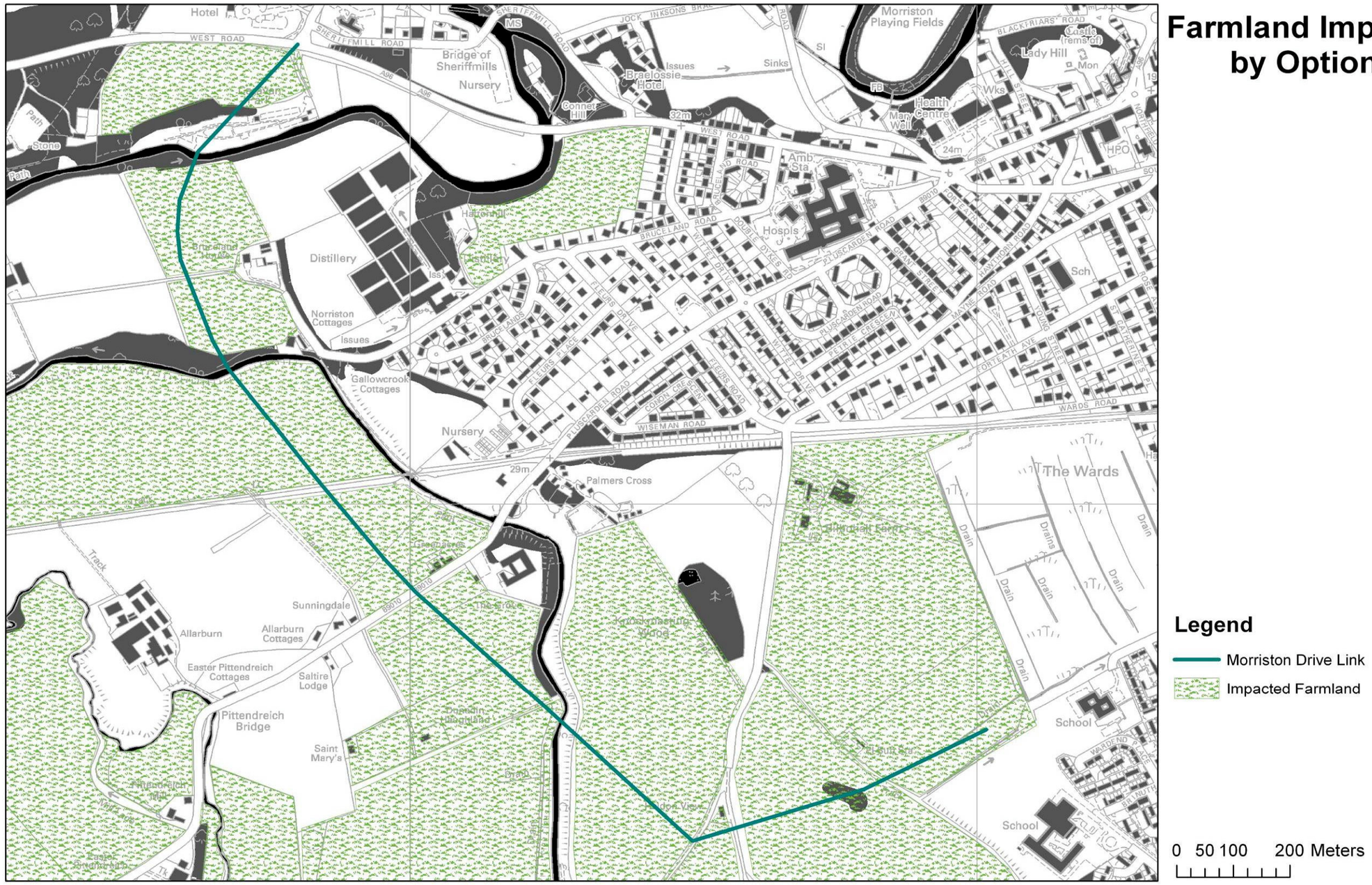

Figure 8-2: The farmland impacted by Option 6 Morriston Road

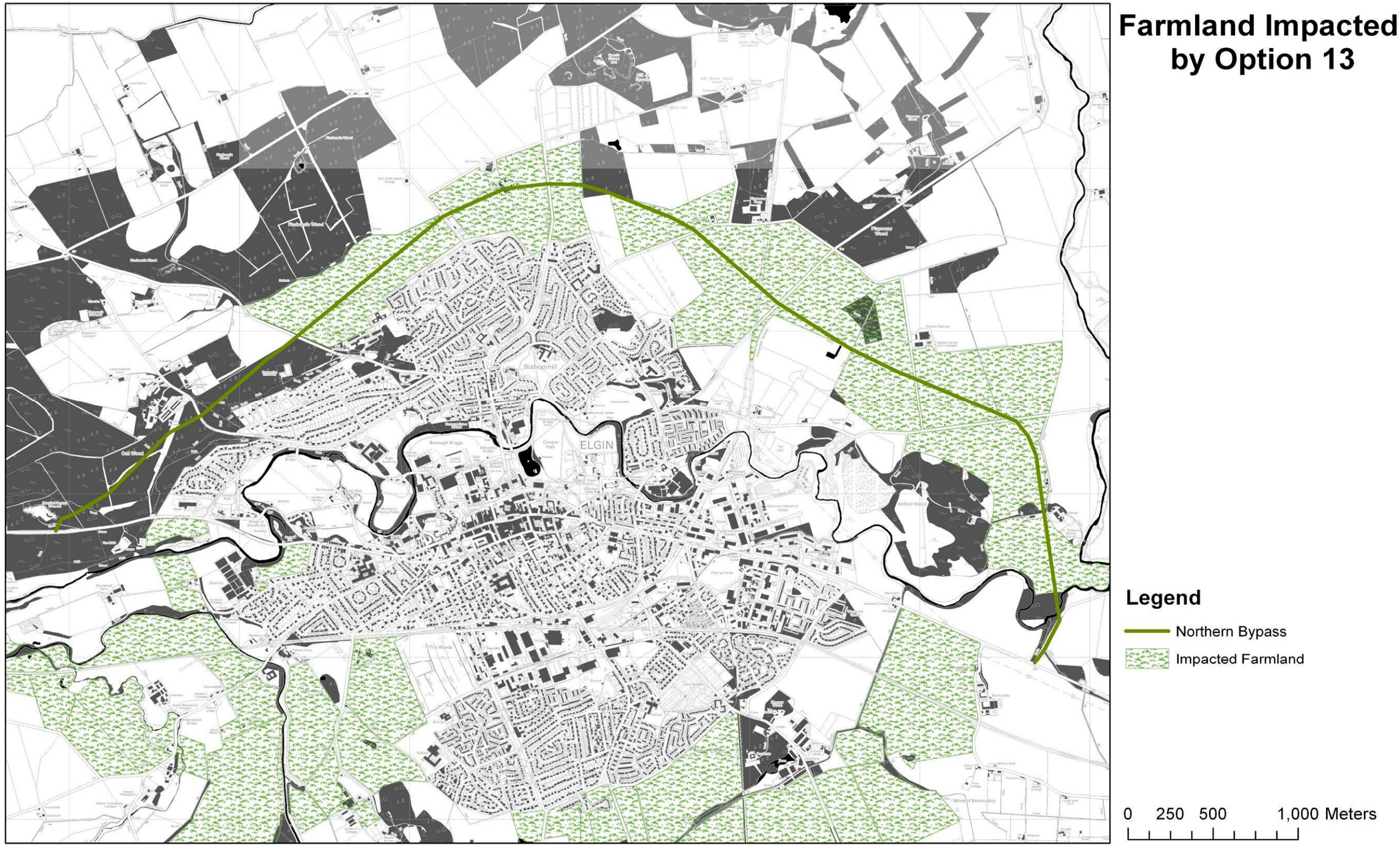

Figure 8-3: Farmland Impacted by Option 13 the Northern Bypass

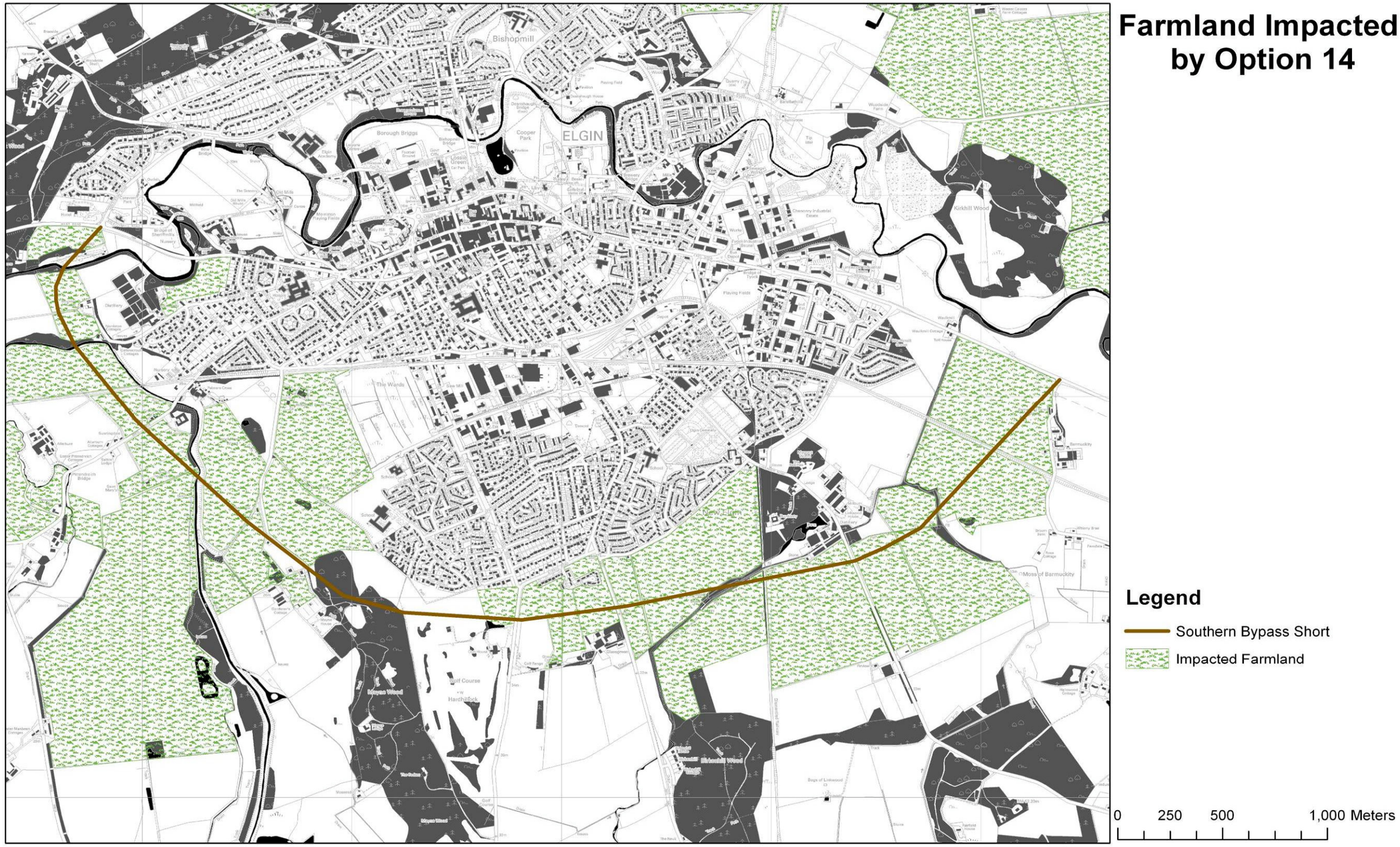

Figure 8-4: Farmland Impacted by Option 14 the Southern Bypass (Short Option)

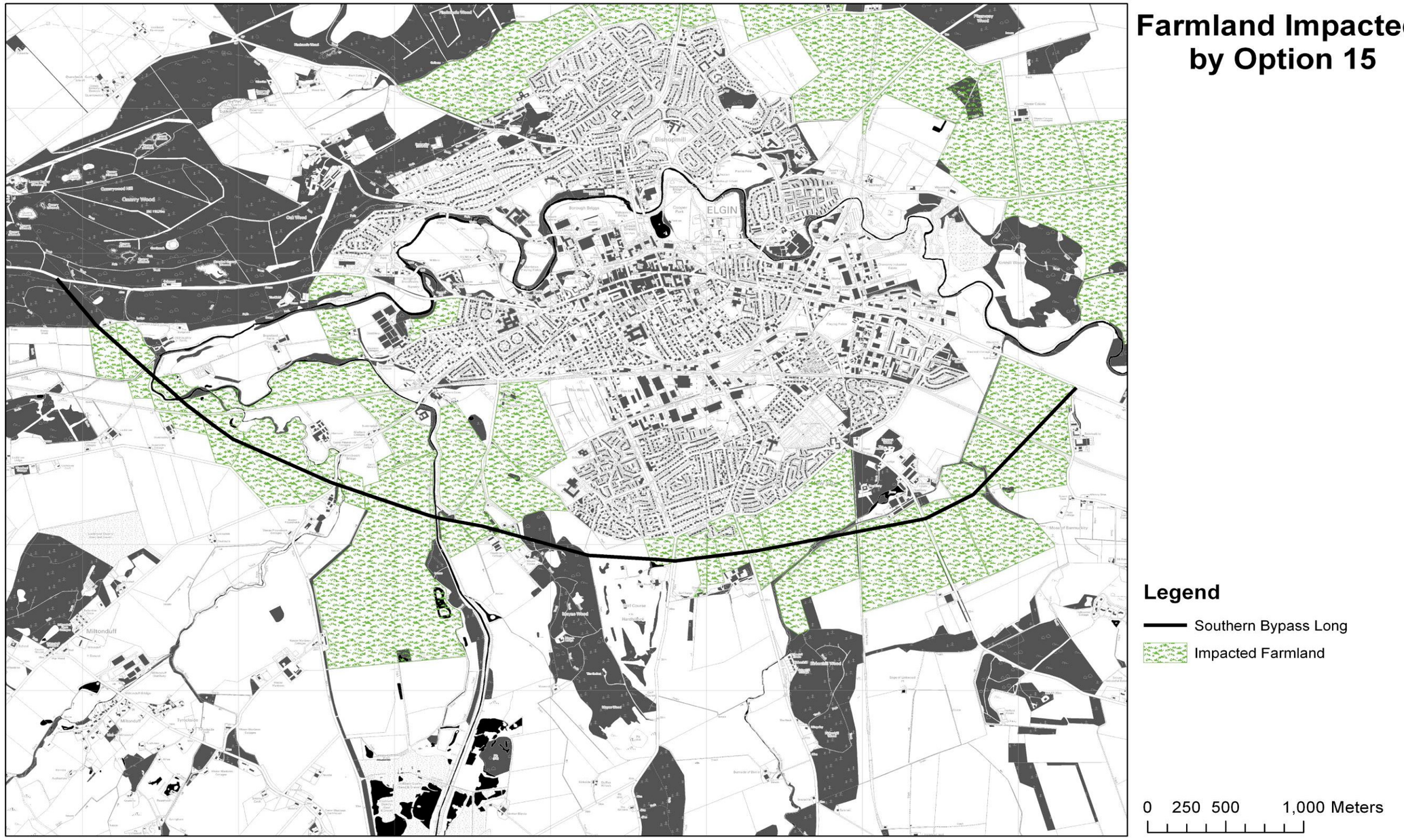

Figure 8-5: Farmland Impacted by Option 15the Southern Bypass (Long Option)

Figure 8-6: Farmland Impacted by Option 16 the Wittet Drive and Southern Distributor Route

Figure 8-7: Farmland Impacted by Option 17 the Morriston Road and Southern Distributor Route

Appendix H

Cultural Heritage Map

Figure 9.1: Cultural Heritage Constraints Map