

The Moray Council

# **Traffic in Elgin**

## Traffic Management Options

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#### 1 Introduction

##### 1.1 The Current Commission

1.1.1 Elgin dominates the travel patterns of Morayshire. It is the main administrative centre of Moray, is the dominant provider of employment, goods and services for the area and is the centre of both the local and strategic transport networks. The A96 Trunk Road bisects the town and is part of the Trans European Network. The road carries a significant amount of traffic on a west-east axis through Elgin between Inverness and Aberdeen.

1.1.2 Babbie Group was initially appointed by the Moray Council to undertake a Stage 1 Scottish Transport Appraisal Guidance (STAG) assessment of the case for an Elgin Bypass. This commission was then extended to include consideration of where a bypass proposal might fit within a traffic strategy for the town. Babbie therefore undertook a review of the traffic situation within Elgin with a view to identifying the potential elements of a package of measures to manage traffic in the short, medium and longer term.

1.1.3 The proposals included in this report form a significant step towards developing a strategy for the long-term management of traffic moving through and around Elgin. This is not the start point however as some work has already been successfully completed to improve the road network in the town and additional work is already committed. Further work will be required later to ensure a continued improvement.

1.1.4 The key deliverable from this commission is this report that contains a review of the traffic situation in Elgin and appraises options, including a potential town bypass, for reducing congestion in the town.

##### 1.2 Scottish Transport Appraisal Guidance

1.2.1 The Scottish Transport Appraisal Guidance (STAG) document was produced by the Scottish Executive to assist decision makers in the consistent assessment of transport policies and projects. STAG provides an objectives-led, open, pragmatic process that is both auditable and inclusive.

1.2.2 In effect this means that the objectives of any scheme or proposal should be set in the established aims of the planning organisation before any specific solutions are sought. Having clear objectives as a start point, the next step is to obtain a clear understanding of the issues that should be addressed and a thorough understanding of the opportunities and threats in the area. At this point it is appropriate to begin consideration of the relative merits of options for achieving the identified objectives.

1.2.3 Options are considered in terms of their impact on the Government's five key objectives: environment; safety; economy; integration; and accessibility. Additional key parts of the STAG process are participation/consultation and monitoring/evaluation. The STAG process should be inclusive. Key stakeholder groups therefore have an important role in developing objectives and options. In addition STAG should not be seen as a static

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process. Proposals should be monitored through implementation and use to ensure that they still provide the best practical solution to achieving the scheme objectives.

- 1.2.4 The consideration of options is a two-stage process. Part 1 is an initial sift used to identify practical options that meet the objectives set for the proposed scheme. This is a comparatively high level appraisal to check the suitability of options using the best information available and measuring impact on the Government's five criteria on a seven-point scale.
- 1.2.5 The Part 2 appraisal updates the information provided in Part 1, the five objectives in more detail and considers the issue of implementability. In addition to the more subjective information the Part 2 analysis should provide some quantification of the impacts of the proposal in terms of a range of issues including noise and vibration, geology, accidents, transport economic efficiency, transport and land use integration and accessibility.

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#### 2 Background

##### 2.1 Traffic Issues in Elgin

2.1.1 The road network in Elgin serves a complex mix of strategic and local demands for movement. The combination of long distance strategic traffic on the trunk road and the role of Elgin locally leads to competing demands being made on the town's infrastructure and is perceived as a restriction to the growth of the town.

2.1.2 The Moray Structure Plan Strategy states that the function of the plan is:  
"to promote economic growth and development across Moray whilst safeguarding and enhancing the natural and built environment, and promoting overall sustainability.  
This will require:

- the provision of adequate land for development focussed on the existing settlement pattern
- the securing and targeting of resources to promote economic development and employment opportunities
- the securing of a modern transport and communications network...."

Extract from *Moray Structure Plan*, Page 19.

2.1.3 Within the Structure Plan framework, policy S/T2 identifies a bypass of Elgin as a requirement to enhance movement within and to/from Moray.

2.1.4 The Local Plan seeks, among other objectives, to maintain Elgin's position as Moray's main service and administrative area, to secure provision of a bypass and to provide an ample supply of housing and commercial land.

2.1.5 The A96 Aberdeen to Inverness Trunk Road passes through the town carrying approximately 18000 vehicles per day (seven day average flow in Elgin Town Centre over 88 days between 13/08/01 and 18/06/02). The A96 is single carriageway and is subject to speed restrictions along its length, with traffic negotiating eight major junctions on its route through the town. There is currently no alternative route for strategic traffic around Elgin. There are a number of roads within the town that serve as alternatives when the A96 becomes congested, however the use of these routes is restricted by and their function more generally as access rather than distributor roads and by local knowledge.

2.1.6 The continued growth of Elgin in economic and physical terms is placing increasing pressure on the transport network. More people are living in or commuting to the town from longer distances. Similarly more tourists to the area are visiting Elgin, seeking goods, services and leisure opportunities. This is leading to increased transport usage, predominantly by car.

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- 2.1.7 Increased private car usage brings with it many well-documented problems. These problems, however, are especially severe in a town such as Elgin, where a limited road network is providing for both local and strategic needs. Traffic congestion in Elgin can be severe at times, with particular problems at some key junctions.
- 2.1.8 These transport problems are impacting on the growth of the town, and hence of the wider area.
- 2.1.9 The main problems to be addressed through this strategy are the restrictions to movement on the existing road network and provision for continued growth of the town with the aim of improving journey times for residents of, and visitors from, the wider area. In order to define this view more closely, we have undertaken a SWOT (strengths, weaknesses, opportunities, threats) analysis of the potential for traffic improvements in Elgin:

Table 2.1 Traffic in Elgin SWOT Analysis

Strengths	Weaknesses
<p>Elgin sits on the main Aberdeen/Edinburgh rail line.</p> <p>Elgin is served by the A96(T).</p> <p>Ample parking provision distributed around the town.</p> <p>Up to date development plan and transport strategies cover the town.</p> <p>Accords well with national transport objectives.</p>	<p>Elgin is located at the extreme northwestern edge of the EC therefore communication links to markets are particularly long.</p> <p>The A96(T) is providing for a complex mix of local and strategic demand for movement to and through Elgin.</p> <p>The A96(T) has eight junctions along the stretch that passes through the town.</p> <p>Public transport is not an option for the majority of trips as demand is not of a sufficient scale nor sufficiently focussed.</p> <p>No alternative routes to the A96 for strategic through traffic for a number of local movements</p>

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Opportunities	Threats
<p>Improving the road network in parallel with land use developments around the town.</p> <p>Providing an alternative route for strategic traffic – bypassing Elgin.</p> <p>Improving public transport, cycle and pedestrian routes around the town.</p> <p>Readily implementable projects that could provide significant improvements.</p> <p>Improvements that can be provided, linked to development proposals.</p> <p>Links to proposals to bypass other towns on the A96.</p>	<p>Failure to address congestion would severely limit growth of the town and would impact on journey time on the A96.</p> <p>Potential role of non-motorised modes not realised.</p> <p>Need for cohesive regional approach not demonstrated.</p> <p>The Moray Council is not part of any regional transport planning body (Hightrans or Nestrans).</p> <p>Moray has higher than average growth in car use and journey length.</p>

- 2.1.10 As the above analysis indicates there are significant traffic issues in Elgin, however there are a range of opportunities that can build on the network strengths to aid in maximising the efficiency of the road network across the town. Babbie Group and the Moray Council arranged a workshop with stakeholder groups to further inform the SWOT analysis and to develop the issue of the planning objective of the commission.
- 2.1.11 In general the views expressed supported the idea of a bypass for Elgin, however concern was raised that the bypass should not be considered to the exclusion of other potential options. A number of stakeholders felt that without complementary improvements to the town's road network, the benefits of a bypass would be short-lived, particularly given the substantial residential and business proposals for the town included in the Development Plan.
- 2.1.12 An additional stakeholder meeting was arranged to focus on business interests in the town. Concern was expressed regarding the delays to traffic in some locations at certain times of day. This has an unquantifiable impact on the image of Elgin both as a town and as a trading centre, as well as the more tangible effects. Local business groups are also concerned about journey times along the whole length of the A96, not just the section through Elgin, as this has an adverse effect on business in the Northeast as a whole.
- 2.1.13 Whilst businesses would indeed support the provision of a city bypass, or even effectively a "ring-road" which would remove congestion from the centre of the town, in the absence of either of these they would be likely to be generally supportive of attempts to improve traffic circulation by means of traffic management or other more localised solutions.

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#### 3 Objective

- 3.1.1 After consultation with the Moray Council and local interest groups, the planning objective for this appraisal was defined within the context of the current transport problems in the area and the policy objectives detailed in the Development Plan and Local Transport Strategy.
- 3.1.2 In strategic terms the Moray Council is seeking to enhance accessibility by improving road links and is seeking the support of the Scottish Executive in progressing a bypass proposal for Elgin.
- 3.1.3 At a more detailed level the local plan contains a range of policies for more minor road improvements throughout the town to improve capacity at key junctions and links while allowing for development.
- 3.1.4 The local transport strategy is consistent with the Development Plan in terms of its proposals to improve accessibility and provide a sustainable approach to transport which meets the economic and community requirements of Moray.
- 3.1.5 Given all of the above, the Moray Council has agreed the following objective for this study:

*To identify proposals to minimise congestion in Elgin by making most efficient use of the road network and to identify ways in which the network can be developed, including examination of a possible town bypass, to support the current trend for growth in the local economy.*

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#### 4 Approach to Appraisal

4.1.1 Our first step in appraising the options for managing traffic in Elgin was to consider the North and South options for a town bypass within a STAG 1 framework (see Chapter 5). This is an initial assessment of the case to identify and compare in particular the environmental, traffic and engineering issues for each option. STAG requires appraisal of measures where possible against other options, including lower cost options and not just a do-minimum scenario.

4.1.2 We then went on to consider what options are available to manage traffic demand in the town that could be implemented in advance of the construction of a bypass. The measures outlined in Chapter 6 are grouped broadly into two categories based on scale of intervention and cost:

- junction/link improvements; and
- network improvements and use changes.

4.1.3 All of the interventions detailed in Chapter 6 will provide benefits in terms of network efficiency around Elgin, either through making better use of the existing infrastructure or providing additional road space where appropriate. By taking them forward as a holistic package, however, benefits can be shown over time in parallel with land use changes and growth in traffic.

4.1.4 We strongly believe that the components that can be included in a package of traffic measures should be viewed holistically. In this way we achieve the situation where the benefits of the complete package can be viewed and shown to be greater than the sum of its parts and that this strategic approach can be communicated to existing and potential users of the networks as a reasonable way forward to improve the traffic situation for all.

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#### 5 Elgin Bypass – STAG 1

##### 5.1 Existing Situation

5.1.1 A number of pinch points have already been identified and are causing delay to movement around and through Elgin, e.g. Laichmoray Road junction with Masondieu and New Elgin Roads, and Edgar Road junction with New Elgin Road. Babbie's Elgin Traffic Study (1997) identifies and analyses the issues relating to these points. Given the growth in traffic to and through Elgin since the 1997 study the number of pinch points has increased and delay is noticeably longer.

5.1.2 Elgin is developing at a significant rate at the moment both in the town centre and on the periphery of the town. Any marginal traffic benefits achieved in the short term by small scale improvements are likely to be lost as new developments and changes in use result in significant traffic generation in and around the town.

5.1.3 Elgin's Development Plan identifies substantial levels of development in both the town centre and on the periphery of the town. Without parallel improvements to the road network it is clear that the existing problems of congestion will be compounded as committed land use changes and developments are taken forward. Potential problems are limited in some cases where development is not permitted to go ahead before certain road improvements are in place (e.g. the negotiation surrounding the implementation of the Elgin South Master Plan), however there are currently critical points on the network that will cause significant delay without improvement.

5.1.4 Therefore a more radical strategic approach is suggested that takes account of the needs of both local traffic in Elgin and strategic traffic on the A96.

##### 5.2 Bypass Options

5.2.1 Two broad options were considered within this appraisal as potential Elgin Bypass routes. Each option considered is shown in the Elgin Development Plan and is protected by both structure and local plan policies (see Figures 1 and 2 attached with the appraisal summary table at the end of this chapter).

5.2.2 The southern route option (Figure 1) skirts close to the southern boundary of the town and links to the A96 (via roundabouts) at Morrision Road in the West and Barmuckity in the East. This option is approximately 6.2km long, in comparison with an existing distance of 4.8km on the A96.

5.2.3 The northern option (Figure 2) follows a semi –circular alignment around the northern boundary of the town and links to the A96 (via roundabouts) in Quarry Wood in the West and Barmuckity in the East. This option is approximately 7.6km long, in comparison with an existing distance of 5.7m on the A96.

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- 5.3 Environmental Assessment
- 5.3.1 Full details of the environmental supporting information for this appraisal are enclosed at Appendix A.
- 5.3.2 The Southern Bypass option results in a moderate negative impact overall, in environmental terms. This option offers slight improvement in air quality and noise in town centre due to reduced traffic flows (though this must be seen in the context of increased development of the town), however negative impacts are predicted on receptors in the vicinity of the new bypass.
- 5.3.3 The Moray Council have policies supporting the development of New Elgin towards the southern bypass option. This will also increase the number of receptors negatively affected by the bypass.
- 5.3.4 One known archaeological site lies within 50m of the route and is likely to be disturbed, though this could be mitigated by sensitive alignment. No negative geological impacts have been identified, and any water quality issues should be avoided by good scheme design (e.g. SUDS) and by following good practice during the construction phase.
- 5.3.5 Some land take would be prime quality agricultural land, while the western extent of the bypass would have a negative impact on the River Lossie Corridor.
- 5.3.6 Finally, the southern bypass option would also have a negative impact on visual amenity, particularly due to the requirement to raise the road for bridges over existing roads, watercourses and the rail line
- 5.3.7 The Northern Bypass option also results in a moderate negative impact overall, in environmental terms. Again a slight improvement in air quality and noise in the town centre results from reduced traffic flows (though again, this must be seen in the context of increased development of the town), and is balanced by negative impacts predicted on receptors in the vicinity of the new bypass.
- 5.3.8 The northern bypass option passes within 50m of 5 known archaeological sites, which would be disturbed during construction. No negative geological impacts have been identified, and any water quality issues should be avoided by good scheme design (e.g. SUDS) and by following good practice during the construction phase.
- 5.3.9 No prime quality agricultural land would be used.
- 5.3.10 The northern bypass option would have a negative impact on visual amenity of the open rural landscape. The most significant negative impact likely to be the loss of habitat at Quarry Wood.

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- 5.4 Preliminary Engineering Feasibility Analysis
- 5.4.1 Full details of the preliminary engineering feasibility analysis of each option are enclosed at Appendix B.
- 5.4.2 As part of this study Babbie Group undertook a preliminary engineering feasibility assessment of the Outline Southern and Northern Routes for the proposed Elgin Bypass. The analysis is based on the routes shown on Moray Council drawings R/A96 T (dated 25 March 1998) and the corridors included in the Development Plan for Elgin.
- 5.4.3 It is assumed that the proposed bypass will be Single carriageway 7.30m All-Purpose (S2) with 1m hard strips as shown in Figure 6 in TD 27/96 of the DMRB. It is assumed that verges will be 3.5m wide as per the current standard cross section for the A96. It is assumed that all major design elements will be designed in accordance with DMRB (August 2002 version) with the possible exception of drainage where it is assumed that filter drains will be used on embankments as well as in cuttings. A design speed of 100kph has been assumed.
- 5.4.4 The Southern Route is considered at this stage to be technically feasible and there are no obvious insurmountable technical problems. A number of issues relating to impacts on local amenities (Caravan Park and Golf Course) and impacts on adjacent properties at Edgar Road roundabout have been identified which may affect scheme promotion and it is suggested that these issues need to be investigated. The number of structures required to cross the River Lossie and Inverness – Aberdeen railway line will add significantly to the overall cost of this option. It may be difficult to achieve a cut/fill balance on this route and this makes the construction costs significantly higher.
- 5.4.5 It is estimated that the construction cost of the Southern Route as described above would be approximately £25m.
- 5.4.6 The Northern Route is also considered at this stage to be technically feasible although there appear to be elements of the horizontal curvature that do not comply with DMRB for the assumed design speed. These non standard curves should be designed out at an early stage and it appears that this should be possible within the constraints identified for this route. No other insurmountable technical problems have been identified at this stage. The only significant issue identified at this stage that may affect scheme promotion is the impact on Quarry Wood as the road would run through the wood for a significant distance. The Northern Route is likely to be significantly cheaper to construct than the Southern Route primarily due to the lower number of structures and a better cut/fill balance.
- 5.4.7 It is estimated that the construction cost of the Northern Route would be approximately £15m.

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- 5.5 Traffic Analysis
- 5.5.1 A bypass for Elgin would allow strategic traffic using the A96 to avoid the town. The intention is that such a bypass would reduce delay to trunk road traffic while also reducing congestion in the town.
- 5.5.2 The impact of the bypass proposals was assessed using the Elgin SATURN model as developed initially by Babbie, and subsequently updated by Colin Buchanan and Partners. The base information in the model is five years old and is nearing the end of its useful life. The model is still appropriate to provide an indication of the impact of schemes that would have the level of impact of the bypass proposals within the framework of a STAG1 Appraisal – that is, more detailed consideration will be required for a STAG2 and for detailed design.
- 5.5.3 The bypass alignments protected in the Elgin Development Plan were coded into the SATURN Model and run for both the AM and PM model periods (e.g. the AM and PM peaks). On average, the bypass options provide limited timesavings, measured in seconds, over the existing A96 route through the town.
- 5.5.4 The existing A96 route through Elgin is comparatively straight and has eight junctions operating broadly within capacity, except for a limited time within each of the peak periods. The bypass options are both significantly longer than the existing route and both have number of major junctions (the terminal points and main north/south routes from the town to Lossiemouth/ Aberlour). The effect of this is to minimise any time benefit for road users.
- 5.5.5 Given the current levels of local traffic using the A96, the bypass would not significantly reduce the levels of traffic delay in Elgin.
- 5.5.6 As congestion and delay within Elgin itself increases, e.g. through development of housing and significant business areas, the bypass options will offer more of a time saving and therefore become more attractive.
- 5.5.7 As a result of the limited time savings provided by the bypass options traffic flows are also comparatively low. The Southern Option generates an AM two-way flow of 820 vehicles and a PM two-way 760. In contrast the Northern Option generates two-way flows of 660 and 630 vehicles respectively. To allow some consideration of the transport economic efficiency of the bypass options these flows were growthed up to generate an estimated 24-hour flow.
- 5.5.8 The flow profile provided by the Scottish Executive's automatic traffic counter NE006 (located on the A96 to the East of Elgin) was used to generate 24-hour flows. The Southern bypass option generated a maximum 24-hour two-way flow of 15,700 vehicles while the Northern option generates a maximum 24-hour two-way flow of 12,600 vehicles.

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- 5.5.9 Table 5.1 summarises the transport economic efficiency of the Elgin Bypass options. Both options achieve a significant negative net present value. This can be explained by the limited benefits to drivers offered by the bypass options currently.

Table 5.1 – Transport Economic Efficiency of the Elgin Bypass Options.

	Southern	Northern
Construction Costs	£25,000,000	£15,000,000
Maintenance Costs	£94,000	£115,000
User Benefits – No of users	15,700	12,600
Time savings (min)	0.05	0,07
VOC savings	-£0.14	-£0.19
Non User Benefits – Time savings	£1,182.73	££949.20
Total Benefit PVB	-£3,066,857	-£4,213,292
Total Cost PVC	£19,315,316	£12,217,395
Net Present Value NPV	-£22,362,639	-£16,430,687

- 5.5.10 Additional justification for a bypass of Elgin through accident savings and air quality improvements was investigated. Given, however, the limited reduction in traffic on the existing A96 and the expected growth in local traffic due to developments in the town, it is considered that only marginal potential benefits could be identified through changes in air quality or potential accident levels. Our initial investigation indicates that the improvements identified were so marginal that they are not statistically significant and have therefore not been developed further.

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#### 5.6 Conclusion and Appraisal Summary Table

- 5.6.1 Clearly, there are environmental issues related to both options. The most significant of these are the impact of the southern option on amenity of the southwestern periphery of Elgin (the golf course) and the impact of the northern option on Quarry Wood. While in transport planning terms these are not significant issues, it is likely that both will raise strong local feeling that will need to be addressed as a bypass scheme is developed.
- 5.6.2 Both bypass options are feasible in engineering terms and neither has any insurmountable technical problems. The Southern option is significantly more expensive than the Northern due to the number of structures required and the cut /fill imbalance. While a more balanced cut/fill ratio could be achieved it is unlikely to reduce the cost by more than £3m to £4m.
- 5.6.3 In traffic terms a bypass for Elgin does not currently provide a significant benefit to strategic road users or to the inhabitants of the town. While there is a substantial flow of traffic on the A96 through Elgin, much of that flow is made up of local traffic. The road network in the town is such that the A96 is an integral part that must be used for at least part of certain north/south and west/east movements. Given the proportion of traffic on the A96 in Elgin that is local in nature the bypass would be unlikely to reduce flows on the route through town by more than 300 to 500 vehicles in the peak period. The limited time savings for both bypass users and non-users, comparatively low flows and high construction costs combine to give the bypass options for Elgin a high, negative net present value (NPV).
- 5.6.4 Given the high negative NPV additional justification for a bypass was investigated in terms of air quality improvements and accident benefits. Only very marginal benefits for either could be identified and no statistical significance could be attached to either. They have therefore not been added to this case.
- 5.6.5 STAG1 appraisal summary sheets for each option are attached. The appraisal indicates that a bypass for Elgin offers some benefits however is not justified at present. The bypass could therefore be pursued as a longer-term objective within a strategy to provide network improvements to support the development of Elgin. This would also tie in with the lead-time involved in promoting a major road scheme that can take a number of years from feasibility to construction.

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##### 6.1 Road Network Strategy

6.1.1 Whether or not it is accepted that a bypass for Elgin should be pursued as a long term objective the lead time involved in developing a major road scheme would suggest that a road network development strategy be drawn together for Elgin taking account of committed and proposed road improvements, committed and proposed land use changes and the Scottish Executive's strategy for the management of the A96 route.

6.1.2 Given the dual function of the A96 through Elgin, catering for both local and strategic traffic, it would appear reasonable to seek a partnership approach between the Moray Council and the Scottish Executive to identify traffic solutions that could improve the situation for all traffic using the A96 through the town.

6.1.3 The Road Network Strategy should identify short, medium and long-term objectives linked to proposals and options that can be taken forward to achieve these objectives. The strategy can then show the logical and objective development of the Elgin road network including a relevant programme (integrating road and land use development) and expanding the case for progressing the proposals for a bypass at an appropriate point.

6.1.4 The remainder of this chapter outlines some proposals that could be considered for inclusion in a road network development strategy for Elgin.

##### 6.2 Junction/Link Improvements

6.2.1 In the short term, a number of very specific projects could be taken forward to improve network efficiency in Elgin. By their nature such improvements would be relatively small scale, easy to implement, localised interventions.

6.2.2 The Elgin Local Plan lists a number of such schemes, junction and link improvements for the town. Some of these improvements are development dependent and are intended to ensure that the network will suffer no net detriment from the traffic generated by new developments. The proposed junction/link improvements included in the Elgin Local Plan are:

- TSP3 Roundabout at A96/Reiket Lane
- TSP4 Reiket Lane Railway Bridge
- TSP5 Reiket Lane, Linkwood Road, Thornhill Road Junction
- TSP7 A941, Thornhill Road junction
- TSP9 Junction Improvement Birnie Road/Sandy Road

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- TSP11 Edgar Road, Glen Moray Drive, Wards Road junction improvement
  - TSP14 A96/Wittet Drive roundabout
- 6.2.3 Work is on-going in relation to minor network improvements that will be required to support the South Elgin Master Plan proposals. This includes potential improvements to South Street/Hay Street, Station Road/Moss Street, Edgar Road/new Elgin Road junctions and the Reiket Lane Link.
- 6.2.4 In addition, it is recommended that consideration should be given to improving the operation of the junctions along the A96 to minimise delay and increase capacity. Junction improvements could be prioritised by their relationship to new development and estimated loading points on the network, e.g. redevelopment of the Blackfriars Road area and subsequent loading at the Haugh Road/Alexandra Road and Bishopmill Brae/Alexandra Road junctions.
- 6.3 Network Improvements and Use Changes
- 6.3.1 The Elgin Local Plan lists a number of network improvements proposed for the town. Again, as with some link and junction improvements, the network improvements are development dependent and intended to ensure that the network will suffer no net detriment from the traffic generated by new developments. The proposed network improvements included in the Elgin Local Plan are:
- TSP6 Thornhill Road link to A941
  - TSP8 Birnie Road link to Sandy Road
  - TSP10 Sandy Road, Glen Moray Drive realignment
  - TSP12 Edgar Road extension – Wittet Drive (Railway link)
  - TSP13 New Railway Bridge, Edgar Road – Wittet Drive
  - TSP15 Linkwood Road to Maisondieu Road
- 6.3.2 Consideration could also be given to larger scale, more radical projects for implementation in the medium to longer term. One such project could be the formalisation, enforcement and support of a hierarchy of roads. This would require a review of the road network and the identification of, for example, formal strategic, distributor and access roads. The function of each road type could be supported by a mixture of measures including, but not limited to, appropriate regulation, traffic management and signing. Examples of this could be to formalise the function of Morrision Road as a distributor for traffic from the West to Lossiemouth and to upgrade Reiket Lane/Thornhill road to provide this function for the South Elgin Master Plan area.

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- 6.3.3 The development and support of a hierarchy would help manage demand and control flows, particularly at key junctions where turning movements and proportions are a significant factor in causing congestion. The development of a hierarchy could also consider movements that are not currently well served and identify new routing or links to provide added value to the existing network.
- 6.3.4 Part of the hierarchy concept could include recognition of the dual function of the A96 as both a strategic and local road. Support for the function of the A96 could be provided possibly controlling access to prioritise in favour of local or through traffic depending on, for example, time of day, direction of travel. Alternatively, banning some turning movements on the A96 could support a more strategic function improving capacity and reducing delay (e.g. fewer local traffic issues/movements).
- 6.3.5 Consideration could also be given to achieving improvements in network efficiency by developing a one-way system around Elgin town centre. Two options are obvious:
- Alexandra Road eastbound and Pansport Roundabout to Wittet Drive westbound;  
or
  - Alexandra Road eastbound and Pansport Roundabout to Hay Street westbound.
- 6.3.6 Initial assessment of these options indicates that significant increases in flow can be achieved by developing a clockwise scheme. Traffic, however, still appears to route by Hay Street even on the Wittet Drive scheme. Journey time would appear to be increased slightly, however more detailed analysis using up to date information and traffic modelling tools would allow a more robust conclusion to be made. Any one-way scheme would need to be supported by appropriate one-way provisions and control of all roads within the gyratory.

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- 7 Conclusion
- 7.1.1 Babbie Group was initially appointed by the Moray Council to undertake a STAG1 assessment of the case for an Elgin Bypass. This commission was then extended to include consideration of where a bypass proposal might fit within a traffic management package for the town. Babbie therefore undertook a review of the traffic situation within Elgin with a view to identifying the potential elements of a package of measures to manage traffic in the short, medium and longer term.
- 7.1.2 The STAG1 appraisal of the bypass options indicates that in environmental and engineering terms there are no problems that could not be overcome by appropriate design or technical solutions. Further work would be required to inform a decision on the preferred option and take it forward to detailed design. In the short term, however, there is no economic or traffic case to support a bypass of Elgin. The justification for and commitment to a bypass project should be pursued as a long-term objective in the context of on-going policies and proposals intended to improve the efficiency of the road network in Elgin.
- 7.1.3 The current Development Plan for Elgin includes proposals to release land in the southeast of the town in the initial five-year period, for 700 houses and associated community facilities. It is expected that additional land for a further 300 will be released in the second five-year period. In the next 15 years, a total of 1500 additional housing units are proposed in the South Elgin area. Trip generation in Elgin is estimated to be of the order of 8 trips per household per day (though our view is that given the location and travel characteristics of rural areas this is low).
- 7.1.4 This shows the potential for growth in traffic in Elgin and does not take account of other housing, business and retail land allocation that will inevitably be developed.
- 7.1.5 The result of this allocation will be to support the current economic and land use development trend in the area and the expansion of Elgin, in turn resulting in a significant addition to the estimated traffic levels in and around the town. The need to support this growth provides the justification for extensive improvements to the road network of the town.
- 7.1.6 Given all of this, it is recommended that a strategy is developed to provide a framework for the development of the road network in Elgin over the long term. The strategy should take account of planning policies and proposals, and roads policies and proposals in an integrated way to ensure that the road network development strategy complements the land use Development Plan and vice versa.
- 7.1.7 Another critical consideration will be the Scottish Executive's long term strategy for the management of the A96 and its role in the strategic road network.
- 7.1.8 A road network development strategy could include short medium and long-term objectives that could be achieved through a package of measures including, but not restricted to, junction and link improvements, network improvements and network use

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changes. In practical terms a number of potential improvements have already been identified by the Moray Council, however what is not clear is the overall impact of these specific improvements.

- 7.1.9 It is recommended therefore that trip and traffic flow data is collected to allow the Elgin SATURN Model to be updated to allow robust analysis of packages of proposals in a holistic way to ensure the best package can be developed to meet the agreed objectives of the road network development strategy.
- 7.1.10 The development of a road network development strategy would also inform a STAG 2 appraisal. This will be required to obtain support from the Scottish Executive, particularly if funding is sought for particular interventions or they have an impact on the A96, which is the responsibility of the Executive.

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Appendix A - Environmental Supporting Information

# **The Moray Council**

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#### Introduction

In accordance with 'Scottish Transport Appraisal Guidance – A draft consultation document (STAG) 2001', the following environmental parameters were considered as part of the environmental appraisal of the northern route bypass option:

- Noise and Vibration;
- Air Quality;
- Water Quality, Drainage and Flood Defence;
- Geology;
- Biodiversity;
- Landscape;
- Visual Amenity;
- Agriculture and Soils; and
- Cultural Heritage.

#### Noise and Vibration

Generation of noise is usually one of the principal environmental concerns associated with road schemes proposed in close proximity to residential areas. STAG recommends that an impact corridor width of 50m be considered when assessing the likely impacts of traffic noise on receptors. A wider (zoned) corridor of up to 300m is recommended in the Design Manual for Roads and Bridges (DMRB) Volume 11 (Stage 1 Assessment) for new routes, or for existing routes subject to a change in traffic of over 25%.

For the purposes of this assessment the number of residential properties lying within 50m bands up to 300m were estimated, with reference to the housing indicated on the Development Plan map of Elgin, and OS 1:25,000 and 1:50,000 maps.

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	Southern	Northern
0-50m:	0 properties	0 properties
51-100m:	0 properties	0 properties
101-150m:	13 properties	1 properties
151-200m:	42 properties	5 properties
201-250m:	48 properties	14 properties
251-300m:	39 properties	50 properties

No properties lie within 100m of the proposed routes. There are an estimated 142 properties within 300m of the southern option, primarily in the southern outskirts of Elgin, while there are an estimated 70 properties within 300m of the northern route, primarily in the northern and northwestern outskirts of Elgin.

In addition to the residential properties identified close to the southern route, a number of non-residential receptors have been identified that can all be considered particularly sensitive to noise disturbance. Elgin High School grounds (south-west Elgin) are approximately 200m, and the actual school buildings approximately 300m north of the proposed bypass route. Elgin Golf Course is located immediately south of the bypass route. At its western extent, the bypass would cross the Lossie Corridor, which has high public amenity value (see Biodiversity Section), and has a camping area/caravan park within 50m of the proposed bypass route.

Adjacent to Linkwood/Dunkinty (Figure 1), Thornhill Field has been identified in the Local Plan for the provision of 'sporting and recreational facilities' in association with the development of nearby land for housing. The boundary of Thornhill Field lies approximately 200m from the proposed bypass route, and would therefore be susceptible to noise nuisance from traffic on the bypass.

The Local Plan identifies the following sites in the vicinity of the proposed bypass as being suitable for housing development:

- Waulkmill (capacity 160 housing units)
- Linkwood East (capacity 390 housing units)
- Glass Green (capacity 150 housing units)
- Thornhill (capacity 350 housing units)
- Bilbohall South (capacity 320 housing units)

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These areas have been identified in the Local Plan with the southern bypass route also indicated. The boundaries of each of the above sites are within 300m of the proposed bypass route, and Glass Green and Thornhill are particularly close (approximately 50m). Retention of existing planted areas along the boundaries and provision of additional planted screening is stipulated in the Local Plan as a requirement for each site. This will reduce the noise disturbance at the new properties, but those close to the boundary in particular would experience some degree of noise disturbance from traffic on the bypass.

In addition to the residential properties identified close to the northern route, Spynie Hospital has been identified as a sensitive receptor, located on the northwestern outskirts of Elgin. Due to the distance from the proposed bypass route (approximately 350m), and provided that acoustic mitigation is provided if a need is identified during acoustic modelling, it is unlikely that this site will be significantly affected.

The Local Plan identifies the site of Linksfield Farm Steading (OS NJ 225 640) as being potentially suitable for the development of up to 80 residential properties. The boundary of this site is approximately 350m from the proposed bypass route, and provision is to be made for a 15m tree belt to be planted along the eastern boundary. Given its distance from the route, and provided that adequate screening is incorporated into the site development, it is unlikely that this area would be significantly affected by the proposals.

The 'Elgin Traffic Study – Draft Traffic Assessment Report 1997' (Babtie Group) estimates that a new bypass would reduce the volume of traffic on the A96 passing through the town centre by approximately 20%, and a slight reduction in noise disturbance within Elgin may therefore be expected based on current traffic flows. However, the Structure Plan allocation for housing in Elgin is 700 properties between 2000 and 2005 (Waulkmill, Linkwood East and Glass Green), with Thornhill and Bilbohall South identified for development in the longer term. This expansion of Elgin will cause an increase in traffic, and is therefore likely to increase traffic passing through the town centre. The bypass would be likely to alleviate this problem to some extent.

There are no noise constraint policies stated in the Moray Structure or Local Development Plans 2000.

Acoustic modelling of sensitive is recommended so that mitigation measures such as low noise road surfacing and the use of planted areas as acoustic barriers can be incorporated into the scheme design where necessary.

### Air Quality

Changes to air quality caused by road transport are typically localised in nature, and DMRB (Vol. 11 Stage 1) recommends that only the effects on properties within 200m of a proposed road need be considered. This approach has been adopted in this assessment. The routes were also assessed in terms of receptors that were not within 200m but were considered to be particularly sensitive.

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It is estimated that the following properties lie within 200m of the each route:

	Southern	Northern
0-50m:	0 properties	0 properties
51-100m:	0 properties	0 properties
101-150m:	13 properties	1 properties
151-200m:	42 properties	5 properties

As discussed in the previous section (Noise and Vibration), significant additional housing is planned close to the southern route over the period 2000-2005. This will significantly increase the number of properties within the 200m air quality bands assessed.

In addition to the residential properties close to the southern route identified above, the sensitive receptors identified in the previous section (Noise and Vibration) (Elgin High School, Elgin Golf Course, Lossie Corridor) may experience a slight reduction in air quality, although this change is expected to be negligible.

The grounds of Spynie Hospital, on the northern outskirts of Elgin, are approximately 350m from the proposed bypass northern route. It is unlikely that air quality would be significantly affected at this receptor.

The planted areas along Lesmurdie Road and Linksfield Road to the north of Elgin are identified in Policy ENV3 of the Local Plan as being of amenity and nature conservation value. The boundaries of these areas are approximately 500m from the northern bypass option, and are therefore unlikely to be affected.

The 20% reduction of traffic on the A96 in Elgin predicted to occur as a consequence of providing a bypass would be likely to cause a slight improvement in air quality within Elgin, due to both a lower number of vehicles and reduced congestion. As discussed in the previous section (Noise and Vibration), the volume of traffic within Elgin is expected to increase as additional areas are developed for housing. A bypass could therefore alleviate future air quality issues by redirecting traffic away from the centre of the town.

There are no Air Quality Management Areas or policies specifically relating to air quality in the Moray Structure or Local Development Plans 2000.

#### Water Quality, Drainage and Flood Defence

The River Lossie meanders west (upstream) to east (downstream) through Elgin. The proposed southern route of the bypass would cross the River Lossie at three points (upstream-downstream: OS NJ 203 614, NJ 197 613, NJ 196 627) while the proposed northern route of the bypass would cross the River Lossie at OS NJ 246 626.

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The Scottish Environment Protection Agency (SEPA) routinely measures a number of water quality parameters of the Lossie (including pH, suspended solids, Dissolved Oxygen, nitrates and phosphates) at the following locations:

- East Elgin - Waulkmill (OS NJ 239 624)
- East Elgin - Moycroft (OS NJ 233 632)
- West Elgin - Sherrifmill Park (OS NJ 198 627)
- Arthurs Bridge (OS NJ253 673)

The section of the River Lossie running through Elgin is downgraded to Class B (Fair) due to measured biological parameters (at Waulkmill, Moycroft and Sheriffmill Park). However, further downstream (at Arthurs Bridge) water quality is Class A2 (Good) (*Pers. comm.*<sup>1</sup>).

There should be no significant long term impacts on the water quality of the area provided that drainage water from the bypass is collected and disposed of in accordance with the 'Sustainable Urban Drainage Systems Manual for Scotland and Northern Ireland (SUDS) 2000', as required by Structure Plan Policy S/ENV8 (Sustainable Urban Drainage) and Local Plan Policy L/ENV24 (Surface Water Drainage: SUDS). Construction works have potential to cause negative water quality impacts, but can usually be avoided or else mitigated by adherence to best practice guidelines such as the Pollution Prevention Guidelines (PPG's) produced by SEPA.

Severe flooding has been experienced in recent years throughout Elgin (notably September 1995, July 1997 and April 2000), due mainly to flooding of the River Lossie and its tributaries. SEPA has advised that some flooding occurs in the area where the southern bypass route would join the A96 to the west of Elgin, although flooding at this location is very localised and not as significant as elsewhere along the river corridor. More serious problems are encountered where the bypass options would join the A96 to the east of Elgin. The River Lossie and nearby burns cause serious flooding of the land to both sides of this road section, particularly in the area of Barmuckity (*Pers. comm.*<sup>2</sup>).

Due to the low-lying nature of the land surrounding Elgin and the historical records of frequent flood events, detailed hydrological studies would be required to quantify the flood risk to the proposed bypass, and ensure that engineering proposals managed this risk adequately.

The Local Plan states one of the planning objectives for Elgin as the requirement to implement a Flood Management Plan, and the following policies in the Moray Development Plan are of particular relevance to flooding:

*Structure Plan Policy S/ENV9* (Flood Management) states that the Council will work closely with SEPA and the Water Authority in the appraisal of areas liable to flooding, and requires that the local plan:

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<sup>1</sup> Telephone conversation between Nigel Weller of Babbie Group and David Shore (Environment Protection) of SEPA Elgin Office. Tuesday 24 September 2002.

<sup>2</sup> Telephone conversation between Nigel Weller of Babbie Group and Ron Murdoch (Hydrology) of SEPA Elgin Office. Thursday 26 September 2002.

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- Directs 'high risk' development away from vulnerable locations;
- Specifies management criteria for development in areas of risk;
- Safeguards floodplains and low lying land from inappropriate development and ensure where possible that they can flood naturally;
- Identifies proposals for new flood protection schemes;
- Has preference for the use of 'soft engineering' solutions to Flood Prevention Order;
- Encourages use of Best Management Practices to manage run-off; and
- Promotes an integrated management approach to flood risk.

*Local Plan Policy L/ENV25 (River Engineering)* requires that flood management works are also considered in terms of upstream and downstream impacts.

*Local Plan Policy L/ENV26 (Control of Development in Flood Risk Areas)* advises that permission for 'high risk development' in areas liable to flood will be refused. Any non-high risk development must include appropriate flood mitigation and have the potential to contribute to the improvement of floodwater management in the area of risk.

'High risk' development as covered in the above policies relates to facilities such as medical/emergency services or commercial developments with polluting/contaminating processes, and in this context road development is unlikely to be considered high risk.

### Geology

The rock strata underlying the entire scheme belong to the Cornstone Beds of Upper Old Red Sandstone (Devonian) age. These strata are predominantly cross-bedded sandstones, with some conglomerates, shales and sandy limestones (cornstones). The strata have shallow dips to the north-west and are not indicated to be affected by faulting. To the west of the A941, for the northern option, there are strata of the overlying Rosebrae Beds, which are also predominantly sandstones but with a greater abundance of shales, mudstones and marls (calcareous siltstones).

The strata have shallow dips to the north-west and are not indicated to be affected by faulting.

For the majority of the southern route, the strata are overlain by glacial sand and gravel deposits. At either end of the scheme, the sands and gravels are covered by flood plain alluvium associated with the River Lossie. On the northern route however, at the western end, beyond the suburb of Woodlands, the sands and gravels are replaced by boulder clay, while a small section at the eastern end have flood plain alluvium associated with the River Lossie lying above the glacial deposits.

The Upper Old Red Sandstone strata and the glacial sands and gravel represent potentially important groundwater aquifers. The Upper Old Red Sandstone is described on the Hydrogeological Map of Scotland as a highly productive aquifer with the potential for moderate borehole yields. The glacial

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sands and gravels are described as a locally important aquifer dependant on its thickness. The thickness is not known in the vicinity of the scheme, but given the extent of these deposits across a wider area a significant thickness is expected.

River alluviums are classified as aquifers with limited or local potential. The potential will depend not only on thickness but on the nature of the alluvium, which can range from predominantly sandy to silty clays.

The nearest SSSI of geological interest to the scheme is Cuttie's Hillock. This site, located in Quarry Wood approximately 1 to 1.5km to the north-west of the western end of the route options, is cited for the important reptile fossils excavated from and still present in the Upper Permian sandstones. Given the distance from the proposed route, the road development would have no impact on the site.

No RIGS (Regionally Important Geological Sites) have been identified in the vicinity of the scheme.

### Biodiversity

Areas of high ecological value are protected to varying degrees by a range of designations implemented through statute, international convention or local authority planning controls. Non-designated sites of local significance are also important and can provide habitats of local nature conservation value, as well as areas for human recreation, enjoyment and education.

The southern route option does not cross any sites statutorily designated for their nature conservation/ecological value. Quarry Wood Site of Special Scientific Interest (SSSI) lies approximately 350m from where the proposed route would join the A96 west of Elgin, and would be unlikely to be affected.

Approximately 2km of the northern bypass route however runs through Quarry Wood (Figure 1). The Local Biodiversity Action Plan (LBAP) for the wood states that this is the 'finest example of mixed oak and birch woodland in the North East'. It may be possible to mitigate negative impacts on Quarry Wood likely to occur during both construction and operation of the bypass to some extent, although it would still cause a loss of habitat and represent a significant negative ecological impact. A 22 ha area of Quarrywood is designated as a Site of Special Scientific Interest (SSSI), and the proposed bypass route runs immediately adjacent to, and could possibly encroach upon this.

Three further SSSIs (Cuttie's Hillock, Findrassie and Spynie Quarry) lie between 600-700m to the north, and Loch Spynie SSSI approximately 1.2km to the north of the northern route option.

The countryside surrounding Elgin is protected by Local Plan Policy L/ENV11 (CAT: Countryside Around Towns) within which there is a presumption against development unless it involves rehabilitation, conversion, limited extension or change of use of existing buildings. However, although a bypass does not fall under this categorisation, a corridor of land required for each option has been identified and is protected.

The 'Lossie Corridor' is a 174ha area of land following the River Lossie through Elgin. The Local Plan states that this area is "the single most important environmental asset to the town". Policy ENV1 of the Local Plan states that development within this area will only be permitted where:

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The proposal is an extension of an existing use considered compatible with the environmental designation;

The proposal is for the re-use of existing premises considered compatible with the environmental designation; or

The proposal is directly linked to a new use of the area for civic purposes or public recreation that is considered directly compatible with the environmental designation.

The existing A96 to the west of Elgin runs through the Lossie Corridor, and the southern bypass option would pass through this area for approximately 350m before joining the A96. This would result in an estimated 7ha area of the corridor being severed, which is predicted to reduce both its ecological and amenity value. There would also be disruption during construction of the bypass.

### Landscape

Elgin lies on the edge of the Moray Coastal Plain, in a rural area characterised by flat to gently undulating lowland, usually rising no more than 100m, with more hilly areas visible to the south of the town. The 'Moray and Nairn Landscape Character Assessment 1998' (Scottish Natural Heritage, SNH) identifies the area as Coastal Plain, and as lying within 'Coastal Farmland' Landscape Character Area.

There are numerous fragmented areas of coniferous, broadleaved and mixed woodland. The River Lossie reaches the western boundary of Elgin from a southerly direction and meanders west-east through the town centre before flowing to the sea at Lossiemouth, approximately 14km downstream.

Elgin developed as a market town in the thirteenth century around the River Lossie, and much of the medieval town centre remains. The town has expanded considerably in recent years in both a northerly and southerly direction. The southern area of the town is known as New Elgin, and is where most of the land identified in the Local Plan for housing is located.

The road network from the town centre is radial in nature, with major roads A96 running east (Fochabers) to west (Forres), and the A941 running north (Lossiemouth) to south (Rothes). A railway runs roughly parallel to the A96, intersecting the town between the areas of Elgin and New Elgin.

There are no statutory or non-statutory landscape designations (such as National Scenic Areas or Areas of Great Landscape Value) that would be directly or indirectly impacted by the construction of the bypass.

### Visual Amenity

Elgin lies in an area of relatively gentle, low-lying topography, and as such any development may be visible over a long distance.

One of the objectives of the Local Plan is to "achieve more sensitive treatment of development sites on the edge of town". The housing boundary of Elgin has extended significantly in recent years, beyond that which is illustrated on the OS Base Map (Figure 1). In addition, much of the land between

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the southern and south-eastern areas of New Elgin in particular have been identified as suitable for housing development.

The most significant non-residential area within Elgin likely to be affected by the southern route option in terms of visual impacts is the Lossie Corridor, of high public amenity value, including a camping area/caravan park. The impact of the bypass on scattered rural properties not within Elgin but in the vicinity of the proposed bypass would also need to be considered during scheme design.

Much of the northern route option would be likely to be screened from properties in Elgin by existing planted areas. In particular, the route would run through Quarry Wood, an established coniferous woodland which would reduce the visual impact from the western and north-western outskirts the town. Similarly, screening is provided by a narrow strip of woodland running eastwards from the A941 along the edge of a recent housing development (not indicated on the OS map base Figure 1) as far as Linksfield Farm.

The areas of Linksfield Farm and Lesmurdie House to the north-west of Elgin are identified in the Local Plan as being suitable for housing development. The Local Plan requires that a 15m strip of woodland is planted along the boundary of any such development to provide screening.

After passing Lesmurdie House, the northern bypass route option runs a significant distance (0.6-1.0km) from the eastern outskirts of Elgin, characterised by industrial areas. The area of existing deciduous woodland north of Waulkmill would increase the visual screening of this section of the bypass.

The impact of the bypass on scattered rural properties not within Elgin but in the vicinity of the proposed bypass would also need to be considered during detailed scheme design.

Due to the open, gently undulating topography of the area, the design and location of the bypass has the potential to cause significant negative visual impacts. Road junctions can contribute significantly to this impact, and the principal junctions are likely to be those with the A96 west and east of Elgin, and with the A941 south of Elgin. Bridges would also be required over the River Lossie at approximate OS locations NJ203 614, NJ197 613 and NJ196 627, over the Inverness-Aberdeen rail line both east and west of Elgin, and at a number of minor roads and access tracks. In addition to these major elements, features such as road signs and any street lighting also contribute to the visual impact of a road development and should be considered during scheme design.

Roads should also be designed to reflect existing topography and keep sections of cutting and embankment to a minimum. This may prove difficult to achieve for the southern bypass, particularly due to the numerous bridges likely to be required over existing roads, railway line and watercourses. Landscaping can be used to help mitigate impacts on sensitive visual receptors, and as discussed previously (Noise and Vibration), a requirement of the Local Plan is that landscaping is used to provide planted tree screening along the boundaries of the new development sites. The SNH Landscape Character Assessment provides guidance on the road development in areas identified as 'Coastal Farmland'. In particular, it is recommended that to reduce the potential negative impact of new roads, care should be taken not to emphasise the road's presence through linear planting of tree and shrub screening where tree lines are not already a characteristic feature of the landscape.

### Agriculture and Soils

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The southern route would be approximately 7.0km in length, while the northern route would be approximately 8.3km in length. The majority of either route runs through agricultural land.



Assuming a uniform land-take throughout the length of the bypass options, the following, approximate, proportions of land types would be taken (as classified by the Macaulay Institute for Soil Research):

	Southern	Northern
Agriculture Class 3 <sub>1</sub> <i>(land capable of producing a wide range of crops)</i>	45%	0
Agriculture Class 3 <sub>2</sub> <i>(land capable of producing a moderate range of crops)</i>	48%	90%
Agriculture Class 4 <sub>1</sub> <i>(land capable of producing a narrow range of crops)</i>	7%	0
Agriculture Class 4 <sub>2</sub> <i>(land capable of producing a narrow range of crops)</i>	0	10%

Prime quality land is defined by the Scottish Executive as that which falls within Classes 1, 2 and 3<sub>1</sub>, and is a limited resource in Scotland.

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The routes pass through two main soil types:

*Aluvial soils.* Characteristic of flood plains, river terraces and former lake beds. Typical vegetation includes arable and permanent pasture, oak and birch, rush pastures and sedge mires. Approximately 25% of total route length.

*Humus-iron podzols; some gleys.* Characteristic of undulating lowlands, mounds and terraces with gentle slopes. Typical vegetation includes arable and permanent pasture, oak and birchwood, rush pastures and sedge mires. Approximately 75% of total route length.

In addition the northern route option passes through a third main soil type:

*Humus-iron podzols; some gleys and peaty podzols.* Characteristic of undulating lowlands and hills with gentle and strong slopes. Typical vegetation includes arable and permanent pasture, oak and birchwood, rush pastures and sedge mires. Approximately 40% of total route length.

### Cultural Heritage

The study of cultural heritage involves consideration of archaeological remains, listed buildings, conservation areas, historic gardens and designed landscapes, and other heritage designations. Potential negative impacts on cultural heritage sites may result from the direct or indirect effects of demolition or loss, damage, severance, effects on setting, increased noise, vibration or disturbance, and loss of amenity.

The Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) maintains the National Monuments Record of Scotland (NMRS), which contains information on archaeological sites, monuments, buildings and maritime sites. In summary, there are:

#### Southern Route Option

Within 50m:	1 feature	(NMRS NJ26SW135: Grid Ref NJ242 620)
51-100m:	0 features	
101-200m:	4 features	(NMRS NJ26SW138.01: Grid Ref NJ206 611) (NMRS NJ26SW159: Grid Ref NJ 227 611) (NMRS NJ26SW124: Grid Ref NJ 242 618) (NMRS NJ26SW135: Grid Ref NJ 242 620)
201-300m:	7 features	(NMRS NJ16SE67: Grid Ref NJ 196 616) (NMRS NJ26SW138.02: Grid Ref NJ 207 609) (NMRS NJ26SW138.00: Grid Ref NJ 208 609) (NMRS NJ26SW98: Grid Ref NJ 232 613) (NMRS NJ26SW86: Grid Ref NJ 240 621) (NMRS NJ26SW83: Grid Ref NJ 246 621) (NMRS NJ16SE64: Grid Ref NJ 192 626)

The closest known archaeological site is NMRS Site Number NJ26SW135, approximately 30m from the proposed route of the bypass, close to where it would join the existing A96 east of Elgin. It is categorised as a Linear Cropmark and possible Enclosure. As with most archaeological sites, buried

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archaeology associated with this may be more extensive than the visible surface features, and it is therefore highly likely that further archaeological features would be uncovered during construction of the bypass.

#### Northern Route Option

Within 50m:	5 features	(NMRS NJ26SW83: Grid Ref NJ 246 621) (NMRS NJ26SW132: Grid Ref NJ 245 631) (NMRS NJ26SW171: Grid Ref NJ 233 639) (NMRS NJ26SW81: Grid Ref NJ 219 646) (NMRS NJ26SW3: Grid Ref NJ 207 644)
51-100m:	1 feature	(NMRS NJ26SW105: Grid Ref NJ 247 629)
101-200m:	3 features	(NMRS NJ26SW190.01: Grid Ref NJ 247 620) (NMRS NJ26SW189: Grid Ref NJ 247 626) (NMRS NJ26SW170: Grid Ref NJ 229 642)
201-300m:	4 features	(NMRS NJ26SW184: Grid Ref NJ 240 636) (NMRS NJ26SW133: Grid Ref NJ 246 633) (NMRS NJ26SW169: Grid Ref NJ 229 645) (NMRS NJ16SE17: Grid Ref NJ 196 630)

None of the above identified archaeological features (for either route option) are classified as Scheduled Ancient Monuments. NMRS Site Number NJ16SE64 is a residential property known as 'The Bield' and is the only Listed Building within 300m. It is situated 300m from the western extent of the southern bypass option and is therefore unlikely to be significantly affected by the construction of the bypass. The majority of the remaining features are Enclosures, Cropmarks or Ring Ditches. Buried archaeology associated with these are usually more extensive than the visible surface features, and it is therefore highly likely that further archaeological features would be uncovered during construction of the bypass.

Local Plan Policy L/ENV12 (Archaeological Sites) advises that the Council will not permit development which would adversely affect significant archaeological sites (the significance of a particular site to be determined during consultation between the Council, Regional Archaeologist and other relevant bodies). Where new development is proposed which would affect nationally or regionally important sites, developers will be required to undertake an Archaeological Assessment, and in exceptional circumstances where preservation of archaeological features is not feasible, excavation and recording of the site will be required.

There are two Conservation Areas in Elgin (Elgin High Street and Elgin South). These have been designated to safeguard the built environment, in accordance with Policy L/ENV15 (Conservation Areas). The predicted reduction in traffic passing through the centre of Elgin as a consequence of provision of a bypass is considered to be a positive impact on these Conservation Areas.

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Appendix B – Preliminary Engineering Feasibility Assessment

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### Traffic Management Options

#### 1. Introduction

This report is a preliminary engineering feasibility assessment of the Outline Southern and Northern Routes for the proposed Elgin Bypass. The report is based on the routes shown on Moray Council drawings R/A96 T/ dated 25 March 1998. Other than these drawings, the main source of the information contained in the report was a one day site visit by the author. As there is no site specific information available at this stage, the only other source of information was readily available maps and reports including the Ordnance Survey 1:25,000 scale map and specialist geotechnical maps and costing publications.

The main aim of the assessment is to determine if the proposed routes are likely to be feasible from an engineering/technical point of view. Any significant potential problems associated with each route will be identified and a preliminary cost estimate will be provided for each route based on the information available at this stage.

#### 2. Assumptions

It is assumed throughout the report that the proposed bypass will be Single 7.30m All-Purpose (S2) with 1m hard strips as shown in Figure 6 in TD 27/96 of the DMRB. It is assumed that verges will be 3.5m wide as per the current standard cross section for the A96. It is assumed that all major design elements will be designed in accordance with DMRB (August 2002 version) with the possible exception of drainage where it is assumed that filter drains will be used on embankments as well as in cuttings. A design speed of 100kph has been assumed.

#### 3. Southern Route

##### Horizontal Alignment

The southern route follows a semi-circular alignment around the southern boundary of Elgin terminating in roundabouts on the A96 at Morrision Road to the West and Barmuckity to the East. Roundabouts are also proposed at a new road connecting to Edgar Road and at the intersection with the A941 Elgin-Rothes road. The total length of the bypass is approximately 6.2km. The horizontal alignment comprises curves in the range 750 to 2900 approximately and some straights, all of which are in accordance with DMRB for the assumed design speed of 100kph. Of these, approximately 1.7km is made up of non overtaking curves and 4.5km is made up of overtaking curves or straights. On the overtaking sections, Full Overtaking Sight Distance is likely to be available over a length of 2.8km for Westbound traffic and 1.9km for Eastbound traffic. This is broken into lengths of approximately 600-900m long. The available lengths with FOSD are constrained by the presence of roundabouts and crests on the vertical curvature. However an Overtaking Value of 30% as recommended in DMRB for this type of road (Assumed Category 2) should be achievable in both

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directions provided the vertical and horizontal alignment is designed carefully in accordance with the advice in 'Highway Link Design'.

#### Vertical Alignment

The existing topography along the proposed southern route is generally characterised by gently rolling to flat countryside. The route passes through minor hills near Moss of Barmuckity and Mayne Wood and crosses the minor valleys created by the River Lossie at three locations near the western end. No information regarding the proposed vertical alignment is available, but for the purposes of this report, a basic vertical alignment has been created. This indicates that it should be possible to achieve a vertical alignment which complies with DMRB requirements. Due to the relatively flat topography it is likely to be more economical to keep the vertical alignment as close as possible to the existing ground level with side roads being taken over the new bypass on overbridges where necessary. However, it is likely that the alignment will have to be raised on embankments up to approximately 8m high to cross the River Lossie (3No. crossings) and the Inverness-Aberdeen Railway line at the West end and for a further crossing of the railway line at the East end. The maximum cutting depth will be approximately 6m although there may be scope to increase cut depths to improve the cut/fill balance.

#### Obstructions, Features and Constraints

Starting at the West end of the proposed route, the following is a summary of the main features, obstacles and constraints encountered:

- Commences with at grade roundabout on A96 at Morriston Road
- Passes through caravan park
- First crossing of River Lossie
- Crosses Bruceland Farm Access –Overbridge required
- Second crossing of River Lossie
- First crossing of Inverness – Aberdeen railway line
- Crosses B9010 adjacent to existing houses – Underbridge required
- Third crossing of River Lossie
- Crosses Mayne farm access tracks adjacent to existing house – Overbridge required
- At grade roundabout with Edgar Road extension adjacent to existing house
- Passes through northern end of Mayne Wood
- Passes through Elgin Golf Course

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- Crosses Elgin – Birnie road – Overbridge or side road diversion required
- Passes through northern corner of Glassgreen Golf range
- At grade roundabout with A941 Elgin – Rothes road
- Crosses Burn of Linkwood – culvert required
- Crosses access track adjacent to Burn of Linkwood – Overbridge or access track diversion required
- Crosses dismantled railway – it is assumed no structure is required
- Crosses Linkwood Road – Overbridge required
- Crosses Burn of Linkwood – culvert required
- Second crossing of Inverness – Aberdeen railway line
- Passes under high voltage overhead power line
- Ties into existing A96 with at grade roundabout at Barmuckity – access onto roundabout or realignment required for Barmuckity side road.

#### 3.4 Structures

In summary, it is anticipated that approximately 13 structures will be required comprising 3No. River Underbridges and 2No. Rail Underbridges, 4No. Side Road/Access Track Overbridges, 2No. Side Road/Access Track Underpasses/Underbridges and 2No. culverts. The number and type of these structures, particularly those for side roads and access tracks will be dependent on the final vertical alignment and on the outcome of negotiations with landowners and other affected parties.

#### Geotechnical

The Southern Route passes through a region which is believed to be generally made up of sands and gravels overlaying sandstone. Without any site specific geotechnical information it is not possible to comment in detail on the geotechnical design of the route. However it would appear that the earthworks material on the site will generally be of good quality. It has therefore been assumed for the purposes of cost estimates that approximately 70% of the site-won material will be acceptable. The preliminary vertical alignment developed for the southern route results in approximately 100000m<sup>3</sup> of cutting and 520000m<sup>3</sup> of fill. It is anticipated that the balance could be improved with amendments to the vertical alignment although this cannot sensibly be done without more accurate topographical information.

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#### Drainage

Based on the preliminary vertical alignment prepared for the purposes of this report, the road should generally drain towards the River Lossie at the West end and Burn of Linkwood and the Existing A96 at the West End. No specific problems are envisaged although a more detailed investigation of the capacity of any proposed outfall locations would be required. Such an investigation may result in a requirement to provide attenuation ponds on some or all outfalls. It is assumed that normal SEPA requirements will apply in terms of pollution treatment. It has been assumed that filter drains will be used and these will assist in pollution reduction. Due to the likelihood of winning granular material on site, it is possible that an over-the edge drainage system without filter drains may be feasible on embankments. Burn of Linkwood passes through the Linkwood Distillery and further investigation would be required to determine if any special measures will be required to avoid pollution of this stream, particularly if it is used by the distillery.

#### 3.7 Potential Problems

Although the obstacles and constraints listed above will not cause significant technical problems, it is considered that several may impact on the feasibility of the southern route in other ways. These are described in more detail below.

##### 3.7.1 Impact on local amenities

The proposed southern route passes through a caravan park, Elgin Golf Course and the Glassgreen Golf range. The impact on the first two is more serious and would appear to be unavoidable without significant deviations from the proposed alignment. It may be possible to tie-in to the A96 towards the West end of the Eight Acres Hotel grounds thus avoiding the caravan park. However such an alignment would still be very close to the caravan park and may have a detrimental impact on the park in any case. It does not appear possible to avoid significant impact on the golf course within the southern route corridor.

The impact on these local amenities is considered serious and would require careful consideration and negotiation with the affected parties to avoid problems in scheme promotion.

##### 3.7.2 Edgar Road Roundabout

The proposed Edgar Road Roundabout is very close to an existing house. The proposed route to the West of this roundabout then passes very close to another house on the opposite side of the road, effectively passing between the two houses. It is suggested that consideration be given to moving the alignment at this location to the north of both houses and closer to Elgin, avoiding potential objections

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from the affected parties. Such a change to the alignment may also allow a straighter crossing of the River Lossie (third crossing).

#### 3.7.3 Structures

The southern route requires three crossings of the River Lossie and two crossings of the Inverness – Aberdeen railway. It appears unlikely that a diversion of the river to avoid the need for some or all of the river crossings would be feasible on cost, technical, hydraulic and/or environmental grounds, although further investigation could be carried out to confirm this.

Assuming that all five of these structures are required, they will add significantly to the overall cost and possibly construction timescale for the Southern Route.

#### 3.8 Cost Estimate

It is estimated that the construction cost of the Southern Route would be approximately £25m. This includes an allowance for scheme development and promotion with procurement through a Design and Build type contract. A provisional sum for service diversions has been included although no specific information is available at this stage to assess service diversion requirements accurately. The cost is made higher due to the number of structures required on the Southern Route, and also due to the poor earthworks balance. It is likely that there is scope to improve the latter with changes to the vertical alignment at a more detailed design stage. There was not scope within the remit for this report to carry out a detailed investigation of typical costs on recent similar projects for items such as traffic management, preliminaries and scheme promotion as such information is generally only available to the Scottish Executive or other client organisations. There is therefore a possibility of significant variations in the cost estimate. The cost estimate calculation is included as Appendix A.

#### 3.9 Summary for Southern Route

The Southern Route is considered at this stage to be technically feasible and there are no obvious insurmountable technical problems. However, a number of issues relating to impacts on local amenities (Caravan Park and Golf Course) and impacts on adjacent properties at Edgar Road roundabout have been identified which may affect scheme promotion and it is suggested that these issues need to be investigated prior to this route being taken forward. The number of structures required to cross the River Lossie and Inverness – Aberdeen railway line will add significantly to the overall cost of this option. It may be difficult to achieve a cut/fill balance on this route which would also make the construction costs higher.

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#### 4. Northern Route

##### Horizontal Alignment

The northern route follows a semi-circular alignment around the northern boundary of Elgin terminating in roundabouts on the A96 in Quarry Wood to the West and near Barmuckity to the East. Roundabouts are also proposed at the intersection with the B9012 Elgin – Hopeman road and the A941 Elgin – Lossiemouth road. The total length of the bypass is approximately 7.6km. The horizontal alignment comprises curves in the range 350 to 3000 approximately. Of these, there is a length of about 300m between Chainages 6500 and 6800 (Chainage starting at Inverness end) which has a radius of approximately 350m. This is below the desirable minimum radius for a 100kph design speed of 510m. There is also a length of 700m between Chainage 1900 and 2600 which has a radius of about 2400m which is not recommended in DMRB for the assumed design speed. Of the remaining sections, approximately 2.5km is made up of non overtaking curves and 3.8km is made up of overtaking curves. On the overtaking sections, Full Overtaking Sight Distance is likely to be available over a length of 2km in total made up of one section 700m long and one section 1300m long. This would give an Overtaking Value of 26% in both directions which is just below the recommended value of 30%. It should be possible to achieve the recommended 30% Overtaking Value within the constraints identified for this route. However it is important that below standard and non recommended curves are eliminated at an early stage.

##### Vertical Alignment

The existing topography along the proposed northern route is generally characterised by gently rolling to flat countryside. However the route starts towards the eastern end of Quarry Wood and will require a significant cutting through the Quarrywood hill to achieve permissible vertical gradients. Cuttings will also be required close to Linksfield and Kirkhill Wood. Over the remainder of the route it is likely that the route will follow the existing topography as closely as possible with side roads being taken over the bypass by means of overbridges. As with the Southern Route, no information regarding the proposed vertical alignment is available, but for the purposes of this report, a basic vertical alignment has been created. This indicates that it should be possible to achieve a vertical alignment which complies with DMRB requirements. The maximum cutting depth will be approximately 10m and maximum embankment will be approximately 7m.

##### Obstructions, Features and Constraints

Starting at the West end of the proposed route, the following is a summary of the main features, obstacles and constraints encountered:

- Commences with at grade roundabout in Quarry Wood

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- Significant cutting through wooded hillside of Quarry Wood
- Likely to remain in cutting to cross Brumley Brae – Overbridge required
- Comes out of cutting to at-grade roundabout on B9012
- Passes under High Voltage overhead cables and follows route of power line towards Lochside Road (name of road to be confirmed)
- Crosses Lochside Road – Overbridge required
- At grade roundabout with A941 Elgin – Lossiemouth road
- Crosses Linksfield Road – Overbridge required or alternative access arrangements to be made with affected parties
- Crosses dismantled railway - it is assumed no structure is required
- Crosses Pitgaveny Road – Overbridge required
- Crosses Wester Calcots access road – this will need to be diverted
- Crosses Calcots Road – Overbridge required
- Passes Eastern boundary of Kirkhill Wood
- Crosses River Lossie – bridge required
- Ties into A96 with at grade roundabout east of Barmuckity

#### 4.4 Structures

In summary, it is anticipated that approximately 6 structures will be required comprising 1No. River Underbridges and 5No. Side Road/Access Track Overbridges. The number and type of these structures, particularly those for side roads and access tracks will be dependent on the final vertical alignment and on the outcome of negotiations with landowners and other affected parties.

#### Geotechnical

Comments and assumptions for the Southern Route will also apply to the Northern Route. The only notable difference at this stage is that the Northern Route will have a much deeper cutting (Quarry Wood) where there is a possibility that rock will be encountered. (To be confirmed)

#### Drainage

Based on the preliminary vertical alignment prepared for the purposes of this report, the road is likely to drain towards existing roads at the A941 and Calcots Road and the A96 at both ends. Provided it is possible to connect to an existing drain or ditch from these roads, no specific problems are envisaged.

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The feasibility of outfalling at these locations requires further investigation if this route option is taken forward. General comments regarding pollution will be as per the Southern Route.

#### 4.7 Potential Problems

It is not considered likely that any of the obstacles and constraints listed above will cause significant technical problems. The only potential problem anticipated for the Northern Route at this stage is that it will cause significant negative impact on the Quarry Wood. This appears to be a popular local amenity, with several paths crossing the proposed route. Due to the proximity of the Wood to the town, it is not possible to provide a route which does not impact on the wood without a significant deviation from the proposed northern route corridor. Such a deviation would need to pass to the north and west of Quarry Wood and is outwith the scope of this report. However the potential impact on Quarry Wood, and options to avoid or mitigate this impact will need to be carefully considered if the Northern Route is taken forward.

#### 4.8 Cost Estimate

It is estimated that the construction cost of the Northern Route would be approximately £15m. Allowances and assumptions as per the Southern Route have been made. It is possible that the assumptions made in the calculations will slightly distort the cost estimate in favour of the Northern Route however this would require more detailed investigation. The cost estimate calculation is included as Appendix A.

#### 4.9 Summary for Northern Route

The Northern Route is considered at this stage to be technically feasible although there appear to be elements of the horizontal curvature which do not comply with DMRB for the assumed design speed. These non standard curves should be designed out at an early stage and it appears that this should be possible within the constraints identified for this route. No other insurmountable technical problems have been identified at this stage for this route. The only significant issue identified at this stage which may affect scheme promotion is the impact of the route on Quarry Wood. The Northern Route is likely to be significantly cheaper to construct than the Southern Route primarily due to the lower number of structures and a better cut/fill balance.

#### Conclusion

Both of the proposed routes for Elgin Bypass are considered to be technically feasible and capable of being designed to comply with DMRB. The estimated cost of the Northern Route is £15m which is cheaper than the Southern Route at £25m. The main reason for the cost difference is the number of structures and poor cut/fill balance on the Southern Route which override the saving made due to the

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shorter length of this route. It should be stated that there is likely to be room to improve the cut/fill balance on the Southern Route whereas the vertical alignment chosen for the Northern Route for the purposes of this report gives a good cut/fill balance and there is unlikely to be scope for improvements. It is also possible that the assumptions made for the cost estimate (e.g. those based on a percentage of construction cost) are likely to exaggerate the cost of the Southern Route although this would need to be confirmed by a more detailed investigation.

A number of issues have been identified on both routes which may impact on the promotion of the scheme. These are the impact on the Golf Course, Caravan Park and houses at Edgar Road Roundabout for the Southern Route and the impact on Quarry Wood for the Northern Route. These are not engineering problems and are likely to be considered in more detail as part of the environmental appraisal. However, it may be possible to eliminate some of these problems by changes to the proposed alignment and it is suggested that these issues be given early consideration should the bypass proposal be taken forward.

There would appear to be a number of non standard horizontal curves on the Northern Route which should be designed out prior to this route being taken forward.

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Annex A - Cost Estimate Calculations