Chapter 2 Scheme Description and Alternatives Considered

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Chapter 2 Scheme Description and Alternatives Considered

2.1 This Chapter presents a detailed description of the A1 to South East Northumberland Strategic Link Road: Morpeth Northern Bypass, which should be read in conjunction with the Design and Access Statement. This Chapter also provides a description of the evolution of the preferred route and the alternatives considered.

Scheme Description

Detailed Road Proposals

2.2 The bypass will comprise a 7.3 metres (m) wide single carriageway with a separate 2.5 m wide combined cycleway/footway. The road will be 3.8 kilometres (km) long extending from Whorral Bank on the A197, to the north east of Morpeth, westward to the A1 trunk road (see Figure 2.1 and the Scheme Proposals located in Scheme Design Drawing in Appendix 2.1). It is anticipated that the speed limit on the full length of the bypass will be 60 mile per hour (mph), conforming to the national standard for a road of this type. In accordance with this standard, access will be limited, thus junctions onto the bypass will be of the roundabout type and include:

- The completion of the fifth leg to the existing Whorral Bank Roundabout where the A197 meets the B1337;
- Further west, access will be afforded off a new roundabout for the St. George's development;
- An at-grade roundabout with the existing A192 at Northgate, and finally; and
- A grade separated dumbbell roundabout onto the A1.

2.3 The St. George's roundabout has three legs, with the southerly one providing an access point for the St. George's development site.

2.4 The roundabout on the A192 at Northgate caters for both east-west and north-south traffic along with a fifth leg to accommodate an access point to the proposed light industrial site. West of the roundabout two bus lay-bys, one in each direction, will be included in anticipation of servicing the employment site.

2.5 At the intersection of the bypass with the A1 trunk road a grade separated dumbbell roundabout junction will be constructed to provide access and egress, via slip roads, in all directions. As a result, the existing northbound merge and southbound diverge slip roads, to and from the A192 at Fairmoor, will be closed.

2.6 A 2.5m wide segregated combined cycleway/footway will be provided for the complete length of the bypass, located at the top of the cutting or toe of the embankment, within a landscape zone on the south side of the road. The new track will connect to the existing network of roads and footpaths including at each roundabout, where the cycleway/footway will be provided around the junction with crossing points on splitter islands to provide a continuous route. In conjunction, on the A192 from the town centre

northwards, it is proposed that the existing wide single carriageway will be remarked with cycleways in each direction and the cycleway continued northwards through Fairmoor to the A697.

2.7 This impact assessment and ES is based on the design drawings provided in Appendix 2.1, which include:

- HE092631/0/A197/01/56 - Site Set-Up and Bulk Earthworks Strategy; - This drawing indicates the proposed haul routes, potential site compounds, areas of temporary soil storage and areas of cuttings and embankments;
- HE092631/0/A197/01/67 - Proposals for Public Rights of Way and Other Paths (2 sheets); - This drawing shows the proposed cycle/footway network to be created as part of the Scheme, as well as details of the proposed permanent diversions of existing footpaths and public rights of way;
- HE092631/0/A197/01/80 - Scheme Proposals Drainage Networks and Key Plan; - This drawing shows an overview of the Scheme drainage strategy;
- HE092631/0/A197/01/07 - Scheme Proposals; - This drawing shows a general overview of the Scheme;
- HE092631/0/A197/01/84 - Environmental Strategy; - This drawing indicates the Scheme environmental strategy including existing and proposed landscape and ecological features, as well as specific proposed mitigation measures;
- HE092631/0/A197/01/85 - Typical Cross Sections; - This drawing shows a typical cross section of the road, both where the footway/cycleway is adjacent the carriageway and where it is set away from the carriageway. The sections indicate road widths, slope angles and typical planting;
- HE092631/0/A197/01/93 - Construction Outlines; - This drawing shows the outline of various construction activities such as earthworks and compound areas;
- HE092631/SL/0027/ENV - Preliminary Lighting Proposals; - This drawing shows the preliminary lighting strategy for the scheme showing areas of likely street lighting and typical street lighting column types;
- HE092631/2/A197/B3/07 - Cotting Burn Bridge General Arrangement; - This drawing shows the proposals for the Cotting Burn Structure indicating its size, scope, and nature in section;
- HE092631/2/A197/B5/16 - How Burn Wood Bridge General Arrangement; - This drawing indicates the proposals for the How Burn Wood Structure indicating its size, scope, and nature in section;
- HE082631/2/A197/B2/02 – St. Leonard’s Underpass Plan Layout and Details; - This drawing shows the proposals for the St. Leonard’s Underpass Structure indicating its size, scope, and nature in section;
- HE092631/2/A197/B8/01 - West Lane End Farm General Arrangement; - This drawing shows the proposals for the West Lane End Farm Agricultural Underpass Structure indicating its size, scope, and nature in section

- HE082631/2/A197/B4/07 - Fulbeck Lane Bridge; - This drawing shows the proposals for the Fulbeck Lane Structure indicating its size, scope, and nature in section;
- HE092631/0/A197/01/51 - Northgate Roundabout Potential Traffic Management Phasing; - This drawing shows the potential traffic management arrangements which will be employed during the construction of the Northgate roundabout, including durations, temporary speed restrictions and coordination with site activities;
- HE092631/0/A197/01/57 – St. Leonard's GSJ Construction Traffic Management Phases; - This drawing shows the potential traffic management arrangements which will be employed during the construction of the St. Leonard's Underpass including durations, temporary speed restrictions and coordination with site activities;
- HE0926321/0/A197/01/130 - Traffic Management During Construction; - This drawing shows the overall wider traffic management arrangements anticipated during construction, including diversion routes required during the closure of Fulbeck Lane, restrictions on St. Leonard's Lane and restrictions on Whorral Bank; and
- HE092631/0/A197/20/01 - Public Utilities Apparatus. - This drawing shows the locations of utility company apparatus in the vicinity of the Scheme and details of necessary diversionary works required to construct it.

Structures

2.8 There are five structures along the route of the bypass:

- **St. Leonard's Grade Separated Junction** - An interchange at the west end of the bypass where an underpass takes the link road beneath the existing A1 between the roundabouts of the grade separated junction. This structure will be a 15m span deck supported by reinforced earth abutments. The A1 highway to be supported has an overall width of 25m consisting of 7.3m wide dual carriageways, 4.5m central reserve and 2.5m wide verges;
- **West Lane End Farm Stock Underpass** - A 4.5m span buried corrugated steel structure to act as an accommodation facility to allow farm animals to pass under the proposed bypass;
- **Cotting Burn Bridge** – A structure to carry the Cotting Burn through an approximately 10m high embankment that supports the proposed bypass. The structure form is a corrugated steel arch resting on concrete walls supported on a reinforced concrete base slab (with a sunken invert) that is in turn supported on bored concrete driven piles. Overall length of the structure is 58.4m;
- **Fulbeck Lane Bridge** – A 27m span bridge to carry a minor road over the proposed bypass at a skew angle of 45 degrees. The bridge deck consists of two principle steel beams supporting a composite deck construction on abutments formed of contiguous bored piles and capping beams; and
- **How Burn Bridge** - A structure to carry the How Burn through a 10m high embankment that supports the proposed bypass. The structure form is a buried

corrugated pipe, 8m span, supported on a reinforced concrete sunken invert. Overall length of the structure is 51m.

Drainage

2.9 The road will primarily be drained using over edge drainage and swales (lined in groundwater vulnerable locations) to existing watercourses. Kerbs and gullies will be used at the roundabouts. Swales will be used to help improve the quality of the runoff before discharge into watercourses. In order to limit discharge into the watercourses to the equivalent of green field runoff, a sustainable method of discharge will be employed using ponds, as shown at St. George's and Pegswood Moor, and an open grassed drainage channel off St. Leonard's Lane into a pond then on to Benridge Burn.

2.10 The proposed road scheme will require the crossings of Cotting Burn, Fulbeck Lane, How Burn, and a tributary of How Burn (See Figure 13.1). However, detailed design for the crossings of Cotting Burn and How Burn has been carried out taking into consideration potential environmental effects.

2.11 The Cotting Burn and How Burn bridge structures have been described above. These have been designed to allow the creation of a natural river bed and to maintain natural banks either side of the watercourse. The corrugated steel buried structure has been designed to allow bats to fly through. Mammal ledges have also been provided. It is also proposed to realign a short stretch of How Burn to the north of the alignment, which will shorten the length of the required structure. Habitat improvement will also be carried out along the realigned watercourse, with deepening of the channel and "natural" banks formed using willow spiling. The foundations for both structures will be piled.

2.12 Two minor watercourses crossing the route of the proposed bypass will be accommodated with large drains: the stream flowing from the former opencast quarry and the stream near St George's roundabout.

2.13 In addition, a number of new outfalls will be required. These have been summarised in Table 2.1.

Table 2.1 Proposed Outfalls

Outfall Number	NGR	Catchment	Outfall Purpose	Receiving Water
1	NZ 174 870	1	Road drainage from the A1 junction. Outfall via drainage ditch starting at Leonard's Lane.	Benridge Burn
2	NZ 186 870	2	Road drainage from the section east of the A1 junction to Northgate roundabout and from the A192.	Cotting Burn Tributary
3	NZ 187 872	3	Road drainage from Northgate roundabout to St. George's roundabout.	Cotting Burn
4	NZ 193 875	4	Road drainage from St. George's roundabout to just east of How Burn.	Fulbeck
5	NZ 206 874	5	Road drainage from just east of How Burn to Whorral Bank roundabout.	How Burn Tributary

2.14 The scheme proposes sustainable drainage measures to treat and attenuate road runoff. Runoff from the proposed bypass will be drained predominantly into grassed swales running alongside the carriageway and only into pipes where there are restrictions on the use of swales. Swales will be 1.5m wide, 400 millimetres deep and semi-circular in shape and lined within a clay-rich soil matrix in those locations where groundwater is vulnerable. Most of the swales will convey the flow towards the outfall. However, in certain locations drainage will flow to larger storage/carrier ditches (Benridge Burn and St. George's). Kerbs and gulleys will be used to collect the runoff at the roundabouts and the slip roads will be drained over the edge into filter drains. Both will be piped to the necessary outfall or ditch. Chambers with sumps (catchpits) will be used on piped sections and at the end of swales (where runoff has to be drained into another ditch or piped section) to trap particulates.

2.15 Road runoff will drain via the initial collection and storage into purpose built drainage ditches, settlement (dry) ponds, or wet ponds (or combination of) prior to outfalls to receiving watercourses, except road catchment 3 where it is not possible to provide a pond. Table 2.2 summarises the treatment to be provided for each outfall.

Table 2.2 Proposed outfall location and purpose (please also refer to Figure 13.1)

Outfall Number	NGR	Catchment	Treatment	Receiving Water
1	NZ 174 870	1	Runoff will be collected by swales adjacent to the carriageway which will discharge into a new drainage ditch to convey flows across green fields to an outfall to Benridge Burn. An overspill storage pond (grassed/dry pond) will be located close to this outfall to attenuate flows during flood events.	Benridge Burn
2	NZ 186 870	2	Road runoff from the new road will be collected by swales and runoff from new Northgate roundabout and existing A192 by kerb and gullies. Flows will be carried towards the existing highway drainage. Outfall from the existing manhole into Cotting Burn tributary will be via a dry overflow basin with measures to reduce mobilisation of sediments.	Cotting Burn Tributary
3	NZ 187 872	3	Road runoff from Northgate Roundabout will be collected by kerbs/gullies and conveyed via a grassed swale before discharging into Cotting Burn. Sumps will be located at strategic locations to assist with the removal of particulates.	Cotting Burn
4	NZ 193 875	4	Runoff, collected by swales, from the east of St. Georges Roundabout will drain into a wet pond before discharging into Fulbeck. Runoff from St. Georges Roundabout will drain via the pond also.	Fulbeck
5	NZ 206 874	5	Grass swales will convey road runoff to a new dry overflow basin north of the bypass which will discharge treated flows back under the road and via the existing wet pond into the tributary of How Burn.	How Burn Tributary

Landscaping

2.16 Landscaping measures will be implemented to mitigate the effect of the road on the surrounding environment and enhance the biodiversity of the area.

2.17 Sections of the road are set into cutting to reduce the effect of moving traffic upon the visual amenity and tranquillity of the area. False cuttings will be created to the northwest of Lancaster Park and to the northwest of Fulbeck to screen the road from residential properties.

2.18 Significant areas of woodland, tree, shrub and hedgerow planting will integrate the road and the associated structures into the surrounding landscape. The planting mixture has been devised to increase the visual and ecological diversity of the existing landscape. Where visual screening is a primary consideration a percentage of evergreen species will be included in the mix. Native species of local provenance will be used throughout the scheme.

2.19 Hedgerows, with hedgerow trees, will be planted along all new highway boundaries. Over time, these will provide screening, re-establish the field pattern, improve the connection between habitats, integrate the road and enhance the landscape character of the open arable farmland and the recently restored opencast coal site.

2.20 New ponds, swales and ditches created as part of the proposed sustainable drainage system will be enhanced by the use of suitable species rich grassland mixes and native marginal plants to increase the biodiversity of the area.

2.21 To compensate for the loss of semi-improved and improved grasslands, appropriate species rich grass and flora mixtures will be sown on roadside verges and embankments throughout the length of the proposed scheme. The mix will be selected to reflect the nature of the surrounding landscape and the existing ground conditions.

Street Lighting and Signs

2.22 The Street Lighting design has not yet been finalised. Street lighting will be designed to be as inconspicuous as possible and will only be placed where required by best practice. It is anticipated that the lighting will be LED based. Street lighting on the bypass is to be provided only at the junctions and exceptionally between Northgate and the A1. Lighting is also proposed on the existing A192 to link up Fairmoor, Northgate Roundabout, Fulbeck and Morpeth. To minimise light spill and glare all new lanterns will be of the cut off type.

2.23 Northumberland County Council's (NCC) street lighting asset accounts for a significant share of its carbon footprint and, along with rising energy costs, it is important to look at how new technology is making lighting installations more energy efficient. Therefore, it is proposed to consider dimmable lighting units which would significantly reduce the energy consumption at night when traffic volumes are low.

2.24 It is anticipated that all traffic signing on the trunk road will be required to be mounted on passive posts. Although NCC has no specific policy as yet, for consistency it is proposed that passive posts will be used throughout the bypass. A major re-signing exercise on the principle road network will be required due to road re-numbering.

Accommodation Works

2.25 The highway boundary will consist of a double row of hedgerow plants with intermittent hedgerow trees. On the field side a fence will be erected as a temporary demarcation until the hedge has matured. As far as possible, field access off the bypass will be avoided. Preferably, access will be provided through inter-field connections with the provision of new access tracks if necessary. Where land is severed, negotiations will be undertaken with a view to minimising the effect on local agricultural business. Ultimately this could lead to the provision of an agricultural access underneath the road (West Lane End farm) with a resultant reduction in compensation.

2.26 There are a number of existing utilities, particularly in the Northgate area, which require diversion. The most significant being the diversion of a large 36" diameter potable water main, in fields east of Cotting Burn on East Lane End Farm land.

Public Rights of Way

2.27 Public Footpath No 9, in the parish of Hebron, currently runs across Cottingwood Common heading north and intersecting with the unnamed road 200 m west of How Burn. The footpath crossing with the bypass will be at-grade.

2.28 Public Footpath No.13, in the parish of Mitford, is affected by the scheme where the southbound merge and northbound diverge slip roads join the A1 trunk road. It is proposed that the footpath crossing is closed. However, it would be safer if pedestrians could cross the A1 through the proposed St. Leonard's grade separated junction underpass, and thus to this end a replacement footpath connection is to be created from Lancaster Park to the new junction and then further west to link up with St. Leonard's Lane.

Minor Works in Fairmoor

2.29 On completion of the bypass and works on the A1 trunk road, it is intended to improve road junction arrangements in Fairmoor once the A1 trunk road traffic has been permanently diverted.

Waste and Recycling

2.30 Where possible, excavated materials from the proposed scheme will be re-used on site. Currently, it is intended that all surplus material will be re-used on site as part of the proposed landscape mitigation bunds. It is currently believed that surplus material is suitable for use, although this will be confirmed prior to commencement of any site works.

2.31 The recycling of material on site will be carried out in accordance with relevant UK waste legislation. A Site Waste Management Plan (SWMP) is included in Appendix 17; this will be developed further prior to commencing any works on site. Although topsoil/subsoil is not significantly affected by contamination (See Chapter 14 for more details), it would be preferable if materials derived from the Pegswood area remained in the Pegswood area, and materials from the A1 St Leonard's Junction embankments stayed in the St Leonard's approach embankments, in order not to diminish the quality of the greenfield areas. If additional hydrogeological risk assessment is required this will be carried out at the appropriate time to inform earthworks.

Utilities

2.32 As part of the proposed scheme a number of utility services will require diverting. A comprehensive consultation exercise was carried out in 2008 with utility service providers to determine the scope of utility work required.

2.33 Drawing HE092631/0/A197/20/01 in Appendix 2.1 illustrates the utility services that require works. In summary these are as follows:

- Diversion of a fibre-optic cable service (in duct) from the east verge of the A1 Trunk Road to down and up the east slip roads of the St. Leonard's Junction and around the St. Leonard's East Roundabout;
- Diversion of the apparatus (in ducts), both fibre-optic and copper, from both verges of the A192 to accommodate the Northgate Roundabout. However an option to maintain the services on their existing line has been reserved;
- A temporary diversion, during the construction period, of a single ducted service to Kater Dene;
- Diversion of a fibre-optic cable (in duct) from the west verge of the A1 Trunk Road to down and up the west slip roads of the St. Leonard's Junction and around the St. Leonard's West Roundabout;
- Lowering of a pumped foul sewer adjacent and to the west of the Northgate Roundabout ;
- Lowering/diversion of a 36" diameter potable water main, in fields east of Cotting Burn on East Lane End Farm land;
- Temporary diversion, during the construction period, of a single minor water main servicing Kater Dene;
- Diversion of a 335 mm diameter medium pressure gas main within the east verge of the A192 to accommodate the Northgate Roundabout;
- Pole relocation of high voltage overhead services to accommodate the St. Leonard's Junction slip roads;
- Alterations to high voltage underground services to accommodate the St. Leonard's Junction slip roads;
- Alterations to a high voltage overhead service to accommodate the bypass in the vicinity of the How Burn Bridge embankment;
- Adjustments to the pole cable stays for an existing electrical service adjacent Fulbeck Grange; and
- Temporary diversion, during the construction period, a single low voltage cable servicing Kater Dene with the permanent diversion through the Fulbeck Lane Bridge deck.

Management of Utility Diversions during Construction

2.34 It is intended that procurement of the required utility diversions through the NRWSA process will be carried out by NCC, but that all responsibility for the management, accommodation and programming of the utility diversions will be passed to the main contractor. The main contractor will be responsible for the protection of all services within the site during the construction period and compliance with any special restrictions imposed by the relevant utility company. Maintenance of service continuity and the

provision of any necessary temporary supplies during the construction period will by the responsibility of the relevant utility company. Diversions may be carried out wholly by the utility company or partly by the contractor (i.e. duct laying only), any agreement such as this will be to the satisfaction of the utility company. Should funding and the nature of the diversion allow, utility diversion works will be undertaken in advance of the main contract, however responsibility for the management, accommodation and programming of any advance works will still lie with the main contractor. Some diversions are task related and cannot be carried out in advance, such as the telecommunications diversions to the St. Leonards slip roads.

Development Parameters

2.35 Although it is not anticipated that there will be any major modification to the scheme as presented on the scheme plans in Appendix 2.1, there remains the possibility of minor refinements to the design as it is developed further for construction. So that the Environmental Statement (ES) has taken the possibility of such changes into account the EIA has been based on the application of maximum and, where relevant, minimum parameters. The technical assessments have assessed an 'envelope' within which the works will take place. However, to remain in accordance with the Environmental Impact Assessment (EIA) directive and regulations these parameters are as 'tight' as possible to ensure that the 'likely significant effects' are identified, rather than unrealistically amplified effects, which could be deemed to be unlikely. This approach has been established in case law and is the subject of a guidance note from the Planning Inspectorate (Advice Note Nine: Rochdale Envelope. Republished April 2012).

2.36 The following table (Table 2.3) describes the parameters. The parameters that affect each technical assessment will form the topic specific 'basis of the assessment'. Each technical chapter of the ES will confirm if each of the elements is likely to influence the assessment of likely significant effects, and if so, how the information has been taken into account in the assessment. Any assumptions applied in reaching a 'realistic worst case scenario' have also been highlighted.

Table 2.3 Basis of Assessment

Development Parameter	Description of Parameter
Red Line Boundary	The Red Line Boundary sets out the complete area of land that will be affected by the permanent and temporary works. The boundary is unlikely to change. The red line boundary is shown on the Figures contained in Appendix 2.1.
Vertical Road Alignment	The fixed vertical road alignment is based on 100 kilometres per hour (kph) DMRB design speed and has been designed to maximise benefit of cuttings to mitigate noise and visual intrusion where possible. The scheme has also been designed to balance cut and fill volumes to minimise landfill volumes as far as is practicable
Horizontal Road Alignment	The fixed horizontal road alignment is based on 100kph DMRB design speed.
Number of carriageways	The scheme has been designed as a single carriageway 'A' road and has one lane in each direction.
Location of roundabouts	Roundabout locations are set and have been positioned to aid future potential development areas. The Northgate roundabout has been specifically designed to minimise disruption due to construction and the St. George's Roundabout has been positioned to accommodate future development in this area.
Area of development	This will not extend beyond the Red Line Boundary.
Volume of earthworks	The volume of earthworks is set by the horizontal and vertical alignment and the anticipated angle of earthworks slopes. The scheme is designed to balance cut and fill volumes to avoid excessive landfill as far as practicable. Volumes could be reduced by steeper cut and fill slopes which would reduce land requirements but only if costs did not increase and if cut fill balance could be maintained.
Footprint of earthworks	The footprint of earthworks is also set by the horizontal and vertical alignment and the anticipated angle of earthworks slopes. The footprint could be reduced utilising the same methods detailed above. The areas of earthworks proposed for noise and visual intrusion mitigation only (false cuttings) and tree planting at the north of How Burn Wood on Pegswood Moor may have some scope for amendment if proposed mitigation measures are not affected.
Height and angle of repose of embankments	The embankment heights are set by the vertical alignment and the angle of repose is currently set by the anticipated natural soil angle. However should a construction technique allow steeper angles (without increasing costs or altering the cut fill balance) then this will be considered.
Depth of cuttings	Depth of cuttings is set by the vertical alignment.
Landscape planting	The areas of landscape planting have been designed to help mitigate the effects of the scheme. There may be some scope to change the planted species if such a change would not affect the purpose of the area concerned.
Arched Structure design – type, diameter etc.	The appearance and size of the arched structures has been agreed with the Environment Agency (EA). Construction material changes may be considered subject to further EA approval, but the size and general appearance is unlikely to change.
Location, type and volume of SUDS	The majority of the drainage system is designed using SUDS techniques. The method of collection of surface water runoff is set, however the location and type of flood storage solutions may be altered subject to Red Line Boundary constraints. The drainage systems must be able to accommodate a 1 in 100 year return period storm without allowing additional water into the existing watercourses as per EA requirements.
Location of surface water outfalls	The watercourses which will accept the surface water runoff have been determined, however, the exact location of each outfall is flexible subject to Red Line Boundary constraints and land owner negotiations.

Development Parameter	Description of Parameter
Route of replacement Public Rights of Way (PRoW)	With one exception affected PRoW and footpaths have only been slightly diverted to allow safe crossing of the bypass where the two routes intersect. The exception to this is Public Footpath 13 (PF13) which is being diverted from an at-grade crossing of the A1 to go safely through the proposed St Leonard's Underpass. This is being done because the existing crossing point is affected by the proposed slip roads making the crossing more dangerous. An opportunity to make the crossing safer has therefore been taken.
Cut and fill balance	Earthworks are set for a cut fill balance. Any alterations to earthworks should ensure the balance is maintained. If during construction a surplus is produced locations have been identified within the Red Line Boundary where the excess material can be placed without increasing the volume taken to landfill.
Lighting – location, type, number, and height of lighting columns	The Street Lighting designed has not yet been finalised. Street lighting will be designed to be as inconspicuous as possible and will only be placed where required by best practice. It is anticipated that the lighting will be LED based. Discussions with the highway authorities are continuing in an effort to produce the best least intrusive lighting design. It is envisaged that lighting will be installed at St. Leonard's Junction, Northgate roundabout and the link between the two. Assessments are continuing as to whether St. George's roundabout will require lighting. (see HE092631-SL-0027-ENV Preliminary Lighting Proposals)
Bridge, large structure designs	The St. Leonard's Underpass is a pre-stressed concrete deck with reinforced earth retaining walls. The HA are required to approve the design and therefore there is limited opportunity for this structure to change.
Changes to the provision for pedestrians and cyclist	Existing pedestrian routes are unchanged with the exception of a slight diversion to follow the A192 when accommodating the location of Northgate roundabout. There is a new cycleway and footway that runs approximately parallel to the bypass in line with the Council's ambition to promote healthy exercise. There is scope for this to change slightly but as it is to be built on top of the proposed construction haul road it is anticipated that this will be limited and may only affect crossing points.
Vehicle speed rating for the bypass	Set at 60 mph (derestricted for type of road) to maximise benefits that can be realised by use of the road.
Gradient	Road gradients are set by the vertical alignment. See above.
Road surface characteristics	The surface course of the carriageway is to be of a negative texture type.

Transport Assessment

Introduction

2.37 A Transport Assessment was prepared by AECOM (Morpeth Bypass Transport Assessment, 2011) in support of a planning application for the A1-South East Northumberland Strategic Link Road-Morpeth Northern Bypass.

2.38 Traffic modelling was completed in 2011 and was subject to detailed audit by the Department for Transport prior to approval. Assumptions made in respect of future year developments (scale, timescales and planning status) were subject to particular scrutiny. In addition, central, optimistic and pessimistic model scenarios have been developed and assessed to understand the sensitivity of scheme benefits to different planning assumptions. On that basis there is a good level of confidence that the model outputs provide a robust appraisal of future year traffic network conditions.

2.39 The Transport Assessment was prepared in accordance with Guidance on Transport Assessment (DfT, March 2007) and following discussions with the development control officers at Northumberland County Council.

2.40 The Transport Assessment determined the effect of the implementation of the scheme on both local roads and at the new junctions proposed as part of the scheme. The following text provides a summary of the Transport Assessment.

2.41 In addition to this summary of the Transport Assessment, Chapter 11 assesses the effects of the bypass on Non-Motorised Users (NMU's), i.e. pedestrians, cyclists, equestrians, as well as effects on the wider community and Chapter 12 assesses the effects on vehicle travellers arising from the construction and operation of the bypass.

Existing Conditions

Strategic Network

2.42 South east Northumberland is reasonably well served by the strategic road network as follows:

- A1 (running north to south) to the west;
- A189 (running north to south) to the east; and
- A19 (running east to west) to the south.

2.43 Despite the extensive highway network, traffic movements in South East Northumberland are somewhat limited in an east west direction to the north of Morpeth, resulting in traffic having to use Morpeth town centre as a through route between the A1 in the west and the old mining towns to the east.

Morpeth Town Centre

2.44 The situation in Morpeth town centre is somewhat exacerbated by poor access arrangements from the A1. To the south of Morpeth, 4 km from the town centre, a junction to the A1 is provided from the A197 at Clifton. This junction however, only permits the northbound diverge and southbound merging movements. To the north of Morpeth, also 4km from the town centre, is an additional junction onto the A1. Whilst the northbound access and southbound egress are relatively straightforward, the northbound egress and southbound access movements are only facilitated by an unsatisfactory right turn facility on the slip road to the A697. As a result of these poor access arrangements, traffic often leaves the network early and travels through the centre of town.

2.45 Traffic movements in Morpeth town centre are constrained by the River Wansbeck, with only one major crossing point at the A197 Telford Bridge. Whilst vehicle actuated signals have recently been installed at junction to be installed at the junction of the A197 and Bridge Street to facilitate a supermarket development at Low Stanners, the junction will still be operating at capacity in the future.

2.46 To the south of Telford Bridge is Mafeking roundabout, which connects the A197 and the A192, two key radial routes into the centre of Morpeth. This junction currently exhibits high levels of congestion with queues on the three main approaches to the junction.

2.47 The traffic congestion which is clearly evident in Morpeth town centre is detracting from the market town feel of the local area. With parts of the current highway network already operating at capacity, it is difficult to see how Morpeth town centre will accommodate any future growth in traffic levels. Given the urban constraints on the transport network, there is little scope for geometric improvements to problematic junctions.

Accidents

2.48 Accident analysis has determined that whilst the majority of accidents in the locality are slight in nature there are a number of serious and fatal accidents on key radial routes into Morpeth and on the A1 trunk road. Of particular concern is the distribution of accidents, which highlights the Warrener's House junction as an issue. The current arrangement of this junction sees the A697 merge onto the southbound carriageway of the A1 within 200m of the diverge off the A1 onto the A192 at Morpeth. The weaving movement which takes place under this layout is effecting on the frequency of accidents in this location. This situation will be improved with the new A1 grade separated dumbbell junction, which is proposed as part of the proposed bypass (see paragraphs 2.47 to 2.52).

Scheme Effects and Benefits

2.49 The do something scenario with the proposed bypass in place affords a number of development opportunities that would not be possible in the 'do minimum scenario'.

2.50 The bypass will enable the development of the St. George's Hospital site by providing a dedicated roundabout access onto the proposed route. This site has been earmarked for close to 1000 houses split into three phases. Without the bypass in place, only phase 1 of the development will be permitted due to traffic constraints in the centre of Morpeth.

2.51 The proposed bypass will also improve access to housing and employment land at Fairmoor and Northgate. The new junction with the A1, the proposed link onto the A192 and the new Northgate Roundabout will significantly improve access to the proposed sites enhancing the viability of these developments.

2.52 Following construction of the scheme, it is highly likely that further developments will come forward which would not be considered feasible without the new route in place.

2.53 The scheme will affect traffic flows, accidents, non-motorised users and public transport.

2.54 The following section details the likely effects of the proposed scheme on all road users.

Traffic Flows

2.55 One of the principal objectives of the proposed bypass is to reduce traffic levels in Morpeth town centre. Traffic modelling work has shown that traffic levels entering and exiting Morpeth town centre will reduce by approximately 20% with the implementation of the proposed scheme. Analysis of the traffic model has shown that traffic diverts from the town centre onto the proposed bypass and uses the A1 as a more direct route into Tyne and Wear. Traffic originating in Ashington sees particular benefits from the proposed bypass when accessing employment opportunities at Fairmoor. There is also a slight reduction in traffic using the A189 Spine Road, which has a direct effect on delay and journey time reliability along this route.

2.56 As with any new highway scheme, the construction of the proposed bypass is likely to lead to new trips being created as a result of increased capacity on the highway network. The effect of induced/generated traffic has been modelled using a freestanding variable demand modelling process which was developed by AECOM and used in previous work with the approval of the Department of Transport (DfT). The matrix totals from this model however, show that the extent of suppressed demand in the Morpeth traffic model is minimal, with only slight increases in the matrix totals of less than 1% in 2015 and between 1-2% in 2030.

Accidents

2.57 The reduction in traffic levels in Morpeth town centre is expected to have a positive effect on road traffic accidents in this location. As part of the best and final bid for DfT funding

for the proposed bypass, the potential for accident reduction has been modelled in COBA. Accident costs/benefits are calculated in COBA by assigning accident rates to road and junction types and comparing the results of the do minimum and do something networks. This analysis has shown an overall net benefit in accident costs as a result of the proposed scheme of over £1 million.

Non-Motorised Users

2.58 As well as the quantifiable benefits identified above, the proposed scheme is expected to increase the numbers of people walking and cycling in the area through the addition of a shared cycleway/footway the entire length of the route. The effect on pedestrians, cyclists, equestrians, and community effects (i.e. non-motorised users) is fully assessed in Chapter 11.

2.59 An additional section of footpath will also be created from Lancaster Park to the new A1 junction and then further west to link up with St. Leonard's Lane, as part of the diversion of Public Footpath (PF) 13. Increased levels of walking and cycling as part of the daily routine can have significant benefits for a person's health. Increasing physical activity will lead to a reduction in healthcare and social care costs, improve mental well-being, lead to greater productivity and reduce sickness absence rates from work.

2.60 Although new cycleway/footway facilities will be introduced into the Morpeth area as a result of the proposed scheme, the construction of the proposed bypass will also affect existing facilities. However, to ensure that the effect of the proposed bypass is minimal, mitigation measures from been incorporated into the scheme design as summarised below:

- Public Footpath No.9, located in the parish of Hebron, currently runs northwards across Cottingwood Common and intersects with an unclassified road 200m west of Howburn. The footpath will be maintained by crossing the proposed bypass at grade; and
- Public Footpath No.13, located in the parish of Mitford, is affected by the scheme where the southbound merge and northbound diverge slip roads join the A1 trunk road. The existing crossing point over the A1 trunk road will be relocated approximately 200m further north, beneath the A1, through the proposed grade separated junction, to remove the at grade crossing on the A1 trunk road.

Public Transport

2.61 Whilst the proposed bypass will not provide any additional public transport services as a direct effect of its implementation, the operation of bus services in Morpeth town centre will benefit from the expected reduction in traffic levels. This will lead to better reliability of services and reductions in journey times, which will improve the attractiveness of the bus as a mode of transport. Local public transport operators are in support of the

proposed scheme with operators citing the congestion at Telford Bridge as a particular pinch point on current service operation.

Materiality Tests

2.62 The Transport Assessment uses traffic flows taken from the Morpeth SATURN model for both 2015 (opening year of the bypass) and 2030 (design year of the proposed bypass). An assessment of flow change at key routes into Morpeth and a further two junctions which have already been identified as being congested, Telford Bridge and Mafeking Roundabout, was conducted in the AM and PM peak periods. Table 2.4 and Table 2.5 outline the changes in flow across these time periods. The results of the assessment demonstrate a sizeable reduction in peak hour traffic flows on routes in Morpeth with the proposed bypass in place.

Table 2.4 2015 AM and PM Two-Way Traffic Flows in Morpeth Town Centre

Link	AM			PM		
	DM Flow	DS Flow	% Change	DM Flow	DS Flow	% Change
A192 Pottery Bank	1373	847	-38%	1484	1027	-31%
A197 Whorral Bank	1347	996	-26%	1292	1056	-18%
A196 Stobhill	774	629	-19%	782	623	-20%
A192 Barmoor	981	943	-4%	982	941	-4%
A197 Clifton	1235	1052	-15%	1081	936	-13%
Mafeking Roundabout - South	1746	1618	-7%	1849	1700	-8%
Mafeking Roundabout - West	1500	1333	-11%	1575	1465	-7%
Mafeking Roundabout - North	2385	2084	-13%	2573	2260	-12%
Mafeking Roundabout - East	68	69	+2%	77	78	+2%
Bridge Street	1125	880	-22%	1151	1005	-13%
Damside	1354	1319	-3%	1301	1314	+1%
Telford Bridge	2313	2020	-13%	2480	2226	-10%

Table 2.5 2030 AM and PM Two-Way Traffic Flows in Morpeth Town Centre

Link	AM			PM		
	DM Flow	DS Flow	% Change	DM Flow	DS Flow	% Change
A192 Pottery Bank	1447	899	-38%	1605	1121	-30%
A197 Whorral Bank	1396	1034	-26%	1401	1083	-23%
A196 Stobhill	829	650	-22%	825	663	-20%
A192 Barmoor	1017	969	-5%	1021	975	-5%
A197 Clifton	1238	1064	-14%	1078	939	-13%
Mafeking Roundabout - South	1748	1639	-6%	1895	1737	-8%
Mafeking Roundabout - West	1508	1350	-11%	1555	1484	-5%
Mafeking Roundabout - North	2400	2096	-13%	2604	2288	-12%
Mafeking Roundabout - East	69	70	+2%	80	81	+1%
Bridge Street	1126	890	-21%	1161	1044	-10%
Damside	1301	1300	0%	1311	1328	+1%
Telford Bridge	2313	2034	-12%	2516	2254	-10%

Cordon Flows

2.63 To further understand the effect of the proposed bypass on traffic flows into and out of Morpeth town centre, the percentage change in cordon flows has been identified. The cordon for Morpeth town centre consists of the following links:

- A192 Pottery Bank;
- A197 Whorral Bank;
- A196 Stobhill;
- A192 Barmoor; and
- A197 Clifton.

2.64 The results for this assessment show a significant reduction in traffic flows entering Morpeth town centre with the bypass in place for all years and time periods assessed. The results are summarised in Table 2.6 and Table 2.7.

Table 2.6 Inbound Cordon Traffic Flows

Scenario	DM Flow	DS Flow	% Change
AM 2015	3159	2519	-20%
PM 2015	2700	2149	-20%
AM 2030	3278	2597	-21%
PM 2030	2827	2237	-21%

Table 2.7 Outbound Cordon Traffic Flows

Scenario	DM Flow	DS Flow	% Change
AM 2015	2551	1947	-24%
PM 2015	2922	2434	-17%
AM 2030	2649	2019	-24%
PM 2030	3103	2545	-18%

Junction Assessments

2.65 The Transport Assessment also evaluated the operational capacity of the new junctions associated with the scheme to ensure that they are designed to an adequate operational capacity. The following junctions were assessed:

- Whorral Bank Roundabout;
- St. George's Roundabout;
- Northgate Roundabout;
- St. Leonard's Grade separated junction and dumbbell roundabouts onto A1; and
- Merge/diverge junctions onto/off A1.

2.66 Assessment at each of these junctions was undertaken using appropriate junction assessment software for an opening year of 2015 and a design year of 2030.

Whorral Bank Roundabout

2.67 The proposed bypass will tie in with the Pegswood Bypass through the addition of a fifth leg onto the existing Whorral Bank Roundabout. The results of the ARCADY assessment for the worst fifteen minute period are shown in Table 2.8. The results show that the junction will operate within its design capacity in both 2015 and 2030.

Table 2.8 ARCADY Results for the Whorral Bank Roundabout in the AM and PM Peak

Link	AM				PM			
	2015 RFC	2015 Queue	2030 RFC	2030 Queue	2015 RFC	2015 Queue	2030 RFC	2030 Queue
C395 (Pegswood)	0.183	0.2	0.205	0.3	0.207	0.3	0.221	0.3
A197 Pegswood Bypass	0.590	1.4	0.633	1.7	0.273	0.4	0.323	0.5
A197 Whorral Bank	0.238	0.3	0.246	0.3	0.363	0.6	0.390	0.6
A1-SENSLR-MNB	0.195	0.2	0.259	0.3	0.295	0.4	0.329	0.5
B1337	0.322	0.5	0.362	0.6	0.139	0.2	0.154	0.2

St. George's Roundabout

2.68 The St. George's Roundabout is a new three arm junction, which will be located north west of the St. George's Hospital Site. It will provide access to the proposed St. George's housing development which could see the construction of circa 1000 dwellings. The results of the ARCADY assessment for the worst fifteen minute period are shown in Table 2.9. The results show that the junction will operate within its design capacity in both 2015 and 2030.

Table 2.9 ARCADY Results for St. George's Roundabout in the AM and PM Peak

Link	AM				PM			
	2015 RFC	2015 Queue	2030 RFC	2030 Queue	2015 RFC	2015 Queue	2030 RFC	2030 Queue
A1-SENSLR-MNB (east)	0.358	0.6	0.386	0.6	0.140	0.2	0.196	0.2
St. George's	0.024	0	0.028	0	0.023	0	0.029	0
A1-SENSLR-MNB (west)	0.222	0.3	0.286	0.4	0.299	0.4	0.328	0.5

Northgate Roundabout

2.69 The proposed Northgate Roundabout is a proposed five leg roundabout located at the junction of the proposed bypass with the A192, which will provide an additional access point to development land on the Northgate Hospital site. The results of the ARCADY assessment for the worst fifteen minute period are shown in Table 2.10. The results show that the junction will operate within its design capacity in both 2015 and 2030.

Table 2.10 ARCADY Results for the Northgate Roundabout in the AM and PM Peak

Link	AM				PM			
	2015 RFC	2015 Queue	2030 RFC	2030 Queue	2015 RFC	2015 Queue	2030 RFC	2030 Queue
A1-SENSLR-MNB (east)	0.491	1.0	0.545	1.2	0.226	0.3	0.319	0.5
A192 (south)	0.271	0.4	0.312	0.5	0.343	0.5	0.4	0.7
A1-SENSLR-MNB (west)	0.476	0.9	0.504	1.0	0.280	0.4	0.312	0.5
A192 (north)	0.020	0	0.023	0	0.035	0	0.039	0
Northgate	0.275	0.4	0.420	0.7	0.597	1.5	0.692	2.2

A1 Grade Separated Junction Dumbbell Roundabouts

2.70 The proposals for the proposed bypass include the construction of an all-movements grade separated junction incorporating two roundabout junctions on the A1 south of Fairmoor. The existing A1 northbound on-slip and A1 southbound off-slip will be closed but the existing junction arrangement at Warrener's House will remain. Assessment of the two roundabout junctions included in the dumbbell arrangement has been undertaken in ARCADY. The results of this assessment for the worst fifteen minute period are shown in Table 2.11 and Table 2.12.

Table 2.11 ARCADY Results for the A1 (East) Roundabout in the AM and PM Peak

Link	AM				PM			
	2015 RFC	2015 Queue	2030 RFC	2030 Queue	2015 RFC	2015 Queue	2030 RFC	2030 Queue
A1-SENSLR-MNB (east)	0.189	0.2	0.222	0.3	0.286	0.4	0.317	0.5
A1 Southbound On-Slip	-	-	-	-	-	-	-	-
A1 (West) Roundabout	0.094	0.1	0.100	0.1	0.059	0.2	0.069	0.1
A1 Southbound Off-Slip	0.228	0.3	0.235	0.3	0.151	0.1	0.158	0.2

Table 2.12 ARCADY Results for the A1 (West) Roundabout in the AM and PM Peak

Link	2015 RFC	2015 Queue	2030 RFC	2030 Queue	2015 RFC	2015 Queue	2030 RFC	2030 Queue
A1 (East) Roundabout	0.127	0.1	0.142	0.2	0.187	0.2	0.203	0.3
A1 Northbound Off-Slip	0.123	0.1	0.134	0.2	0.077	0.1	0.092	0.1
St. Leonard's Lane	0.010	0	0.012	0	0.005	0	0.005	0
A1 Northbound On-Slip	-	-	-	-	-	-	-	-

2.71 The results in the tables above show that both the east and west A1 roundabout junctions operate well within their design capacity in all time periods and assessment years. The results suggest that queuing will not be an issue on the link between the 2 dumbbell roundabouts and queuing will not stretch back onto the mainline traffic. The new A1 junction will therefore provide an attractive option for local traffic to access the trunk road network.

A1 Merge/Diverge Assessments

2.72 Merge/diverge assessments have been undertaken on the new A1 junction to ensure that it is designed to a required standard. This has been done in accordance with criteria set out in the Design Manual for Roads and Bridges, Volume 6, Section 2, Junctions.

2.73 The results of the merge diverge assessments are summarised in Table 2.13 to Table 2.16. These tables show that the new A1 junction is designed to the required standard for both the opening year and design year; 2015 and 2030 respectively.

Table 2.13 Merge/Diverge Results for the A1 2015 AM Peak

Link	Mainline Flow (v/h)	Merge / Diverge Flow (v/h)	Required Junction Standard	Actual Junction Standard
Northbound Diverge	615	237	Taper Diverge	Taper Diverge
Northbound Merge	616	256	Lane Gain	Existing 2 lane carriageway
Southbound Diverge	1298	420	Taper Diverge	Taper Diverge
Southbound Merge	1298	164	Lane Gain	Existing 2 lane carriageway

Table 2.14 Merge/Diverge Results for the A1 2015 PM Peak

Link	Mainline Flow (v/h)	Merge / Diverge Flow (v/h)	Required Junction Standard	Actual Junction Standard
Northbound Diverge	1282	137	Taper Diverge	Taper Diverge
Northbound Merge	1282	369	Lane Gain	Existing 2 lane carriageway
Southbound Diverge	716	292	Taper Diverge	Taper Diverge
Southbound Merge	717	253	Lane Gain	Existing 2 lane carriageway

Table 2.15 Merge/Diverge Results for the A1 2030 AM Peak

Link	Mainline Flow (v/h)	Merge / Diverge Flow (v/h)	Required Junction Standard	Actual Junction Standard
Northbound Diverge	631	250	Taper Diverge	Taper Diverge
Northbound Merge	631	288	Lane Gain	Existing 2 lane carriageway
Southbound Diverge	1377	430	Taper Diverge	Taper Diverge
Southbound Merge	1377	206	Lane Gain	Existing 2 lane carriageway

Table 2.16 Merge/Diverge Results for the A1 2030 PM Peak

Link	Mainline Flow (v/h)	Merge / Diverge Flow (v/h)	Required Junction Standard	Actual Junction Standard
Northbound Diverge	1331	160	Taper Diverge	Taper Diverge
Northbound Merge	1331	399	Lane Gain	Existing 2 lane carriageway
Southbound Diverge	820	241	Taper Diverge	Taper Diverge
Southbound Merge	820	251	Lane Gain	Existing 2 lane carriageway

NB: Where a lane gain is required, this is from a one lane carriageway to a two lane carriageway. The current arrangement is already a two lane carriageway and therefore meets the required standards.

2.74 Full results of these assessments are contained in the Transport Assessment that can be made available upon request.

Summary

2.75 The assessment outlines that the existing traffic conditions in Morpeth town centre are showing significant constraints on the transport network. This restricts any future development in this area and is detracting from the market town characteristics of Morpeth. With the implementation of the scheme however, traffic flows and congestion in Morpeth town centre will be reduced and land to the north of Morpeth will be opened up for future development.

2.76 The scheme is expected to have a positive effect on traffic levels at existing junctions in Morpeth town centre, with no existing junction showing a material effect with the implementation of the proposed scheme.

2.77 Junction assessments have been carried out on the design proposals for new and modified junctions on the proposed scheme and these assessments show that all junctions will operate well within their design capacity.

2.78 As a direct effect of the reduction in traffic levels in Morpeth town centre, it is expected that there will also be a reduction in the occurrence of road traffic accidents. This will benefit motorised and non-motorised users alike. Non-motorised users will also benefit from enhanced cycling and walking facilities which will also be implemented along the full length of the proposed route.

Construction Phase and Programme

2.79 The following provides an overview on the proposed approach to construction. Further detail on construction methods, working routine, plant schedule, and programme is dependent on the methodology developed by the successful contractor. At this stage the construction method for the scheme is outline and indicative. Standard best practice construction techniques will be employed, and developed in accordance with the draft Construction Environmental Management Plan (CEMP) included in Appendix 18.

2.80 Construction of the bypass is programmed to start in September 2014. The construction period will last approximately 80 weeks (18 months) and the new road is expected to be open to traffic in May 2016. The primary activities are listed in the Table 2.17 below.

Table 2.17 Main construction activities

Activity	Estimated start	Estimated end
Tree/shrub clearance, footpath closures/diversions and temporary fencing	January 2015	February 2015
Site Establishment	March/April 2015	July/August 2015
Construction of A1 slip roads and the link to St. Leonard's Lane	April 2015	October 2015
Construct Fulbeck Lane Bridge	April 2015	March 2016
Construct Drainage	March 2016	June 2016
Construct main carriageway (Northgate to Whorral Bank)	May 2015	October 2015
Construct How Burn Bridge	May 2015	November 2015
Construct Northgate Roundabout	June 2015	July 2015
Public Utility works	June 2015	February 2016
Cotting Burn Bridge	July 2016	August 2016
Construct St. Leonard's Underpass	September 2015	
Close A1 and divert traffic from A1 onto slip roads	March 2016	
Construct carriageway (A1 to Northgate)	March 2016	August 2016
Landscaping	May 2016	
Re-open A1		September 2016
Completion	January 2015	February 2015

2.81 St. Leonard's grade separated junction - The slip roads for the junction will be constructed in advance and used as a temporary diversion of the A1 trunk road. This will enable the A1 to be closed for the construction of the underpass. Once the underpass is complete, the A1 can be re-opened and the traffic transferred back to the A1. The roundabouts for the grade separated junction can then be constructed.

2.82 Fulbeck Lane Bridge - The proposed bridge is to be constructed parallel and immediately east of the U6010. The form of the bridge will be a composite reinforced concrete deck on steel beams, founded on piled bridge abutments. The U6010 will be temporarily closed during the construction of the bridge.

2.83 Cotting Burn and How Burn Bridges – Both of these bridges, although different sizes, are formed as corrugated steel buried structures within the earthworks embankment. The watercourse running through them will be maintained and enhanced to provide a natural stream bed and bank sides.

2.84 Northgate Roundabout – this roundabout will be constructed just to the east of the A192 so as to minimise the effect on traffic. Once constructed there will be some temporary diversions to enable the roundabout to be integrated with the existing A192.

2.85 Haul roads will be constructed along the south side of the bypass to move approximately 350,000 cubic metres of material about the site to form earthworks embankments. These haul roads will be converted to cycleways/footways as the scheme progresses.

Construction Working Hours

2.86 Hours of work will generally be Monday to Friday 0700-1900 and Saturday 0700 – 1300.

2.87 No work on Bank Holidays.

2.88 Exceptional, short-term works may be agreed with Environmental Health/Protection or permitted under Section 61 of the COPA 1974 outside the normal permitted hours and days allowed by condition in the decision notice.

Construction Methods

2.89 The appointed contractor will provide detailed construction methodologies including activities, materials required and quantities of materials. An outline of construction activities associated with the proposed scheme is provided below.

2.90 Site clearance, including vegetation clearance, will be undertaken involving the use of large machinery and vehicles. The construction compounds will be created for site offices, material storage and site vehicles. Where necessary, services will be protected to the satisfaction of the appropriate utility company.

2.91 Materials brought to site will include corrugated steel, steel beams, materials for the road pavement, concrete, cement, granular material and gravel, pipes, chemicals and oils. The construction of the road and associated structures will involve earth movements

approximately 350,000 cubic metres of material will be moved about the site to form earthworks embankments, crossing services, site drainage and run-off, working near or within watercourses, laying the road pavement and cycleways/footways.

2.92 Table 2.18 shows the anticipated material types and volumes to be used in the construction of the Bypass.

Table 2.18 Material Supply

Type	Indicative Quantity	
Pavement Construction type B	3,780	m^2
Road studs	1,773	no
Signs	238	no
Temporary screening	91	m
Filter drain	6,700	m
Pipe	65	m
Drain	2,079	m
Edge of carriage way/ sub-base drain	4,210	m
Fin Drains and Narrow Filter Drains	4,815	m
Channel Gulley	50	no
Manhole/catch pit	59	no
Head wall	5	no
Outfalls	5	no
HRA Surfacing	1,199	m^2
Fencing	14,555	m
Gates	33	no
Stiles	4	no
Safety barrier	2,190	m
Geotextile	34,164	m^2
Sub-base	18,769	m^3
Pavement	109,612	m^2
Regulating Course	29	tonne
Surface Treatment	3,900	m^2
Tack coat	1,984	m^2

Type	Indicative Quantity
Kerbs, channels and edgings,	4,117 m
Footpaths and paved areas	13,028 m^2
Bus stop poles	2 no
Bus shelter	2 no
Illuminated Bollards	13 no
Road lighting columns and brackets	97 no
Cable	4,056 m
Duct	2,586 m
Hedge Plants	44,950 no
Woodland, trees and shrubs	61,300 no
Marginal and Aquatic planting	2,000 no
Wildflower plug plants	2,000 no
Hedge/tree protection	21,675 no
Pre-stressed Beams	37 no
Steel Piles	55 tonne
Shutters	225 m^2
High yield deformed type 2 reinforcement	32 tonne
Concrete	767 m^3

2.93 Sourcing of materials for construction of embankments and road surfacing will be determined by the Contractor, subject to the necessary statutory procedures.

2.94 Due to the size of the development, it is also likely that concrete batching may occur on-site. Such equipment should be operated in accordance with Process Guidance Note 3/1 (04) and is regulated under the Environmental Permitting Regulations 2010.

Construction Compounds

2.95 Three potential compound locations have been proposed which will be subject to the appointment of a contractor these are:

- Northgate Roundabout between the A192 roundabout arm and the proposed bypass. The compound will be accessed off the A192. The compound will be approximately 100m by 60m and will contain offices, a parking area for a minimum of 35-40 vehicles, stores and heavy plant and an earthwork mound to mitigate visual instruction;
- Whorral Bank Roundabout between the A197 roundabout arm and the proposed bypass. The compound will be accessed off the A197. The compound will be

approximately 100m by 55m and will contain offices, a parking area for a minimum of 35-40 vehicles and stores and heavy plant; and
- St Leonards Junction on the A1 which will potentially be used during the construction of the underpass once traffic has been diverted.

2.96 The compounds will be fenced using wire mesh and wooden post fencing or proprietary portable boundary fencing.

2.97 In respect of the operation of the site compounds this will include the following procedures to minimise any environmental effects:
- Fuel storage - double-skinned tank arrangement with bund surround; spill control measures for fuel delivery and refuelling; and a site based emergency response team;
- Lighting – units selected to minimise light spillage and to face away from adjacent properties;
- Noise and air quality – implications for nearby properties during construction and operation would be managed by working restrictions and the CEMP;
- Dust/noise – road brush to be used to keep hardstandings, car parking and approaches clear and dust suppression water sprays to be used during dry periods;
- Drainage – temporary surface water and foul drainage systems would be installed; and
- Surface water system would include interceptors; these interceptors would be emptied regularly and following any spills.

2.98 It is also proposed that there will be mobile welfare at the following locations:
- How Burn Bridge;
- Fulbeck Lane Bridge; and
- St. Leonard's Lane.

Lighting Arrangements

2.99 Construction lighting arrangements are unknown at this time however; it is likely that lighting will be kept to the minimum required for health, safety and security purposes. Where possible the lighting will be directional to reduce light spill.

Construction Traffic

2.100 The appointed contractor will provide detailed information on construction traffic movements, plant requirements and the parking of vehicles. Although the plant schedule is not currently known it is anticipated that the following plant will be required during the construction of the scheme:
- General large compaction equipment
- 20 tonne payload articulated dumpers;
- Backhoe excavator with various mounted equipment such as hydraulic breakers, loaders and lifters;
- Tracked excavators;

- Tracked dozers;
- Large mobile cranes operated under a contract lift;
- Mobile working platforms;
- Concrete pumps;
- Specialised large material delivery vehicles such as low loaders and bituminous or granular material wagons;
- Asphalt Paver;
- Road Roller;
- Road Planer; and
- General site 4x4 vehicles.

2.101 It has been assumed for the purpose of the EIA that the transfer of earthworks material amounts to between 17,500 and 35,000 vehicular movements over a 5 month period, depending on vehicle capacity. Therefore, on average, the number of HGV movements will be between 120 and 240 per day, the bulk of which will be internal to the site. Staff parking will only be allowed in the construction compounds.

Construction Access and Routes

2.102 During the construction period, the following permitted routes for site construction traffic will be used:

- The A197 to the Whorral Bank Roundabout; and
- A697/A1 on to the A192 joining the proposed bypass at the Northgate roundabout or St. Leonard's Lane joining the proposed bypass at St. Leonard's Junction.

2.103 An assessment has been undertaken to assess potential routes to the site in particular:

- The A1 trunk road;
- The A192 from the A1 trunk road;
- The A192 via Morpeth Town Centre;
- The A197 via Morpeth Town Centre;
- The A197 via Pegswood Bypass;
- The B1337 (from the north); and
- Access along the U6010, Fulbeck to Hebron.

2.104 The assessment has considered existing relevant constraints including weight and height limits with the aim of providing a definitive plan of permitted routes to the site.

2.105 The A1 trunk road will be the main route into the construction site utilising the turning facility at the A697, Warrener's House junction. Delivery of material and plant to the site will return via the A1 trunk road southbound off slip onto the A192, passing Northgate Hospital to the east (this is Haul Road 1 as shown on drawing HE092631/0/A197/1/56 in Appendix 2.1). In addition, construction vehicles will be allowed to use the A197 from the

east, via Pegswood Bypass (please refer to Haul Road 3 on drawing HE092631/0/A197/1/56 in Appendix 2.1).

2.106 Only essential construction traffic will be able to use the A197 through Morpeth Town Centre. These journeys will require the prior approval of Northumberland County Council.

2.107 Construction traffic will be prohibited from using the U6010 and the associated access points from the A1 trunk road through Hebron, the U6010 from the A192 road and the side road off the B1337 near to Longhirst. The prohibition of construction traffic will be posted throughout the construction period.

2.108 Earthwork operations will require 3 three temporary haul routes to enable transfer of materials during construction. The routes utilise county roads, the proposed footway/cycleway and temporary alignments. The routes of the 3 three haul roads are shown on Drawing HE092631/0/A1971/56.

2.109 Access to the Northgate roundabout construction compound will be off the A192 with haul routes proposed either along the proposed bypass to the A1 and the working width or alternatively along the A192 and St. Leonards Lane to the A1. Access to the Whorral Bank roundabout construction compound will be off the A197, with proposed haul routes along the proposed by pass.

Construction Workers

2.110 The number, and type, of workers will depend on the contractor and the sub-contractors employed and their methods. All workers will be appropriately trained with emphasis on health and safety and the environmental responsibilities.

Relevant Authorisations, Licences, Permits and Consents Required

2.111 Table 2.19 contains a list of authorisations, licences, permits and consents which are likely to be required to enable the A1 to South East Northumberland Strategic Link Road: Morpeth Northern Bypass operations to proceed. The table describes the requirement, who the consenting authority will be and makes comments regarding the progress in obtaining these other permits, licences or consents. It is intended to progress towards obtaining these licences during the determination period of the DCO application.

Table 2.19 List of Required Authorisations, Licences, Permits and Consents

Authorization's, Licences, Permits or Consents	Relevant Legislation	Location(s) Licenses are Required For	Reason Required	Consenting Authority
Flood Defence Consent	Water Resources Act 1991 and the Land Drainage byelaws	Cotting Burn crossing and outfall	Any structures or works carried out in, over, under or within 5m of the top of a 'Main River' bank requires written consent from the Environment Agency. Separate consent is required for permanent and temporary structures,	Environment Agency and NCC
Flood Defence Consent	Land Drainage Act 1991	How Burn and tributary of How Burn (crossing and outfalls)	Prior written consent of the Local Authority is required for any proposal to divert, culvert or otherwise obstruct the flow in any watercourse (including the provision of a connection to a culvert).	Local Authority
Environmental permit	The Environmental Permitting Regulations 2010	Pegswood Moor	Offence *"to cause or knowingly permit a groundwater activity"* except under and in accordance with an Environmental Permit. Civil engineering activities that involve the injection of grouts or other media for the purpose of sealing (such as around tunnel linings or in boreholes) or ground stabilisation (such as infilling adits or mineshafts) may constitute a groundwater activity if the materials being used contain leachable pollutants and they will be in contact with or otherwise discharge into groundwater. However, some activities involving grouts may be able to take place without the need for an Environmental Permit, providing the relevant requirements are complied with.	Environment Agency
Water Activity Permit	The Environmental Permitting Regulations 2010	Not known at present, but might include any of the watercourses or other controlled waters in the study area.	Discharges of construction site water to any controlled water, other than clean surface water will require a Water Activity Permit.	Environment Agency
Environmental Permit	Environmental Permitting Regulations 2010	Site Wide	Any proposals to deposit, treat, store or dispose of any waste material may require an Environmental Permit or specific Exemption from the Environment Agency.	Environment Agency

Authorization's, Licenses, Permits or Consents	Relevant Legislation	Location(s) Licenses are Required For	Reason Required	Consenting Authority
Controlled Waste Transfer Note	Duty of Care Regulations 1991 Hazardous Waste (England and Wales) Regulations 2005 Environmental Permitting (England and Wales) Regulations 2010 The Waste (England and Wales) Regulations 2011	Site Wide	Contaminated soil that is, or must be disposed of, is waste. Therefore, its handling, transport, treatment and disposal is subject to waste management legislation.	Environment Agency
See above.	Hazardous Waste Premises Notification		Required where more than 500 Kg of hazardous waste is produced, collected or removed from site per year.	Environment Agency
Register as a Waste Broker	Control of Pollution Act 1989	Site Wide	If you arrange for the disposal or recovery of waste on behalf of others you must register as a waste broker.	Environment Agency
Water Activity Permit	Environmental Permitting Regulations (England and Wales) 2010		Anyone intending to discharge volumes of sewage effluent of 5 cubic metres per day or less to controlled waters or 2 cubic metres per day or less to ground may be eligible for an exemption and will need to register before they commence making the discharge. An Environmental Permit from the Environment Agency is normally required for discharges above this volume. It is illegal to discharge sewage effluent without either an exemption registration or an environmental permit. In addition no discharge to an aquifer should be made without prior consultation with the Environment Agency.	Environment Agency
Water Abstraction License	Water Resources Act 1991 (as amended by the Water Act 2003)	May not be required and will be determined by the appointed Contractor.	Any abstraction of water or de-watering from underground strata may require an Abstraction License from the. Environment Agency	Environment Agency
Bat License	E.C. Habitat Directive - Conservation of Habitats and Species Regulations	Rose Cottage (NG 190 874).	Any work to, or which may disturb, a bat roost will require a European Protected Species License granted by Natural England.	Natural England

Authorization's, Licences, Permits or Consents	Relevant Legislation	Location(s) Licenses are Required For	Reason Required	Consenting Authority
	2010 (as amended).			
Bat License (TBC)	E.C. Habitat Directive - Conservation of Habitats and Species Regulations 2010 (as amended).	Four bat trees (identified on Figure 7.5) depending on the results of the preconstruction bat surveys	Any work to, or which may disturb, a bat roost will require a European Protected Species License granted by Natural England.	Natural England
N/A	Section 61 Consent under the Control of Pollution Act 1974	To be determined by Contractor once final Construction method Statement has been prepared.	Agreement restricting certain activities, timescales and type of construction (legal contract between the Local Authority and the contractor.)	Local Authority

Decommissioning Phase

2.112 The proposed road is intended to be a permanent infrastructure for the benefit of those living in Morpeth and the wider communities. Unlike many schemes, there are no proposals for the bypass to be decommissioned and for all intents and purposes it should be considered a permanent' development of undefined longevity. Therefore, despite this being raised in the PINS Scoping Report (September 2012) it is considered that it would not be appropriate to assess a decommissioning phase for this scheme. However, should PINS wish to consider what the effects would be, it is considered that the processes of removing the bypass would be comparable to those predicted to take place during the construction works.

Maintenance

2.113 It is typical for major roads such as the proposed bypass to be regularly maintained on an on-going basis, which would keep the road operational. This may include routine gully pot cleaning, management of landscaped areas along the verge and drainage ponds, and the routine inspections to spot and correct defects. Table 2.20 provides a schedule of maintenance requirements and likely timescales against road components.

Table 2.20 Maintenance Schedule

Road Component	Maintenance Schedule
Carriageway	Re-surfacing and 20% patching after 10-15 years Re-surfacing, surface and binder course after 20-25 years
Street Lighting	Column maintenance every 6 years Column replacement after 25-30 years LED replacement every 10-15 years Lantern replacement every 20-25 years
Structures	General inspection every 2 years Principal inspection every 6 years
Grass Cutting	Highway verges – 2 cuts per year Swales – 3 cuts per year
Drainage	Gulley cleaning/emptying – twice per year
Road markings	Re-paint/refresh every 12-15 years

These activities have the potential only for very short term, temporary, minor adverse effects (if any) and will need to be managed in accordance with good practice and the requirements of environmental legislation that may apply. As maintenance activities will

not result in any significant effects they have not been considered by the EIA, which is focused on the key environmental issues.

Design Evolution

Design Team

2.114 The design team is composed of Northumberland County Council 'in house' engineers supplemented by partnership consultants and contractors as required. The 'in house' approach over the years has led to a consistency of the design throughout the life of the scheme.

Overview

2.115 The design has been evolving since the mid-1990s when the scheme was first conceived. During this time various route alignments have been assessed and the preferred route has been refined to the current alignment proposed in this Development Consent Order (DCO).

Key Objectives

2.116 The A1 - South East Northumberland Strategic Link Road - Morpeth Northern Bypass will:

Improve highway connectivity within South East Northumberland:

2.117 The construction of the Morpeth Northern Bypass is the final element of the A1 - South East Northumberland Strategic Link Road. It completes a direct link between the A1 to the north-west of Morpeth through to the A189 Spine Road to the east of Ashington. This in turn completes a strategic highway box in South East Northumberland comprising the A1 to the west; the A197 (the Strategic Link Road) to the north; the A189 Spine Road to the east; and the A19 between the Moor Farm roundabout and the Seaton Burn roundabout to the south.

Facilitate and provide access to allocated development sites and other strategic locations:

2.118 The Strategic Link Road specifically facilitates a second access to the former St. George's Hospital site to the north of Morpeth, thus significantly increasing its development capacity. It additionally improves access to the allocated employment sites at Northgate and Fairmoor to the north of Morpeth. It will provide improved access from the north to the Port of Blyth, the associated proposed renewable development in the Blyth Estuary area and the Wansbeck and Ashwood Business Parks in Ashington. It will similarly improve the marketability and delivery potential for growth area housing sites (East Ashington, Ellington and Lynemouth) and may create over 5,000 new jobs once completed.

Improve highway capacity and reduce traffic congestion in and around Morpeth:

2.119 Taking into account existing and committed development in and around Morpeth, transport modelling undertaken by consultants AECOM has identified significant stress on the highway network due to the fact that it is operating at or near capacity in key areas and junctions. This results in congestion in the town primarily as a result of vehicular trips through the town centre and also shorter trips to the town centre. The modelling work demonstrates that the Strategic Link Road would significantly improve the operation of the highway network in Morpeth by adding additional capacity and by facilitating or improving access to significant development in Morpeth. As well as reducing traffic congestion within Morpeth the scheme also provides traffic relief in surrounding villages such as Hebron.

Determination of the Preferred Route

2.120 The fundamental route of the A1 – South East Northumberland Strategic Link Road remains that which was laid out in Fig 30.1 of the Castle Morpeth District Local Plan which was subject to a public enquiry and adopted in February 2003. The Pegswood Bypass section of the Strategic Link Road was completed in 2007, essentially fixing the eastern third of the Morpeth Northern Bypass.

Three Options to Preferred Option

2.121 Historically, various alternatives were investigated for the route of the A1 to the South East Northumberland Strategic Link Road (also in comparison to the do nothing scenario). Paragraph 1.38 in Chapter 1 describes the objectives of the scheme. The development objectives necessarily require a new bypass across the north of Morpeth, and thus possible routes are limited. At the east end, the accepted option was to bypass Pegswood to the south, with this section of the road constructed and opened in 2007. Prior to the construction of the Pegswood Bypass an opencast contractor submitted an application to extract coal from the Pegswood Moor Area. This had implications on potential routes for the scheme therefore following various discussions an agreement was reached on the proposed route across that section of land. Subsequently a condition was attached to the open cast planning permission to restore and consolidate a corridor across the land past the quarry and, as a result all of the do something options share a common alignment from the Whorral Bank roundabout in the east to the How Burn Bridge.

2.122 At the west end there were three main options considered as to where the new route would connect to the A1. Figure 2.2 shows the 4 options considered including the existing situation.

2.123 The trunk road in this location was improved in 1970, with the opening of the Morpeth (A1) bypass to the west of the town. Built to an all-purpose dual two lane standard

without marginal strips, it stretched from Clifton in the south, to Warrener's House in the north, where the A697 intersects. Limited access junctions were provided at either end.

2.124 Just south of Warrener's House, the A1 is wedged between the small village of Fairmoor to the west (at the intersection of the A192 from Morpeth with the A1) and the Northgate Hospital development to the east. As a result, the settlements either side of the A1 trunk road have a significant influence on the choice of location for the new intersection, and any new connection to the A1 must be either to the north, near the A697 junction, or to the south.

2.125 Following a consultation exercise in 2008 it became obvious that the location of the junction with the A1 was a primary source of public concern and that earlier work to determine the preferred route had not been sufficiently updated for this new submission.

2.126 As a result, three potential alignments were considered along with the 'Do Minimum' scenario.

2.127 The three options share a common alignment at their eastern ends and primarily differ in their junctions with the A1. See drawing number HE092631/0/A197/01/99.

- Option 1 - utilises the existing arrangement at Fairmoor converting it into an all movements junction.
- Preferred Route (Option 2) - connected to the A1 between Lancaster Park and Fairmoor.
- Option 3 - utilises the existing junction with the A697 at Warrener's House, again converting it to an all movements junction.

2.128 A summary of the Environmental Appraisal of the options undertaken in 2008-09 using appropriate methods to that time is presented in Table 2.21. It concluded that there were no significant environmental differences between the options and therefore engineering considerations were the deciding factors in choosing the preferred option.

2.129 While comparing the options, only the items relating to any divergence from the preferred route were considered, as all other items for their coincident alignments would obviously be identical.

2.130 The items considered included:

- design standards;
- congestion reduction;
- properties affected;
- cost;
- stakeholder support (HA, EA, public etc.); and
- disruption due to construction.

2.131 As previously mentioned, the ‘Do Minimum’ option was also considered during this time but was quickly discarded. To continue to use the existing over capacity junctions within Morpeth was considered unacceptable.

2.132 Table 2.21 summarises the options considered against various criteria:

Table 2.21 Options Comparisons

Topic	Option 1 – Fairmoor Junction	Preferred Route (Option 2)	Option 3 – Warrener's House Junction	Do Minimum
Capital Cost	£1m more than Preferred route	Approximately £40 million	£18m more than Preferred route.	N/A
Buildability	Extended use of contra-flow on A1. Proposed roundabout will have to form part of the traffic management during construction increasing inconvenience and safety risks. More difficult construction due to long skewed underpass.	Proven construction method with minimal effect on trunk road traffic.	Prolonged closure of existing Warrener's House junction to south bound traffic from A697. Prolonged reduction of dual c\way to two way flow required. Potential A1 closure should bridge replacement be required.	N/A
Meets current design standards	No - Non-standard junction layout with numerous elements of sub-standard geometry. Would entail multiple departures from standard.	Yes – apart from some minor departures from standard for the St. Leonard's Grade Separated Junction	No – Sub-standard carriageway width over bridge. Sub-standard bridge parapet. Would entail multiple departures from standard.	Continued acceptance of existing urban route
Earthworks	Likely to be cut / fill balance	Cut/Fill balance	Likely to require substantial volume of imported fill	N/A
Congestion in Morpeth	Likely projected 18% reduction	Projected 18% reduction	Due to longer route – likely projected reduction of less than 18%	23% increase by 2029
Journey Times	Will provide overall journey time benefits as per preferred route. Relative to the preferred route however journey times for the dominant northbound merge and southbound diverge flow from the A1 will be slightly longer.	New route is likely to cut journey times for through traffic avoiding Morpeth Town Centre. Additionally journey times are likely to become more reliable.	Will provide overall journey time benefits as per preferred route. Relative to the other options however journey times for the dominant northbound merge and southbound diverge flow from the A1 will be significantly longer.	No change but expected to deteriorate as traffic volumes in Morpeth increase over time.

Topic	Option 1 – Fairmoor Junction	Preferred Route (Option 2)	Option 3 – Warrener's House Junction	Do Minimum
Effect on residential Properties	1 demolished 19 within 100m of the new alignment. 3 within 100m – 200m of the new alignment.	1 demolished 6 within 100m of the new alignment. 3 within 100m – 200m of the new alignment.	4 demolished 16 within 100m of the new alignment.	Ongoing detrimental traffic growth effect on the Morpeth residential properties
Effect on Existing Buildings in Northgate Hospital	2 buildings within 100m – 200m of new alignment.	1 building within 300m of new alignment with existing wooded screening.	2 buildings within 200m of new alignment with some existing screening.	N/A
Highways Agency Support	No	Yes	No	N/A
Public Support	Some	Yes	Some	Unknown
Environmental Effect (see Table 2.22 for more information)	These options have a similar effect on agriculture and the natural environment. All will employ similar methods to mitigate any adverse effects as far as is reasonably practicable.			Ongoing detrimental traffic growth effect on the Morpeth Urban Environment
New Development Opportunities	Provides access for St George's but conflicts with Northgate development sites	Provides access opportunities for St George's and Northgate development Sites	Provides access for St George's but provides no direct access for Northgate development sites	None
Future Road Maintenance - Works	Any future maintenance of the underpass will require diversion of all trunk road traffic through single roundabout arrangement. Inherently more costly	Proven layout allowing standard developed methods of maintenance and traffic management.	Proven layout allowing standard developed methods of maintenance and traffic management.	Likely major refurbishment of Telford Bridge. Significant roadwork's in an urban environment.
Utilities	It is likely that this alignment will have a greater effect on existing utility apparatus.	Substantial utility diversion works, costing £1m approximately.	It is likely that the effect will be similar to the preferred option.	

Topic	Option 1 – Fairmoor Junction	Preferred Route (Option 2)	Option 3 – Warrener's House Junction	Do Minimum
Other Benefits	Re-use of existing A1 infrastructure. Less land take. Construction of one less roundabout. Safe access to Morpeth from A697. Retains lay-by provision on A1.	High standard alignment with conventional junction layouts.	Re-use of existing A1 infrastructure. Recognised junction layout. Retains lay-by provision on A1.	Least cost
Other drawbacks	Non-standard layout which may cause driver confusion. Inherent potential for future capacity problems which may require substantial junction reconfiguration for which there is already local precedent. Possible safety issues for Non-Motorised Users at roundabout.	Little re-use of existing infrastructure. Loss of existing lay-bys on A1.	Bridge might be too weak for proposed purpose. Significant length of new link road to join A192 to scheme. Significant additional dual c\way required on A1. Alignment remote from Morpeth dilutes the potential beneficial effects.	Vulnerable to disruption e.g. flooding.

2.133 From a highway engineering perspective, locating the junction to the north, at or near the A697 junction at Warrener's House, has the least merit of the do something options:

- the new junction would be at least 3.5 km away from the town centre, significantly compromising the objectives of the scheme;
- the new junction would require significant alteration to the A1 to the north, effectively extending the dualling for 1-2km further north from existing;
- this option is by far the most expensive, estimated at the cost of the preferred route plus 45% with an accordingly lower BCR.

2.134 The remaining Preferred Route and Option 1 – Fairmoor Junction can both, however be considered feasible. Both options are broadly similar in effect and character and meet the objectives set out in Chapter 1.

2.135 Ultimately, it is the junction with the A1 which separates Option 1 from the Preferred Route and, in several aspects, is the area where this Option 1 is weakest:

- the junction at Fairmoor will not conform to current design standards and will require significant departures from standard in respect of geometry and visibility;
- the layout poses serious buildability issues, with implications for traffic congestion during construction;
- the single roundabout solution to the east of the A1 has inherent flaws with regards to future maintenance, i.e. restricted traffic management options;
- the single roundabout solution also has potential capacity issues, due to focussing all of the A1 access/egress traffic at this roundabout. There is already a local example of such an arrangement at the A1 Seaton Burn junction to the south. This junction had a history of poor performance, particularly at peak times, with traffic regularly backing up to the trunk road. The Highways Agency has recently added traffic signal control to this junction (at significant cost) to alleviate the situation;
- again, the focussing of all of the A1 access/egress traffic to a single roundabout increases the likelihood of accidents and has the potential to magnify the effects with restricted options for traffic movement should the roundabout become blocked;
- whilst roundabouts are fundamentally a safe form of junction the accident frequency increases significantly as the number of arms increase. In TD16/07 Safety at Roundabouts (DMRB; Volume 6, Section 2, Part 3) a TRL study found that the accident frequency for single carriageway approaches at roundabouts doubles from 1.08 to 2.11 with a six leg roundabout, compared to a typical four leg layout;
- the Highways Agency does not support the Fairmoor option. As a key stakeholder and the Highway Authority for the trunk road, Highways Agency support is vital for the scheme;
- the location of the Fairmoor option junction perpetuates the conflict between the existing A1 (restricted movements) junction and the A697 to the north.

2.136 In contrast, the Preferred Route suffers from none of these issues. Buildability and maintenance have been proven from successful delivery of the near identical A1 Stannington junction to the south. Similarly, experience from Stannington indicates that the arrangement is an inherently safe layout.

2.137 It is for these reasons that the Authority seeks to pursue the Preferred Route as the only proposal which fully meets all of its objectives and ambitions.

2.138 Additionally a “Do Minimum” option was assessed. The principle of the Do Minimum scenario was to effectively retain and maintain the existing road network through the town centre. The do minimum option has the advantage of very low capital expenditure but obviously results in a worsening of the congestion, air quality, journey ambiance, accident statistic, severance or modal shift benefits anticipated by the do something options and does not meet any of the Scheme development objectives. It also achieves no alternatives to the pinch-point of Telford Bridge. Further, pressure for future town centre redevelopment will only accelerate these disbenefits as illustrated by the challenges recently faced trying to manage the limited road space through the introduction of traffic signals in the vicinity of Telford Bridge to mitigate the effects of a supermarket development. A further illustration of the pinch point pressure is the recent closure of the Chantry Footbridge following flood damage in 2012. This has resulted in a significant increase of pedestrian activity over the already limited space on the Telford Bridge. Additionally, significant, overdue maintenance is required to the Telford Bridge which will add further strain to the local network.

2.139 NCC has commissioned an independent study into the medium to long term future of traffic in Morpeth town centre which is due to report results in 2013.

2.140 Following careful consideration, the Preferred Route was confirmed as the option which best fit the key objectives of the project.

Alternatives Considered – Environmental Appraisal

2.141 In 2008-2009 AECOM undertook an environmental appraisal of three possible options to connect with the A1 trunk road using the Department for Transports Transport Appraisal Guidance methodology (refer to Table 2.22). This appraisal, which was based on the available information and assessment methods at the time (and thus are superseded by the revised EIA assessments), concluded that in environmental terms there was no significant difference between either route, each of which would require some environmental assessment of key issues, including relevant ecological and other surveys. In addition, all of the routes crossed arable or pasture fields without any significant environmental disadvantages. Consequently, the southern route was proposed based on the engineering reasons previously discussed.

Table 2.22 Environmental Appraisal Summary of the Proposed Options

Topic	Preferred Option	Fairmoor Option	Warrener's House Option	Topic Preferred Option
Air Quality	All the three options are likely to have minor beneficial effect on local air quality and a minor adverse effect on regional and greenhouse gas emissions.			As the effects of the three options are comparable, there is not a preferred option in terms of air quality.
Archaeology and Cultural Heritage	A number of sites could be directly affected by the proposed option, particularly a group of cropmark features. The setting of listed buildings at East Shield Hill would be adversely affected.	The proposed new route has the potential to effect upon a number of sites but largely remnants of ridge and furrow. The setting of listed buildings at East Shield Hill would be adversely affected.	A number of sites could be directly affected by the proposed route, particularly a group of cropmark features. The setting of a number of listed buildings at West Shield Hill and East Shield Hill would be adversely affected.	The Preferred Option is the Topic Preferred Option.
Ecology	The preferred option would have adverse effects upon biodiversity. This is mainly due to the requirement for bridges across Cotting Burn and How Burn, and habitat loss and disturbance on Howburn Wood.	This option would have adverse effects upon biodiversity. This is mainly due to the requirement for a bridge across Cotting Burn and culvert at St George's roundabout.	This option would have adverse effects upon biodiversity. This is mainly due to the requirement for bridges across How Burn, Shieldhill Burn, Pegswood Moor and the head of Cotting Burn.	The Preferred Option avoids the construction of a culvert at St. George's roundabout (Fairmoor Option) and a bridge across Shieldhill Burn (Warrener's House Option). The loss of significant areas of woodland is also avoided by selecting the Preferred Option.
Landscape and Visual	The three proposed options have the potential to result in moderate to minor adverse impacts due to the introduction of road infrastructure and associated traffic into a rural landscape. Substantial to moderate adverse impacts could result on the visual amenity of residents with views of the proposals with significant adverse impacts resulting.			No preferred option in terms of landscape and visual effects.
Land Use	This option primarily effects upon six agricultural holdings including a holiday cottage on Kater Dene Farm adjacent to Fulbeck Lane. In total 18 ha of land is required including 3 ha for landscaping. A further 8.25 ha is temporarily required under licence for construction.	This route option has the same effect on the Kater Dene Farm Settlement and Fulbeck Training Centre as the preferred route. The area of land required is largely similar to the preferred option.	Construction would require the demolition of four residential properties with the serious blight of four others, and significant effects on 12 residential properties within the Northgate Hospital site. The area of land required is largely similar to the preferred option.	All route options will affect agricultural land, and in the case of the Warrener's House Option, a number of residential properties would need to be demolished.
Noise and Vibration	The three options would result in a significant benefit to the residents in Morpeth in terms of diverting traffic, and the associated noise, away from residential areas. The noise TAG assessments were undertaken in 2008 for the various options based on the traffic data available at the time. It should be noted that for the subsequent noise assessment and Environmental Statement the study area has been updated and revised traffic data has been used.			In terms of vibration and noise, all three options would result in varying levels of effects for sensitive receptors. Depending on distance between the sensitive receptor and the alignment option,

				as well as the change in traffic volumes on existing roads as a result of the new alignment, the effects may be adverse or beneficial for each individual sensitive receptor. On the outcomes of assessments to date, no particular option is preferable over another.
Pedestrians, Cyclists, Equestrians and Community Effects	A beneficial effect is predicted on physical fitness and severance as a result of the implementation of any of the three options.			Considering the three options, the Preferred Option is preferable given the benefits to pedestrians, cyclists, equestrians and community effects. This has been taken forward for assessment.
Vehicle Travellers	A beneficial effect is predicted, upon the stress of travelling, journey ambience and safety (i.e. road accidents).	A beneficial effect is predicted, upon the stress of travelling and journey ambience. An adverse effect is anticipated on safety (i.e. road accidents).	A beneficial effect is predicted, upon the stress of travelling, journey ambience and safety (i.e. road accidents)	Considering the three options, the preferred option is preferable given the benefits to vehicle travellers. This has been taken forward for assessment.
Water Environment	From a water environment perspective all routes would require similar watercourse crossings, and all routes are similar in length and design meaning that the volume of runoff would be comparable, as would the spillage risk.			All three option are comparable in terms of likely significant effects from a water environment perspective.

2.142 Once a likely route was established, JMP Consultants were commissioned to carry out a traffic assessment. Initially a traffic model of the existing network was constructed, following data collection, in order to test the effect of the new proposal on the surrounding road network, in particular the A1 trunk road and the A197 road through Morpeth.

Refinement of the Preferred Route

2.143 Since determining the preferred route the design team have been refining and adapting it as the scheme has developed. The issues affecting landowners, road users, non-motorised users (NMU's) and the public in general have been considered. As a result parts of the scheme have been redesigned to mitigate, where possible, issues where stakeholders are affected by the proposals.

2.144 Some design revisions have been instigated by the design team through good design practices and include:

- A presumption, where possible and within cut/fill balances, to locate the road in cutting to reduce its visual effect. See number 1 on drawing HE092631/0/A197/01/100.
- Laybys have been introduced on the scheme to comply with relevant network spacing of such features and are in accordance with the appropriate DMRB guide. While it may be possible that the layby locations offer views of the surrounding area for the public this is not their primary function. See number 2 on drawing HE092631/0/A197/01/100.
- The inclusion of Fulbeck Road Bridge rather than the permanent severance of Fulbeck Road. (To reduce accesses onto the bypass, a junction at this location was quickly eliminated as an option). See number 5 on drawing HE092631/0/A197/01/100.
- Starting in mid-2009 it was decided to amend the drainage design and philosophy. The original drainage design had been based on conventional construction methods, i.e. kerbs, gullies and carrier pipes to the designated outfall points. Current design guidance requires inclusion of Sustainable Drainage Systems (SUDS) elements wherever possible. It was therefore decided to remove the gullies and carrier pipes from the majority of the scheme (there are still limited locations where these will be retained) and replace them with combined kerb and drainage units that then outfall into grassed drainage channels (or swales) to convey the flow to the outfalls. This was exhibited in March 2010. Subsequently, as part of the Best and Final Bid (BAFB) process, the DfT required promoters to find further savings through value engineering. As part of this process the decision was made to remove the combined drainage units and introduce 'over the edge' drainage of the carriageway. This has resulted in a much more environmentally sensitive drainage design.
- This is due to the reduction in concrete required to construct the drainage. Not using kerbs (either concrete or recycled plastic) removes the need to construct concrete foundations, backing, or the kerbs themselves. Concrete manufacture produces a

large amount of CO_2 when made and therefore reducing its use can only be environmentally sound. See number 14 on drawing HE092631/0/A197/01/100.

- In October 2009 it was decided to move Northgate roundabout to the east of the A192, off the line of the existing carriageway. This reduces the disruption due to construction, better accommodates the fifth leg for the Northgate Development, a key project objective, and reduces potential land issues at Butley Ben. See number 15 on drawing HE092631/0/A197/01/100.

2.145 In addition to the above, the following elements arose as a result of both formal consultation/exhibitions and informal discussions with stakeholders and members of the public:-

- When the St. Leonard's Junction and link to the A192 was considered as a separate scheme (and developed in 2002) a stock underpass was proposed as accommodation works on West Lane End Farm. However by the time the Bid for Programme Entry (BFPE) was submitted in October 2008 it had been removed from the bypass scheme. Following that submission and during informal discussions with affected landowners the use of the fields to be split in two by the bypass at West Lane End Farm was reviewed. The owners want to continue to keep livestock either side of the bypass, or at least have the option to do so. As a consequence, the method of how livestock could be moved from one side to the other was reconsidered. The outcome was to re-introduce the stock underpass at a natural low point in the topography. This required minimal vertical re-alignment of the scheme to make the structure fit. However this element of the scheme is still subject to discussion between the promoter and the landowner. See number 3 on drawing HE092631/0/A197/01/100.
- In June 2003 a connection from the proposed St. Leonard's Underpass to St. Leonard's Lane was requested by the local parish council to ease local journeys. This was incorporated, as an amendment, into the A1-A192 Planning Application which was submitted when that part of the scheme was previously proposed as a separate project. The link has been retained in the current design. See number 4 on drawing HE092631/0/A197/01/100.
- Following a public exhibition in 2008, additional planting and a false cutting were introduced to further increase the visual mitigation for residents of Lancaster Park. While not the primary aim of the false cutting at St. Leonard's Underpass it will also provide some noise mitigation. See number 6 on drawing HE092631/0/A197/01/100.
- Between the public exhibitions in March 2008 and March 2010 it was proposed to relocate Public Footpath No. 13 (PF13) from its current position of crossing the A1 at-grade, to going through the proposed St. Leonard's Underpass. This decision was taken after discussions with the Countryside Team of Northumberland County Council and considered ease of access, ease of the crossing and user safety. See number 7 on drawing HE092631/0/A197/01/100.

- Following the March 2008 exhibition a proposal was put forward to extend the proposed cycling facilities from Fairmoor to the A697. The facilities would utilise the existing road to the cemetery and then have additional cycle track constructed from there to join the A697 at Warrener's House. However, inclusion of this amendment lies outside of the primary aims of the scheme and when the DfT required savings to be made to project costs (BAFB submission) it was decided to remove this facility from the proposals. See number 8 on drawing HE092631/0/A197/01/100.
- Over a period of time, and prior to the BFPE submission in October 2008, the original idea of 'bridges' being used to cross the Cotting Burn and How Burn watercourses has been replaced by the use of buried arch structures. Primarily this decision was taken to reduce costs and simplify the engineering. The structures have been developed to be large enough to allow the passage of light to encourage mammal use as well as span the water.
- These have been discussed with the Environment Agency and agreement on size and function has been reached. See number 9 on drawing HE092631/0/A197/01/100.
- After the scheme was originally submitted to the Department for Transport (DfT) in October 2008 (BFPE) bus laybys were added between Northgate roundabout and the proposed grade separated junction. This is to accommodate the anticipated change of routes some services will make because of the alterations to the junction arrangement on the A1. See number 10 on drawing HE092631/0/A197/01/100.
- In January 2009 advisory cycle lanes were added on the A192 north and south of Northgate roundabout. This accomplishes several things. It provides better cycling access to and from Morpeth town centre (something approved by cyclist organisations during discussions); better utilises the 10m wide existing carriageway and their introduction allows for a safer and more economical design for the geometry of Northgate roundabout. See number 11 on drawing HE092631/0/A197/01/100.
- In February 2009 during discussions with the consulting ecologist mammal tunnels were recommended along the scheme to facilitate the passage of wildlife from one side of the road to the other. These are in addition to the openings formed by the structures crossing the Cotting Burn and How Burn watercourses. One location has been decided upon between How Burn and Pegswood Moor to aid crossings while others will have their locations determined after further pre construction surveys to identify the most suitable points. See number 12 on drawing HE092631/0/A197/01/100.
- During the same discussions it was also recommended, by the consulting ecologist, that at How Burn Bridge the wing wall faces should have bat roosts incorporated into them. This has been adopted but details of the method of providing roosts have yet to be determined. See number 13 on drawing HE092631/0/A197/01/100.
- During a second public exhibition in March 2010, two residents of Fulbeck commented that the view north from their properties would be adversely affected by the bypass, even though the bypass is in shallow cutting over this particular length. Following

discussions and assessments of the issue, a false cutting has been designed between Cotting Burn and Fulbeck Road Bridge to help screen the majority of traffic from view. The visual effect will reduce further in time with an appropriate planting scheme. As per the false cutting at St. Leonard's underpass this false cutting will also provide some noise mitigation. See number 16 on drawing HE092631/0/A197/01/100.

- In April 2012 it was decided to reduce the length of the third leg on St. George's roundabout. This was a consequence of the change of legal process from a planning application to a DCO. The third leg is not essential for the bypass therefore any construction could not be included in Compulsory Purchase Orders (CPO) arrangements. It was therefore decided to significantly reduce its length to that shown (which will allow safe connection in the future without influencing traffic on the bypass) to avoid unnecessary legal complications. See number 17 on drawing HE092631/0/A197/01/100.
- At the same time the ponds at St. George's were also amended. Two ponds are still proposed but are now both situated to the south west of the roundabout (to the west of where a third leg would connect) rather than one south west and one south east. This allows better use of the retained land by the landowner. See number 18 on drawing HE092631/0/A197/01/100.
- The Northgate roundabout was also slightly amended in April 2012. The fifth leg, allowing access to potential development land, was shortened for the same reasons as the third leg at St. George's. See number 19 on drawing HE092631/0/A197/01/100.
- In late August / early September 2012 another consultation was held as part of the DCO process and for compliance with the Statement of Community Consultation. This allowed the public and consultees to be brought up to date on the scheme proposals and explain the remainder of the process through to planning approval. From this consultation representations were made to the Environment Agency (EA) concerning the level of flood protection provided within the scheme. The EA, as part of the statutory consultees, also made separate comment in relation to the level of the flood design standard compared to their current Flood Alleviation Scheme within Morpeth. The outcome was that they requested that the Morpeth Northern Bypass is designed to accommodate a 1 in 100 year storm event without adding extra runoff into the local watercourses. This is an increase on the previous requirement of a 1 in 30 year event and required additional storage volumes to be designed as either increased pond storage or as underground tanks. See number 20 on drawing HE092631/0/A197/01/100.
- As part of the 2012 consultation a potential change to the crossing of the bypass by Fulbeck Lane was considered. Three options were put forward, the existing road crossing, a footbridge crossing or an at-grade foot crossing. Opinions were sought as to the publics and consultees preferred option. Following the end of the consultation period all comments and opinions were assessed. The consensus of the returned information was for the road bridge to remain. However the project board decided to

amend the design to be a single lane road bridge rather than the wider structure previously put forward. This decision was taken in January 2013. See number 21 on drawing HE092631/0/A197/01/100.

2.146 It is not possible for the design to balance all aspects of every comment so that the scheme has a neutral effect, but as much as possible has been incorporated during the evolution of the scheme, from the preliminary alignments to the scheme seeking development consent.

Consideration of Design

2.147 The proposals have sought to enhance the environment and create pockets of habitat creation wherever possible. Proposed planting of trees, shrubs, grass seeding and bulbs, in pockets of land available within the development, would make a positive contribution to the character of the landscape, whilst encouraging biodiversity at a local level'. During the design process and evolution this has always been one of the aims and elements of the scheme were developed with this in mind.

2.148 Chapter 9 considered Land Use and highlights that during the design evolution discussions were held with landowners and their requirements were incorporated into the design.

2.149 Noise will inevitably increase due to the construction and operation of the bypass and while it is not possible to eliminate this it is feasible to reduce the effect of it. Design decisions to put the road in cutting or false cutting, to improve the visual impact of the scheme, have had a secondary beneficial effect in helping to limit the extent of overall increase in noise for the scheme.

2.150 Chapter 10 considers the effect of noise. The conclusion was that while there will be an increase in permanent noise levels at some properties, the values of the noise level would be below the value from the World Health Organisation where it would be considered a nuisance. It also concluded that while noise levels would not be considered a nuisance there would be an increase in annoyance due to the new noise levels being marginally higher than the current low levels. Without the design and mitigation described in this document (and elsewhere) these noise levels would be higher.

2.151 The needs of non-motorised users have been discussed Chapter 11 and states that elements of the proposed scheme "demonstrate an awareness of existing and potential new pedestrian and other non-motorised user movement patterns in and around Morpeth. The needs of NMU's have been incorporated into the proposals, with the provision of high quality segregated facilities alongside the bypass and connections into the existing network of PRoW's" and "The cumulative effect of these measures mean that much of the effect of the bypass is already accommodated."

2.152 The effect of road drainage on the local water environment was always a high priority consideration during the design process and is discussed in Chapter 13. The aim of the

scheme has always been to have a neutral or positive benefit on the water affected by the scheme. SUDS techniques and designs have been used where possible and the runoff generated entering the local watercourses will not increase flood risk in the River Wansbeck.

2.153 The evolution of the design has also paid careful attention to the use of soils and a cut/fill balance has been achieved for the proposed design, resulting in no loss of topsoil or soil mineral resources within the area. Chapter 14 acknowledges that there is no possible mitigation for the loss of agricultural soils other than the reuse elsewhere.

Summary

2.154 Table 2.23 tabulates the summary of the evolution of the design.

Table 2.23 Design Evolution Summary

Evolution / Refinement		Reason / Background	When
1	Locate road in cutting.	Reduce visual effect within limits of balanced cut/fill volumes.	Constant Design Aim
2	Laybys added.	Comply with layby spacing along route.	Constant Design Aim
3	Stock underpass.	Allow livestock to safely cross bypass on severed farm.	2002 & April 2009
4	Link from A1 junction to St. Leonard's Lane.	Local Parish Council request when A1 junction was separate scheme.	June 2003
5	Crossing of bypass by Fulbeck Road.	Desire to keep link open.	February 2008
6	Additional landscape planting and screening of A1 junction.	To mitigate visual effect on residents of Lancaster Park.	Post March 2008
7	Diversion / Relocation of PF13.	Access and safety of users.	March 2008 – March 2010
8	A697 cycle facilities.	Additional cycling link from Fairmoor to A697. Subsequently removed.	March 2008 – September 2011
9	Replacement of bridges with buried arch structures.	Cost savings and simpler engineering.	Pre October 2008
10	Bus laybys added.	Bus routes should be diverted therefore some provision on new (envisaged) route provided.	Post October 2008
11	Creation of cycle lanes on existing A192.	Following discussions with cycling groups. Better utilisation of carriageway space. Aids geometric design of Northgate roundabout.	January 2009
12	Mammal tunnels under bypass.	Recommendation of consultant ecologist.	February 2009
13	Bat roosts in How Burn	Recommendation of consultant	February 2009

Evolution / Refinement		Reason / Background	When
	structure.	ecologist.	
14	SUDS drainage.	Change of design to follow current guidance. Also cost savings.	Mid 2009
15	Northgate roundabout moved off existing A192.	Minimises disruption during construction. Better design for 5th leg. Reduces potential land issues.	October 2009
16	False cutting added between Cotting Burn and Fulbeck Road Bridge.	Additional visual screening of road from Fulbeck properties.	Post March 2010
17	Reduction in third leg length on St. George's Roundabout.	Not essential to scheme and therefore cannot be included in purchase orders.	April 2012
18	Drainage pond arrangement at St. George's amended.	Allowance of better use of remaining land by landowner.	April 2012
19	Reduction in fifth leg length on Northgate Roundabout.	Not essential to scheme and therefore cannot be included in purchase orders.	April 2012
20	Increase of water storage requirements.	EA requirement to store runoff from 1 in 100 year storms.	September 2012
21	Reduction of Fulbeck Lane road bridge width.	Project Board decision.	January 2013