

2 The Proposed Scheme

2.1 Need for the Scheme

The RAP and FSR established the existing traffic conditions along the A68 and identified local constraints to traffic flow. It then defined priorities for localised improvements and increased overtaking opportunities. This was completed by taking traffic modelling, engineering, environmental and economic conditions into consideration. The findings of the RAP stated that this particular section of road has the poorest sections of road geometry in the study area and is out of keeping with the current design speed.

The preferred scheme's overtaking priority differs from that shown in the overall strategy described in A68 RAP. Due to severe engineering constraints, associated with the abandoned limestone workings in the Hope area and the presence of the high pressure gas main, the proposed scheme has been moved further south than was envisaged at the initial feasibility stage. However, the overtaking priority does fit well with the adjoining sections of road as it is extremely unlikely that any major improvement works will take place where the Cakemuir Burn crosses beneath the trunk road in a deep valley at Fala Tunnel.

Southbound overtaking will help reduce the traffic platoons that develop initially in Pathhead and are then continued between Pathhead and Hope whereas the northbound overtaking will provide definitive overtaking for traffic which has had little scope to overtake safely since Soutra.

The changeover sections at junctions will provide refuge for right-turning vehicles where none exist at present.

2.2 Scheme Objectives

The following main objectives are applicable to the scheme:

- To improve the operational performance and level of service on the A68 by reducing the effect on driver stress and journey times by constructing dedicated overtaking sections designed to break up convoys/platoons;
- To improve and increase the number of overtaking opportunities to reduce the conflicts between long distance users, local and agricultural traffic;
- Wherever practicable, incorporate measures for non-motorised users. In particular cycling proposals shall be designed in accordance with the 'Trunk Road Cycling Initiative' which supports the Sustrans Millennium National Cycle Network;
- Maintain the asset value of the A68;
- Mitigate the environmental impact of the new works where possible; and

- Achieve good value for money for both taxpayers and road users.

Improvement of the A68 is identified as having the ability to provide benefits and opportunities in terms of the Scottish Government's five transport objectives (environment, safety, economics, accessibility and integration).

2.3 Alternative Scheme Options

As mentioned in Chapter 1, a total of three options were initially developed at Stage 1, but following a workshop in July 2004, it was agreed that only one scheme was feasible to take forward to Stage 2. A summarising version of the Stage 2 Assessment Report was issued in August 2004 and approved by the SE in January 2005. At Stage 3, the SE confirmed that due to the significant costs associated with an overtaking scheme directly to the south of Pathhead, with the associated Public Utilities diversions and abandoned lime working protection measures, SE would have difficulty promoting the preferred scheme.

Six new economically viable options for the proposed scheme, between Hope and Fala Tunnel, were developed with summary tables of issues and benefits. The SE concluded that options 12 and 14 were granted approval for a Stage 2 assessment to be undertaken. Following discussions within the Standards Section at the SE a further option was developed as a hybrid of option 14 and it was called Option 14A. All of the proposed schemes comprised an alternating WS2+1 scheme where the carriageway configuration consisted of a wide single carriageway with two lanes in one direction (providing dedicated overtaking opportunities) and one lane in the opposite direction (with overtaking prohibited).

2.3.1 Option 12

This option was centred on the B6458 Tynehead junction and provided southbound overtaking from the U60 Longfaugh junction to the Tynehead junction and northbound overtaking on the straight from Fala Tunnel to the Tynehead junction.

The scheme would commence just north of the U60 Longfaugh junction with a non-critical changeover incorporating a right-hand turning refuge for the T-junction to Longfaugh (U60). The changeover would be 355m long. To maximise the southbound overtaking, the U60 junction would be relocated approximately 65m further north with the existing junction being stopped up.

The existing U77 Fala Dam and the U78 Costerton junctions would also be stopped-up. Access to land and the various properties to the east of the trunk road would be provided by a new access road formed closer to the Tynehead junction which joins the existing U77 around Haugh Head House. The existing U78 Costerton side road may be left in-situ and utilised as a pedestrian and cycle route.

The new side road would form a left/right stagger junction with the existing B6458 Tynehead junction. This junction also forms a critical changeover section where the

direction of overtaking is changed. The total length of the changeover would be 466m. The B6458 junction would be moved around 5m further north so that it is perpendicular to the proposed A68 alignment.

The commencement taper at Fala Tunnel will take the form of a climbing lane start taper and would be 145 metres long. This will allow the southbound lane to be widened from 3.4 metres to 3.65 metres over the taper length. In the northbound direction, the lane would be widened from 3.65 metres to 6.6 metres over this length.

The overall length of Option 12 would be 2574 metres.

The new WS2+1 carriageway would be constructed on the existing alignment. The existing carriageway width is 7.3m (S2 without hardstrips) throughout. The carriageway widening requirements would therefore be 5.70m. The actual widening would, however, vary from this to take account of differences between new and existing verge widths, variations in existing verge widths, changes in height of embankments and depths of cut and allowance for set-back of boundary fences.

Widening would in general be limited to one side of the road only. This will limit the environmental impact of the scheme and minimise the cost of diverting public utilities.

The widening would be adjacent to the existing southbound carriageway from the tie-in, Chainage (Ch) 01+61, to Ch 14+50, then the widening would cross to the northbound carriageway between Ch 14+50 to Ch 19+00 (Tynehead Junction) and remain adjacent to the northbound carriageway to the southerly tie-in at Ch 27+35 (Fala Tunnel).

The existing Salters Burn culvert on the A68 at Ch 9+60 would require to be extended to accommodate the widening adjacent to the southbound carriageway. There is also one minor watercourse that crosses beneath the A68 north of the B6458 Tynehead junction at Ch 14+90. This minor watercourse is piped under the existing trunk road and this pipe would have to be extended.

All of the ten existing field accesses off the trunk road would be stopped up and alternative means of access provided.

Magazine Wood lay-by, which is located at the northern tie-in of the scheme, would be stopped up as this area would be utilised for the widening of the carriageway adjacent to the existing southbound lane of the A68. The non-standard lay-by, which is located 250m north of the B6458 Tynehead junction, would be stopped up and an access would be provided to the Scottish Water pumping station from the B6458.

2.3.2 Option 14 (All junctions re-aligned to coincide with changeovers, U78 Stopped up)

This option was centred on the B6458 Tynehead junction and provided southbound overtaking from the U60 Longfaugh junction to the Tynehead junction and northbound overtaking on the straight from Fala Tunnel to the Tynehead junction.

The scheme would commence just north of the U60 Longfaugh junction with a non-critical changeover 472 metres long, incorporating a right/left stagger junction. The U60 Longfaugh and U77 Fala Dam side roads would both be re-aligned to create the stagger junction. The U60 junction would be relocated approximately 65m further north than at present and the U77 junction would be moved 490m further north to create the right/left stagger. Both existing U60 and U77 junctions with the A68 would be stopped up.

This option would create a critical changeover incorporating the B6458 Tynehead junction. The junction would be moved 5m further north so that it is perpendicular to the proposed A68 alignment. The changeover would provide a right turning refuge for southbound vehicles. The total length of the changeover would be 400 metres.

The existing U78 Costerton junction would be stopped-up with the road possibly left in-situ and utilised as a pedestrian and cycle route.

The commencement taper at Fala Tunnel will take the form of a climbing lane start taper and would be 145 metres long. This will allow the southbound lane to be widened from 3.4 metres wide to 3.65 metres over the taper length. In the northbound direction, the lane would be widened from 3.65 metres wide to 6.6 metres over this length.

The overall length of Option 14 would be 2574 metres.

The new WS2+1 carriageway would be constructed on the existing alignment. The existing carriageway width is 7.3m (S2 without hardstrips) throughout. The carriageway widening requirements would therefore be 5.70m. The actual widening would, however, vary from this to take account of differences between new and existing verge widths, variations in existing verge widths, changes in height of embankments and depths of cut and allowance for set-back of boundary fences.

Widening would in general be limited to one side of the road only. This would limit the environmental impact of the scheme and to minimise the cost of diverting public utilities.

The widening would be adjacent to the existing southbound carriageway from the tie-in, Chainage (Ch) 01+61, to Ch 14+580, then the widening would cross to the northbound carriageway between Ch 14+50 to Ch 19+00 (Tynehead Junction) and remain adjacent to the northbound carriageway to the southerly tie-in at Ch 27+35 (Fala Tunnel).

The existing Salters Burn culvert on the A68 at Ch 9+60 would require to be extended to accommodate the widening adjacent to the southbound carriageway. There is also one minor watercourse that crosses beneath the A68 north of the B6458 Tynehead junction at Ch 14+90. This minor watercourse is piped under the existing trunk road and this pipe would have to be extended.

All of the ten existing field accesses off the trunk road would be stopped up and alternative means of access provided.

Magazine Wood lay-by, which is located at the northern tie-in of the scheme, would be stopped up as this area would be utilised for the widening of the carriageway adjacent to the existing southbound lane of the A68. The non-standard lay-by, which is located 250m north of the B6458 Tynehead junction, would be stopped up and an access would be provided to the Scottish Water pumping station from the B6458.

2.3.3 Option 14A (Direct Access to U77, U60 & B6458 at changeovers, U78 stopped-up)

This option was centred on the B6458 Tynehead junction and provides southbound overtaking from the U60 Longfaugh junction to the Tynehead junction and northbound overtaking on the straight from Fala Tunnel to the Tynehead junction.

The scheme would commence just north of the U60 Longfaugh junction with a non-critical changeover incorporating a right-hand turning refuge for the T-junction to Longfaugh (U60). The changeover would be 355m long. To maximise the southbound overtaking, the U60 junction would be relocated approximately 65m further north with the existing junction being stopped up.

The U77 Fala Dam road would be re-aligned locally to create a simple T-junction with the A68 some 30 metres further south of the existing junction. No turning facility would be provided for this junction as it would connect to the two lane side of the new carriageway. The access to the private residence of Marldene would also be re-aligned to connect with the new U77 alignment.

This option would create a critical changeover section incorporating the B6458 Tynehead junction. The junction would be moved 5m further north so that it is perpendicular to the proposed A68 alignment. The changeover would provide a right turning refuge for southbound vehicles. The total length of the changeover would be 400 metres.

The existing U78 Costerton junction would be stopped-up with the road possibly left in-situ and utilised as a pedestrian and cycle route.

The commencement taper at Fala Tunnel will take the form of a climbing lane start taper and would be 145 metres long. This will allow the southbound lane to be widened from 3.4 metres wide to 3.65 metres over the taper length. In the northbound direction, the lane would be widened from 3.65 metres wide to 6.6 metres over this length.

The overall length of Option 14A would be 2574 metres.

The new WS2+1 carriageway would be constructed on the existing alignment. The existing carriageway width is 7.3m (S2 without hardstrips) throughout. The

carriageway widening requirements would therefore be 5.70m. The actual widening would, however, vary from this to take account of differences between new and existing verge widths, variations in existing verge widths, changes in height of embankments and depths of cut and allowance for set-back of boundary fences.

Widening would in general be limited to one side of the road only. This would limit the environmental impact of the scheme and to minimise the cost of diverting public utilities.

The widening would be adjacent to the existing southbound carriageway from the tie-in, Chainage (Ch) 01+61, to Ch 14+50, then the widening would cross to the northbound carriageway between Ch 14+50 to Ch 19+00 (Tynehead Junction) and remain adjacent to the northbound carriageway to the southerly tie-in at Ch 27+35 (Fala Tunnel).

The existing Salters Burn culvert on the A68 at Ch 9+60 would require to be extended to accommodate the widening adjacent to the southbound carriageway. There is also one minor watercourse that crosses beneath the A68 north of the B6458 Tynehead junction at Ch 14+90. This minor watercourse is piped under the existing trunk road and this pipe would have to be extended.

All of the ten existing field accesses off the trunk road would be stopped up and alternative means of access provided.

Magazine Wood lay-by, which is located at the northern tie-in of the scheme, would be stopped up as this area would be utilised for the widening of the carriageway adjacent to the existing southbound lane of the A68. The non-standard lay-by, which is located 250m north of the B6458 Tynehead junction, would be stopped up and an access would be provided to the Scottish Water pumping station from the B6458.

2.4 Selection of the Preferred Scheme

The Stage 2 Environmental Assessment Report identified Option 14A (Figure 2.1) as the preferred scheme on the following grounds:

- The key environmental issues were identified as ecology, landscape/visual, change in vehicle journey times, safer provision for pedestrians and cyclists and the reduction in driver stress due to improved overtaking facilities, reduced driver frustration and lower accident risk. For all of these assessments except reduction in driver stress, Option 14A was assessed as having the least negative impact, primarily due to less overall land take, and was determined as the preferred option. However, the direct access to the U77 in the middle of the southbound overtaking section was deemed to be the poorest in terms of driver stress, as it would not reduce the accident risk as much as Options 12 and 14 and there was a greater likelihood of platoons being formed as a result of vehicles stopping to turn right on the single lane.

In terms of the Stage 2 Engineering, Traffic and Economic Assessment, Option 12 (Figure 2.1) was determined as the preferred option based on the following factors:

- All options will increase the number of overtaking opportunities and reduce the conflicts between long distance users and local/agricultural traffic.
- All options will improve the operational performance, level of service and safety on the A68 by constructing guaranteed overtaking sections designed to break up the effects of convoys/platoons. This will give more reliable journey times and reduce driver stress.
- All options involve the construction of on-line overtaking sections; carriageway widening; the rationalisation of side road junctions and realignment improvements to junctions and bends.
- All options will incorporate the needs of pedestrians and cyclists, and acknowledge the "Trunk Road Cycling Initiative" which supports the Sustrans Millennium National Cycle Network.
- All options will maintain the asset value of the A68.
- All options mitigate the environmental impact of the new works where possible by undertaking the construction within the existing highway boundary.
- Option 12 and Option 14A are considered similar in environmental terms with Option 14 least preferred.
- Option 12 and 14 are considered similar in safety terms with Option 14A least preferred.
- Option 14A is preferable in economic terms.
- Option 12 is preferable in accessibility terms.

Option 12 was chosen as the preferred scheme fundamentally in relation to safety, as all the junctions are incorporated into a changeover section, which reduces the risk of accidents.

2.5 Scheme Description

Detailed illustrations of the scheme proposals for the preferred Option 12 are presented in Figures 9.3 to 9.6 of the Landscape Section.

The preferred scheme option is centred on the B6458 Tynehead junction and provides southbound overtaking from the U60 Longfaugh junction to the Tynehead junction and northbound overtaking on the straight from Fala Tunnel to the Tynehead junction. The scheme starts approximately 500 metres north of the existing U60 Longfaugh junction and ties in with the northern bend at Fala Tunnel. The overall length of the A68 improvement is 2.51km, plus improvements to the side roads and farm/residential accesses.

The new carriageway configuration will comprise alternating WS2+1. The WS2+1

consists of a wide single carriageway with two lanes in one direction providing dedicated overtaking opportunity and one lane in the opposite direction with overtaking prohibited in that direction. A typical example of the WS2+1 arrangement, based on that developed for other proposed Scottish WS2+1 schemes, such as the improvements at Soutra Hill on the A68 south of the Pathhead scheme, is illustrated below.



Overtaking will be provided in both northbound and southbound directions as illustrated in Figures 9.3 to 9.6. The southbound overtaking will be approximately 833m in length extending from the Ghost Island junction for the U60 Longfaugh Junction, terminating at the stagger junction changeover, 190m north of the new side road linking the A68 with the U77. A left/right stagger junction changeover section of approximately 463m in length will then be provided to allow safe access to and from the new side road and the B6458 Tynehead junction. The northbound overtaking will be approximately 648m in length and commence 130m north of Fala Tunnel, to 180m south of the Tynehead junction, terminating at the stagger junction changeover.

The scheme will commence just north of the U60 Longfaugh junction with a non-critical changeover incorporating a ghost island junction configuration to provide turning refuge for the T-junction to Longfaugh (U60). The private access track to Magazine Wood and the Haugh field to the east of the A68 will be provided from the rear of the relocated Magazine Wood lay-by, just north of its existing position. The U60 junction will remain in its existing location, but will be improved to incorporate a channelising island.

The existing U77 Fala Dam and the U78 Costerton junctions with the A68 will be closed as part of the preferred scheme. Access to land and the various properties to the east of the trunk road will be provided by a new access road, between the A68 and the U77, commencing in a left/right stagger arrangement with the B6458 Tynehead junction and joining the existing U77 around Haugh Head House. This new side road crosses two small drainage ditches that emanate from the surrounding farm land. The ditches will require to be culverted to allow for the side road crossing. The design of the culverts has yet to be finalised, but this will be completed in consultation with statutory consultees and incorporate their requirements regarding passage of fish and other wildlife. The existing U78 Costerton side road will be left in-situ and utilised as a pedestrian and cycle route and as a field access for Saughland Farm, with rights for Scottish Water to maintain their plant within the verge of the side road.

The commencement taper at Fala Tunnel will take the form of a climbing lane start taper and will be 130 metres long. This will allow the southbound lane to be reduced from 5.0 metres to 3.65 metres over the taper length. In the northbound direction, the lane will be widened from 3.65 metres to 8.0 metres over this length.

All of the existing ten field access points off the Trunk Road will be stopped up. Alternative means of access to these fields will be provided with the use of new and existing field access points located on the side road and adjoining fields.

The existing disused loop layby at Magazine wood, in its current position, would exit onto the proposed ghost island junction for the U60. Therefore an alternative, but similar configuration of layby, will be provided immediately to the north of the existing layby. Two further maintenance laybys will be incorporated into the scheme, one adjacent to the northbound carriageway, 220m north of Tynehead junction and the second adjacent to the southbound carriageway, 200m north of Fala Tunnel. The first layby will be utilised for road maintenance, while providing access for Scottish Water to their plant in this area. The second will be used for road maintenance, while providing safe vehicle refuge for telecommunication companies to access their apparatus in the vicinity of Fala Tunnel.

2.6 Predicted Benefits of the Proposed Scheme

The proposed WS2+1 scheme has been designed to meet current design standards as stipulated in DMRB Volume 6 and the Highways Agency's Draft Advice Note on Wide Single Carriageways. The scheme fulfils the objectives of providing dedicated overtaking opportunities both northbound and southbound, removing drivers stress from frustration and also reducing the risk of potential accidents occurring at local access junctions with the A68.

The most noticeable benefit will be a change in travel times for vehicle travellers using the A68. The preferred scheme provides overtaking opportunities for convoys/platoons that have formed to the north through the village of Pathhead and from the south between the overtaking provision, some 4km to the south of Fala Tunnel at Soutra Hill.

This improvement combined with the existing WS2+1 on the top of Soutra Hill, the existing climbing lane on the south side of Soutra and the proposals for a WS2+1 between the bottom of Soutra Hill and Carfrae roundabout to the south, will provide additional overtaking opportunities for travellers, improving upon travel times along with alleviating levels of driver stress. In addition, conflicts between long-distance users and local / agricultural traffic will be reduced by this scheme.

Benefits of the scheme will also be to improve the operational performance of the A68 and provide a better level of service.

With the incorporation of the proposed new access tracks and side road, severance of existing properties and farmland in the immediate area will be minimised. Benefits will also be available from the realignment of other junctions and the geometry improvements to the A68.

Cyclists and pedestrians will be provided with a widened footway adjacent to the northbound carriageway, linking to the existing footway to the north and south, but a 1m wide verge will be created between the edge of the carriageway and this pedestrian and cyclist facility. The U78 will be stopped up as part of the scheme but the road will be left in situ to provide a link between the side road networks either side of the A68 corridor.

The WS2+1 dedicated overtaking layout will enable closure of one lane during general route maintenance works whilst allowing traffic to continue to flow freely in both directions and therefore minimise disruption.

The proposed scheme involves on-line construction and therefore aims to minimise potential adverse environmental impacts, particularly due to the close proximity of sensitive habitats such as the local watercourses.

2.7 Construction Programme

It is anticipated that the construction of the preferred scheme will commence December 2009. Construction will last for a period of approximately 52 weeks with substantial completion by December 2010.

The sequence of construction activities on site is anticipated to be as follows:

Preliminary Works (Winter 2009)

- Site establishment including material/plant storage compound.
- Erection of temporary fencing.
- Installation of temporary pollution control measures / pre-earthworks drainage.
- Undertaking of site clearance works, including necessary removal of any vegetation or dry stone walls.
- Creation of haul roads/access locations and setting up of traffic management requirements.

Main Works (February 2010 – October 2010)

February 2010 – May 2010

- Topsoil stripping, soil to be carefully removed and stored appropriately for re-use on site.
- Commence earthworks.
- Undertake bulk earthworks – cut, fill and capping (reuse/import of acceptable material and disposal of unacceptable materials).
- Install SUDS for settling of run-off (reed beds, filter drains) and permanent outfall arrangements.
- Provide accommodation works.
- Reinstate topsoil.

June 2010 – October 2010

- Laying of sub base.
- Laying of base course.
- Laying of binder course
- Laying of surface course.
- Extension of existing culverts and installation of new beneath the new side road.
- Construct kerbs, footways and paved areas.
- Undertake road marking and erect traffic signs.
- Completion of drainage.

Finishing Works (October 2010 to December 2010)

- Completion of side roads.
- Complete outstanding surfacing and road markings.
- Commence landscaping and planting proposals.
- Complete site restoration / snagging exercise.
- Dismantle site facilities.

A critical programming activity will be the lowering of the A68 at Tynehead, to provide 215m forward visibility in the completed scheme, as the widening also changes from the east to the west side of the A68. The lowering of the A68 affects the existing culvert immediately to the north of Tynehead junction and it will require to be re-aligned vertically, keeping a gravel bed and incorporating a mammal ledge for the otters and badgers in the vicinity. These works will be scheduled to take place between June and October 2010. In general this work will cause significant disruption to the road user because both lanes of the existing carriageway will be affected.

Restrictions on the flow of existing vehicle travellers will unavoidably occur during construction works as the majority of the preferred scheme is an on-line proposal. The improvements mentioned above will affect the motorist along with the improvement of

junctions, the connection of the third lane onto the existing carriageway, overlaying the existing carriageway, mammal crossings and both scheme tie-ins.

2.8 Construction Methods

It is anticipated that conventional construction methods will be employed for the majority of the preferred scheme with no special techniques being required, except for the extension/installation of culverts, which will require sensitive working procedures and timing of works to minimise the environmental impact upon ditches and watercourses.

The scheme essentially involves road widening with the existing road construction being incorporated into the new road by means of a bituminous overlay. This would considerably reduce the quantity of new sub-base material required and the amount of spoil generated.

It is unlikely that there would be scope for the re-routing of traffic and consequently traffic flow would have to be maintained on the trunk road. Traffic management methods would be in place for the duration of the construction period. This would permit two-way flow for the majority of the construction period, probably with a reduced speed limit in place. It would however be necessary, at times, to operate a traffic light or convoy system to ensure a safe working area for the Contractor to complete the earthworks adjacent to the existing carriageway, to construct structures across the road or undertake surfacing/lining works. The traffic management proposals will be co-ordinated with the Trunk Road Maintaining Authority BEAR.

To minimise the hauling distance of plant, it would be likely that suitable material excavated from the cut area would be used in the nearest areas of fill. Imported fill would be used to complete the upfill of embankments. It is possible that this imported fill could be sourced from the newly opened quarry on the north side of Soutra Hill and that lorries transporting the fill would take unsuitable excavated material to tip off site. It is also possible that any capping material required would also be supplied from the same quarry.

Sub-base would be placed on the road formation as soon as it is prepared to prevent deterioration of sub-grade from adverse weather conditions and construction plant trafficking. The sub-base would probably come from the nearest suitable quarry which would be either Bangley quarry at Haddington or Craighouse quarry near Earlston.

Bituminous coated material would follow as base, binder and surface courses. These materials would probably be obtained from either Bangley quarry at Haddington or Craighouse quarry near Earlston.

The scheme would be completed with the erection of traffic signs, the installation of road markings and the commencement of the landscaping works.

2.8.1 Earthworks

The approximate earthwork quantities would be as follows:

Cut: 16,694 cubic metres

Fill: 41,613 cubic metres

It is anticipated that a proportion of the cut material will be suitable as fill. These quantities, based on the results of the 2006 ground investigation interpretative report (September 2006), have been estimated as follows:

Granular Material: 9,100m³ potentially available.

Clays: 700m³ potentially available.

Unacceptable: 3,000m³ potentially unusable.

It should be noted that the proportion of clay is greater than expected in the Stage 2 assessment. All site won cut materials are to a greater or lesser degree, weather susceptible, with increases in moisture content due to heavy rain or poor drainage measures resulting in less material remaining acceptable. This is more so with the clays than the granular soils, and the above quantities are base on good weather conditions. Therefore the exact amount of excavated material that can be re-used as suitable fill will be maximised if the weather is dry and the material can be kept free of water during earthworking operations.

Topsoil over natural ground was encountered across the site in fields and landscaped areas with thicknesses varying between 300mm and 450mm. It is likely that the majority of this topsoil will be suitable for covering conventional slopes and verges as Class 5A material (acceptable topsoil). Verge topsoil was also reasonable at CH0+00 to CH4+75 and CH15+50 to CH19+25 on the A68 and in the side roads, where it averages 200mm, but it is generally thin and poor quality elsewhere.

Unfortunately, due to the topography, in particular the embankment widenings which tend to predominate, it is not possible to achieve a perfect earthwork balance which would negate the requirement for imported material. So even with good site earthworks management and reasonable weather conditions (assuming earthworks are not undertaken during winter) the required import will equate to 27,800m³ assuming that all the acceptable cut can be used. Similar protective measures should be applied to *in situ* carriageway formations in areas of clays.

Earthworks slopes of between 1:1.8 and 1:2.25 (vertical : horizontal) are proposed for the cuttings (averaging at 1:2), with embankment side slopes of 1:2.1 for clays (Class2) and 1:1.9 for granular materials (Class1).

2.8.2 Construction Plant

The type and number of construction plant used would vary throughout the construction period depending on the operations being undertaken. An indication of plant that would be used on the scheme is given in Table 2.1 below.

Table 2.1. Typical Construction Plant.

Transport	No.	Earthworks	No.	Drainage	No.
Low Loader	1	Tracked Excavator (25T)	2	Excavator	1
Tipper Lorry (16T)	5	Dump trucks (25T)	4	Dumper (6T)	2
Pick-up (7.5T)	2	Dumper (9T)	2	Cat 943	1
		Dozer (Cat D6)	2		
		Vibratory Rollers	2		
Surfacing	No.	Structures	No.	Miscellaneous	No.
Planing Machine	1	Mobile Crane	1	Fuel Bowser	2
Paving machine	1	Vibrating Poker (2")	2	2" Pump	2
Roller	2	Vibrating Poker (6")	2	Vibrating Plate Compactor	2
Bond coat sprayer	1			Generator and Lighting Set	2
				Traffic Lights Set	2
				Road Marking Machine	1

It is not anticipated that there would be any exceptionally noisy activities such as piling or rock blasting. There would however be a requirement to use vibratory rollers for compaction of granular material during earthworks fill, capping and sub-base operations. Although these activities are anticipated to be of short duration and intermittent in nature, the Contractor will be required to adhere to maximum noise levels which will be specified within the contract document in accordance with Midlothian Council requirements.

2.8.3 Vehicle Movements

The main access route to the site will be the A68 trunk road. The direction of traffic to and from the site would be dependent on where the Contractor locates offices, stores, plant and equipment and where the labour force travels from each day. Mobilisation and demobilisation of plant and equipment during the construction period would entail approximately 300 return trips each using low loaders and other goods vehicles. Travel to and from site would entail approximately 30 return trips each day in pick-ups and cars. Materials may come from a number of different suppliers. Imported fill will generate 3000 return trips, capping would generate 350 return trips, sub-base 400 return trips, coated materials 900 return trips and miscellaneous materials such as

precast concrete units, ready mix concrete, etc. a further 200 return trips, mainly in 16-20 tonne tipper trucks.

Over the duration of the contract, the average number of return trips per day would be approximately 50. This equates to two-way traffic flow of 100 vehicles per day, which represents 1.08% of the annual average daily flow of approximately 9200 vehicles per day on the A68 at Pathhead. There would however be considerable variation in the number of daily trips depending on the operations being undertaken on site at the time. It is anticipated that vehicle movements will be most frequent from the site compound at both the beginning and end of the working day.

Vehicles travelling south to the site will likely pass through Dalkeith and Pathhead whereas vehicles travelling north will pass through Earlston and Lauder.

2.8.4 Hours of Working

Working hours will depend on the contractor employed to complete the works but normal working hours within the site are likely to be set as Monday to Friday between 0730 and 1800 hrs and Saturday between 0800 and 1300 hrs. No work is usually undertaken on a Sunday. Exceptionally, written consent for work outside these hours could be sought from the overseeing organisations.

2.8.5 Lighting Requirements

Lighting is likely to be required within the site compound area during the winter period for safety reasons. Portable lighting may be required during the construction phase if natural light is inadequate during working hours. Portable lighting may also be required overnight where structures are being completed and in areas where temporary traffic diversions are in place. No requirement for permanent lighting is envisaged.

2.8.6 Fencing

It would be likely that the permanent boundary fence would be installed on both sides of the road at the start of the works to remove the risk of farm stock straying onto the road.

2.8.7 Establishment of Site Compound and Services

The area required for the permanent works would not accommodate a temporary site compound. It would therefore be the responsibility of the Contractor to identify an area for the site compound in conjunction with local landowners and the Midlothian Planning Authority. However, the compound should be sited appropriately, well away from watercourses and so that, after site restoration, there are no permanent environmental impacts.

Once the area for the compound is agreed, topsoil will be stripped and the area covered with sub-base material. The area may also be surfaced if necessary. Portable

cabins will be erected on site to accommodate offices and welfare facilities. The site compound will require temporary services, e.g. electricity, telephone, water supply and sewage disposal.

The compound area will be defined using security fencing. A night watchman may be employed to reduce the possible threat of vandalism or theft of site equipment.

The reinstatement of the compound area will require the removal of temporary services, surfacing and sub-base and the area finished to the satisfaction of the landowner

2.8.8 Traffic Management

General traffic management measures will be required but will be the responsibility of the Contractor. No additional land take is expected for this purpose and any ancillary services will be determined and decided upon by the Contractor. A traffic management plan will also be prepared for the preferred scheme.

2.8.9 Environmental Protection

The Contractor will be required to operate a quality management system for construction of the works. This will include an Environmental Management System (EMS) to avoid, wherever possible, environmental accidents and pollution incidents and to encourage reduced consumption of resources and to restrict the production of waste. There will be a requirement to produce site specific method statements for all operations where there may be a risk of environmental damage. SEPA's special requirements would also be included as part of the conditions of contract for the scheme.

Any areas needing special protection would be fenced off and access restricted.

2.8.10 Pollution Prevention Measures

The contractor will be required to comply at all times with the requirements of the final scheme specification with regard to prevention of pollution. Consultation will be held with SEPA to agree measures required to prevent pollution to watercourses, measures to deal with accidental spillages and discharge points to watercourses. Generators will be housed within bunded containment areas to prevent possible spread of any accidental spillages. The specification will outline requirements for all cutting equipment to be water-cooled. If necessary, wheel washing facilities will be made available so as to avoid deposition of dirt onto public roads and to reduce the possibility of contamination of watercourses. A portable bowser will be utilised to dampen dry surfaces to avoid unnecessary dust emission.

Surface water drainage will be controlled during the construction period with the use of temporary swales/settlement facilities or other measures of best practice, as appropriate. These will be discussed in advance of works with SEPA and the

number/location/type/size of measures agreed. The assessment provided within this report and associated identification of mitigation/compensatory measures will assist in identification of these particular measures (Road Drainage and the Water Environment, Ecology and Nature Conservation and Disruption due to Construction Chapters).

With respect to the extensions/installation of culverts, a detailed Construction Method Statement will be produced which will outline in detail, the specific pollution prevention methods required for this aspect of work. This will be approved by SNH and SEPA as part of the Water Framework Directive.

2.8.11 Landscaping Proposals

Appropriate landscaping will be developed for the preferred option within the assessment (Landscape chapter) and will be designed and specified by professional landscape specialists. The aim of the final planting scheme will be to blend the new road alignment into the surrounding landscape as much as possible. Planting will be in keeping with existing natural vegetation patterns and types and native species only will be used.

Landscaping will probably consist of grassing to verges, hedging to new boundary fences and the enhancement of tree belts throughout the scheme. There will be minor landscaping earthworks associated with the detention ponds and other Sustainable Drainage System provisions.

It is envisaged that sufficient topsoil will be available from site to meet the requirements of the scheme and consequently there would be no need to import topsoil.

2.9 Operational Requirements

2.9.1 Traffic

It is not anticipated that there will be any significant increase in traffic on the A68 trunk road as a result of implementation of the scheme. The annual average daily traffic flow (AADT) will therefore be approximately 9800 vehicles per day on the year of opening of the scheme.

Stopping up of the U77 and U78 junctions will combine the traffic figure on the new side road to approximately 150 vehicles per day.

2.9.2 Drainage System

It is anticipated that the proposed road drainage system will consist of filter drains along both sides of the carriageway with catch pits constructed at appropriate intervals. Catch pits will discharge into swales along the foot of the batters and/or settlement ponds before outfalling into watercourses. It is not envisaged that there will be a need to provide specific accidental spillage containment facilities within swale/settlement pond systems. Detailed discharge arrangements for the preferred scheme are

currently being discussed in detail with SNH and SEPA as part of the Water Framework Directive.

2.9.3 Permanent Fencing

Stock proof fencing will be installed in agreement with the affected landowners but will typically comprise 1.1m high timber post and/or wire mesh fence topped with barbed wire. It is possible that this will be supplemented with rabbit netting to protect newly planted hedging. It is also possible that badger/otter fencing may be required in certain places (as identified in Ecology and Nature Conservation chapter).

2.9.4 Road Surfacing and Furniture

The 13.5m wide carriageway will be surfaced with a combination of Hot Rolled Asphalt (HRA) and thin wearing coarse systems, depending on the skid resistance requirements at specific locations.

There will be signs associated with the alternating WS2+1 road configuration which will consist of road narrows ahead signs with 400yds, 200yds and three lane plates. These signs will be provided on both sides of the road at either end of the changeover section, constituting twelve signs in the vicinity of each changeover section. Advance direction and direction signs at each of the junctions will also be required, along with new road layout ahead signs at each end of the new scheme. Advanced signs will be provided at 2km and 1km intervals an approach to the scheme in both directions. There will be no need for overhead gantries.

Safety fencing will extend along the southbound carriageway embankment to suitable termination points.

The Traffic Master mast adjacent to the A68 north of Tynehead and Post Office box at the Tynehead junction will be repositioned slightly due to the geometric changes to the A68 and Tynehead junction. The existing speed camera on the A68 south of the U60 Longfaugh junction will be re-located after discussions with Midlothian Council and Lothian & Borders Police.