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1 Introduction

1.1 Purpose of the Report

1.1.1 This Scheme Assessment Report has been prepared using the Highways Agency’s guidance included within the Design Manual for Roads and Bridges (DMRB). This guidance describes three stages of scheme assessment and how these should be reported. This report is written and structured in accordance with the guidelines of a DMRB Stage 3 assessment, setting out the advantages and disadvantages of the Baseline Design in terms of engineering, traffic and economics, and the environment.

1.1.2 This report forms part of the consultation exercise planned for January 2012 and is written in a clear and simple manner to ensure that the key issues are understood by all. This report makes reference to other, more technical reports, which can be made available at the local consultation exhibitions if required.

1.1.3 The design described within this report is referred to as the Baseline Design. This is supplemented by a comparative assessment of junction options, which differ from the Baseline Design in terms of how traffic would join or leave the new A556, and also how local traffic would cross the new A556. These options are reported separately in the Junction Options Comparative Assessment Report (see Section 1.2 for further details).

1.1.4 This DMRB Stage 3 Scheme Assessment Report (SAR) presents the engineering, traffic and economic assessment work undertaken for the Baseline Design since the amended preferred route announcement of March 2010. It also highlights the main environmental impacts that have been identified and how these would be reduced as far as possible.

1.1.5 The environmental assessment is presented as a separate report referred to as the Preliminary Environmental Information (PEI). An executive summary of the PEI is provided within Section 7 of this report, along with the Non-Technical Summary of the PEI, which is included as Appendix C.

1.1.6 In summary, this DMRB Stage 3 SAR provides:

- An estimate of the cost of the scheme design;
- A summary of key engineering issues;
- An overview of the traffic modelling and economic assessment; and
- An executive summary of the PEI.

1.1.7 The detail provided within this report is based on the preliminary design proposals for the Baseline Design, using the knowledge acquired and survey information available at the time of writing. The design remains open to changes following the consultation, at detailed design and as a result of further value engineering.

1.2 Junction Options Comparative Assessment

1.2.1 The Baseline Design described within this SAR includes two intermediate junctions (i.e. located between M6 Junction 19 and M56 Junction 7/8), near Over Tabley and Millington. Engagement with local communities has identified some concerns about aspects of this junction strategy, although there was also explicit support for it.

1.2.2 To address the concerns that have been raised, several alternative junction strategies have been developed, incorporating different junction locations, different junction layouts and different connectivity within the local road network. A comparative assessment has been undertaken to determine the advantages and disadvantages of the various junction options.

1.2.3 The alternative options are described within the Junction Options Comparative Assessment Report, which presents the results of the assessment. This compares each of the alternatives with the design described in this SAR (the Baseline Design), and considers whether it would be better or worse in relation to engineering, cost and environmental impacts. As a result, some of the alternative options have been rejected, while others are considered to be potentially viable and are to be presented at the consultation.

1.2.4 The Highways Agency has undertaken this assessment to ensure that the public and other interested stakeholders have the opportunity to comment on the Baseline Design and the alternative junction strategies. This feedback will be taken into account when deciding the layout of the scheme and before preparing the application for a Development Consent Order\(^2\).

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1 Scheme Assessment Report (Capita Symonds, May 2008)

2 A Development Consent Order combines the grant of planning permission with a range of other separate consents, such as the right to compulsory purchase of land.
2 Scheme Background

2.1 Recent Scheme History

2.1.1 This section of the report outlines the development of the proposed scheme since the previous Stage 2 SAR of Spring 2008. Further scheme history is included within Sections 2 and 3 of the PEI, including details of alternatives considered during the development of the scheme.

2.1.2 The Stage 2 SAR compared two improvement options (referred to as Option A and Option B). The two options differed in that Option A would have bypassed Mere only, whereas Option B would bypass both Mere and Bucklow Hill. Alternative junction locations were also considered for both options as part of this comparative assessment.

2.1.3 The public were consulted on both options in Spring 2007. Feedback from the consultation was included within the Stage 2 assessment, which recommended Option B (shown in Figure 1.1) as the preferred option. This included a single junction at the A50, which was considered marginally preferable compared to alternate junction locations at that time. The recommendation was considered by the Secretary of State and confirmed as the Preferred Route in December 2008.

2.1.4 The Preferred Route announced in December 2008 did not include improvement to a short section of the A556 (approximately 600m) on the approach to the existing M6 Junction 19 roundabout. This section of the route was originally planned to be improved as part of a separate M6 Junction 11 to 19 widening scheme.

2.1.5 The Highways Agency have reviewed plans for the M6 widening scheme. Consequently, this 600m section of road is now included in the A556 improvement scheme to ensure that a consistent standard of route would be provided between the M6 and M56. Options were developed to improve this additional length of road and how best to connect into the M6 Junction 19 roundabout. This lead to a supplementary public consultation in September 2009, which considered the options shown in Figures 1.2, 1.3 and 1.4. The alternative connections considered were referred to as the Blue and Red Options. These alternatives were presented alongside the Brown Option, which was the original proposal on which the December 2008 preferred route announcement was based.

2.1.6 The Blue Option differed from the Brown Option in that it proposed to widen the existing 600m section of A556 to dual carriageway with a central reserve. The Red Option proposed an offline solution to the west of the existing route with a new connection with the M6 Junction 19 Roundabout. The existing connection of the old road to the M6 would have been removed as part of this option.

2.1.7 In March 2010 the Red Option was announced as an amendment to the preferred route of December 2008. All other aspects of the route remained unchanged.

2.1.8 The design has been developed since the amended preferred route announcement in March 2010 in order to fix the land required to construct the proposed scheme, including any areas of environmental mitigation. A series of environmental surveys have also been undertaken to inform the environmental impact assessment. This is reported in more detail in the PEI.

2.1.9 The Highways Agency have now appointed a Contractor, who will construct the scheme. The Contractor is involved at this early stage to help improve the buildability of the design and plan how the works will be undertaken. The Contractor is also assessing the overall cost of the scheme design in more detail.
2.2 The Next Steps

Development Consent

2.2.1 Following the consultation, the Highways Agency will consider all suggestions and comments. A consultation report will be produced to summarise the views and comments received, outlining how any feedback has been taken into account. This report will form part of the application to the Infrastructure Planning Commission (IPC), who will then examine the application before making a recommendation to the Secretary of State on whether to grant permission to proceed into the construction phase.

Construction

2.2.2 Subject to the outcomes and timescales of the IPC process, the current plan is to begin construction by 2015. At this stage it is estimated that the scheme will take approximately two years to build.

3 Existing Conditions

3.1 Topography and Land Use

3.1.1 The area generally comprises gently undulating rural terrain. This rises from approximately 16m Above Ordnance Datum (AOD) on the River Bollin floodplain in the north, to approximately 73m AOD close to the centre of the proposed scheme. It then gently slopes down to approximately 51m AOD at the M6 Junction 19 in the south. In addition, the land slopes towards the Mere and Rostherne Mere to the east of the scheme.

3.1.2 The majority of the design is located within the catchment of the River Bollin with the course of the river generally flowing northwards. In the southern part of the scheme area, Tabley Brook flows southwards towards the River Weaver in a narrow valley with moderately steep sloping sides. Indicative catchment areas and associated watercourses for the existing highway network are shown on Figure H.

3.1.3 Historical Maps show the route of the A556 to be present since at least 1881, where it is noted as Watling Street. With the exception of the construction of the M6 Motorway (built in the mid 1960’s) and the M56 Motorway (built in the early 1970’s), little has changed in the study area throughout the period covered by historical mapping.

3.1.4 Aside from the existing highway infrastructure, the land use in this study area is predominantly agricultural, consisting of both arable and dairy farming. There are also some areas of woodland.

3.1.5 The historical maps show the presence of numerous round ponds, some of which have subsequently been filled. The desk study report notes that these pits were associated with the excavation of calcium carbonate (marl) deposits typically at around 1.5m below ground level. Therefore, it is expected that many of the ponds will be around this depth.

3.2 Existing Highway Network

3.2.1 The A556 is a major strategic trunk road linking north Cheshire and southern Greater Manchester with the Midlands via the M6. The section of the A556 under consideration connects the M6 Junction 19 near Tabley/Knutsford with the M56 Junction 7 near Bowdon. The layout of the existing highway network is shown on Figure A.

3.2.2 The section of existing A556 under consideration is 6.5 kilometres (approx. 4 miles) long and is currently mainly single four-lane carriageway with short sections of dual two-lane carriageway. This section of the route is currently restricted to 50mph and there are numerous properties and field entrances.
3.2.3 In addition to the two motorway junctions, there are two signal controlled junctions that connect local roads to the A556; Bucklow Hill Junction and Mere Junction. At Mere Junction the right-turn movements between the A556 Southbound and A50 Westbound, and between the A556 Northbound and A50 Eastbound, are both prohibited.

3.3 Recent Changes to the Existing Highway Network

3.3.1 A number of recent Highways Agency schemes have been completed on or adjacent to the existing A556. These include:

- Installation of ‘Intelligent’ Signal Control at M6 Junction 19 (January 2007)
- MOVA (Microprocessor Optimised Vehicle Actuation) signals were installed on the M6 Junction 19 slip roads to increase traffic capacity. These intelligent signals work by monitoring the traffic flow and changing the sequence of the lights to optimise flow through the junction.
- Improvements to Bucklow Hill Junction (May 2007)
- This improvement work involved local widening of the A556 at the junction in order to provide additional lanes for right turning traffic into Bucklow Hill Lane, Chapel Lane and the A5034 Mereside Road. These works aimed to improve traffic capacity and safety through the junction by separating right turning vehicles from the through flow. Other safety improvements at this junction included the installation of new, ‘intelligent’, signal control. In addition, the section of carriageway which runs through this junction was resurfaced with new low-noise material, as well as a new island constructed to improve safety for pedestrians and cyclists wishing to cross the A556.
- Ramp Metering at M6 Junction 19

3.3.2 In 2008, part-time traffic signals were installed at M6 Junction 19 on both the northbound and southbound merge slip roads. These signals become active only when traffic flows are heavy, and control flows heading towards the M6. This improves traffic flow on the M6 through the junction. This is known as ‘ramp metering’ and is particularly important for the southbound M6 due to the high merge flow coming from the A556.

3.3.3 M56 Junction 7 Eastbound Diverge/Merge Improvements (Winter 2008)

3.3.4 With an aim to ease congestion, the M56 Junction 7 was altered in September 2007 to provide a lane drop/lane gain layout in the eastbound direction. While this improvement helped vehicles to merge more freely from Bowdon Roundabout, there was an increased delay for drivers on the main carriageway. To combat this problem, the Highways Agency carried out further works in the winter of 2008 to reinstate three lanes on the main carriageway. The junction layout was also altered to provide a ghost island merge, which utilises the hard shoulder to provide a long auxiliary lane for traffic joining the motorway from the A556.

3.3.6 The Highways Agency has recently carried out works to demolish and replace Bowdon View Bridge. This action was taken as a solution to long term problems associated with the old structure, which was subject to lane and weight restrictions. This has allowed further improvements to be carried out in order to increase the capacity of the junction including provision of an additional lane along the length of the slip road and over the structure. Improvements also included modifications to the existing M56 westbound diverge through provision of a lane drop with ghost island diverge layout and a series of gantry mounted signals and signs on the approach to the diverge.

3.4 The Need for an Improvement

3.4.1 This section of the A556 forms part of the Highways Agency’s strategic road network and is currently the only non-motorway section on the link between Manchester and Birmingham. Its improvement aims to bring significant benefits to strategic traffic between the M6, south Manchester and Manchester International Airport.

3.4.2 Traffic flows on the A556 between Knutsford and Bowdon have been surveyed at 51,500 vehicles on an average weekday. Approximately 11% are Heavy Goods Vehicles (HGVs), which is similar to the national average (10% for rural trunk roads and 12% for motorways). Most of the traffic is strategic through-traffic, which is in conflict with local traffic joining, leaving, or crossing the A556, at any of the numerous minor road junctions and private access points.

3.4.3 The A556 has been identified as one of the most congested roads in England. The traffic levels are already above the sustainable maximum for this type of road and journey times vary considerably, particularly in the northbound / Manchester direction.

3.4.4 The A556 is also the main tourist route to a popular National Trust property at Tatton Park. Traffic flows are sometimes significantly larger when national events such as the annual Royal Horticultural Society (RHS) Flower Show are held there.
3.4.5 Traffic is often severely congested in the villages of Over Tabley, Mere and Bucklow Hill, particularly at peak times, during road works and during emergency situations (such as after a road traffic accident). This congestion causes driver stress and fatigue, affects the local air quality and causes noise pollution.

3.4.6 The whole length of the A556 through and beyond the section under consideration is designated as an Air Quality Management Area (AQMA) because of pollution from vehicle exhaust emissions on the road. A large number of properties along the route, particularly around the areas of Over Tabley, Mere, Bucklow Hill and Millington, also experience high levels of noise pollution, with road traffic the dominating factor.

3.4.7 The existing road also has a poor accident record. There were 118 personal injury accidents (PIAs) within the scheme area (including relevant parts of the A50 and A5034) between January 2005 and December 2009. Fourteen of these accidents were categorised as ‘serious’ and one was fatal. One of the key aims of the improvements is to significantly improve the accident record along the A556 and adjoining roads.

3.4.8 Vehicles can make right turns at certain junction locations where gaps exist within the central reserve. These right turns, in addition to numerous accesses to properties, make access to and from the existing carriageway extremely hazardous.

3.4.9 The congestion also gives rise to ‘rat-running’ on the minor rural side roads, as drivers try to find alternative routes. The majority of these minor roads are not suitable for this increased traffic, which affects quality of life for residents in the outlying villages and those in other isolated rural properties.

3.5 Scheme Objectives

3.5.1 The A556 Knutsford to Bowdon Environmental Improvement scheme aims to provide a high quality route for the A556 with the following core objectives:

- To improve the local environment of Bucklow Hill and Mere;
- To improve road safety and journey time reliability;
- To reduce conflicts between local and long distance traffic; and
- To minimise the environmental impacts of the design proposals both during construction and once the new road is open.
4.2.4 As the proposed route heads further north it would also pass under two new overbridges at Burleyhurst Lane (Figure D.3) and at the A50 (Figure D.5). The route would cross the existing Bucklow Hill Lane, Chapel Lane and Millington Hall Lane, which would all be closed and turning heads would be provided as required.

4.2.5 Further north, the route would pass below a grade separated junction located to the north of Millington Hall Lane (referred to as Millington Junction - Figure D.8). This junction would cater for local traffic movements and provide a connection for vehicles exiting the proposed southbound A556 and also for vehicles joining the proposed northbound A556. Access would also be provided to Chapel Lane and Millington Hall Lane via a new local road diversion proposed to the west of the new A556.

4.2.6 The proposed alignment of the A556 would rejoin the existing route in the vicinity of Mereside Farm and run online for approximately 1km, utilising the existing Chester Road Bridge over the M56 (Figures D.9 - D.10). The new road would then sweep eastwards on a right hand curve, providing a free flow link to tie in with the existing M56 Spur (Figures D11 to D.12) to the southeast of Bowdon Roundabout. A new grade separated double roundabout junction is proposed at this location to cater for all movements between the A556, M56 and both the A56 Dunham Road and A56 Lymm Road. The double roundabout junction would reuse the existing Bowdon Roundabout, requiring only a new southern roundabout as well as a short length of dual carriageway to provide a link between.

4.2.7 As part of the scheme it is proposed to de-trunk the existing A556 (referred to as ‘Chester Road’), and to reduce its cross-section from 4-lanes to a 2-lane single carriageway. The existing Mere and Bucklow Hill Junctions (Figures F.4 and F.6 respectively) would be modified to accommodate the narrower road cross-section. It is proposed to reconfigure Mere Junction to establish the A50 as the major through route, with signal controlled access from the Chester Road Southern and Northern Links. The existing right turn restrictions at Mere Junction would be removed, with the new junction allowing all movements to and from the A50.

4.2.8 A shared use NMU underpass at Old Hall Lane (Figure F.1), and shared use NMU track at Millington Junction (Figure F.7) would be provided to facilitate movement across the new road. Suitable crossing facilities for NMUs would also be provided along Chester Road, particularly at Mere Junction to ensure that safe crossing of the A50 is provided.

4.2.9 The speed limit on the new road would be de-restricted over the main part of the offline works from the connection to the M6 Junction 19 roundabout up to just south of Mereside Farm (approximate chainage 5660). From this point northward, it is proposed to implement a 50mph mandatory speed limit in order to reduce speed through the online works and around the relatively tight curve that passes under the M56 Junction. Further detail is included within Section 5.2.

4.3 Recent Design Developments

4.3.1 Following the amended preferred route announcement of March 2010, the design has been developed. The key changes to the design made since this time are summarised below.

Route Alignment at Mere Hall Estate

4.3.2 The alignment has been adjusted in the area between Burleyhurst Lane (near Mere Hall) and Bucklow Hill Lane, to maximise the clearance to properties within the estate. The route alignment also seeks to weave between areas of local woodland, to minimise ecological impact, whilst generally remaining in cutting to reduce the visual presence of the new road as far as possible.

Route Alignment at Rangemore Nursing Home

4.3.3 The vertical road profile has been amended throughout its length to ensure that highway drainage can be fed by gravity, a reasonable earthworks balance is achievable and road geometry standards are met. The road would now sit better within the existing landscape.

Route Alignment at Rangemore Nursing Home

4.3.4 The alignment has been adjusted north of Bucklow Hill to pass west of Rangemore Nursing Home and Rostherne Mere Site of Special Scientific Interest (SSSI). This change was made before, and independently of, the changes to the junction strategy (as described over the page) for the following reasons:

- To improve access to Rangemore House Nursing Home and eliminates the need acquire land permanently from the SSSI;
- To allow the introduction of Cherry Tree Lane Link, removing the need to stop-up Rostherne Lane and Cherry Tree Lane. This also allowed for a more direct connection for NMUs wishing to cross the M56 away from the busy trunk road;
- To eliminate the need to drain run-off from part of the new road into the small streams feeding Rostherne Mere, thereby removing a source of pollution from an internationally important ecological site;
- To reduce disruption during construction by minimising the amount of online construction required. This improves the potential to build the new road whilst maintaining adequate traffic flow on the existing A556 during the works; and
- To allow the A556 to be in cutting for a greater proportion of its length.
4.3.5 The junction strategy has been amended. The arrangement considered as part of the Stage 2 Scheme Assessment Report in early 2008 included an all-movements junction with the A50, together with left in/left out connections with Millington Hall Lane and the de-trunked A556. The current proposal includes a restricted movement junction close to M6 Junction 19 (Tabley Junction), and a restricted movement junction north of Millington Hall Lane (Millington junction, with north facing slip roads only) for the following reasons:

- To reduce potentially adverse congestion issue on the single A50/A556 junction, particularly during extreme peak traffic conditions (i.e. events / incident response);
- To make the best use of both the existing A50 and A5034 (rather than focussing the increase in traffic flow along the A50 through Mere), both of which are of a significantly higher standard than other local roads in the area. This provides a similar distribution of local traffic movements to the existing conditions.
- To offer the potential to improve access to local property and business, particularly within Over Tabley and along Cherry Tree Lane/Bucklow Hill/Millington; and
- Based on responses from previous consultation.

4.4 Detailed Scheme Description

4.4.1 At the southern end, the proposed A556 would tie-in to the existing M6 Junction 19 roundabout. The northbound exit from the roundabout would have two lanes. The southbound entry would have two lanes, with an additional segregated left turn lane to provide a free-flow link between the proposed A556 and the existing M6 Junction 19 southbound on-slip.

4.4.2 From M6 Junction 19, the proposed A556 would head northwards on a large radius right hand bend. A NMU link would be provided adjacent to the northbound carriageway to allow movement of NMUs from the M6 Junction 19 roundabout to the existing Old Hall Lane. A proposed NMU underpass would form a junction with this link, providing a connection to Chester Road approximately 100m north of the M6 Junction 19 roundabout.

4.4.3 All NMUs would be permitted to use the new link between Old Hall Lane and Chester Road, although horse riders would be required to dismount before and after the underpass due to the proposed headroom (min. 2.8m). Equestrian dismount blocks would be provided on entry to and exit from the underpass. For safety reasons, only cyclists and pedestrians (including disabled users) would use part of the link provided to/from the M6 roundabout. Cyclists heading south towards the M6 Junction would be required to dismount, cross the slip road, and use the existing footway adjacent to the westerly side of the roundabout.

4.4.4 The existing short length of cycle route, which crosses the existing M6 southbound on-slip, would be closed. This is due to the insufficient width and poor access back onto the main carriageway of the roundabout, which is considered unsafe.

4.4.5 Continuing north along the right hand bend, the road would pass immediately to the west of Tabley Parish Hall. A retaining wall is proposed adjacent to the southbound carriageway to avoid the existing building and minimise the land take from the access and parking area in front of the hall. The new road would then pass under Tabley Junction overbridge, which would carry the northbound diverge slip road towards a new junction with the existing Chester Road. This new structure would be approximately 800m north of the existing M6 Junction 19 roundabout. At their highest point, the embankments of the structure would be approximately 4.8m above existing ground level. In the southbound direction, a merge slip road with a parallel auxiliary lane is proposed, providing a link from Chester Road to the proposed A556. The compact form of Tabley Junction would result in tight bends along both slip roads. Verge widening is proposed to the west of the diverge slip road, and south of the merge slip road to provide adequate forward visibility for drivers. Carriageway widening would also be implemented along both slip roads to accommodate the turning requirements of Heavy Goods Vehicles (HGVs).

4.4.6 The slip roads to and from Tabley Junction would form a T-junction with Chester Road, with a ghost island provided for vehicles turning right from the de-trunked road (see Figure F.2). The junction would be located approximately 300m north of St Paul’s Church and would provide a connection for local traffic to the southbound A556 and from the northbound A556 only.

4.4.7 As the proposed A556 leaves the M6 Junction 19 it would be on a downgrade and on embankment, reaching a maximum height of 3.5m above existing ground level approximately 300m north of the existing roundabout. Throughout this length, false
cuttings (in the form of earth mounds positioned alongside the road) would be provided to reduce the noise and visual effects of the scheme. The new road would then enter a section of cutting, before changing gradients to continue on an upgrade. As the road passes under Tabley Junction Overbridge it would reach a maximum depth of 3m below existing ground level. Figure E.1 shows the longitudinal section of the proposed A556 between the existing M6 Junction 19 and Tabley Junction.

Tabley Junction to the A50 Diversion (Figures D.2 – D.5)

4.4.8 North of Tabley Junction, the alignment would curve to the left before passing under a new overbridge at Burleyhurst Lane, approximately 700m north of Tabley Junction Overbridge. The overbridge would maintain the link between Bentleyhurst Farm to the west, and Chester Road to the east, as well as providing farm access across the new road for Knowlespit Farm. At their highest point, the embankments of the overbridge would be approximately 2.5m above existing ground level.

4.4.9 The vertical alignment of the proposed A556 would be on a slight upgrade between Tabley Junction and Burleyhurst Lane (Figure E.1 and E.2). The road moves from an area of cutting at Tabley Junction to a short section of embankment over low lying ground approximately 400m north of Tabley Junction Overbridge. An earth bund is proposed to the west of the route where the road is on embankment. The road would pass over a proposed drainage culvert (Chainage 1160m), before again moving into an area of cutting and passing under Burleyhurst Lane Overbridge (Chainage 1480m). The vertical alignment would reach a maximum height of approximately 2m above ground level over the proposed drainage culvert, and a maximum depth of 4.5m below ground level at Burleyhurst Lane. This is necessary to provide adequate headroom between the proposed A556 and Burleyhurst Lane Overbridge.

4.4.10 Continuing north from Burleyhurst Lane, the proposed alignment would sweep from right to left, passing approximately 100m to the west of Kennel Wood Cottage, before travelling under a new overbridge at the A50 (Chainage 2770m). The overbridge would carry the new A50 Diversion over the proposed A556, and maintain the A50 as a through route between Knutsford and High Legh. There would be no access to the new trunk road from the A50 at this location. At their highest point, the embankments of the structure would be approximately 4.5m above existing ground level.

4.4.11 The vertical alignment of the proposed A556 would continue on an upgrade between Burleyhurst Lane and the A50 (Figures E.2 and E.3). The road would be mostly in cutting up to a maximum depth of around 6m. A short section of fill is proposed, over low lying ground, between 200m and 600m north of Burleyhurst Lane, where earth bunds are proposed adjacent to each side of the road.

A50 Diversion to Mereside Farm (Figure D.5 – D.9)

4.4.12 North of the A50, the proposed A556 would continue to be in cutting and on an upgrade. It would also continue along the left hand curve, before sweeping right to cross Bucklow Hill Lane, Chapel Lane and Millington Hall Lane, which would all be closed at the boundary of the new road. Approximately 400m south of Bucklow Hill Lane, an emergency lay-by would be provided in each direction.

4.4.13 The proposed A556 would reach a high point approximately 300m south of Bucklow Hill Lane (Chainage 3300m), and then continue on a downgrade through a section of embankment with adjacent earth bunds. The new road would then cross Millington Hall Lane to the east of Denfield Cottages and Stables, before continuing for a further 200m and passing under the proposed Millington Junction Overbridge (Chainage 4710m).

4.4.14 Millington junction (shown on Figure D.8) would comprise two small roundabouts, one either side of the new road, connected by a 2-way link road that crosses the proposed A556 via an overbridge. At their highest point, the embankments of the overbridge would be approximately 4m above existing ground level. The junction would provide restricted movements between the local road network and the proposed A556, with provision of a merge slip road for access to the A556 northbound carriageway only, and a diverge slip road for access from the A556 southbound carriageway only.

4.4.15 Millington Junction would be connected to the local road network via the two new single carriageway link roads. To the west, the new Chapel Lane Diversion would connect Chapel Lane with the western roundabout. A minor crossroads junction would also be provided along this link to provide access to Millington Hall Lane. To the east, a short new link road would extend Chester Road (Northern Link) to connect with the eastern roundabout.

4.4.16 An NMU track would run parallel to this link road, and cross the mainline over the Millington Junction Overbridge. It is proposed that this track would also form part of the Regional Cycle Route 70, which currently runs along Chapel Lane and would therefore be severed by the proposed A556.

4.4.17 Continuing north from Millington Junction, the road passes approximately 50m to the west of Rangemore Nursing Home, before curving to the left and continuing on a downgrade through a section of cutting. It would then cross Millington Lane, which would be closed between the boundaries of the new road. The proposed A556 would then tie back in to the existing A556 alignment, south of Mereside Farm (Chainage 5750m).

4.4.18 Figures E.3 to E.5 show the longitudinal section of the proposed A556 between the A50 and Mereside Farm.
4.4.19 The proposed A556 would continue northwards, following the alignment of the existing A556 along a relatively straight section for approximately 600m, and would then cross over the M56 by utilising the existing Chester Road Bridge.

4.4.20 An additional lane would be provided on the southbound carriageway over the structure. This would accommodate traffic merging with the A556 southbound from the new roundabout as part of the modified M56 Junction. This lane would be separated from the proposed A556 by hatched markings, which would terminate approximately 200m south of Chester Road Bridge. Traffic would then join the A556 southbound via a proposed parallel merge with auxiliary lane. As with the existing situation, a dedicated lane would also be provided over the structure for vehicles travelling in the southbound direction wishing to diverge onto the M56 Westbound Entry Loop, which connects southbound traffic to the M56 westbound carriageway.

4.4.21 As the proposed A556 crosses Chester Road Bridge it would continue online for a further 400m. In the northbound direction, a diverge slip road (referred to as the A556-A56 Northbound Off-Slip) would be provided to connect into the existing Bowdon Roundabout.

4.4.22 The new road would then deviate from its existing alignment, sweeping eastwards on a right hand curve and passing between the existing Bowdon Roundabout and Yarwoodheath Farm. From the back of the A556-A56 Northbound Off-Slip nose (at approximately Chainage 6550m), this section of road is referred to as the Re-aligned M56 Spur. The Re-aligned M56 Spur would be designated as a motorway with the associated regulations applying to both directions. The Re-aligned M56 Spur would pass under a new overbridge (referred to as Bowdon Roundabout Link Overbridge) and then continue eastwards to tie in with the existing M56 Spur, southeast of the existing Bowdon Roundabout. This link would provide a free flow connection from the A556 northbound to the M56 eastbound, and from the M56 westbound to the M556 southbound. This solution is an improvement on the current situation, which requires all vehicles making these movements to pass through the existing Bowdon Roundabout.

4.4.23 The vertical alignment of the Re-aligned M56 Spur would be mostly in cutting up to a maximum depth of approximately 3.5m. A 200m section of embankment is proposed over low lying ground directly to the north of Yarwoodheath Farm.

4.4.24 A merge slip road, referred to as the M56 Spur Eastbound On-Slip, would be provided to connect traffic from Bowdon Roundabout to the Re-aligned M56 Spur eastbound.

4.4.25 For traffic exiting from the M56 westbound direction, a diverge slip road would be provided from the existing M56 Spur. This is referred to as the M56 Spur Westbound Off-Slip and provides a connection to the new roundabout, which would be constructed to the south of the proposed mainline. Traffic exiting from the M56 eastbound at Junction 7, via the new M56 Eastbound Diverge Interchange Link, would merge with this traffic prior to joining the new roundabout.

4.4.26 The new roundabout would be connected to the existing Bowdon roundabout via Bowdon Roundabout Link Overbridge, which would cross over the Re-aligned M56 Spur. At their highest point, the embankments of the overbridge would be approximately 5.5m above existing ground level. The new roundabout would also provide an exit to an interchange link (referred to as the A556 Southbound Merge Interchange Link), which would allow traffic to merge onto the A556 in the southbound direction, or merge with the westbound M56 via the existing M56 Westbound Entry Loop. The roundabout also caters for movement between the M56 Spur westbound and both the A56 Dunham Road and A56 Lymm Road.

4.5 De-trunking Works

4.5.1 The existing A556 would be de-trunked where it would be bypassed by the new route (between M6 J19 and Mereside Farm, see Figures F.1 to F.11). The cross-section of the existing A556 would be reduced to a width generally varying between 5 and 6m with one lane in each direction. Existing kerb lines, drainage and footways would be retained where possible. Redundant areas of existing carriageway would be landscaped, and all public and private accesses to the existing road would be maintained. The de-trunking works would also aim to reduce vehicle speeds and provide better facilities and connectivity for NMUs where possible. Typical cross-sections along Chester Road are shown on Figure F.11.

4.5.2 The vertical alignment of Chester Road (i.e. the de-trunked A556) would match that of the existing A556. A 2m soft verge would be provided adjacent to Chester Road, which could be used by equestrians and pedestrians. Existing footways would also be retained where possible.

4.5.3 As part of the de-trunking works, it is proposed to reconfigure Mere Junction to establish the A50 as the major through route (Figure F.4). The junction would be signal controlled and would incorporate ghost island right turn facilities to improve the safety and operation of the junction. Signalised pedestrian and equestrian crossing facilities are also proposed.

4.5.4 Between Mere and Bucklow Hill it is proposed to retain the footways in the eastern verge of the existing road. Existing crossing points would be retained at Bucklow Hill Junction, with new footways proposed to ensure connectivity across the arms of the junction (Figure F.6).

4.5.5 North of Bucklow Hill Junction, Chester Road would continue on its existing straight alignment before joining a new link road. The new link road would sweep west on a tight radius curve to extend the existing Chester Road (Northern Link) to connect into the eastern roundabout of Millington Junction (Figure F.7). As the Chester Road (Northern
Link) would move away from its existing alignment, a new signalised junction would be provided. The junction would provide a connection between the new link road and the section of the existing A556 north of Millington Junction (referred to a Cherry Tree Lane Link).

4.5.6 Cherry Tree Lane Link would provide a local connection between Chester Road (Northern Link) and the existing Cherry Tree Lane, which is located approximately 400m south of Chester Road Bridge (Figures F.8 – F.9). It would also retain connectivity for Rostherne Lane. Cherry Tree Lane Link would follow the alignment of the existing A556 for approximately 800m, before tying in to a section of new link road constructed adjacent to the proposed A556.

4.6 Structures to be Demolished and/or Constructed

4.6.1 The design would require the construction of new structures and the modification or demolition of a number of existing structures. Figure B.1 shows the locations and reference numbers for all structures required/considered as part of the scheme.

4.6.2 Eleven structures have been identified as being required or modified. Of these eleven structures, eight new structures are required, as listed below:

- S/0 – Old Hall Lane NMU Underpass and Retaining Wall;
- S/1 – Tabley Junction Overbridge;
- S/2 – Burleyhurst Lane Overbridge;
- S/3 – A50 Diversion Overbridge;
- S/4 – Millington Junction Overbridge;
- S/6 – Bowdon Roundabout Link Overbridge;
- S/11 – Cherry Tree Lane Link Retaining Wall; and
- S/12 – M56 On-Slip Retaining Wall.

4.6.3 Three existing structures would require modification, as listed below:

- S/5 – Existing Chester Road Bridge;
- S/7 – Yarwoodheath Farm Access Bridge; and
- S/9 – Yarwoodheath Lane Accommodation Bridge.

4.6.4 Two existing structures in the vicinity of the scheme would not require modification, these are:

- S/8 – River Bollin Bridge; and
- S/10 – Ryecroft Footbridge.

4.6.5 Further detail of the structural design and assessment work completed to date is provided in Section 5.4 of this report. Consideration is also being given to a ‘green bridge’ to reconnect habitats either side of the new road (refer to the PEI for further details).

4.7 Lighting, Signs and Gantries

4.7.1 This section provides a brief description of the road lighting, sign and gantry proposals as part of the scheme, as shown on Figure G. Further details can be found in Section 5.5 of this report.

4.7.2 It is currently proposed to light only parts of the M6 and M56 junctions, with the majority of the proposed A556 unlit (including Tabley and Millington Junctions). Lighting would be provided on the proposed A556 on the immediate approach to/exit from the M6 Junction 19 roundabout. This lighting would tie in to existing lighting at the roundabout which would be retained. Similarly, the modified M56 Junction would also be lit (retaining the existing lighting at Bowdon Roundabout where possible), including all immediate approaches to and exits from the roundabouts.

4.7.3 Existing lighting would be removed along the de-trunked Chester Road (Southern and Northern Links) but retained at the existing Mere and Bucklow Hill Junctions. At this stage it is also proposed to retain the existing lighting along the residential section of Chester Road between Mere and Bucklow Hill.

4.7.4 All directional signs proposed as part of the scheme are to be post mounted within the nearside verge.

4.7.5 Two signal gantries are proposed on the A556 northbound approach to the Re-aligned M56 Spur. A Variable Message Sign (VMS) cantilever gantry would be provided at the end of the A556 Northbound On-Slip auxiliary lane and, where the A556 northbound carriageway would feed directly in to the M56, a portal gantry with lane specific signals is proposed.

4.8 Property Demolished

4.8.1 No properties would be demolished as a result of the construction of the proposed route.
4.9 Amount and Nature of Landtake

4.9.1 The current design would require the permanent acquisition of approximately 98.5ha of land. In addition, approximately 16.8ha of land would be required temporarily during construction. If the temporary land could not be used by agreement with landowners then compulsory acquisition would be necessary.

4.9.2 Permanent acquisition of rights over approximately 1.6ha land would also be required. Rights would be required in order to access, construct and/or maintain existing and new ditches, new drainage outfalls and ditches, and new access tracks.

4.9.3 The majority of land that would be required is agricultural farmland. The route would cross several farms and the land required from them consists of approximately 55% arable land and 45% pasture land. Several areas of woodland would also be required at the southern end of the scheme, between the A50 and the M6 Junction 19 roundabout.

4.9.4 A large amount of the land that would be required for the scheme is existing highway. In particular, large areas of the existing A556 would be required at the northern end of the scheme, as well as where the new road would tie into the existing M56 to A556 Spur.

4.9.5 The amount of land required, broken down by existing land use, is shown in Table 4.1.

<table>
<thead>
<tr>
<th>Existing Land Use</th>
<th>Land to be Permanently Acquired (ha)</th>
<th>Temporary Land (ha)</th>
<th>Land over which Rights are to be permanently acquired (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasture Land</td>
<td>35.45</td>
<td>8.73</td>
<td>0.73</td>
</tr>
<tr>
<td>Woodland</td>
<td>1.13</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Private Grounds / Gardens</td>
<td>0.38</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Arable Land</td>
<td>41.89</td>
<td>7.95</td>
<td>0.78</td>
</tr>
<tr>
<td>Grassland</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td>Existing Highway</td>
<td>19.11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Access Tracks</td>
<td>0.54</td>
<td>0.1</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>98.5</strong></td>
<td><strong>16.8</strong></td>
<td><strong>1.63</strong></td>
</tr>
</tbody>
</table>

Table 4.1 – Use of existing land required for the scheme design.

4.9.6 In addition, it is proposed that works would be undertaken by agreement on 0.22ha of land. This land would not be acquired for the scheme, and would therefore remain under the ownership of the current landowner.

4.10 Material Volumes

4.10.1 During construction of the scheme, the use of various materials would be necessary. The works have been designed to try and minimise the production of waste materials and to use as few new construction materials as possible by reduction, reuse and recycling of any existing materials along the improvement where practicable.

4.10.2 It is also intended to minimise the quantity of materials needing to be disposed of off-site, and to minimise the import of any primary materials.

4.10.3 Under the Site Waste Management Plans Regulations 2008, the project requires a formal detailed Site Waste Management Plan (SWMP) which will be prepared in advance of construction. An outline of the SWMP for the design at this stage is set out in Table 4.2 below. Estimated quantities have been included, based on the information available at this stage or reasonable assumption.

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Estimated Quantity</th>
<th>Action Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthworks</td>
<td>590 000m³</td>
<td>Cut to fill.</td>
</tr>
<tr>
<td></td>
<td>140 000m³</td>
<td>Topsoil strip and re-use.</td>
</tr>
<tr>
<td></td>
<td>60 000m³</td>
<td>Excess material to be landscaped on site.</td>
</tr>
<tr>
<td></td>
<td>50 000m³</td>
<td>Excess topsoil to be re-used on site.</td>
</tr>
<tr>
<td>Structures:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-concrete</td>
<td>Minimal</td>
<td>Re-use of concrete on site following screening and crushing.</td>
</tr>
<tr>
<td>-steel</td>
<td>Minimal</td>
<td>Steel to be sent off-site for recycling.</td>
</tr>
<tr>
<td>Carriageway materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-asphalt planings</td>
<td>53,000m³</td>
<td>Planings to be reused on site where possible. Where not possible due to phasing of the works planings are to be used/recycled offsite.</td>
</tr>
<tr>
<td>Timber waste:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-semi-mature vegetation</td>
<td>20 000m³</td>
<td>Sent off site for:- recycling into new timber products. energy recovery as fuel. biological recovery as compost.</td>
</tr>
<tr>
<td>Metals:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-railings</td>
<td>50 tonnes</td>
<td>Sent off-site for recycling.</td>
</tr>
<tr>
<td>-signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-lamp columns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-safety barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-cables</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2 - Site Waste Management Plan (continued overleaf)
Plastics:
- drainage pipes
- packaging
- cable covering

| Minimal | Sent off site for recycling dependant on type of plastic. Some plastic may require disposal to landfill. |

Hazardous materials:
- contaminated soils
- oil-based waste
- contaminated packaging
- road sweepings

| Not possible to quantify at this stage | Contaminated soils not are expected on site. Further contamination, e.g. by accidental spillage should be avoided by application of the Construction Environmental Management Plan. Alternatives to the use of hazardous chemicals used wherever possible. Where necessary hazardous materials to go for disposal at nearest licensed facility. |

Office / canteen waste
- paper
- electrical goods / computers
- furnishings
- packaging
- food waste
- sewage waste / water

| Not possible to quantify at this stage | Reduce use of paper and packaging materials. Reuse furnishings / electrical goods at other sites. All recyclable materials including paper, packaging and redundant electrical goods to be collected for off site recycling. Food waste collection for biological recovery. Sewage waste water disposed of off site via public sewer or tanker. |

Table 4.2 - Site Waste Management Plan (continued)

4.10.4 During the operation of the scheme and during its routine maintenance, waste materials would arise from several different sources including:

- Road sweeping and gully arisings;
- Metals from replacement signs;
- Green waste from landscape maintenance;
- Lanterns; and
- Traffic debris, including tyres.

4.10.5 The potential impact of these materials would be mitigated by appropriate management of the site. This would include regular street sweeping and collection of any carriageway debris, which would also be necessary to maintain safety standards of the highway to reduce the potential for future accidents.

4.10.6 Any landscape maintenance or route equipment maintenance would employ the industry standards of reduction, re-use and recycling of waste prior to disposal.

4.11 Cost Estimate

4.11.1 A cost estimate has been prepared based on the scope and design available at this stage. A range forecast was produced and expressed as an outturn cost, including estimates for future inflation. Estimates were produced for Minimum, Central and Maximum profiles are provided below:

<table>
<thead>
<tr>
<th>Range Description</th>
<th>Range Estimate at Outturn (Including Programme Risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>£137m</td>
</tr>
<tr>
<td>Central</td>
<td>£174m</td>
</tr>
<tr>
<td>Maximum</td>
<td>£212m</td>
</tr>
</tbody>
</table>

Table 4.3 – Cost Estimate

4.11.2 The Highways Agency will look at value management opportunities during the development of the design to ensure efficiencies are identified.
5 Engineering Assessment

5.1 Engineering Standards

5.1.1 The geometric design for the main works and NMU facilities have been developed in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 6 (Road Geometry). Where the design does not meet the requirements stipulated in the Highways Agency’s design standards, Departures from Standards (referred to as ‘departures’) have been introduced. Notable departures and other key layout issues associated with the design are summarised in Section 5.2 of this report.

5.1.2 The design of the de-trunking works and local road network has been developed through ongoing consultations with Cheshire East Council who are the local highway authority. The design aims to reduce vehicular speeds and promote driver caution by better replicating the existing adjacent network of narrow country lanes. Cheshire East Council adopt DMRB standards, therefore, certain departures have been intentionally retained/ incorporated into the design proposals in order to reduce traffic speeds. Feedback as part of the consultation with Cheshire East Council will be used to mitigate safety risks that are identified within the design.

5.1.3 Table 5.1, over page, summarises the design parameters and proposed cross-sections adopted throughout the design.
<table>
<thead>
<tr>
<th>Link Name</th>
<th>Description</th>
<th>Cross-section Classification</th>
<th>Design Speed</th>
<th>Nearside Verge</th>
<th>Nearside Hardstrip / Hardshoulder (HSstrip / HS)</th>
<th>No. of Lanes</th>
<th>Overall C'way Width</th>
<th>Offside Hardstrip</th>
<th>Offside Verge</th>
<th>Central Reserve</th>
<th>Traffic Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Opening Year 2015</td>
</tr>
<tr>
<td>A556 Mainline (Northbound)</td>
<td>A 6.5km long 2-lane Rural All-Purpose Dual Carriageway, providing a northbound Link between the existing M6 Junction 19 Roundabout and the Re-aligned M56 Spur (eastbound).</td>
<td>D2AP 120kph</td>
<td>2.5m (1.6m min)</td>
<td>1.0m (HSstrip) (0.0m min)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m (0.0m min)</td>
<td>N/A</td>
<td>2.5m</td>
<td>35464</td>
<td>42663</td>
</tr>
<tr>
<td>Re-aligned M56 Spur (Eastbound)</td>
<td>A 1km long Dual 2-Lane Motorway, providing a free flow link between the A556 (northbound) and the existing M56 Spur (eastbound).</td>
<td>D2M 120kph</td>
<td>1.5m</td>
<td>3.3m (HS)</td>
<td>2</td>
<td>7.3m</td>
<td>0.7m</td>
<td>2</td>
<td>7.3m</td>
<td>0.7m</td>
<td>N/A</td>
</tr>
<tr>
<td>Re-aligned M56 Spur (Westbound)</td>
<td>A 1km long Dual 2-Lane Motorway, providing a free flow link between the existing M56 Spur (westbound) and the A556 (southbound).</td>
<td>D2M 120kph</td>
<td>1.5m</td>
<td>3.3m (HS)</td>
<td>2</td>
<td>7.3m</td>
<td>0.7m</td>
<td>2</td>
<td>7.3m</td>
<td>0.7m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556 Mainline (Southbound)</td>
<td>A 6.5km long 2-lane Rural All-Purpose Dual Carriageway, providing a southbound link between the proposed Re-aligned M56 Spur (westbound) and the existing M6 Junction 19 Roundabout.</td>
<td>D2AP 120kph</td>
<td>2.5m</td>
<td>1.0m (HSstrip) (0.0m min)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m (0.0m min)</td>
<td>N/A</td>
<td>2.5m</td>
<td>33107</td>
<td>38094</td>
</tr>
<tr>
<td>A556 Northbound Exit Loop</td>
<td>A 720m long single lane Rural Slip Road (diverge), providing a link from the A556 (northbound) to Chester Road (Southern Link).</td>
<td>DG1C 70kph</td>
<td>2.0m</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556 Southbound Entry Loop</td>
<td>A 440m long single lane Rural Slip Road (merge) with parallel auxiliary lane, providing a link from Chester Road (Southern Link) to the A556 (southbound).</td>
<td>MG1C 70kph</td>
<td>2.0m</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556 Northbound On-Slip</td>
<td>A 220m long single lane All-Purpose Rural Slip Road (merge) with parallel auxiliary lane, providing a connection from the western dumbbell at Millington Junction to the A556 (northbound).</td>
<td>MG1C 70kph</td>
<td>2.0m</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556 Southbound Off-Slip</td>
<td>A 230m long single lane All-Purpose Rural Slip Road (diverge), providing a connection from the A556 (southbound) to the eastern dumbbell at Millington Junction.</td>
<td>DG1C 70kph</td>
<td>2.0m</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556-A56 Northbound Off-Slip</td>
<td>A 380m long 2-lane All-Purpose Rural Slip Road (diverge), providing a connection from the A556 (northbound) to the existing Bowdon Roundabout.</td>
<td>DG2E 70kph</td>
<td>2.5m</td>
<td>1.0m (HSstrip) (0.0m min)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m</td>
<td>2.5m</td>
<td>1.0m</td>
<td>2.5m</td>
<td>N/A</td>
</tr>
<tr>
<td>M56 Spur Eastbound On-Slip</td>
<td>A 490m long single lane Motorway Slip Road (merge), providing a connection from the existing Bowdon Roundabout to the Re-aligned M56 Spur (eastbound).</td>
<td>MG1A 70kph</td>
<td>1.5m</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.3m</td>
<td>0.7m</td>
<td>2.3m</td>
<td>N/A</td>
</tr>
<tr>
<td>A556 Southbound Merge Interchange Link</td>
<td>A 420m long 2-lane Rural All-Purpose Interchange Link, providing a connection from the M6 Junction 7/8 South Roundabout to both the A556 (southbound) and M56 (westbound) via the M56 Westbound Entry Loop.</td>
<td>IL2C 85kph</td>
<td>2.5m (1.6m min)</td>
<td>1.0m (HSstrip) (0.0m min)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m (0.0m min)</td>
<td>2.5m</td>
<td>Separated from mainline by hatched markings.</td>
<td>14697</td>
<td>21744</td>
</tr>
<tr>
<td>M56 Eastbound Diverge Interchange Link</td>
<td>A 600m long single lane Motorway Interchange Link, providing a connection from the M56 (westbound) to the M56 Junction 7/8 South Roundabout (via the M56 Spur Westbound Off-Slip).</td>
<td>IL1A 70kph</td>
<td>Varies (2.0m min)</td>
<td>3.3m (HS)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.3m</td>
<td>0.7m</td>
<td>2.3m</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## MAIN WORKS (CONTINUED)

<table>
<thead>
<tr>
<th>Link Name</th>
<th>Description</th>
<th>Cross-section Classification</th>
<th>Design Speed</th>
<th>Nearside Verge</th>
<th>Nearside Hardstrip / Hardshoulder (HStrip / HS)</th>
<th>No. of Lanes</th>
<th>Overall C'way Width</th>
<th>Offside Hardstrip</th>
<th>Offside Verge</th>
<th>Central Reserve</th>
<th>Traffic Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>M56 Spur Westbound Off-Slip</td>
<td>A 570m long 1-lane/2-lane Motorway Slip Road (diverge), providing a connection from the existing M56 Spur (westbound) to the M56 Junction 7/8 South Roundabout. Approximately 300m beyond the diverge, the M56 Spur Westbound Diverge would merge with the M56 Eastbound Diverge Interchange Link by means of a single lane gain.</td>
<td>IL1A / IL2A</td>
<td>85kph</td>
<td>Varies (1.5m min)</td>
<td>3.3m (HS)</td>
<td>1 / 2</td>
<td>3.65m / 7.3m</td>
<td>1.0m</td>
<td>2.0m</td>
<td>N/A</td>
<td>5531 4707</td>
</tr>
<tr>
<td>Bowdon Roundabout Link (northbound)</td>
<td>A 230m long 2-lane Rural All-Purpose Dual Carriageway, providing a link between the M56 Junction 7/8 Roundabout and the existing Bowdon Roundabout.</td>
<td>D2AP</td>
<td>70kph</td>
<td>2.5m</td>
<td>1.0m (HStrip)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m</td>
<td>N/A</td>
<td>2.5m</td>
<td>10693 11702</td>
</tr>
<tr>
<td>Bowdon Roundabout Link (southbound)</td>
<td>A 230m long 2-lane Rural All-Purpose Dual Carriageway, providing a link between the M56 Junction 7/8 Roundabout and the existing Bowdon Roundabout.</td>
<td>D2AP</td>
<td>70kph</td>
<td>2.5m</td>
<td>1.0m (HStrip)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m</td>
<td>N/A</td>
<td>2.5m</td>
<td>14776 22010</td>
</tr>
<tr>
<td>M56 Westbound Entry Loop</td>
<td>A 540m long single lane Motorway Loop, providing a connection from the A556 Southbound Merge Interchange Link to the M56 (westbound).</td>
<td>IL1A (existing)</td>
<td>N/A</td>
<td>2.0m</td>
<td>1.0m (HStrip)</td>
<td>1</td>
<td>3.7m</td>
<td>0.7m</td>
<td>2.8m</td>
<td>N/A</td>
<td>5904 11209</td>
</tr>
</tbody>
</table>

## LOCAL ROADS AND DE-TRUNKING WORKS

<table>
<thead>
<tr>
<th>Link Name</th>
<th>Description</th>
<th>Cross-section Classification</th>
<th>Design Speed</th>
<th>Nearside Verge</th>
<th>Nearside Hardstrip / Hardshoulder (HStrip / HS)</th>
<th>No. of Lanes</th>
<th>Overall C'way Width</th>
<th>Offside Hardstrip</th>
<th>Offside Verge</th>
<th>Central Reserve</th>
<th>Traffic Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burleyhurst Lane</td>
<td>A 290m long single carriageway local road, connecting the existing Burleyhurst Lane either side of the proposed A556.</td>
<td>S2</td>
<td>50kph</td>
<td>2.0m</td>
<td>N/A</td>
<td>2</td>
<td>4.0m max) 2.5m (min)</td>
<td>N/A</td>
<td>2.0m</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>A50 Diversion</td>
<td>A 1km long Single 2-Lane link road, connecting the existing A50 either side of the proposed A556.</td>
<td>S2</td>
<td>85kph</td>
<td>2.5m</td>
<td>1.0m (Hstrip)</td>
<td>2</td>
<td>7.3m</td>
<td>1.0m</td>
<td>N/A</td>
<td>2.5m</td>
<td>11693 13843</td>
</tr>
<tr>
<td>Chapel Lane Diversion</td>
<td>A 800m long single carriageway local road, providing a link between the existing Chapel Lane and western dumbbell at Millington Junction.</td>
<td>S2</td>
<td>60kph</td>
<td>2.0m</td>
<td>N/A</td>
<td>2</td>
<td>5.0m</td>
<td>N/A</td>
<td>2.0m</td>
<td>N/A</td>
<td>2000 3476</td>
</tr>
<tr>
<td>Chester Road (Northern Link)</td>
<td>A 760m long (part existing / part new) single carriageway local road, providing a connection between Chester Road (Northern Link) and the eastern dumbbell at Millington Junction, whilst maintaining access to properties and businesses along the link.</td>
<td>S2</td>
<td>60kph</td>
<td>2.0m (min)</td>
<td>N/A</td>
<td>2</td>
<td>6.0m (min)</td>
<td>N/A</td>
<td>2.0m (min)</td>
<td>N/A</td>
<td>7461 9504</td>
</tr>
<tr>
<td>Cherry Tree Lane Link</td>
<td>A 1.3km single carriageway local road, providing a link between the existing de trunked A556 (north of Millington Junction) and the existing Cherry Tree Lane.</td>
<td>S2</td>
<td>50kph</td>
<td>1.0m (min)</td>
<td>N/A</td>
<td>2</td>
<td>5.0m (min)</td>
<td>N/A</td>
<td>1.0m (min)</td>
<td>N/A</td>
<td>384 1285</td>
</tr>
<tr>
<td>Chester Road (Central Link)</td>
<td>A 1.6km long single carriageway local road, maintaining the existing connection between Mere Junction (A50) and Bucklow Hill Junction, whilst maintaining access to properties and businesses along the link.</td>
<td>S2</td>
<td>50kph</td>
<td>2.0m</td>
<td>N/A</td>
<td>2</td>
<td>6.0m (min)</td>
<td>N/A</td>
<td>2.0m</td>
<td>N/A</td>
<td>1658 1877</td>
</tr>
<tr>
<td>Chester Road (Southern Link)</td>
<td>A 1.9km single carriageway local road, providing a link between Mere Junction (A50) and Tabley Junction, whilst maintaining access to properties and businesses along the link.</td>
<td>S2</td>
<td>100kph</td>
<td>2.0m</td>
<td>N/A</td>
<td>2</td>
<td>6.0m (min)</td>
<td>N/A</td>
<td>2.0m</td>
<td>N/A</td>
<td>1175 1791</td>
</tr>
<tr>
<td>Link Name</td>
<td>Description</td>
<td>Cross-section Classification</td>
<td>Design Speed</td>
<td>Nearside Verge</td>
<td>Nearside Hardstrip / Hardshoulder (HStrip / HS)</td>
<td>No. of Lanes</td>
<td>Overall C'way Width</td>
<td>Offside Hardstrip</td>
<td>Offside Verge</td>
<td>Central Reserve</td>
<td>Traffic Flows</td>
</tr>
<tr>
<td>-----------</td>
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<td>---------------</td>
</tr>
<tr>
<td>M6 Roundabout to Old Hall Lane NMU Link</td>
<td>A 200m long shared use NMU track connecting the existing footpath at M6 Junction 19 roundabout to Old Hall Lane. The link also provides a connection to the proposed Old Hall Lane NMU Underpass. Cyclists would be required to dismount, and equestrians prohibited, prior to accessing the M6 Junction 19 roundabout.</td>
<td>N/A</td>
<td>10kph</td>
<td>0.25m</td>
<td>N/A</td>
<td>1 (2-way)</td>
<td>4m</td>
<td>N/A</td>
<td>0.25m</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Old Hall Lane NMU Link</td>
<td>A 120m long un-segregated NMU track which passes under the proposed A556 via a new NMU underpass. The link would provide a connection between the M6 Roundabout to Old Hall Lane NMU Link and Chester Road (Southern Link), located to the east and west of the scheme respectively.</td>
<td>N/A</td>
<td>10kph</td>
<td>0.25m</td>
<td>N/A</td>
<td>1 (2-way)</td>
<td>4m</td>
<td>N/A</td>
<td>0.25m</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Millington Junction NMU Link</td>
<td>A 400m long shared use NMU track which passes over the proposed A556 via Millington Junction Overbridge. The track would be segregated from vehicular traffic and would provide a link between the proposed Chapel Lane Diversion and Chester Road (Northern Link).</td>
<td>N/A</td>
<td>10kph</td>
<td>0.5m</td>
<td>N/A</td>
<td>1 (2-way)</td>
<td>5m (3.5m over structure)</td>
<td>N/A</td>
<td>0.5m</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Table 5.1 – Design Parameters and Proposed Cross-sections**

**Notes:**

Lengths of individual links are approximate. The lengths of slip roads or interchange links have been assumed from/to the back of diverge or merge nose.

AADT (Average Annual Daily Traffic) is the total number of vehicles expected on an average day of the year.

Cross-section classification extracted from the DMRB Volume 6, Section 1, Part 2, Technical Directive (TD) 27/05: Cross-sections and Headrooms
5.2 Layout Issues and Departures from Standards

5.2.1 The following section summarises the main layout issues and departures associated with the proposed road layout design.

5.2.2 As highlighted in Section 5.1, the design has been carried out in accordance with the requirements of the DMRB. Where the design does not comply with standards, a departure has been sought.

5.2.3 A table summarising the main works (including all new roads to be maintained by the Highways Agency), local road network and de-trunking works departures is provided in Appendix C.

Main Works

5.2.4 The preliminary design has identified 21 departures relating to the proposed geometric layout of the main works. These departures have been collated and summarised in three areas that represent the key layout issues associated with the design, as summarised below.

Tabley Junction Proximity to Existing M6 Junction 19 Roundabout

5.2.5 The proposed location of Tabley Junction does not allow for the required minimum junction spacing (1km) from the existing M6 Junction 19 roundabout, as required in accordance with DMRB. Consequently, two departures are proposed (one for each direction) as a result of this substandard junction spacing.

5.2.6 The departures have been incorporated in to the design to reduce the impacts on community severance in the Tabley area, which would be brought about by the scheme. The junction’s proximity to the local facilities in Over Tabley (petrol station, hotel, restaurant and farm business) would significantly reduce the required diversion length and would maximise the potential for these to remain commercially viable.

5.2.7 In order to achieve the required minimum junction spacing of 1km, it would be necessary to locate Tabley Junction a further 0.55km north of the location currently proposed. If the junction were to be located further north then this would have a detrimental effect on the local community, compromising local access to Over Tabley and resulting in the likely loss of local viable businesses.

5.2.8 The substandard junction spacing is considered most critical in the southbound direction. Merging vehicles from the A556 Southbound Entry Loop may have difficulty crossing safely into the desired lane prior to the M6 Junction 19 roundabout.

5.2.9 To reduce the impact of the substandard weaving length in the southbound direction, a parallel auxiliary lane is proposed at the merge to allow for increased vehicle acceleration and gap finding potential. Consideration has also been given to provide appropriate additional signage and road markings in advance of the junction.

Online Section / Chester Road Bridge

5.2.10 South of Mereside Farm, the proposed offline section of the A556 would rejoin and follow the horizontal and vertical alignment of the existing A556. Provision of this online section would allow the route to cross over the M56 by using the existing Chester Road Bridge. It is proposed to retain the width of the existing structure in order to avoid significant cost and programme implications associated with the provision of a new or widened structure. The disruption to traffic on the M56 would also be reduced as construction works to provide a new structure would prolong periods of traffic management, with likely lane closures and speed restrictions.

5.2.11 The existing alignment of the A556 is substandard when assessed against the 120kph (approx. 70mph) design speed of the proposed mainline. Consequently, retention of the existing vertical road profile would result in a number of departures. These would relate to substandard vertical curvature and the associated reduction in forward visibility, as well as insufficient or non-application of superelevation.

5.2.12 A compliant vertical alignment cannot be achieved without construction of a new offline link, and hence provision of a new structure to cross the M56. This was not considered reasonably practicable due to the significant increase in construction cost (greater than £10m). This alternative option would also substantially increase the required land take and potentially delay the start of construction by up to 2 years.

5.2.13 Reductions in cross-sectional width are also proposed through the section of online improvement works. These are required due to a narrow corridor between Mereside Farm and Cherry Tree Lane Link / Rostherne Mere Site of Special Scientific Interest (SSSI), as well as existing constraints imposed by the width over the existing Chester Road Bridge as discussed above. Consequently, a number of geometric departures are required for reductions in cross-section including reduced width or non-provision of hardstrips and verges. It should be noted that compliant lane widths are proposed to be maintained throughout.

5.2.14 A retaining wall is proposed close to the existing boundary between Rostherne Mere SSSI and the proposed Cherry Tree Lane Link. The purpose of this wall is to allow the local road to be constructed close to the A556, without taking land permanently from the SSSI. The design team are developing proposals for the design, construction and maintenance of the structure, through consultation with Natural England, who manage the designation at the site.
5.2.15 Providing a compliant cross-section and removal of the retaining wall would result in land take from the environmentally sensitive area of Rostherne Mere SSSI. Alternatively, the departures and retaining wall could be avoided by non-provision of Cherry Tree Lane Link. However, this is considered to provide an important local road connection and also provide a continuous route for NMUs between the north and south of the scheme away from the main trunk road.

5.2.16 To improve safety along the section of online improvement works, it is proposed to enforce a mandatory 50mph speed on both the northbound and southbound carriageways of the A556 over this length. This would replicate the current restriction on the existing A556. In the northbound direction, this would be implemented approximately 100m south of Mereside Farm (Ch5660m) and maintained along the tight right hand curve of the Re-aligned M56 Spur, before terminating prior to merging with the M56 eastbound carriageway. Similar extents would also be applied in the southbound direction (i.e. diverging from the M56 westbound carriageway).

Re-aligned M56 Spur

5.2.17 The design proposes a free flow link between the A556 and the existing M56 Spur. The proposed alignment is constrained as a result of retaining the existing Chester Road Bridge whilst also providing a tie-in with the existing M56 Spurs to and from the M56 mainline. These constraints result in the requirement to introduce a substandard horizontal radius along the new link, with resultant reductions in forward visibility.

5.2.18 A compliant horizontal alignment cannot be provided without significant amendment to the existing road network and either reconstruction of Chester Road Bridge or new connections to the M56 further east of the current location. The latter would also require replacement of Bowdon View Bridge, which has only recently been improved. Such measures are not considered reasonably practicable due to the additional length of carriageway required (in the order of 2.5km) and the significant increase in construction costs (greater than £10m) and land-take (over 50,000m²).

5.2.19 Another option could be to remove the proposed A556/M56 free-flow link. The direct connection between the A556 and Bowdon Roundabout could then be retained in a manner similar to the existing. This would have the benefit of removing this layout issue and eliminate any associated departures. However, it is anticipated that this would result in significant capacity issues at Bowdon Roundabout (including all approaches), and would compromise the objectives of the scheme. Consequently, this option was rejected.

5.2.20 As noted in paragraph 5.2.16, it is proposed to implement a mandatory 50mph speed limit along the free flow link in both directions. Should motorists adhere to this mandatory speed limit, it is considered the proposed alignment and achieved visibility would be appropriate for vehicular speeds. In addition, a variable matrix signal is also proposed on the northbound A556 in advance of the free flow link to warn road users of downstream road conditions.

Tie-in to M6 Junction 19 / Tabley Parish Hall

5.2.21 In order to construct a compliant tie in at the M6 Junction 19 roundabout, it is necessary to construct the proposed A556 approximately 3m to the west of Tabley Parish Hall. Although the structure itself is not directly affected, land take would be required from the existing car park area, as well as amendments to the existing access. In order to minimise this impact a retaining wall (approx. 1m in height) is proposed adjacent to the southbound carriageway of the new A556. This would form the boundary between the trunk road and land surrounding Tabley Parish Hall.

5.2.22 To avoid land take from Tabley Parish Hall it would be necessary to re-align the proposed A556 further to the west of its current location. This is not considered a viable option as a substandard horizontal curve would be required on the A556 to tie back in to the roundabout. Furthermore, the resultant exit angle and radius for vehicles making the left turn from the M6 southbound off-slip onto the northbound A556 would be unsuitable.

5.2.23 On the A556 southbound approach to the M6 Junction 19 roundabout, verge widening is currently proposed to provide adequate driver visibility of the junction and segregated left turn lane. This occurs adjacent to Tabley Parish Hall and increases land take.

5.2.24 Consultation with Tabley Parish is ongoing in order to mitigate the impacts on the hall. Options are being considered to provide an alternative building at a new site, or retaining the structure and providing additional access and parking facilities on adjacent land.

Local Road Network and De-trunking Works

5.2.25 The preliminary design has identified nine geometric departures related to the de-trunking of Chester Road and six geometric departures relating to the Local Road Network. Details of these departures are given in the Departures from Standards Summary Table attached in Appendix B. For general arrangement drawings of the de-trunked Chester Road, refer to Figures F.1 to F.11.

5.2.26 The geometry of Chester Road and Local Road Network has been developed through consultation with Cheshire East Council (CEC). The strategy developed through these consultations aims to reduce vehicular speeds and promote driver caution through better replicating the existing road network. As a result, substandard features (when assessed against requirements of the DMRB) such as cross-section or vertical alignment have been intentionally retained/incorporated into the design proposals.
5.2.27 In line with the design strategy outlined above, the de-trunking of Chester Road has been designed to match the vertical alignment of the existing Highway. Retaining the levels of the existing A556 results in a number of departures relating to substandard vertical curvature and reductions in forward visibility along Chester Road. These are most critical along the Southern Link where, unlike the Central (30mph) and Northern Links (40mph), a derestricted speed limit would apply due to the rural nature of the link and low levels of access.

5.2.28 To provide a fully compliant vertical alignment along Chester Road (Southern Link), it would be necessary to significantly lower or raise sections of the existing carriageway in order to ‘flatten’ the vertical alignment. This would increase construction costs and would require land take beyond the highway boundary of the existing A556. Lowering the carriageway would also require the removal of mature vegetation (trees and hedgerows) along the existing carriageway edge.

5.2.29 Warning signs and road markings would be provided along Chester Road (Southern Link) to inform drivers of any hidden dips or blind summits along the link. A narrow cross-section is also proposed along the entire length of Chester Road to promote a cautious approach from motorists and consequently encourage lower vehicular speeds.

5.3 Operational Considerations

5.3.1 Preliminary traffic modelling suggests that, during periods of peak hourly flow, future congestion may occur at the M6 and M56, partly due to the increased traffic flow coming from the improved A556. Further assessment is currently ongoing to determine the severity of these anticipated capacity issues. The Highways Agency is planning to deliver low cost interventions in tandem with this scheme and the longer term need for improvements is being examined separately. It is noted that such improvements have not been included within the traffic modelling and environmental impact assessment work completed at this stage.

5.3.2 By introducing a continuous central reserve, the improved cross-section of the new A556 could present some issues in terms of undertaking routine maintenance works. This would include tasks such as re-surfacing works, safety barrier repair, grass cutting, winter grit spreading, etc. It is considered likely that there would be insufficient width to undertake re-surfacing works safely without a short term closure of one carriageway. The design team are considering in detail how such works would be completed with minimal disruption and focussing on reducing any resultant impacts as far as possible.

5.3.3 Similar issues may be encountered in emergency situations, particularly between Tabley and Millington Junctions, where a stranded vehicle and driver would need to pull over onto the verge and await recovery as no hard shoulder is proposed. As junctions to/from the mainline are limited, there may also be a significant distance to the next available exit slip road. To minimise this risk, two emergency laybys are proposed, which would have advanced traffic signs. Furthermore, it is proposed to include emergency telephones and CCTV cameras to reduce response times and assist in vehicle recovery. Access to the local facilities on the existing Chester Road in Tabley / Bucklow Hill would also be available.

5.3.4 The provision of all-purpose laybys for parking and waiting has been discounted. This is due to the associated operational safety issues that they would bring and the threat of inappropriate usage (overnight parking, trading, etc).

5.3.5 It is noted that the issues associated with incident response and routine maintenance would arise as a consequence of the significant operational safety benefits associated with the improvements in cross-section, junction standards and route alignment. This is considered to significantly outweigh the adverse effects, subject to appropriate mitigation measures, such as the emergency laybys, being considered.

5.3.6 Approximately 250m south of Bowdon Roundabout there is an existing Vehicle and Operator Services Agency (VOSA) compound, which is located off the western side of the existing site and therefore it is to be relocated as part of the scheme. VOSA oversees licensing, testing and enforcement of roadworthiness standards for road vehicles, and the site near Bowdon Roundabout includes a weighbridge, inspection bays and an adjacent operations building.

5.3.7 The current location of the VOSA site restricts vehicle access for enforcement purposes to the A556 northbound direction only. The existing at-grade access from the A556 is also shared with that for the Cheshire Lounge Public House. This is considered inappropriate for the volume and speed of traffic using the A556.

5.3.8 Preliminary design proposals seek to remove these issues by relocating the VOSA compound into the centre of the existing Bowdon Roundabout. This avoids the need for additional land take from the surrounding area. It also has the benefit of providing VOSA with an increased enforcement area by allowing access to and from both the A556 and M56 motorway. Traffic signals are proposed to control access to and from the proposed site and the roundabout, providing a safer solution than the existing situation.

5.3.9 Facilities at the existing VOSA compound (weighbridge, operations building and welfare facilities) will be retained and relocated to the new site. However, although a preferred
location has been agreed, the exact layout has yet to be confirmed. It is therefore assumed that the site layout shown of Figure D.11 will be subject to design development following further consultation with VOSA.

5.3.10 It should be noted that operation of the existing compound would stop during the scheme construction. This has been agreed through consultation with VOSA.

Tatton Park Events

5.3.11 Tatton Park is located to the east of the A556 and accessed generally from the A556 and then along a series of narrow country lanes. Tatton Park hosts numerous events throughout the year, which attract significant traffic volumes, often in very short durations. This places a heavy load on the existing highway network. The largest event is the annual Royal Horticultural Society (RHS) Tatton Park Flower Show and is known to attract thousands of visitors across the four day event.

5.3.12 The existing traffic management strategy employed on the network during the RHS show has been reviewed. Currently all vehicles on the northbound A556 (arriving from the south) are routed up to Bowdon Roundabout where they would perform a u-turn to head southwards on the A556. Access to Tatton Park is via a left turn along one of several minor local roads. This leads to significant congestion and conflict between vehicles accessing the events and those making other regular journeys within the area.

5.3.13 The current proposals are considered to significantly improve access to Tatton Park, and reduce traffic congestion on the minor local roads. This is considered to be possible as access to Tatton Park from the north and south could remain separate and without the need for u-turns at Bowdon Roundabout. From the south, vehicles could use Tabley Junction, followed by a right turn at Mere Junction to access via the A50 and the south-easterly section of the A5034 Mereside Road. From the north, access would be via Millington Junction, then the A5034 Mereside Road and onto Ashley Road.

Cheshire County Show

5.3.14 The Cheshire County Show is an agricultural show held on land approximately 2km south west of the M6 Junction 19 roundabout, and is estimated to attract around 80,000 visitors across the two-day event. Based on a review of information provided by the Tabley Parish Council, the principal access into the showground is from the A556 south of M6 Junction 19. To avoid right-turning conflicts, all events traffic is directed southwards, past the showground, to make a u-turn at the junction with the A559, before heading northwards and then via Fittergate Lane.

5.3.15 An alternative access to the site is currently provided via a left turn into Old Hall Lane from the A556 just north of the M6 Junction 19 roundabout. For the 2011 Cheshire Show, this access was used predominantly for exhibitors and also as an overflow, should the primary route become overcapacity.

5.3.16 The current design proposes to remove access to Old Hall Lane from the new A556. Therefore, events traffic would no longer be able to make use of this facility. An amendment to the current traffic management proposals would therefore be necessary to account for exhibitors and overflow traffic as required.

5.4 Structure Assessments

5.4.1 The proposed design requires the construction of eight new structures and the modification of three existing structures. Full details of structures that are affected by can be found in Existing Structures Options Report and Structures Options Report. A brief description of the proposed option for each structure is summarised in Table 5.2.

Chester Road Bridge Inspection

5.4.2 The improvements over Chester Road Bridge would result in the existing highway cross-section being reconfigured over the structure. The lane widths in the northbound carriageway would remain, but the verge width would be reduced. The southbound carriageway would be increased in width to accommodate an additional lane.

5.4.3 To ensure that Chester Road Bridge would be capable of withstanding the additional traffic load, an inspection of the existing structure was carried out in April 2011. The inspection assessed the condition of the bridge in order to ascertain if any maintenance or strengthening works were required before the bridge could be incorporated into the A556 Knutsford to Bowdon Environmental Improvement scheme.

5.4.4 The inspection concluded that the bridge was in a generally good condition with no significant defects affecting the structural capacity of the bridge, therefore the bridge was assigned a condition factor of 1.0 (i.e. low deficiency in the integrity of the structure). Details of the defects noted along with preventative maintenance recommendations can be found in the Inspection for Assessment Report.

5.4.5 Currently, no carriageway drainage is present on the existing bridge deck. Bridge deck drainage units, or similar, are proposed to be installed over Chester Road Bridge to eliminate the risk of standing water from the proposed running lanes and will be connected to the existing highway drainage system.
<table>
<thead>
<tr>
<th>Structure Name</th>
<th>Ref</th>
<th>Description</th>
<th>Type</th>
<th>Existing / New</th>
<th>Width</th>
<th>Length</th>
<th>Max Height (H) / Min Headroom (HR)</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Hall Lane NMU Underpass and Retaining Wall</td>
<td>S/0</td>
<td>Underpass allowing NMUs to pass beneath the A556 mainline. The structure would be formed from a reinforced concrete box, with reinforced concrete wing walls.</td>
<td>Underpass</td>
<td>New</td>
<td>4.5m</td>
<td>38m</td>
<td>2.8m (HR)</td>
<td>A reinforced concrete retaining wall would tie in to the eastern side of the underpass. The wall would retain the A556 mainline adjacent to Tabley Parish Hall.</td>
</tr>
<tr>
<td>Tabley Junction Overbridge</td>
<td>S/1</td>
<td>Twin span, fully integral structure which would carry the A556 Northbound Exit Loop over the A556 mainline. The superstructure would comprise a reinforced concrete deck supported on a reinforced concrete leaf pier and abutments. The bridge wingwalls would be formed from reinforced soil.</td>
<td>Bridge</td>
<td>New</td>
<td>14.0m</td>
<td>30m</td>
<td>5.3m (HR)</td>
<td></td>
</tr>
<tr>
<td>Burleyhurst Lane Overbridge</td>
<td>S/2</td>
<td>Twin span fully integral structure which would carry the Burleyhurst Lane over the A556 mainline. The superstructure would comprise a reinforced concrete deck supported on a reinforced concrete leaf pier and abutments. The bridge wingwalls would be formed from reinforced soil.</td>
<td>Bridge</td>
<td>New</td>
<td>7.0m</td>
<td>34.5m</td>
<td>5.3 m (HR)</td>
<td></td>
</tr>
<tr>
<td>A50 Diversion Overbridge</td>
<td>S/3</td>
<td>Twin span fully integral structure which would carry the A50 over the A556 mainline. The superstructure would comprise a reinforced concrete deck supported on a reinforced concrete leaf pier and abutments. The bridge wingwalls would be formed from reinforced soil.</td>
<td>Bridge</td>
<td>New</td>
<td>13.6m</td>
<td>33.3m</td>
<td>5.3 m (HR)</td>
<td></td>
</tr>
<tr>
<td>Millington Junction Overbridge</td>
<td>S/4</td>
<td>Twin span fully integral structure which would carry the Millington Roundabout Link over the A556 mainline. The superstructure would comprise a reinforced concrete deck supported on a reinforced concrete leaf pier and abutments. The bridge wingwalls would be formed from reinforced soil.</td>
<td>Bridge</td>
<td>New</td>
<td>18.0m</td>
<td>29.7m</td>
<td>5.3 m (HR)</td>
<td></td>
</tr>
<tr>
<td>Existing Chester Road Bridge</td>
<td>S/5</td>
<td>Twin span concrete highway bridge which carries the A556 over the M56. The deck is formed from precast pre-stressed beams with reinforced concrete infill and topping. The abutments and pier are formed from reinforced concrete. The bridge was constructed in 1974.</td>
<td>Bridge</td>
<td>Existing</td>
<td>29.3m</td>
<td>44.0m</td>
<td>5.26m(^2) (HR)</td>
<td>The design would require reconfiguration of the cross section over the structure. The proposed carriageway would consist of an additional southbound lane over the bridge and a concrete step barrier would be constructed within a relocated central reserve. Note: Measured value taken from Principal Inspection Report (May 2000).</td>
</tr>
<tr>
<td>Bowdon Roundabout Link Overbridge</td>
<td>S/6</td>
<td>Twin span fully integral structure which would carry the Bowdon Roundabout Link over the A556 mainline. The superstructure would comprise a reinforced concrete deck supported on a reinforced concrete leaf pier and abutments. The bridge wingwalls would be formed from reinforced soil.</td>
<td>Bridge</td>
<td>New</td>
<td>29.7m</td>
<td>39.7m</td>
<td>5.3 m (HR)</td>
<td></td>
</tr>
<tr>
<td>Yarwoodheath Farm Access Bridge</td>
<td>S/7</td>
<td>Accommodation route over the M56 Spur Eastbound On-Slip</td>
<td>Bridge</td>
<td>Existing</td>
<td>7.1m</td>
<td>25.7m</td>
<td>5.22m(^2) (HR)</td>
<td>In order to realign the farm access accommodation route over Structure S/7, the existing southwest wingwall of the bridge would be demolished and reconstructed. The replacement wingwall would be reinforced concrete with piled foundations, and would be independent of the existing structure. Note: Measured value taken from Principal Inspection Report (November 2008).</td>
</tr>
<tr>
<td>Structure Name</td>
<td>Ref</td>
<td>Description</td>
<td>Type</td>
<td>Existing / New</td>
<td>Width</td>
<td>Length</td>
<td>Max Height (H) / Min Headroom (HR)</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
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<td>----------------</td>
<td>-------</td>
<td>--------</td>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yarwoodheath Lane Accommodation Bridge</td>
<td>S/9</td>
<td>Single span reinforced concrete bridge. It carries farm access traffic over the M56. The bridge superstructure is formed from a reinforced concrete portal frame supported on Freyssinet hinges. The substructure is formed from reinforced concrete cellular abutments with cantilever wingwalls.</td>
<td>Bridge</td>
<td>Existing</td>
<td>5.0m</td>
<td>39.0m</td>
<td>5.15m*3 (HR)</td>
<td>As a result of the design, the route across the structure would be upgraded. This may require the existing parapets to be upgraded. 3 – Measured value taken from Principal Inspection Report (July 2006).</td>
</tr>
<tr>
<td>Cherry Tree Lane Link Retaining Wall</td>
<td>S/11</td>
<td>Reinforced concrete retaining wall. The wall would retain Cherry Tree Lane Link above Rostheme Mere SSSI.</td>
<td>Retaining Wall</td>
<td>New</td>
<td>N/A</td>
<td>88.3</td>
<td>1.9m (H)</td>
<td></td>
</tr>
<tr>
<td>M56 On-Slip Retaining Wall</td>
<td>S/12</td>
<td>Reinforced soil retaining structure with a pedestrian guardrail fixed to a precast concrete coping on top of the structure. The structure would retain the re-aligned Yarwoodheath Farm Access Track above the M56 Eastbound On-Slip.</td>
<td>Retaining Wall</td>
<td>New</td>
<td>N/A</td>
<td>58.6m</td>
<td>3.5m (H)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2 – Structure Proposals
### 5.5 Lighting Assessment

5.5.1 The requirements for road lighting have been assessed and developed in accordance with the DMRB Volume 8 (Traffic Signs and Lighting). The following section provides a brief summary of the preliminary lighting proposals for the scheme. Lighting proposals for the scheme are shown on Figure G.

5.5.2 As part of the DMRB assessment, a lighting appraisal was undertaken to consider the economic, safety and environmental impacts of providing lighting on the new route. The appraisal identified that provision of street lighting would deliver only a slight accident saving. However, this benefit would not outweigh the capital and revenue costs associated with the provision of lighting, and thus the net benefit would be negative. Therefore, the appraisal concluded that it would not be economically justifiable to provide road lighting across the full extent of the proposed scheme.

5.5.3 Although lighting would not be provided for the majority of the scheme, it is still advised from a safety perspective, to have conflict areas such as roundabouts and junctions lit. Therefore, in order to balance the need for road safety with the desire to minimise any impacts on costs and the environment, it is proposed to light parts of the M6 and M56 Junctions for the main works. It is not proposed to light either Millington or Tabley Junctions. A summary of the preliminary lighting proposals is provided in Table 5.3 below.

<table>
<thead>
<tr>
<th>Link/Junction</th>
<th>Lighting Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 Junction 19</td>
<td>The existing lighting around M6 Junction Roundabout would be retained. New lighting is proposed along the A556 approach to / exit from the roundabout, for a distance of approximately 100m.</td>
</tr>
<tr>
<td>Proposed A556 / Re-aligned M56 Spur</td>
<td>Other than the above, road lighting would not be provided on the A556 mainline or Re-aligned M56 Spur.</td>
</tr>
<tr>
<td>M56 Junction 7/8</td>
<td>The existing lighting around Bowdon Roundabout and its entries/exits would be retained (other than along the existing A556). New lighting would be provided around the new southern roundabout and the connecting link road, as well as all new entries/exits to the junction. This includes the new slip road entry to the existing Bowdon Roundabout.</td>
</tr>
<tr>
<td>Chester Road</td>
<td>As part of the de-trunking works, existing road lighting would be removed along the Chester Road (Southern and Northern Links), as well as the section to the north of Millington Junction. At this stage it is proposed that the Chester Road (Central Link) would remain lit due to the presence of numerous private property and field accesses along this section. Lighting would also be retained at Mere and Bucklow Hill Junctions.</td>
</tr>
</tbody>
</table>

Table 5.3 – Preliminary Lighting Proposals

### 5.6 Signs and Gantry Assessment

5.6.1 Sign and Gantry requirements have been assessed and developed in accordance with the DMRB Volume 8 (Traffic Signs and Lighting) and Volume 9 (Network - Traffic Control and Communication). Local Transport Note (LTN) guidance, as published by the Department for Transport (DfT), has also been used where applicable. The following section provides a brief description of the preliminary sign and gantry proposals.

5.6.2 In order to reduce the visual impact on the rural landscape, provision of gantries has been kept to a minimum. It is therefore proposed to post mount all directional signs in the nearside verge as this is considered less visually intrusive than gantry mounted signage.

5.6.3 Gantries are required, in accordance with the DMRB, on the immediate approach to a trunk road feeds directly into a motorway (i.e. where the proposed A556 northbound provides a free-flow connection to the Re-aligned M56 Spur). Based on this guidance two gantries are proposed, one portal gantry spanning across the carriageway, and one Variable Message Sign (VMS) cantilever gantry, both located on the A556 northbound approach in advance of the change in route status. The design proposals are shown on Figure G.

5.6.4 The cantilever VMS gantry would be located on the A556 northbound carriageway at the end of the A556 Northbound On-Slip auxiliary lane. The variable message capabilities of this gantry would enable informative messages to be relayed to road users on potential hazards on the road network further downstream.

5.6.5 Where the A556 northbound carriageway meets the Re-aligned M56 Spur, a portal gantry with lane specific signals is proposed. This gantry would span the northbound carriageway only, with matrix signals mounted above the nearside and offside lanes of the mainline. The matrix signals would inform drivers of lane/road closures ahead, or display advisory speed limits following an incident or during periods of congestion.

5.6.6 It should be noted that a departure has been sought in relation to the above gantry proposals. It is considered that, due to the variable message capabilities of the VMS cantilever gantry, the departure would represent a more informative and safer solution than a fully compliant design, which requires provision of three portal gantries with lane mounted signals. The design, with associated departure, would also minimise the visual impact on the rural landscape. Further detailed of the proposed departure can be found in the Departures from Standards Summary Table attached in Appendix B.
5.7 Geotechnical Assessment

5.7.1 This section summarises the geotechnical engineering aspects of the scheme. Further details can be found in the Preliminary Ground Investigation Report and the Proposals for Earthworks Report.

Existing Ground Conditions

5.7.2 The geological map covering the scheme area shows the site to be underlain by glacial drift deposits or alluvium that overlie mudstones of the Permo-Triassic period.

5.7.3 The glacial drift comprises glacial till with occasional lenses of laminated clay. Glacial sand and gravel is also shown in localised areas, predominantly between Bucklow Hill and Tabley. Previous reports suggest that the glacial sand, gravel and laminated clay are patchy in extent and form separate lenses within the glacial till. Underlying the northern part of the route, north of Cherry Tree Lane, fluvio glacial gravel and alluvium is present, which is associated with the River Bollin and its tributaries.

5.7.4 Deposits of salt are known to be present within the underlying mudstones. It is generally considered that the Meres in the study area occupy salt subsidence hollows. These are likely to have been formed by the salt being dissolved and the resultant collapse of the overlying material. Based on the information available, the risk of further salt subsidence affecting the proposed route is considered to be very low, and comparable to the existing situation. Therefore, no measures to reduce the risk of salt subsidence are considered to be necessary.

5.7.5 Natural brine was pumped from Agden, 2km west of the existing A556, and Heatley, 6km north of the M56. Correspondence with the Cheshire Brine Compensation Board indicates that subsidence due to brine pumping is localised due to the presence of major geological faulting, which limit the extent of the salt deposits and are therefore not expected to affect the proposed route.

5.7.6 Rock salt mining has not taken place within the study area. The nearest rock salt mine was at Northwich, over 10km southwest of the study area.

Embankment Design

5.7.7 The heights of the embankments would vary across the scheme due to the topography of the area and existing infrastructure. The maximum embankment height is not anticipated to exceed 7.5m.

5.7.8 It is assumed that the majority of the embankments along the scheme would be constructed from fill material generated on site from cuttings within the scheme, although a proportion of imported fill material may also be required.

5.7.9 For preliminary design purposes, it is considered that embankments constructed from site won material (Class 1 or Class 2) may be constructed with side slopes of between 1 (vertical) in 2.5 (horizontal) and 1 (vertical) in 3 (horizontal).

5.7.10 For the tallest embankments it may be necessary to include a pause period between completion of the earthworks and surfacing of the road to allow settlement to occur. This will be considered further at detailed design stage.

Cutting Design

5.7.11 It is anticipated that cuttings up to 10m deep would be stable with side slopes of 1 (vertical) in 2.5 (horizontal) when formed in the in-situ deposits of glacial till and sand and gravel.

5.7.12 At this stage it is considered unlikely that cut slope drainage will be required to enhance the stability of slopes at 1 (vertical) in 2.5 (horizontal) or shallower. However, locally it may be necessary to install slope drainage to manage groundwater and prevent erosion of the slope face. The location and type of slope face drainage will be considered as part of the design process.

5.7.13 It is anticipated that the majority of material arising from the cuttings will be available for use in the construction of embankments.

Summary

5.7.14 The ground conditions beneath the proposed route are considered to be such that standard earthworks and foundations solutions should be sufficient to allow construction.
5.8 Drainage Assessment

5.8.1 This section describes the existing drainage features and conditions within the scheme area, before outlining the drainage proposals for the new works. The following sections should be read in conjunction with Figure H (Existing Drainage Catchments Plan) and Figure I (Proposed Drainage Strategy Plan).

Existing Conditions

Hydrology

5.8.2 The River Bollin is located to the north of the site, approximately 50m north of Bowdon Roundabout. The majority of the scheme is located within the catchment of the River Bollin with the watercourse generally flowing northwards.

5.8.3 Tabley Brook is situated to the south of M6 Junction 19 and flows southwards towards the River Weaver in a narrow valley with moderately steep sloping sides. Agden Brook is located around 1km north east of Bucklow Hill and flows northwards to the Bridgewater Canal. There are no major rivers crossing the proposed road.

5.8.4 Little Mere, The Mere and Rostherne Mere are located approximately 200-300m east of the existing A556. In addition to these large water bodies, there are numerous small ponds, many of which are believed to originate as marl pits.

5.8.5 The drainage of the study area is characterised mainly by small, un-named streams and agricultural drainage ditches, forming parts of the headwaters of brooks that are tributaries of the Rivers Bollin and Weaver. In some areas, particularly around Over Tabley, some of these small watercourses drain into ponds or marshy hollows with no known outflow.

5.8.6 There are limited floodplains around the Meres, and along the River Bollin, Agden Brook and Tabley Brook. The remainder of the study area, including the whole area of the improvements, falls within Flood Zone 1 (i.e. it is categorised by the Environment Agency (EA) as having a low probability (less than 0.1%) of flooding in any year).

Hydrogeology

5.8.7 The Preliminary Sources Study Report\(^3\) states that the majority of the site overlies an area that has been classified as a non-aquifer. However, in a number of locations the geological classification of the underlying formation is a minor aquifer with the overlying soils classified as either H1 (shallow or easily transmissible) or H2 (deep permeable soils).

5.8.8 Additionally, given the presence of a number of ponds along the length of the scheme it is considered likely that the groundwater table may be shallow in certain locations. It is likely that perched water may be present within the more granular layers of the glacial till.

Existing Highway Drainage (Figure H)

5.8.9 The existing A556 and M56 Spur have eight separate highway drainage catchment areas within the scheme that would be affected by the works. Each catchment collects the surface water run-off from the existing road and drains towards the corresponding discharge points as shown on Figure H.

5.8.10 The existing drainage networks along the A556 (i.e. Catchments 1, 2, 3, 4, 5 and 7) discharge to a number of watercourses and water bodies along the length of the scheme. It is proposed that these discharge points remain in place without modification.

5.8.11 There is no provision of pollution control facilities or flow attenuation at any of the existing drainage outfalls at present. However, for the catchments listed above, the quality of the discharge would be greatly improved by the significant reduction in traffic using the existing A556 with the new road in place. The risk of contamination due to accidental spillage from road vehicles would also be reduced due to the significant reduction in traffic volume.

5.8.12 It is also proposed to reduce the width of the existing Chester Road as part of the de-trunking proposals. Consequently, the surface area of impermeable road pavement would also be reduced, decreasing the peak discharge flow rates and volumes.

Proposed Highway Drainage Strategy (Figure I)

5.8.13 The objectives of the highway drainage design, as set out in the Drainage Strategy Report, are as follows:

- Quick removal of surface water from carriageways to improve the safety of the road;
- Use of a sealed drainage system, which allows for the containment of accidental spillage;
- Use of a gravity drainage network system without requirement for pumping to reduce future operation and maintenance;

\(^3\) A556 Environmental Improvement: Preliminary Sources Study Report (Capita Symonds, December 2007)
Attenuation and treatment of highway drainage run-off prior to outfall to surface watercourses;

Existing drainage on Chester Road is to be retained, where possible with local road drainage kept separate from the proposed drainage along the new A556; and;

A like for like replacement of the existing drainage provision on local roads as agreed in principle with the local highway authority.

5.8.14 The proposed highway drainage catchment areas and discharge points are shown on Figure I. Detailed information relating to the proposed drainage design can be found in the Drainage Strategy Report.

5.8.15 The preliminary carriageway surface and sub-surface drainage has been designed in accordance with DMRB. The proposed highway drainage network consists primarily of surface water channels that would outfall into an adjacent carrier drain. Narrow filter drains are currently proposed to provide adequate sub-surface drainage.

5.8.16 Various forms of edge drainage are proposed at junctions and on side roads including ‘kerb and gully’ and combined drainage and kerb units. Over the edge drainage has been proposed for the side roads where this replicates the existing drainage situation and where it is not feasible to connect back to the proposed highway drainage.

5.8.17 Bridge deck units are proposed to drain the lengths of carriageway crossing structures.

5.8.18 It is proposed that all highway drainage would discharge to open watercourses adjacent to the scheme.

Attenuation and Pollution Control

5.8.19 It is proposed that all four new discharges from Catchments A to D would pass through a surface flow wetland (consisting of planted vegetation to allow removal of contaminants) and be attenuated in a wet pond to limit and control discharge rates. At this stage, the current proposal is to form the surface flow wetland from the base of the attenuation pond to provide a combined system.

5.8.20 The proposed attenuation ponds would control the discharge from the highway drainage networks to 2 litres/second/hectare in a critical 100 year storm event. An increase of 20% in rainfall intensity has been assumed to allow for potential climate change.

5.8.21 It is anticipated that the surface flow wetland would provide significant treatment of both soluble and sediment-bound pollutants.

Drainage Culverts

5.8.22 Drainage culverts are pipes that cross below the road and are introduced to retain the natural overland flow of water that would be affected, or severed, by constructing the new road. Therefore, drainage culverts are required to divert natural watercourses, or new ditches that have been introduced as part of the design to route drainage to an appropriate culvert location.

5.8.23 A total of ten culverts are currently proposed and are shown on Figure I and in more detail on Figures D.1 to D.12.

5.9 Public Utilities

5.9.1 As part of the A556 Knutsford to Bowdon Environmental Improvement, existing utilities would need to be diverted and/or protected. Enquiries are currently ongoing to determine the scope of works for all Statutory Undertakers equipment affected by the proposals. Contact has been made with the following utility providers who are considered to have equipment located within the scheme area, which may or may not be affected:

- Arqiva Services Ltd
- British Telecom
- Cable & Wireless
- Colt Plant
- Easynet Ltd
- E-on UK
- Geo Networks
- Global Crossing PEC
- KCOM Group PLC
- National Grid
- Mainline Pipelines Ltd
- Scottish Power Energy Networks
- T-Mobile
- United Utilities
- Virgin Media
The following paragraphs summarise the current position with respect to the works associated with the major utility provider’s equipment crossed by the scheme (working from south to north).

**National Grid High Pressure Gas Main**

Between the M6 roundabout connection and Tabley Junction, the new A556 would cross the existing Feeder No. 4, high pressure gas main, which is owned and operated by National Grid.

Although the vertical alignment of the new road would be above the pipeline, a protection detail is not considered acceptable in this location. This requirement comes from improved safety regulations due to the high density of traffic on the new A556, and would require the pipe to be composed of a thicker wall material where below the road and over a defined length either side of the carriageway. A local diversion is therefore required in order to replace the existing pipe and this could be achieved whilst the pipe is live, or during an outage. Consultations with National Grid are ongoing to ensure that this diversion is completed efficiently, with minimal disruption to its service and impact on the construction programme.

**Geo-Networks – Geo and Fibrespeed Cables**

Existing geo and fibrespeed cables would cross the new A556 just north of the National Grid Gas Main on a similar alignment. At this stage it is considered that a diversion would be required to this equipment, but this would rely in part on the works required to the gas main due to both being relatively close together.

**Scottish Power High Voltage Overhead Power Lines**

Existing overhead power lines would cross the new A556 just south of Burleyhurst Lane. A topographical survey, undertaken by representatives of Scottish Power has confirmed that the road, on its currently proposed alignment, would not interact with the overhead cables. Consequently, no permanent works are required.

**Mainline Pipelines Ltd**

The new A556 would cross the existing pipeline within the offline works. A new local road would cross the pipeline further west. The road alignments in both locations would provide sufficient cover to the pipeline such that a diversion is not required. This has been confirmed with Fisher German, who manage the operation of the pipeline on behalf of Mainline Pipelines, and details of the necessary protective works have been provided.

The pipeline currently crosses the A50 and also a section of the existing Chester Road that would be de-trunked. In both cases it has been confirmed that no works would be required.

**United Utilities Dunham to Knutsford Pipeline**

This new service utility became live during 2010. The pipeline runs along Rostherne Lane to the east of the existing A556 and crosses at the existing Rostherne Lane and Millington Lane junctions, before heading north towards the M56. The proposed A556 would cross at a skew to the line of the water main, roughly at existing ground level. A diversion is required to ensure that a suitable crossing is provided.

### 5.10 Construction Sequence

<table>
<thead>
<tr>
<th>Construction Phase No.</th>
<th>Key Construction Activities</th>
<th>Indicative Duration (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Advanced works - environmental mitigation works, archaeological excavations, hardening of A556 central reservation, services diversions.</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>Mainline works – including southern section offline works, M56 Junction offline works, online works either side of Chester Road Bridge (verge widening and carriageway realignment).</td>
<td>92</td>
</tr>
<tr>
<td>3</td>
<td>Millington Junction tie-in to existing A556 after switch of traffic to new alignment</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>De-trunking works – reduction in existing A556 from 4 lanes to 2 lanes, reconstructing Bucklow Hill and Mere Junctions, completion of the Cherry Tree Lane link, general landscaping along Chester Road</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 5.4 – Construction Sequence
6 Traffic and Economic Assessment

6.1 Overview

6.1.1 In order to predict the impact of the scheme in the future, a series of transport models have been developed to produce forecasts of traffic flows in the area in future years based on detailed modelling of the existing traffic conditions.

6.1.2 The first of these was a model of existing traffic, or Base Model, which was used as the starting point to develop Forecast Models for an Opening and Design Year. The Forecast Models would then be used to predict traffic flows and behaviour in the future, taking into account growth in housing, employment and the number of cars on the road network.

6.1.3 The Forecast Models examine two development alternatives, one with the scheme in place (Do Something) and one without the scheme (Do Minimum). The traffic flows around the area could then be compared to determine whether the scheme would alleviate the problems associated with the current road layout in the future, and what conditions would be like if the scheme did not go ahead. Data from the models could then be extracted for the purposes of the environmental, economic and operational assessments.

6.1.4 This chapter discusses the processes behind the construction of the Base Model and the Forecast Models that followed. It also outlines the main effects of the scheme, both in terms of the traffic and economic impacts.

6.2 Modelling

6.2.1 A Base Model had already been developed as part of the Stage 2 Option Selection phase to enable a decision on a Preferred Route. As part of the Stage 3 Preliminary Design phase, this model was replaced by the MidMan model, which includes more detail around the scheme itself and also takes account of wider strategic movements.

6.2.2 The area modelled in detail was defined as the Simulation Area. It accounts for most major links and strategic movements in the region, covering an area from the M62 in the north and to the M6/M5 junction near Birmingham in the south in order to model the effects on traffic from the West Midlands and the South.

6.2.3 Within this wide Simulation Area, a Detailed Study Area was defined around the scheme itself that focused on the area between the M62 in the north and the A53 in the south. It was coded in more detail than the rest of the Simulation Area to account for junction delays, rural roads and urban areas that were likely to be affected by the scheme such as Stoke on Trent, Salford, Northwich, Warrington and Knutsford.

6.2.4 Outside the Simulation Area an External Model Area was defined to allow for regional movements from other parts of the UK to be included. In this area, roads were modelled in less detail than in the Simulation Area. An illustration of these areas is given in Figure 6.1.

6.2.5 In order to make the Stage 3 Base Model suitable for modelling current traffic behaviour, it was coded using new traffic information (traffic count data, journey time data and roadside interview data) collected in the Detailed Study Area between June and September 2009. This data was added to existing traffic data to improve data coverage. All data was adjusted to represent an average month in 2009.

Figure 6.1 – Study Areas within the A556 Traffic Models

6 The MidMan model refers to the Midlands-Manchester model developed in 2006 as part of a multi-modal study of transport improvements in the West Midlands and North West Conurbation. It included an earlier version of the A556 scheme, as well as public transport enhancements in the area.
6.2.6 The locations of the Data Collection sites are shown in Figure 6.2 and further details of the Data Collection process can be found in the Traffic Data Collection Report (TDCR). The Base Year was set at 2009 so that the model could be checked, or calibrated against the most recent observed data.

6.2.7 The models represent an average hour for three time periods as follows:

- Weekday AM peak period: 07:00 - 10:00.
- Weekday Inter peak (IP) period: 10:00 - 16:00.
- Weekday PM peak period: 16:00 - 19:00.

6.2.8 The principal output of these models was traffic flows and journey times.

6.2.9 Flows in the models were represented as Passenger Car Units (PCUs), which take into account the additional road space taken up by HGVs. In this case, it was assumed that a HGV was equal to 2.3 PCUs. All figures quoted from the models are given in PCUs unless otherwise stated.

6.2.10 The models did not predict any public transport vehicle types or “non-motorised modes” such as cyclists or walkers. This was because the total number of these road users only account for a small fraction of total traffic and therefore do not have an effect on the traffic predictions being made.

6.2.11 More details on the model specifications can be found in the Local Model Validation Report (LMVR).

6.3 Base Network Development

6.3.1 The Base and Forecast Models comprised of two elements, the Network and the Traffic Demand. The Network element can be split into a number of components:

- **Nodes**: Represent junctions and the system that controls them (such as traffic signals, roundabout or give way).
- **Links**: Represent the roads that link together junctions in the model. These are coded depending on the type of road and the characteristics it has (such as number of lanes, location, classification, etc).
- **Zones**: Represent areas that act as the source of traffic flows in and out of the network.
- **Zone Connectors**: Tie the flows entering or leaving a zone into the links.

6.3.2 As part of the network coding, each link type had a speed/flow relationship assigned to it, which allowed the traffic speed to be modelled as a product of the flows on it. This meant that more congested roads experienced lower speeds and freer flowing roads experienced speeds closer to the desired speed limit.

6.3.3 The extent of the coded network is shown in Figure 6.3 and is overlaid across the courses of major roads for clarity.
6.3.4 The addition of the Traffic Demand element to the network element was divided into two stages; Matrix Development and Matrix Assignment. The whole process was based around developing Origin-Destination (OD) matrices of trips travelling between all of the zones in the network.

6.3.5 Matrices were developed in five separate parts corresponding to User Class types: cars are split into three User Classes, with Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) making up the remaining two User Classes. The User Classes were therefore defined as:

- **User Class 1:** Cars – Commuting Trips.
- **User Class 2:** Cars – On Business Trips.
- **User Class 3:** Cars – All Other Trips.
- **User Class 4:** LGVs – All Trips.
- **User Class 5:** HGVs – All Trips.

6.3.6 Each of the three car User Class matrices were developed from synthesised data taken from census and car ownership data. This data was used to develop a set of distinctive “traveller types” with their own distinctive trip rate, that would be likely to travel from and to each zone. These trips were then distributed according to national trends on trip lengths before they were adjusted to match observed distributions as closely as possible.

6.3.7 LGV and HGV matrices were developed using distributions from synthesised car business trips, as it was assumed they would follow similar trip patterns. These were then scaled according to observed patterns of LGV and HGV traffic.

6.3.8 Once the matrices for each User Class had been developed, the Matrix Assignment process routed vehicle trips between their origin and destination making use of the most appropriate roads. The behaviour of vehicle trips and the routes they took depended on the User Class and their associated values of time and vehicle operating costs, which give a different generalised cost for a particular route depending on the User Class. The generalised cost is a formulation that dictates, for each User Class, the perceived cost of a trip in terms of time, distance and money spent undertaking that trip. A business trip, for example would place more emphasis on saving time on a trip, regardless of the monetary cost (including the cost of petrol) whereas a trip for a leisure purpose may take a trip that takes longer if it saves on the monetary cost.
6.3.9 The model ran through a number of cycles, or iterations whereby traffic was assigned to the network. The network was checked to obtain revised delay and cost information based on that assignment. The traffic was then re-assigned until the model balanced trips across all possible routes so that the cost of making any given trip between two zones could not be reduced by switching route. This took into account the flow dependant speeds and delays experienced as vehicles traverse the network. This is a principal known as “equilibrium”.

6.3.10 Each of the peak period models had its own set of matrices that required estimation and assignment and these were all run until equilibrium had reached an acceptable level, known as “convergence”. These levels of acceptability are defined in the Design Manual for Roads and Bridges (DMRB 12.2.1 – Appendix H) criteria. The converged results were then calibrated against survey data to ensure the model was replicating surveyed conditions to a suitable level of accuracy. Generally, the models were predicting accurate levels of flow across the network, and flows along the A556 reflected strategic trips being made between Birmingham and Manchester, as well as more localised trips between Northwich, Knutsford and Altrincham.

6.3.11 The Base Year model has been reviewed and approved by the Highways Agency’s TAME ACO (Traffic Appraisal, Modelling and Economics Appraisal Certifying Officer) and was also peer reviewed and approved by external transport planning consultants. Following the TAME ACO review and the peer review of the model performance, the Stage 3 Base Model was deemed to be capable of producing sufficiently accurate estimates of existing traffic conditions within the Detailed Study Area. Therefore the final calibrated results could be used with confidence to predict forecast future flows with and without the A556 scheme.

6.3.12 Following the development of the Stage 3 Base Model, a Variable Demand model was developed, which makes further adjustments to the matrices based on frequency, modal and distributional responses to changes in the Generalised Cost. A series of “realism tests”, set out by the Department for Transport, were completed to ensure the predicted changes in demand from the Variable Demand model would be acceptable. The Variable Demand model was then taken forward for use in the forecasting process.

6.3.13 Full methodologies and results from this model can be found in the Appendices of the LMVR.

6.4 Forecasting

6.4.1 The model of existing traffic, or Base Model, was used as the starting point for predicting traffic flows and behaviour in the future, which take into account growth in housing, employment and the number of cars on the road network. Traffic flows were factored up to the Forecast Years in order to produce the Forecast Models. The Forecast Years were defined as 2015 and 2030, which are defined within the appraisal as the Opening and Design Years respectively.

6.4.2 These demonstrate how the road network would perform in the future given predicted increases in traffic flow and the completion of certain housing and employment developments, as well as proposed highway improvements in the area. These modifications contribute towards the construction of a Do Minimum model for each Forecast Year, which include all the surrounding growth and developments for that year, and other committed highway improvement schemes but do not include the scheme itself. All other model specifications (such as vehicle classes, time periods and study areas) remained the same as the Base Model.

6.4.3 Similarly, a Do Something model for each Forecast Year was developed that was exactly the same as the Do Minimum model, but also included the A556 scheme. The models could then be used to predict how the network responds to the addition of the A556 scheme compared to how the network performs without it in each forecast year. From this, it would be possible to quantify the environmental and economic impact of the scheme, as well as use predictions of flow on the new road to inform scheme design.

Forecast Network Development

6.4.4 The Do Minimum networks included the current highway network from the 2009 Base Year traffic model, together with any significant highway changes identified in adopted planning documents that are expected to be in place by each forecast year.

6.4.5 The highway improvements included:

- Hard Shoulder Running Schemes (on the M6, M60 and M62).
- Motorway Improvements (on the M60).
- By-Passes (such as the Alderley Edge By-Pass).
- Highway Improvements for large developments.

6.4.6 The location of these highway improvements are illustrated in Figure 6.4.

6.4.7 In the High Benefit scenario, an additional set of Hard Shoulder Running schemes were added on the M6 and M56, which are also shown in Figure 6.4. The Low Benefit scenario only included the highway improvements coded into the Core Scenario.
6.4.8 For the Do Something models, a new set of roads and nodes were coded into the network to simulate the proposed dual carriageway link and the two new junctions tying into it at each end, as well as the Tabley and Millington Junctions as described in Section 4.2 and 4.4. It also removed connections that would be severed by the scheme and reflected the de-trunking of the existing Chester Road. No additional roads were required for the Do Something models as no other proposed roads are dependant on scheme completion. Speed flow curves were assigned to all new roads in line with the approach followed for the Base network development.

Forecast Matrix Development

6.4.9 The additional demand was generated using predictions in jobs and population for each modelled zone from the National Trip End Model (NTEM) Version 6.1. This demographic information was used to produce trips across the model for each User Class and Forecast Year.

6.4.10 Additional forecast developments were derived from planning data supplied by nearby local authorities in Cheshire, Greater Manchester and Staffordshire. These areas are shown in yellow on Figure 6.5. Due to the strategic nature of the data, in some instances this growth was evenly applied across several modelled zones within the relevant local authority. Developments were only loaded onto specific zones where the proposals were specific enough and the zone was at a sufficient level of detail and size. These are shown as red circles on Figure 6.5.
6.4.11 The developments themselves had a negligible impact on overall growth predictions. Where no additional forecast development information was available, only NTEM forecasts were applied to each modelled zone. After growth due to specific developments was added in, growth was then constrained back to overall NTEM levels. No other constraints to the forecast matrices’ limits to growth were deemed necessary at this stage.

6.4.12 Due to the improved precision of the modelling tools, the Core Scenario predicts slightly lower overall growth rates compared to NTEM being applied on its own. The input population changes and car ownership changes are consistent with the control totals in NTEM. However, the application of Trip Rates is more precise than in NTEM which leads to a small variation in the absolute numbers of trips in the model. Tests have shown that this has no impact on the scheme appraisal.

6.4.13 No additional measures of growth were added into the Do Something models as no developments have been proposed that were dependant on scheme completion.

6.4.14 The Variable Demand model, described above in Section 6.3, makes further adjustments to the matrices based on responses to changes in the Generalised Cost. The result of the Variable Demand model is a reduction in the overall trip making in the model, which is consistent with expectations.

6.4.15 Further details of the Forecasting process can be found in the Traffic Forecasting Report (TFR).

6.4.16 Despite the changes in trip levels, the average trip lengths and average speeds remained stable, demonstrating that vehicle trips were still behaving in a similar fashion to the validated trips in the Base Model. The Forecast Models were therefore deemed to be suitable for providing an accurate estimate of the traffic flows likely to occur around the A556 scheme and the surrounding network. The Forecast Year models have been reviewed and approved by the TAME ACO. Following this review, these future year traffic flows were used in the economic assessments, environmental assessments and in the recent design development of the scheme.
6.5 Effects of the Scheme

6.5.1 Forecast flows on the A556 scheme itself between the M6 and M56 were higher in the Do Something scenario compared to flows along the existing route in the Do Minimum scenario. Figures B.2 and B.3 (included following the main report text, before the appendices) show the AADT flows on the mainline A556 in the Do Minimum scenario and on the scheme in the Do Something.

6.5.2 In the Do Something scenario, the scheme caused a marked reduction in flows along the de-trunked A556. Full schematics of Do Minimum and Do Something flows can be found in the TFR. Flows on the M6 between Junctions 19-20 and the M56 between Junctions 8-9 also decreased as a result of traffic diverting off the motorway network and onto the A556. Aside from the scheme itself, there were also flow increases in the Do Something scenario along the A556 and A56 at either end of the scheme, as well as the A50 which bisects it. The scheme also appears to lower flows on rural roads in the area, suggesting that rat running has been reduced.

6.5.3 The results also show that the proposed A556 route between the M6 and M56 provides shorter journey times in the Do Something scenario compared to journey times along the existing route in the Do Minimum scenario. Journey times are summarised in Table 6.1.

6.6 Economic Performance of the Scheme

6.6.1 The economic performance of the scheme was examined by comparing the costs and the benefits of the scheme in order to determine whether the scheme represented good value for money.

6.6.2 The user benefits part of the economic analysis was carried out using the Transport Users Benefit Appraisal (TUBA) program, which calculated the monetised benefits derived from journey time savings and distance savings in the Forecast Models.

6.6.3 In addition to TUBA, the Cost Benefit Analysis (COBA) program was used to estimate the accident benefits resulting from the scheme and the Queues and Delays at Roadworks (QUADRO) program was used to estimate the impact of construction and maintenance of the scheme. They also used traffic flows and road specifications taken from the Forecast Models.

6.6.4 The TUBA analysis used results from the 12 hour AM/IP/PM periods modelled in the traffic forecasting and therefore excluded any benefits arising in the off-peak night time period as well as weekends. Both COBA and QUADRO used AADT figures that were calculated from the 12 hour modelled flows.

6.6.5 Benefits were assessed over a 60 year assessment period from the Opening Year. Costs include items such as the construction and land cost, preparation and supervision costs and maintenance costs. The majority of the scheme costs would be incurred in the years leading up to the Opening Year.

6.6.6 The environmental benefits such as noise were omitted as the environmental analysis had not been carried out at this stage. However, carbon benefits were taken into account as part of the TUBA analysis.

6.6.7 Full results and assumptions can be found in the Economic Assessment Report (EAR). A summary of the outputs from the Core Scenario are given in Table 6.2.

6.6.8 The outturn cost of the scheme was estimated as £174 million, though this was expressed as £111.2 million in the economic assessment as this equates to the undiscounted 2002 prices. When discounted to a common base year of 2002 at 2002 prices, the cost is £87.7 million. All other prices quoted have also been discounted to 2002 and are in 2002 prices.

6.6.9 Maintenance costs when the scheme is in place (Operating Costs) were forecast to decrease by £1.3 million as a result of the scheme. This is because the cost of maintaining additional bridges, roundabouts and slip roads when the scheme is in place occurs further in the future, where discounting has more of an effect. There would also be less maintenance on the existing A556 as most of the traffic has been removed.

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### Table 6.1 – Comparison of Average Modelled Journey Times

<table>
<thead>
<tr>
<th>Route</th>
<th>Direction</th>
<th>2015 Journey Times (secs)</th>
<th>2030 Journey Times (secs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DM</td>
<td>DS</td>
<td>Difference</td>
</tr>
<tr>
<td>M6 J18 - M56 J6 via Existing A556</td>
<td>NB</td>
<td>1,335</td>
<td>1,354</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>1,261</td>
<td>1,316</td>
</tr>
<tr>
<td>M6 J18 - M56 J6 via Proposed A556</td>
<td>NB</td>
<td>N/A</td>
<td>1,133</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>N/A</td>
<td>1,106</td>
</tr>
<tr>
<td>M6 J18 - M56 J6 via M6/M56 Junction</td>
<td>NB</td>
<td>1,534</td>
<td>1,552</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>1,553</td>
<td>1,573</td>
</tr>
</tbody>
</table>

* Figures compare the proposed (DS) route journey time against the existing (DM) route journey time as shown in the rows directly above.
Table 6.2 – Summary of Costs and Benefits from Forecast Models (discounted to 2002 and in 2002 prices)

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Cost/Benefit Elements</th>
<th>Costs/Benefits (£ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer User Benefits</td>
<td>Travel Time</td>
<td>£126.5 m</td>
</tr>
<tr>
<td></td>
<td>Vehicle Operating Costs</td>
<td>-£15.1 m</td>
</tr>
<tr>
<td></td>
<td>User Charges</td>
<td>-£0.2 m</td>
</tr>
<tr>
<td></td>
<td>Delays During Construction</td>
<td>-£0.3 m</td>
</tr>
<tr>
<td></td>
<td>Delays During Maintenance</td>
<td>-£5.5 m</td>
</tr>
<tr>
<td></td>
<td>Net Consumer User Benefits</td>
<td>£105.4 m</td>
</tr>
<tr>
<td>Business User Benefits</td>
<td>Travel Time</td>
<td>£158.2 m</td>
</tr>
<tr>
<td></td>
<td>Vehicle Operating Costs</td>
<td>£13.2 m</td>
</tr>
<tr>
<td></td>
<td>User Charges</td>
<td>£0.0 m</td>
</tr>
<tr>
<td></td>
<td>Delays During Construction</td>
<td>-£0.1 m</td>
</tr>
<tr>
<td></td>
<td>Delays During Maintenance</td>
<td>-£6.8 m</td>
</tr>
<tr>
<td></td>
<td>Private Sector Provider Revenue</td>
<td>£0.6 m</td>
</tr>
<tr>
<td></td>
<td>Net Business User Benefits</td>
<td>£165.0 m</td>
</tr>
<tr>
<td>Accident Benefits</td>
<td></td>
<td>£19.6 m</td>
</tr>
<tr>
<td>Indirect Tax Revenues</td>
<td></td>
<td>£15.4 m</td>
</tr>
<tr>
<td>Carbon Emissions</td>
<td></td>
<td>-£3.6 m</td>
</tr>
<tr>
<td>Total Present Value of Benefits (PVB)</td>
<td></td>
<td>£301.8 m</td>
</tr>
<tr>
<td>Costs</td>
<td>Operating Costs</td>
<td>-£1.3 m</td>
</tr>
<tr>
<td></td>
<td>Total Investment Costs</td>
<td>£87.7 m</td>
</tr>
<tr>
<td></td>
<td>Total Present Value of Costs (PVC)</td>
<td>£86.4 m</td>
</tr>
</tbody>
</table>

6.6.10 The construction of the scheme would only cause a slight disbenefit of -£0.5 million because it is being built off-line (away from existing roads). The slight disbenefit is as a result of traffic being diverted along local and strategic routes.

6.6.11 There is expected to be an increase in carbon emissions brought about by the increase of traffic encouraged to use the scheme, equating to 85,300 tonnes over the 60 year appraisal period and a disbenefit of -£3.6 million. The increase in carbon has mainly been brought about due to the additional traffic encouraged onto the A556 as a result of the scheme and the overall increase in traffic flow that occurs across the entire model. The new route is also longer and has a higher speed limit than the existing route, which all contribute to higher carbon emissions. This is offset slightly by the reduction of traffic on the M6/M56 equivalent route and on rural links around the scheme. Furthermore, the scheme is expected to bring about significant time savings equating to £284.7 million through the reduction in congestion and improvement of flows around key junctions.

6.6.12 The scheme would achieve one of its key objectives of improving safety, with a predicted reduction of 118 personal injury accidents and 255 casualties over the 60 year appraisal period. This equated to a £19.6 million saving in accident benefits.

6.6.13 There is a Vehicle Operating Cost (VOC) disbenefit of -£15.1 million for consumers and a VOC benefit of £13.2 million for business users. This is as a result of Consumer Users, particularly the Car Other User Class, experiencing large non-fuel VOC disbenefits when the scheme is in place as they tend to make longer trips in the model.

6.6.14 There are -£0.2 million of Consumer User Charge disbenefits as a result of the scheme. When the scheme is in place, there is likely to be an increase in the amount of traffic using the M6 Toll road as a result of an increase in north to south traffic.

6.6.15 The Private Sector Provider Revenue increases of £0.6 million is larger than the User Charges because the TUBA software calculates the two results in different ways. In WebTAG 3.5.2 Paragraph 1.6.4, it is explained that the economic benefit of changes in user charges is not the same to the traveller and the operator.

6.6.16 The total calculated benefits of the scheme are therefore expected to be £301.8 million, offset by a total cost of £86.4 million, which produces a Net Present Value of £215.4 million and a BCR of 3.5, which represents a High Value for Money.
7 Environmental Assessment

Summary of the Preliminary Environmental Information

7.1.1 For ease of reading, the Preliminary Environmental Information (PEI) is presented in a separate document. The following paragraphs provide an executive summary of the PEI. The non-technical summary of the PEI is also included within this report under Appendix C.

7.1.2 The PEI is organised in a similar way to the future Environmental Statement (ES) and covers the following specialist topics:
- Air Quality;
- Noise;
- Cultural Heritage;
- Landscape;
- Ecology and Nature Conservation;
- Road Drainage and the Water Environment;
- Materials;
- Geology and Soils;
- Community and Private Assets; and
- Effects on All Travellers.

7.1.3 Each specialist topic has a dedicated chapter within the PEI, which describes the following:

Air Quality

7.1.4 Improving air quality is one of the key ‘environmental improvements’ intended by the road scheme. People living in houses along the current A556 are exposed to air pollution concentrations above air quality standards set by government. This pollution is caused principally by high volumes of traffic on the existing A556.

7.1.5 Shifting the traffic from the existing A556 onto the new road alignment would move the main source of air pollution further away from most residential properties. This would improve air quality around these properties, so that concentrations of pollutants fall below the upper limits set by the European Union (EU).

Noise

7.1.7 Potential noise and vibration impacts arising from the construction and operation of the new A556 have been assessed for sensitive receptors within a defined study area.

7.1.8 Reductions in noise and vibration are predicted for large numbers of properties close to the existing A556 and A5034, while smaller numbers of properties would have increases in noise and vibration in close vicinity to the scheme. The number of properties experiencing benefits classified as ‘moderate’ or ‘major’ greatly outweighs the number experiencing major or moderate adverse impacts. Therefore, the overall noise and vibration impact of the scheme would be beneficial for the surrounding environment.

Cultural Heritage

7.1.9 Cultural heritage has been addressed in line with the guidance provided in DMRB. It draws on information gained from desk-based sources, site inspections and specialist field surveys commissioned for the proposed scheme. A diverse range of heritage features have been identified, varying from prehistoric archaeological remains to early 20th century buildings.

7.1.10 Potential adverse impacts on cultural heritage include removal of archaeological remains during construction and effects on the setting of historic buildings and the historic landscape. A small number of beneficial impacts have also been identified where the proposed scheme will lead to a reduction in traffic passing close to historic buildings.

7.1.11 Measures proposed to mitigate impacts on cultural heritage include the detailed recording of archaeological remains, photographic survey of the existing setting of historic buildings and historic landscapes, and tree and shrub planting designed to integrate the proposed scheme into the historic landscape.
Landscape

7.1.12 The landscape assessment has characterised the existing landscape, including its typical topography, land use and land cover. Available views have been assessed to determine their direction, nature and quality. The area is typical Cheshire countryside, with only slight undulations and with a mosaic of arable land, grassland and woodland. The landscape is influenced by three major transport corridors (the M6, M56 and A556) and is punctuated by lakes (The Mere, Little Mere and Rostherne Mere) and many small ponds.

7.1.13 New highways can cause short-term or long-term changes in landscape character and views available to local people and road users, in ways that are adverse for some people and beneficial for others.

7.1.14 Landscape character would be affected by removal of features such as trees, hedgerows and ponds, and the introduction of a new road, subdividing the rural landscape and separating related features such as blocks of woodland.

7.1.15 Views from 157 properties, including residential properties and businesses, could be affected, having either adverse or beneficial effects. During construction, some views would be temporarily altered by visible construction operations, storage areas and compounds. The removal of vegetation would have longer-lasting effects, declining as new tree and shrub planting matures.

7.1.16 There would be longer-term effects on properties with views of the new road, and of prominent features like new bridges. However, approximately 58 properties along the existing A556 would enjoy long-term beneficial effects after transfer of traffic to the new road and other changes to the old road.

7.1.17 Mitigation would include appropriate planting of trees and shrubs in blocks or linear features to replace lost features and provide visual screening, placing the road in cutting or flanking it with earth bunds to make it less visible and sensitive design of structures and lighting.

Ecology and Nature Conservation

7.1.18 Ecology and nature conservation has been assessed in accordance with DMRB supported by guidance from the Institute of Ecology and Environmental Management. Information was obtained from previous studies, biological records, consultation with relevant organisations, and field surveys. Ecological field surveys were undertaken from late 2009 to early 2011 to obtain information about habitats and species. Additional surveys are in progress during 2011.

7.1.19 Key ecological features in the study area include protected nature conservation sites and other sensitive habitats, including broadleaved woodland, parkland, watercourses, over 100 ponds and hedgerows. Legally protected species present in the survey area include bats, great crested newt, badger, otter and wintering and breeding birds including barn owl.

7.1.20 There would be some loss of sensitive habitats, including woodlands and ponds. Wildlife would be at risk of disturbance, direct mortality and pollution, as well as fragmentation and severance of their habitat. However, beneficial effects are predicted for two internationally-important nature conservation sites (The Mere/Little Mere and Rostherne Mere) due to a greater separation from the scheme and improved protection from water pollution.

7.1.21 The adverse effects of the scheme would be mitigated through replacing the lost woodland, ponds and other habitats; re-locating relevant protected species before the start of works; provision of safe wildlife crossings and barriers to stop wildlife straying onto the site; landscape planting designed to discourage barn owls from hunting within the road corridor; and pollution control measures. Provision of a ‘green bridge’ to help reconnect habitats is also being considered.

Road Drainage and the Water Environment

7.1.22 An assessment of the effects of the proposed scheme on the water environment has been carried out in line with the guidance contained in the DMRB.

7.1.23 To the south and west of the study area, minor watercourses flow south to Tabley Brook, a tributary of Smoker Brook. To the east of the study area, minor watercourses drain through a series of meres (lakes), before joining Birkin Brook and the River Bollin adjacent to the M56 slip roads. These include ‘The Mere’, ‘Little Mere’ and ‘Rostherne Mere’, all of which are designated as Sites of Special Scientific Interest (SSSI) and Ramsar sites. Rostherne Mere is also a National Nature Reserve. The area is not in a flood zone. There is an aquifer underlying the study area, although groundwater is not abstracted for public supply.

7.1.24 Most of the existing A556 in the study area drains to tributaries of Rostherne Brook, and through The Mere, Little Mere and Rostherne Mere; no treatment of the water or protection of watercourses is currently provided. Drainage of the new road would avoid these sensitive water bodies. The southern section would drain to the Tabley Brook catchment, and the northern section would drain to a tributary of the River Bollin. Drainage from the re-designed junction with the M56 would drain to Birkin Brook and the River Bollin. Treatment and protection would be provided, in the form of wetlands and ponds.
The assessment has considered the various attributes of each feature of the water environment. Many of the impacts have been assessed as ‘neutral’. There would be beneficial impacts on water quality in Rostherne Brook, The Mere and Little Mere as a result of diverting traffic from the existing A556 onto the new road. There would be adverse impacts on tributaries of Tabley Brook as a result of introducing new discharges to those watercourses.

Materials

This topic addresses the potential environmental effects associated with the use of material resources and the management of waste during the construction of the scheme.

A high proportion of the potential impacts associated with materials cannot be absolutely predicted, as they would only occur if something goes wrong (i.e. they would be the result of unplanned, accidental occurrences, such as spillages, or as a result of failure of management systems). The risk of such events occurring will be managed and reduced through the development and application of several plans addressing different aspects of construction site management, as follows:

- Construction Environmental Management Plan;
- Environmental Action Plan;
- Site Waste Management Plan;
- Materials Management Plan; and
- Soil Resources Plan.

After the application of these plans, construction of the new A556 is expected to give rise to small-scale impacts only, mainly relating to the temporary storage and movement of materials and wastes during construction. However, the de-trunking works on Chester Road (the old A556) may give rise to more significant impacts. This is because this activity can only occur at the end of the construction programme, which limits opportunities for planning materials re-use within the wider scheme, potentially leading to requirements for the disposal of waste off site.

Geology and Soils

An assessment of the impact of the construction and operation of the proposed road development on the geology and soils of the area was undertaken using a generic sensitivity – magnitude – significance methodology. This has allowed the sensitivity of the site to be determined by identifying potential receptors and the impacts of the scheme on these receptors, and has guided appropriate mitigation measures.

A number of sensitive receptors have been identified, the most significant one comprising a Site of Special Scientific Interest located adjacent to the north end of the A556. However, it is not expected that this would be affected by construction or operation of the proposed route.

Minor impacts have been identified relating to the re-use or disposal of excavated soil, soil deterioration, creation of dust and changes to surface water and groundwater flow regimes. With the implementation of relevant mitigation measures, the residual impact on the geology and soils of the site is considered to be neutral.

Potential impacts relating to past land uses within the study area include those arising from potentially contaminated land, which are considered to be generally of slight or negligible impact.

Community and Private Assets

This topic addresses the effects of the scheme on people’s access to community facilities such as schools, doctors’ surgeries, shops, etcetera; effects on land used by the community, such as village greens; and effects on private property, including farms and agricultural land. The assessment draws on information gained from desk-based studies, site inspections, consultation and interviews with farm proprietors.

The assessment covered communities directly affected along the line of the scheme, other communities in the surrounding area that contain facilities that are assumed to be used by local residents, businesses in the affected communities and farms along the line of the scheme.

Communities along the existing A556 currently suffer from severance caused by heavy traffic on the trunk road. This also affects communities in the surrounding areas to either side of the existing A556, due to the difficulty of joining or crossing this road. The new alignment would mean longer journeys for some, particularly in Millington, but would largely eliminate the severance effect of the traffic.

There would be no loss of land used by the community or demolition of private property. Some land would be taken from private and commercial property, and there may be some loss of passing trade for businesses.

Approximately 80% of the permanent land take is from agricultural land, most of which is of good or very good quality, with smaller areas of moderate or poor quality land. Other agricultural impacts include severance of fields, creation of smaller irregular shaped...
fields, and changes to access points. Fourteen farms are affected, although the degree of impact varies greatly from farm to farm.

Effects on All Travellers

7.1.38 This topic addresses effects of the scheme on all types of travellers in the study area – vehicle drivers and passengers, and pedestrians, equestrians and cyclists.

7.1.39 The existing A556 suffers from congestion and has a poor accident record, due to the high volume of traffic on the road and conflict between trunk road traffic and users of the numerous properties, field accesses, minor side roads and public rights of way (PRoW) that have direct access onto the trunk road. Driver stress increases due to frustration and fear of potential accidents. However, the views available to vehicle travellers on the existing road network are mostly of good quality.

7.1.40 The existing PRoWs in the study area do not provide a linked network between the surrounding villages, while the existing A556 forms a barrier to pedestrian, cyclist and equestrian movements, mainly caused by the volume of traffic on the road.

7.1.41 The transfer of traffic to the new A556 and the provision of safe crossing points over the new road would eliminate this barrier effect, allowing the de-trunked Chester Road to become an attractive route for pedestrians, equestrians and cyclists and a connecting route between PRoWs to either side. However, although crossing the trunk road would be safer and easier than at present, changes to side roads and footpaths mean that some users would have to follow longer routes to reach the crossings.

7.1.42 The higher standard of the new road and the elimination of conflict with local traffic mean that stress would reduce for drivers on the trunk road. While trunk road users would initially experience poorer-quality views, the views would improve as the landscaping works along the route mature. Travellers on the local road network would in general experience improved views after the scheme opens.

7.1.43 A de-trunking and non-motorised user strategy has been developed in parallel with scheme design, to ensure that, on balance, the effects on pedestrians, equestrians and cyclists are beneficial.

Cumulative Effects

7.1.44 Cumulative impacts arise where an environmental receptor is affected by the scheme in two or more different ways, or where the effects of the scheme would be added to or compounded by similar effects of other schemes. In either case, the combined effect on an individual receptor is greater than the individual effects considered in isolation.

7.1.45 Cumulative effects have been identified that arise from two or more effects of this scheme on an individual environmental receptor. The receptors affected by such impacts that have been identified to date include communities, residential properties, other sensitive receptors such as nursing homes, farms, the landscape and some wildlife habitats. These effects can be summarised as follows:

- Overall benefits affecting quality of life for residents in the communities of Over Tabley, Mere and Bucklow Hill, and for Rangemore Nursing Home;
- Overall adverse effects on quality of life for the community of Millington, for residents at Over Tabley Hall and certain other groups of properties;
- Overall adverse effects for some farms, due to the loss of land combined with longer access routes and the creation of small, awkwardly-shaped fields;
- Potential adverse effects on habitats and landscape character through pressure for farmers to rationalise small, awkwardly-shaped fields by removing hedgerows.
8 Conclusion

8.1.1 This Scheme Assessment Report has been prepared in accordance with the Highways Agency's guidance as set out in the DMRB. It is intended to present this report as part of a consultation planned for January 2012.

8.1.2 As part of the consultation process, the public will have the opportunity to comment on all of the information provided, and make suggestions to alter/improve the proposed scheme.

8.1.3 Following the consultation, a report will be produced to summarise the views and comments received and outline how any feedback has been taken into account within the design. This report will form part of the application to the Infrastructure Planning Commission (IPC). The IPC will then examine the application before making a recommendation to the Secretary of State whether to grant permission to progress to construction.