3 Description of the scheme

3.1 The existing road

3.1.1 The A14 is a strategic route between Catthorpe, near Rugby, and Felixstowe, and forms part of the Trans-European Network, as explained in more detail in *Chapter 2*.

3.1.2 The existing A14 trunk road infrastructure between Cambridge and Huntingdon is now forty years old, does not meet present-day design standards and has insufficient capacity to cope with either existing or predicted traffic flows.

3.1.3 Around 85,000 vehicles a day use this section of road, with a quarter of that traffic comprising heavy goods vehicles. Congestion and delays occur daily and there are around a dozen lane or carriageway closures a week as a result of incidents.

3.1.4 The lack of capacity and resilience on the A14 trunk road between Cambridge and Huntingdon has a number of impacts related to predictability, delays, business growth, regeneration, public transport, incidents and housing. The current traffic problems are explained in more detail within *Chapter 7.*

3.1.5 The scheme has a number of economic, social, accessibility, integration and legacy objectives to improve the existing situation. These objectives are explained within *Chapter 2*.

3.2 The scheme

3.2.1 The A14 Cambridge to Huntingdon improvement scheme (the scheme) would extend east from the existing A14 at Ellington to the Cambridge northern bypass at Milton, a distance of approximately 34km (21 miles). It would extend south and east from Ellington to create a new southern bypass of approximately 20km (12½ miles) in length around Huntingdon before re-joining the existing A14 near Swavesey. From there it would continue east, with carriageway widening as far as Milton, at the east end of the Cambridge northern bypass. The scheme would also include the widening of the existing A1 trunk road between Brampton and Alconbury, together with the construction of a local road between Fen Drayton and Girton a distance of 8km (5 miles) measured following the route of the A14. The existing A14 trunk road would be downgraded to county road status (de-trunked) between Brampton Hut and Swavesey, as well as between Alconbury and Spittals interchange and the road viaduct over the East Coast mainline railway in Huntingdon would be removed.

3.2.2 The scheme can be broken down geographically into the six sections described below. These sections are also represented on *Figure 3.1*.

Section 1: A1 Alconbury to Brampton Hut

3.2.3 The A1 trunk road would be widened from the existing two lane dual carriageway to a dual three-lane carriageway between Alconbury and Brampton Hut over a length of approximately 3km (1.9 miles). A single carriageway local access road would also be constructed to connect the Ellington junction with Woolley Road.

Section 2: A1/A14 Brampton Hut to East Coast mainline railway

3.2.4 A new section of the A1 would be constructed as a dual three lane carriageway on the western side of the existing A1 alignment between Brampton Hut junction and Brampton interchange. Two new slip roads would provide connections between the A1 and A14 north of Buckden for traffic travelling from A1 southbound onto A14 southbound and for traffic travelling from A14 northbound onto A1 northbound.

3.2.5 The A14 Huntingdon southern bypass would commence at Ellington constructed as two lane dual carriageway crossing the line of the new section of A1 south of Brampton Hut junction and joining the line of the existing A1 as it heads south to a new junction to the south-west of Brampton, Brampton Interchange. There would be a lane gain on the A14 southbound carriageway at Brampton Interchange and there would be a lane drop on the A14 northbound carriageway at Brampton Interchange. The A14 Huntingdon southern bypass would be three lane dual carriageway from Brampton Interchange to a bridge across the East Coast mainline railway.

Section 3: A14 East Coast mainline railway to Swavesey

3.2.6 The new Huntingdon southern bypass would continue as a three lane dual carriageway from the bridge over the East Coast mainline railway to join the existing alignment of the A14 at an improved junction south of Swavesey. Swavesey junction would maintain the connection between the A14 and the local road network, Cambridge Services and Buckingway Business Park and also provide connection to the new local access road. The new section of bypass would include a junction with the A1198 south of Godmanchester with west facing slip roads only, facilitating the exit of eastbound traffic and entry of westbound traffic.

Section 4: A14 Swavesey to Girton

3.2.7 The existing A14 would be widened over approximately 7.9km (5 miles) to provide three lanes in each direction between Swavesey and Bar Hill and four lanes in each direction between Bar Hill and Girton. Girton interchange would be reconfigured to include an improved A14 westbound link and the realignment of the A428.

3.2.8 A new local access road, approximately 8km (5 miles) in length, would be constructed as a dual carriageway link between the existing A14 near Fen Drayton and Swavesey junction, and as a single carriageway between Swavesey and Girton. This road would provide a route for local traffic between Cambridge and Huntingdon as well as providing access to properties and businesses along the route corridor. At Dry Drayton Road the existing overbridge would be maintained, linking to the new local

access road east and west of the A14 which provides a connection to the A14 at Bar Hill Junction to the north and to Huntingdon Road to the south. The existing connection to the A14 at Dry Drayton Road would be removed.

3.2.9 There would be an improved Bar Hill junction which would maintain access to Bar Hill while improving NMU facilities and providing a connection to the new local access road east of the A14. The junction capacity would be increased to cater for forecasted traffic growth generated by Stage 2 of the proposed development at Northstowe.

Section 5: A14 Cambridge Northern Bypass – Histon to Milton

3.2.10 A 2.5km (1.5 miles) section of the Cambridge northern bypass between Histon and Milton would be widened from the existing two lane dual carriageway to a three lane dual carriageway.

3.2.11 By the time of this scheme's construction, the section of the A14 between Girton interchange and Histon will have been widened as part of the A14 Junction 31 to 32 Eastbound and Westbound improvements scheme, and as such does not form part of the A14 Cambridge to Huntingdon improvement scheme.

Section 6: Huntingdon A14 viaduct demolition and A14 de-trunking

3.2.12 The existing A14 trunk road would be downgraded to county road status (de-trunked) between Brampton Hut and Swavesey, as well as between Alconbury and Spittals interchange. Approximately 21km (13 miles) of the existing A14 route would be downgraded to county road status.

3.2.13 As part of this section of the scheme the road viaduct over the East Coast mainline railway in Huntingdon would be removed.

3.2.14 A new link road would be constructed to improve access into Huntingdon from the south and east by connecting the existing A14 with the Huntingdon ring road near the bus station and by constructing a new link road from Brampton Road to connect with the A14 to the west. The Brampton Road bridge would remain as the crossing over the East Coast mainline railway for lightweight traffic.

3.2.15 This scheme contains both the development constituting a nationally significant infrastructure project under the *Planning Act 2008* and associated development, without distinguishing between these two elements. The Explanatory Memorandum to the Draft Proposed Order (Development Consent Order (DCO) submission document number 3.2) expands on this point.

3.3 Climate change adaptation

3.3.1 In order to ensure that the strategic road network can meet the challenge of a changing climate, the potential effects of climate change have been considered as part of the design. In some cases, such as highway surfacing and landscape planting design, climate change considerations will form part of the detail design process. At this preliminary design stage the main climate change considerations relate to the drainage design and flood plain compensation issues.

Policy

3.3.2 Highways Agency strategy on climate change, as set out in Climate Change Adaptation Strategy and Framework, Revision B (Highways Agency 2009), includes a desire to ensure that climate change considerations are factored into Highways Agency business, including design, construction, maintenance, and operations.

Drainage design

3.3.3 The drainage design has been based on the Highways Agency requirement that the rainfall intensities used to calculate design storms for the design of any element of road drainage must include an allowance for the effects of climate change. Where rainfall data excludes such an allowance, then sensitivity testing on the design of the drainage system must be carried out by increasing rainfall intensities of the design storms by 20%.

Flood Risk

3.3.4 In accordance with current Defra guidance, and as agreed with the Environment Agency, the baseline flood event to assess the with-scheme flood risk against is the 1% (1 in 100 year) annual exceedance probability (AEP) event. Any mitigation measures have included an allowance for climate change of an additional 20% in rainfall intensity or peak river flow.

3.4 Structures

3.4.1 The scheme would include 30 new bridges, adding to the 31 existing bridges, of which 13 would remain unaffected, 14 would be modified and four would be demolished (including the Huntingdon viaduct within section 6). A schedule of bridges is provided in *Appendix 3.1*.

3.5 Lighting

3.5.1 Road lighting (fixed column-mounted luminaires) would be used where it would provide a safety or journey continuity benefit. Examples would be at roundabouts, significant junctions and areas where there would likely be a significant amount of traffic weaving due to concentration of heavy goods vehicles (HGVs) or a high proportion of non-motorised users (NMUs). The mainline of the new A14 would be generally un-lit. Landscape and visual impacts of lighting are discussed in *Chapter 10*.

3.5.2 The extent of lighting provided, as well as suitable equipment types, would be derived from the Highways Agency particular requirements, which are informed by, and provide supplementary information to, British, European and international standards. Adjacent lighting on country road tie-ins would similarly be guided by Cambridgeshire County Council's (CCC) standards, in agreement with their authority engineer.

3.5.3 Road lighting luminaires would be required to meet luminous intensity class G4 or better, as defined by *BS EN 13201: 2003 Road lighting: calculation of performance* (British Standards Institute, 2003), to limit glare and ensure good cut-off characteristics. The general distribution of light from luminaires would be required to be the most appropriate to the task, with spill light reduced to a minimum. Luminous intensities above 95° (from the downward vertical) would be zero.

3.5.4 It is an aspiration of the scheme that Highways Agency road lighting is connected to the Motorway Road Lighting Control System (MORLICS) to enable variable operation based on near real-time traffic flow. With this system the lighting output would operate only as much as required to provide safe illumination of the road. MORLICS also contains a facility to switch-off the lighting if traffic flows fall below a prescribed level. In any event, road lighting would at least be connected to a central management system (CMS) to allow remote monitoring, programming and control. It is envisaged that a regime of dimming and potentially switch-off would be accomplished via the CMS in the absence of MORLICS integration.

3.5.5 It may be necessary to include lighting and electrical infrastructure under formal agreements for maintenance. For example, at a number of junctions it is likely that the positions of items such as feeder pillars would be most safely achieved by co-locating Highways Agency and Cambridgeshire County Council equipment.

3.5.6 The scheme has progressed on the basis that a light emitting diode (LED) source would prove most efficient for Highways Agency routes, as increasingly utilised on the strategic road network. It is expected that the maximum lighting column height on the new A14 would be 15m, with lighting at junctions and interchanges provided by way of 8 to 12m columns. The highest lighting columns are likely to be found at locations with the widest highway geometry e.g. at Girton interchange and Brampton interchange. The likely worst case scenario in terms of the highest lighting columns and light spread from roads with the widest geometry has been used in the assessment of effects of lighting within the landscape and visual assessment in *Chapter 10*.

3.6 Intelligent transport system

3.6.1 The main intelligent transport system (ITS) elements of the scheme are provided below, and reflect the likely worst case for the purposes of environmental impact assessment. A full gantries schedule is provided in *Appendix 3.1*.

Signing and gantry strategy

3.6.2 The key objectives of the signage provision are:

- incident management: signage would provide messages to alert network users of incidents and special events on the local and national road networks;
- road works/special events: signage would provide advance warning of planned events on the network, such as road works or special events; and
- advanced directional signage (ADS) providing navigational information to the road user.

3.6.3 ADS and ITS signalling (and other equipment as necessary) would generally be mounted on portal gantries. The dimensions of the gantries would be approximately 2.25m in width with approximately 7.5m forming the height. Proposed gantry locations are shown on *Figure 1.1*. The

gantries would also be used as advance matrix indicators and variable message signs, mark 3, as based on the *Design Manual for Roads and Bridges Volume 9, Section 1, Part 1 TD 46/05 – Motorway Signalling (DMRB TD 46/05)* (Highways Agency et al., 2005) standards, and mark 4, as covered in the *Interim Advice Note 109/08 Advice Regarding the Motorway Signal Mark 4 (MS4)* (Highways Agency, 2008). Some ADS would also be installed on verge mounted signs where appropriate. The provision of this signalling system would enable greater control of the network by providing dynamic signs to manage the lanes.

3.6.4 A high proportion of HGVs in the area can mean that traffic signs mounted on posts in highway verges could be obstructed. Given that the scheme between the A1 and Cambridge is near motorway standard, and the high traffic flows and high HGV numbers, this provides justification for one mile ADS and the requirement for them to be mounted on gantries. Gantries would typically be provided either at one mile/half a mile or two-thirds of a mile/one-third of a mile intervals to suit the spacing of junctions, structure locations, visibility and environmental considerations.

3.6.5 Incorporation of traffic signalling into the signing gantries would be undertaken separately and generally in accordance with the *DMRB TD 46/05* (Highways Agency et al., 2005). *Interim Advice Note 149/11 Existing Motorway Minimum Requirements* (Highways Agency et al., 2011) provides guidance for the design of motorway signalling equipment and also considers the co-location of ADS with ITS matrix signs.

MIDAS detector

3.6.6 The ITS design includes a motorway incident detection and automatic signalling (MIDAS) system comprising loop detectors and detection algorithms to inform operation of the signing and signalling systems. The implementation of a detection system along this route would help to improve the resilience of the road in the event of accidents by warning drivers of issues and advising on alternative routes.

3.6.7 The detection system used on the A14 would automatically set the signs and signals to aid the flow of traffic along the route. The system would protect the back of traffic queues by automatically setting suitable signals to warn approaching traffic.

Closed circuit television (CCTV)

3.6.8 CCTV technology is a commonly used ITS element for monitoring the strategic road network and detecting incidents. It would be operated alongside the MIDAS detectors. The main objective for the A14 would be to use CCTV to confirm incident details. CCTV coverage requirements are for 95% coverage on conventional motorways and would be designed in accordance with *DMRB Volume 9, Section 3 - TD 17/85 Criteria for the Provision of Closed Circuit Television on Motorways* (Highways Agency et al., 1985). Given the strategic importance, volumes and type of traffic on the A14 this approach would be followed for the scheme.

3.6.9 To achieve 95% coverage, CCTV camera sites would be located on the verge at least at 1km intervals. All interchanges would have CCTV coverage.

Emergency roadside telephones (ERT)

3.6.10 As part of the ITS provision strategy for the scheme, emergency roadside telephones would be installed at emergency lay-bys. Due to the lack of a hard-shoulder along the Cambridge to Huntingdon route, an ERT would be provided at every emergency lay-by. ERTs would be provided in pairs opposite each other to discourage road users from crossing the carriageway to access a phone. The provision of ERT is aimed at improving the safety of road users along the route, which is one of the objectives of the scheme.

Telecommunications

3.6.11 The scheme would require the provision of a number of telecommunications circuits to roadside devices in order to support the required ITS application. The technologies that would be deployed on the scheme would be implemented over internet protocol (IP) communication networks provided by National Roads Telecommunications Services (NRTS). The communications design would be based on motorway standards. The locations, quantities and transmission requirements of each device would be identified to allow the circuit provision to be calculated.

3.7 Utilities

3.7.1 The scheme would affect many existing utilities services that either cross or run parallel to the scheme route. The design of the scheme aims to protect these services. For example, the borrow pits would be positioned around the major existing utilities to avoid any unnecessary diversions. Where necessary, diversions to the services have been investigated in conjunction with the utility companies.

3.7.2 Between the junctions of Swavesey and Girton, service corridors have been designed within the scheme to accommodate multiple utilities to be installed. These corridors would allow the services to access their apparatus safely and with minimum disruption to the new road.

3.8 Road surfacing

3.8.1 The surface course would be a low noise thin surface course system in accordance with the *Manual of Contract Documents for Highway Works Volume 1, Specification for Highways Works, Clause 942* (Department for Transport, 2008). The aggregate in the surface course would be the minimum polishing resistance to provide a safe surface whilst minimising the hauling of specialist aggregates long distances. The texture depth would be the latest approved values to maximise durability.

3.8.2 The lower asphalt layers would be designed to maximise durability and the use of recycled asphalt planings would be encouraged by the specification. Cold mix asphalt would be used where possible for side roads. This has far less energy usage than hot mix in its manufacture and enables site won material to be used, rather than importing aggregates. Cold mix asphalt would also enable any asphalt materials containing tar to be reused onsite and not taken to a hazardous waste disposal facility.

3.8.3 The lower hydraulic bound base and sub base would have the option to be made of hydraulic binders and/or secondary aggregates such as slag, and naturally occurring suitable materials stabilised to improve the strength. These options have proved economic on other large schemes. This would minimise the need to import aggregates by road or rail.

3.9 Drainage

Highway drainage

3.9.1 The treatment of surface runoff from the A14 would involve a combination of systems and (where applicable) would address key processes including sedimentation, separation and vegetated treatment processes. There would be 59 balancing and treatment ponds along the scheme and approximately 17,500m of roadside storage ditches would be provided which would also be used for attenuation and treatment. Attenuation would be provided prior to discharge of highway drainage outflows to watercourses in accordance with Environment Agency agreed criteria.

3.9.2 Sustainable drainage systems (SuDS) would be used wherever practicable in line with Highways Agency best practice criteria as detailed in the *DMRB Volume 4 Section 2* (Highways Agency, 2014). Balancing ponds and similar storage facilities would also be designed to sufficient volume following best practice criteria within *DMRB Volume 4 Section 2* (Highways Agency, 2014). Road drainage would include an allowance for the effects of climate change by increasing rainfall intensities of the design storms by 20% over and above current design rainfall intensities.

3.9.3 All local access road drainage would be designed and constructed to current adoptable highways standards as detailed in the *DMRB Volume 4 Section 2* (Highways Agency, 2014) and Cambridgeshire County Council's housing estate road construction specification (CCC, 2013) where appropriate. The current drainage systems employed on minor rural roads proposed to be diverted would be retained and reused.

3.9.4 There are various locations where watercourses would be substantially diverted as part of the scheme, including four main rivers and water bodies as defined by the *Water Framework Directive* (European Commission, 2000), four award drains, one drain managed by an internal drainage board and 15 ordinary watercourses/drains. These diversions are listed in *Appendix 3.1*. An ordinary watercourse is defined as a watercourse that is not a 'main river.' Award drains are awarded for maintenance to local authorities.

3.9.5 There would be 157 new culverts included in the scheme and some extensions to existing culverts. A culvert schedule is provided in *Appendix 3.1*. New culverts under the mainline road would generally be formed using pipes of 1.2m diameter or larger to facilitate maintenance and minimise risk of blockages. Crossings requiring a large flow capacity would generally be constructed as box culverts. The major crossing of the river Great Ouse would be a bridge structure. The landscape mitigation has been designed to incorporate the watercourse diversions and their associated maintenance access requirements.

3.9.6 A schedule of ecological crossings is also provided in *Appendix 3.1*. This lists both drainage culverts with a secondary wildlife crossing function plus assets which are solely for wildlife purposes.

Floodplain compensation areas

3.9.7 The scheme passes through a number of areas of flood zone 2 and 3 and one small section of the existing A1 carriageway is below the estimated flood zone 3 flood level.

3.9.8 There are 29 floodplain compensation areas and spillways included within the scheme. The need for these and their locations has been identified on the basis of flood modelling studies using the latest Environment Agency flood model data.

3.9.9 Floodplain compensation is proposed as mitigation where required and has been developed on a level-for-level basis, located as close as practicable to the area of loss of existing flood plain. These would generally comprise of areas of re-grading to below predicted flood levels to provide sufficient temporary storage volume to ensure no worsening of current conditions in times of flood.

3.9.10 The floodplain compensation areas are designed with 1 in 3 side slopes and with connection to the relevant watercourses. The designs would be refined during detailed design to achieve a sympathetic interface with existing ground levels and to limit impacts on existing vegetation. The design process would also consider the most practicable long-term after uses for each area, taking into account limitations arising from lowered ground levels.

3.10 Environmental design

3.10.1 The outline environmental design for the scheme is shown on *Figure 3.2* and *Figure 3.3*. It incorporates mitigation measures identified as part of the environmental assessment process, and would be developed further during the detailed design phase of the scheme. Existing vegetation would be retained where practicable. *Figure 3.4* provides a general indication of vegetation to be retained and lost. Proposed planting would mainly consist of native tree and shrub species appropriate to an area. Planting in urban areas such as Huntingdon would be of a more ornamental character.

3.10.2 Mitigation measures shown on the outline environmental design and described in this *Environmental Statement* are considered to be essential and would be committed to within the scheme through the processes described in *Chapter 20*. Any associated land requirement would be covered by compulsory acquisition arrangements.

Nature conservation mitigation areas

3.10.3 The outline environmental design would incorporate replacement habitat for affected protected and notable species where required. This would include appropriate receptor sites for amphibians, reptiles, mammals, invertebrates and birds. In addition to receptor sites, specific hibernacula/refugia would be created to accommodate amphibians and reptiles, artificial setts and foraging grounds for badger, and replacement bat roosts. Receptor sites

would be fenced to prevent encroachment and delineate sensitive management regime.

3.10.4 The landscaping detail of ecological mitigation areas would typically comprise a tailored mosaic of habitats (e.g. species-rich grassland and scattered scrub) and allow for more specialist habitats where local conditions require this. Where practicable, mitigation areas would be designed to deliver broader biodiversity benefit rather than just being focussed on a single species' requirements, providing those benefits where broadly compatible.

Landscape planting

3.10.5 The planting design would take into account Highways Agency required minimum planting distances from the carriageway, with shrubs not less than 3m, and trees not less than 5m. The planting areas would maintain safe sightlines at road bends and junctions, and would avoid obscuring signs and signals. Tall growing species would not be planted under power lines, and tree and shrub planting would generally avoid underground services. Planting would perform visual screening, landscape integration, nature conservation/biodiversity, public amenity and noise screening.

3.10.6 Plant stock would be preferably of local or regional provenance. As a minimum, plant stock would be from the UK.

3.10.7 The offline section crosses open country punctuated with side road over-bridges and with a major viaduct at the river Great Ouse. Softening and screening the bridges and embankments, and screening the traffic from isolated farmhouses and nearby villages, would be prioritised in the detailed design. Landscape planting would also link severed hedges and take in severed field corners providing space to create ponds, species rich grasslands or small copses.

3.10.8 The online portions of the scheme are more constrained with adjacent residential and commercial properties. Existing roadside trees and hedges would be retained where possible, although some would be lost to widen the trunk roads and construct the new local access road. Landscape mitigation would restore lost vegetation where practicable and link with remaining hedges and trees on the highway boundary, screening the traffic from nearby properties but also leaving open countryside views from the road at appropriate locations.

Earth mounds

3.10.9 To the west side of Brampton, large mounds for traffic screening would be constructed to approximately 3m higher than the centreline of the proposed skew bridge where the A14 crosses the line of the new section of A1 south of Brampton Hut junction. The bund on the side facing Brampton would extend southwards from the bridge, tapering down to approximately 2m above the A14 carriageway. The north-west facing embankments of the A1/A14 interchange near Buckden would be raised to form a false cutting 1m above road level. Near Offord Hill Farm, a short section of false cutting would be built to 5m above proposed road level. Two metre high false cuttings would also be constructed along the A14 verges near Hilton and Conington to screen views of the traffic from the villages. A linear bund to

1m above carriageway level would be constructed along the south verge to help screen the traffic near a public bridleway west of Hilton.

Vertical noise barriers

3.10.10 Vertical noise barriers are proposed near Brampton; near Hill Farm Cottages (properties near Lolworth); near a property on the Golf Course at Bar Hill; near Hackers Fruit Farm and houses at Catch Hall; and at points along the A14 Cambridge Northern Bypass near Girton, Histon and Orchard Park, Cambridge. The barrier at Brampton would be 2m high constructed on the crest of the proposed earth bunds bringing the combined height of screening to a level above the top of the highest vehicles. The other barriers would range in height from 3 to 4m above the proposed A14 carriageways.

3.11 Construction

3.11.1 The construction of sections 1 to 5 of the scheme would take an estimated four years to complete, with works commencing in 2016. Sections 1 to 5 are programmed to be open to traffic by December 2019.

3.11.2 Section 6, including the demolition of the Huntingdon A14 Viaduct, would be undertaken once the Huntingdon southern bypass is operational.

3.11.3 Within the individual sections of the scheme, construction would be phased so as to accommodate enabling works, prioritise critical early areas of construction and ensure efficient working around traffic management restrictions on the online sections.

3.11.4 Phased construction starts within sections would avoid environmentally sensitive locations until such time that essential mitigation has been implemented.

3.11.5 Construction information is presented in *Appendix 3.2*. This includes further construction programme and phasing information.

Earthworks strategy

3.11.6 The scheme requires approximately 5.8 million m^3 more fill material than is available from the cuttings along the route. Therefore, this material would be sourced from borrow pits near to the route. This is explained further in *Chapter 13*.

Borrow pits

3.11.7 Six borrow pits have been identified for inclusion in the DCO application. Refer to *Figure 3.2* for borrow pit locations. These are an intrinsic part of the DCO scheme and issues relating to their design and environmental aspects are considered in conjunction with the rest of the proposals. The borrow pit restoration proposals are outlined in *Appendix 3.3*.

3.11.8 The purpose of the borrow pits would be to provide sand, gravel and clay as primary construction materials for the scheme. The use of these local sites would avoid the need for similar materials to be transported from further afield. The highest quality potential fill materials along the corridor are the gravels near the river Great Ouse and the cuttings through glacial till between the East Coast mainline railway and Swavesey.

3.11.9 The *Cambridgeshire and Peterborough Minerals and Waste Development Plan* (CCC and PCC, 2011) contains a number of areas adjacent and near to the scheme that have been historically earmarked for the A14 improvement works. Borrow pit 5 has been changed from the original area noted within the minerals plan due to the scheme material requirements being better met by another adjacent site on the south side of the scheme alignment.

Table 3.1: Borrow pits

Borrow pit	Scheme section	Geology summary	Expected material use
BP1	Section 2	Head / River Terrace Gravels / Oxford Clay	Possible source of capping / selected fill Highway or mitigation embankment fill Restoration of borrow pit / other landscaping
BP2	Section 2	Head / River Terrace Gravels / Glacial Till/ Oxford Clay	Possible source of capping / selected fill Highway or mitigation embankment fill Restoration of borrow pit / other landscaping
BP3	Section 3	Head / River Terrace Gravels / Oxford Clay	Possible source of capping / selected fill Highway or mitigation embankment fill Restoration of borrow pit / other landscaping
BP4	Borrow pit number not used.		
BP5	Section 4	Glacial Till (clay), Kimmeridge Clay, Lower Greensand	Highway or mitigation embankment fill Restoration of borrow pit / other landscaping
BP6	Section 4 / 5	Glacial Till (clay) / Gault Clay	Highway or mitigation embankment fill Restoration of borrow pit / other landscaping
BP7	Section 1	Head / River Terrace Gravels	Possible source of capping / selected fill Highway or mitigation embankment fill Restoration of borrow pit / other landscaping

3.11.10 Borrow pit 5 would be anticipated for restoration largely to agricultural use and borrow pit 6, at least partly restored to agriculture. The remaining four borrow pits (1, 2, 3 and 7) would be expected to be flooded by ground water to form lakes. There is no borrow pit 4 within the scheme.

Soil storage areas

3.11.11 There are 39 temporary soil storage areas located across the scheme with a combined area of approximately 1,250,000m^2.

3.11.12 The majority of soil storage areas would be proposed alongside the offline sections of the works, with the primary purpose being used for storing topsoil. Topsoil would be stored to a maximum of 2m high, stacked no closer than canopy spread of boundary vegetation.

3.11.13 Several sites would be multipurpose, serving as topsoil and earthworks cut storage, and also provision of welfare/office sites. The sites would be established early on in the construction programme and utilised for the duration of the works. The soil would be stripped and stored for re-use, and restored to the previous land use following the works.

Compounds

3.11.14 There are seven proposed compound sites located across the scheme with a combined area of approximately 310,000 m^2. Topsoil would be stripped and used to form perimeter screening mounds. Topsoil would be stored to a maximum of 2m high and no closer than canopy spread of boundary vegetation. The compounds would be lit at all times for security and welfare use.

3.11.15 The sites are shown on *Figure 3.1*. Compound sites would be used as a base of operations, with uses including office complexes, welfare facilities, accommodation, storing equipment, machinery and materials. In addition, more welfare sites would be incorporated at soil storage sites.

3.11.16 Compounds would be decommissioned after the construction of the scheme is complete.

Haul routes

3.11.17 Haul routes for moving engineering fill material are proposed primarily within the trace of the scheme, utilising the offline alignment and existing roads on the online section. In the area north of Brampton Hut junction and around the river Great Ouse the haul routes would utilise existing dirt tracks.

3.11.18 The width of haul routes would vary depending on the location and constraints. However, where two-way movements are required, they are proposed to have a width of 8m. Refer to *Figure 3.1* for haul routes in relation to the scheme.

3.12 Operational maintenance

3.12.1 Upon completion of the scheme development, full handover documentation would be passed to the incumbent managing agent for the Highways Agency.

3.12.2 This suite of documents, in conjunction with the Highways Agency requirements and advice for the management of maintenance on motorways and trunk roads, would define the management operations required to ensure the safe management of the road and successful development of the environmental mitigation. Highways Agency guidance is contained across two documents, the *Network Management Manual* (Highways Agency, 2009a) and the *Routine and Winter Service Code* (Highways Agency, 2009b).

3.12.3 Typical activities carried out during operational maintenance would include gully sweeping and clearing, winter servicing (including anti-icing), highway marking, landscape management, asset inspections, reactive road maintenance following road accidents, road improvement schemes and associated traffic management. The incumbent managing agent for the highway would be responsible for assessing operational maintenance activities in line with the *Network Management Manual*, *Routine and Winter Service Code* (Highways Agency 2009a) and the *Design Manual for Roads and Bridges Volume 11* (Highways Agency, 2008).

3.13 Bibliography

British Standards Institute (2003). BS EN 13201 Road lighting: calculation of performance.

Cambridgeshire County Council (2013). Housing Estate Road Construction Specification. Available at: http://www.cambridgeshire.gov.uk/download/downloads/id/99/housing_estate_road_construction_specification. Accessed 14 November 2014.

CCC and Peterborough City Council (PCC) (2011). Cambridgeshire and Peterborough Minerals and Waste Core Strategy Development Plan. Available at: http://www.cambridgeshire.gov.uk/download/downloads/id/392/core_strategy_adopted. Accessed 14 November 2014.

Department for Transport (2008). Manual of Contract Documents for Highway Works Volume 1. Specification for Highways Works. Available at: http://www.dft.gov.uk/ha/standards/mchw/vol1/. Accessed 25 October 2014.

European Commission (2000). The EU Water Framework Directive - integrated river basin management for Europe. Available at: http://ec.europa.eu/environment/water/water-framework/index_en.html. Accessed 14 November 2014.

Highways Agency (2008). Design Manual for Roads and Bridges Volume 11. Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/index.htm

Highways Agency (2009a). Network Management Manual. Available at: http://www.standardsforhighways.co.uk/ha/standards/nmm_rwsc/docs/nmm_part_0.pdf

Highways Agency (2009b). Routine and Winter Service Code. Available at: http://www.standardsforhighways.co.uk/ha/standards/nmm_rwsc/docs/rwsc.pdf

Highways Agency (2009c) Climate Change Adaptation Strategy and Framework, Revision B. Available at: http://assets.highways.gov.uk/about-us/climate-change/CCAF_Strategy_and_Vol_1_Rev_B_Nov.pdf

Highways Agency (2014). Design Manual for Roads and Bridges Volume 4, Section 2. Available at: http://www.dft.gov.uk/ha/standards/dmrb/vol4/section2.htm. Accessed 14 November 2014.

Highways Agency (2011). Interim Advice Note 149/11 Existing Motorway Minimum Requirements. Available at: http://www.dft.gov.uk/ha/standards/ians/pdfs/ian149.pdf. Accessed 26 September 2014.

Highways Agency (2009). Routine and Winter Service Code. Available at: http://www.dft.gov.uk/ha/standards/nmm_rwsc/docs/rwsc.pdf. Accessed 13 November 2014.

Highways Agency (2008). Interim Advice Note 109/08 Advice Regarding the Motorway Signal Mark 4 (MS4). Available at: http://www.dft.gov.uk/ha/standards/ians/pdfs/ian109.pdf. Accessed 25 October 2014.

Highways Agency et al. (2005). Design Manual for Roads and Bridges (DMRB) Volume 9, Section 1, Part 1, TD 46/05 – Motorway Signalling. The Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland. Available at: http://www.dft.gov.uk/ha/standards/dmrb/vol9/section1/td4605.pdf. Accessed 25 September 2014.

Highways Agency (1985). Design Manual for Roads and Bridges Volume 9, Section 3, TD 17/85 - Criteria for the Provision of Closed Circuit Television on Motorways. The Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland. Available at: http://www.dft.gov.uk/ha/standards/DMRB/vol9/section3/td1785.pdf. Accessed 25 September 2014.