

A428 Black Cat to Caxton Gibbet improvements

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7.6 Borrow Pits Optioneering Report

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Regulation 5(2)(q)

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Procedure) Regulations 2009

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**A428 Black Cat to Caxton Gibbet
improvements
Development Consent Order 202[]**

Borrow Pits Optioneering Report

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1 Executive summary

- 1.1.1 As part of an iterative buildability process, a lack of suitable earthwork material which could be re-used during construction of the A428 Black Cat to Caxton Gibbet improvements Scheme (the Scheme) was identified.
- 1.1.2 In order to avoid the importation of material from external sources and the associated environmental impacts as a result of this, it was proposed that suitable earthwork material would be extracted from pre-selected borrow pits at strategic locations along the route of the Scheme. This report presents the appraisal undertaken to identify these borrow pit locations.
- 1.1.3 The appraisal process involved the sifting and refining of twenty potentially suitable sites using a range of criteria, which included: environmental; planning; transport; and technical and logistics considerations to identify the most suitable site(s) for material extraction within the construction phase of the Scheme.
- 1.1.4 Of the twenty sites that were appraised, a refined short list of seven sites was taken forward for further appraisal. This short list identified four sites as the preferred borrow pit locations for the Scheme. Two situated in proximity to the existing Black Cat junction at the western extent of the Scheme, and two situated in proximity to the existing Caxton Gibbet junction at the eastern extent.
- 1.1.5 The four preferred borrow pit locations have been included within the Development Consent Order (DCO) application for the Scheme.

2 Introduction

2.1.1 This report presents the rationale for inclusion of borrow pits to support the construction of the Scheme and explains how the proposed locations for the borrow pits have been selected through a site selection appraisal process.

2.1 Scheme description

2.1.1 The purpose of the Scheme is to address the problems of congestion, poor journey time reliability and poor resilience against incidents between the Black Cat and Caxton Gibbet roundabouts. The Scheme seeks to address these problems through construction of a new 10 mile (16km) dual 2-lane carriageway from the Black Cat roundabout to Caxton Gibbet roundabout, to be known as the A421 (hereafter referred to as the 'new dual carriageway') and in addition approximately 1.8 miles (3km) of tie-in works shown in schematic form in **Figure 2.1** below.

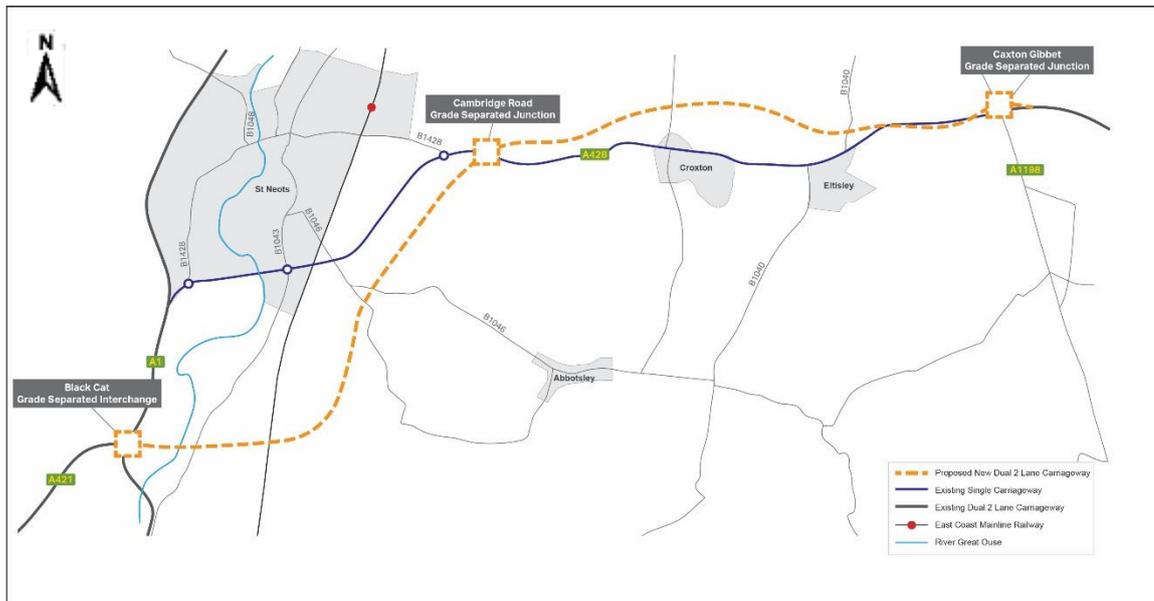


Figure 2.1 The Scheme

2.1.2 The Scheme includes the following components:

- a. A new three-level grade separated junction at Black Cat roundabout, with the A1 at the lower level, the new dual carriageway on the upper level and a roundabout between the two at approximately existing ground level. In addition to slip roads, a new free flowing link between the A421 eastbound carriageway and the A1 northbound carriageway will also be provided.
- b. A new grade separated all movements junction will be constructed to the east of the existing Cambridge Road roundabout to provide access to the new dual carriageway and maintain access to the existing A428.

- c. At the Caxton Gibbet roundabout, a new grade separated all movements junction will be constructed, incorporating the existing roundabout on the south side of the new dual carriageway and a new roundabout on the north side. The new dual carriageway will then tie-in to the existing A428 dual carriageway to the east of the new Caxton Gibbet junction.
- d. In the vicinity of the new Black Cat junction, direct access onto the A1 from some local side roads and private premises will be closed for safety reasons. A new local road will provide an alternative route. The existing Roxton Road bridge will be demolished and replaced with a new structure to the west to accommodate the realigned A421.
- e. New crossings will be constructed to enable the new dual carriageway to cross the River Great Ouse, East Coast Main Line railway, Barford Road, the B1046/Potton Road, Toseland Road and the existing A428 at Eltisley.
- f. The existing A428 between St Neots and Caxton Gibbet will be de-trunked and retained for local traffic and public transport with maintenance responsibility transferred to the local highway authorities.
- g. An alternative access will be provided to side roads at Chawston, Wyboston and Eltisley.
- h. There will be safer routes for walkers, cyclists, and horse riders.

2.2 Strategic context

- 2.2.1 In August 2019, Skanska and Walters were engaged to provide buildability advice for the Scheme. It was identified that across the Scheme, there was a significant lack of suitable earthworks material which could be re-used. This was driven by key decisions made with respect to the junction construction strategy, road and junction alignments, and negating the need for pumped surface water drainage systems.
- 2.2.2 These decisions resulted in the Scheme's earthworks fill volumes being greater than the earthworks cut volumes. This was considered preferable to achieving a balance between cut and fill volumes, as this would have resulted in a vertical alignment with several low points along the route of the new dual carriageway, which in turn would have required several pumped drainage systems rather than gravity drainage systems. Gravity drainage systems are preferred as they do not require a power supply and require less maintenance than a pumped drainage system. Pumped drainage systems can fail and when this occurs the carriageway can flood. If this occurs at a junction then traffic can use the slip roads to bypass the flooded area, but if this occurred along the main carriageway, then the road has to be closed to all traffic. A road with several pump stations along a relatively short length would therefore present a high operational risk to Highways England. At Caxton Gibbet junction, had the new dual carriageway been designed to pass beneath the A1198 in a cutting, a small watercourse would also have been severed and would have required its own separate pump station and power supply. In addition, this cutting would also have generated a large amount of material, some of which may have been used as fill material elsewhere along the Scheme, but may also have generated a significant

surplus of material and securing a suitable site for this surplus would have been difficult.

- 2.2.3 To address this issue, the relative performance of the following three strategic buildability options were considered:
1. Import all deficit material and off-site disposal of Class 4 materials (lower quality materials).
 2. Incorporation of borrow pits (near Black Cat roundabout and Caxton Gibbet roundabout) and mitigation bunds.
 3. Include eastern borrow pits (near Caxton Gibbet roundabout) but not western borrow pits (near Black Cat roundabout).
- 2.2.4 Following a review of the options, it was identified that Option 2, the incorporation of borrow pits (near to Black Cat roundabout and Caxton Gibbet roundabout) and mitigation bunds providing storage of fill material would be adopted by the project team into the overall approach to scheme delivery. Option 2 would provide a secure source of fill and defined locations to place Class 4 materials. Using borrow pits would likely reduce some of the environmental impacts associated with construction of the Scheme, however it was recognised that this was also likely to temporarily increase environmental impacts in the local area. Although additional land would be required, the use of borrow pits would reduce the need to transport construction materials, leading to a reduction in construction traffic on public and local roads and associated reductions in fuel use and vehicle emissions.
- 2.2.5 Four primary locations were identified as requiring earthwork materials during the construction phase of the Scheme, these were:
- a. The new Roxton Road link and the new Roxton Road bridge embankments.
 - b. The embankment for the new dual carriageway on the approach to the River Great Ouse.
 - c. The embankment west of the new Caxton Gibbet junction.
 - d. The embankment east of the new Caxton Gibbet junction.

2.3 Need for borrow pits

- 2.3.1 The buildability analysis undertaken by the project team showed a shortfall of suitable material (approximately 500,000m³ of Class 1 / Class 2 material (higher quality materials)) to build certain Scheme elements, including areas close to the existing Black Cat roundabout and the existing Caxton Gibbet roundabout.
- 2.3.2 Introduction of borrow pits would provide a source of suitable material close to these junctions.
- 2.3.3 It would also save approximately 125,000 lorry movements (representing more than a 40% reduction in Heavy Goods Vehicle (HGV) deliveries to the Scheme) on the local road network which would be required to import the shortfall of acceptable fill material from areas remote from the Scheme.

2.3.4 The incorporation of borrow pits (primarily for extraction purposes but also for infilling of unsuitable material) would result in the Scheme being self-contained in terms of the sourcing and disposal of earthworks materials which would minimise vehicle miles overall on an already congested local road network.

2.4 Description of the borrow pits

2.4.1 A borrow pit is an area of land where materials such as gravel or clay are excavated for use at another location and can often be found close to major construction projects. They are used to build infrastructure elements such as embankments.

2.4.2 Sourcing materials from the borrow pits on the Scheme would generally involve:

- a. Stripping the top-soil with a blade, which would be stockpiled in a temporary bund in an area that provides screening from local receptors.
- b. Removing the sub-soil with a blade or an excavator, which would also be stockpiled in temporary bunds in an area that provides screening from local receptors.
- c. Excavation of material from within the borrow pit to the zone above the existing groundwater level and loaded onto dumper trucks for transport to construction work areas.
- d. At the perimeter of each borrow pit, the edge would be cut to a 1 in 3 slope and a cut off ditch would be excavated to collect any runoff from the slope.
- e. Mobile water pumps and pump lines would be located to lift water from the cut off ditches to a treatment pond or lagoon. Further pumps would be used with local sumps to control surface water and groundwater within the pit.

2.4.3 Following extraction of material, the deeper borrow pits would be restored through backfilling with unsuitable excavated material, which would generally involve:

- a. Surplus material would be delivered back to the borrow pits by articulated dumper trucks.
- b. A blade with towed roller would push out and progressively compact layers of material up to the base of the sub-soil level.
- c. Sub-soil and top-soil would be replaced with the intention of returning the borrow pits to agricultural standards.

2.4.4 Shallow borrow pits would not be brought back to original ground levels but would have their levels remodelled and sub-soil and topsoil would be reinstated with the intention of returning the borrow pits to agricultural standards.

2.4.5 The indicative plant required that would be used for the various activities that are required during the borrow pits works would involve the following (note that it is unlikely that this plant would be employed in the same area at the same time).

- a. Two 40 tonne excavators
- b. Six 40 tonne articulated dumpers

- c. Six 25 tonne articulated dumper
- d. One D6 bulldozer
- e. Two water pumps (six inch)
- f. One tractor and bowser
- g. Two lighting towers
- h. One towed roller

- 2.4.6 The D6 bulldozer, an excavator and three dumpers would be required for the initial topsoil / sub-soil strip. Both 40 tonne excavators and the full fleet of dumpers, spread out along the haul routes, would be required during the main excavation of the borrow pit sites. One excavator and approximately half of the dumpers would be employed in periods where fill is still required. Backfill of the pits would require the dumpers to deliver material to the D6 bulldozer and roller which will push out and compact it in layers. The water pumps would only be used once the level of the pit has been reduced or during a wet weather period. The tractor and bowser would be used in dry periods for dust suppression.
- 2.4.7 Generally, the depth of the borrow pits would be approximately 3m to avoid encountering the water table and having an effect on groundwater. If a preferred borrow pit was to be located on land used previously for gravel extraction, the depth of the pit would need to be deeper to allow virgin material to be excavated from below the level of the previous works.
- 2.4.8 Where practicable, screening and existing boundary features would be retained to minimise the potential environmental effects of the borrow pit activities with the borrow pits being required for the duration of the construction phase for the Scheme.
- 2.4.9 Following extraction of the required materials, restoration of the site(s) would commence and would coincide with the construction phase as a staged process i.e. part of the borrow pit areas would remain in use whilst other parts would be backfilled and restored.
- 2.4.10 Photographs of example borrow pit operations are provided in Appendix A.

3 Optioneering

3.1 Methodology

- 3.1.1 The identification of potential borrow pit sites was undertaken using a two-stage approach. The first stage known as the Long List, collated potential sites based upon their proximity to known areas of the Scheme where fill material would be required.
- 3.1.2 As such, two main areas were considered for the identification of potential borrow pit sites. These included:
- a. Land surrounding the existing Black Cat roundabout (and close to Roxton Road).
 - b. The existing Caxton Gibbet roundabout.
- 3.1.3 Following the identification of the sites for inclusion within the Long List, a process of site refinement was completed, known as the Short List. This Short List was identified by taking the potential sites within the Long List and appraising them against the following criteria:
- a. The size of the land available at each potential site.
 - b. The approximate haul distances for transporting the excavated fill material.
- 3.1.4 In addition to the above, a high-level environmental appraisal was undertaken on each site. This focused on the presence of trees and hedgerows, and whether any of the sites had been identified as having archaeological potential.
- 3.1.5 The sites identified for the Short List were then appraised using primary and secondary criteria.
- 3.1.6 The primary criteria chosen included:
- a. Environmental
 - b. Planning
 - c. Transport
 - d. Technical and logistics
- 3.1.7 The secondary criteria under each primary criteria heading are described in the following sections.
- Environmental**
- 3.1.8 A desk-based exercise was undertaken to identify and determine the potential environmental constraints and opportunities of the identified sites to assist in the selection of the preferred borrow pit sites.

- 3.1.9 The process included a review of available mapping from previous stages of the project; creation of new constraints mapping focussing on the borrow pit appraisal options (refer to Appendix B); identification of environmental topics applicable to the appraisal; and development of criteria, against which each site has been tested and appraised to evaluate their relative advantages and disadvantages from an environmental perspective.
- 3.1.10 A number of environmental topics were discounted as secondary criteria for the appraisal for the following reasons:
- a. **Air quality** – it was assumed that best practice mitigation measures would be applied at all borrow pit sites where close to sensitive receptors, therefore this topic was not seen as a differentiator between borrow pit sites.
 - b. **Geology and soils** – All Short Listed sites near Black Cat and Caxton Gibbet junctions respectively are located on agricultural land of the same Agricultural Land Classification ALC Grade, so this would not be a differentiator in the options appraisal. In terms of groundwater, none of the sites are located within a Source Protection Zone (SPZ), and groundwater vulnerability mapping shows that all sites are either medium to low or low vulnerability. The geology and soils topic was therefore not seen as a differentiator between borrow pit sites.
 - c. **Climate** – this topic was not seen as a differentiator between potential borrow pit locations due to the nature and scale of the proposed activity within wider Scheme construction phase.
- 3.1.11 The following secondary environmental criteria were identified as potential site differentiators in the appraisal for environment, and are described in more detail below:
- a. Noise and vibration
 - b. Landscape and visual
 - c. Ecology
 - d. Cultural heritage
 - e. Hydrology
 - f. Public access
- Noise and vibration*
- 3.1.12 This criterion considered the relationships of the appraisal options to noise sensitive receptors i.e. residential properties, community facilities and Public Rights of Way (PRoW) and noise designations e.g. Noise Important Areas.
- 3.1.13 Potential impacts are likely to be associated with site preparation, operational works and restoration works e.g. hauling materials to and from the construction work areas and excavation of materials from the borrow pits.
- 3.1.14 Due to the direct and indirect nature of the potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 300m outwards based on professional judgement.

Landscape and visual

- 3.1.15 This criterion considered the relationships of the identified sites to visual receptors, landscape designations and existing landscape character.
- 3.1.16 Potential impacts are likely to be associated with site preparation, operational works and restoration works e.g. new visual effects of stockpiled materials, construction equipment and construction vehicles hauling the materials to and from the construction works.
- 3.1.17 Due to the direct and indirect nature of the potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 300m outwards based on professional judgement.

Ecology

- 3.1.18 This criterion considered the proximity of the identified sites to ecologically designated sites.
- 3.1.19 Potential impacts are likely to be associated with site preparation, operational works and restoration works including land take resulting in the loss of terrestrial habitat and disturbance to wildlife.
- 3.1.20 Due to the direct and indirect nature of the potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 300m outwards based on professional judgement.

Cultural heritage

- 3.1.21 This criterion considered the proximity of the individual sites to designated heritage assets such as Scheduled Monuments, Listed Buildings, Conservation Areas and Registered Parks and Gardens.
- 3.1.22 Potential impacts are likely to be associated with site preparation, operational works and restoration works specifically the intrusion into the setting of assets and designations.
- 3.1.23 Due to the indirect nature of the potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 300m outwards based on professional judgement.

Hydrology

- 3.1.24 This criterion considered proximity of the identified sites to surface waterbodies and watercourses and potential flood risk.
- 3.1.25 Potential impacts are likely to be associated with site preparation, operational works and restoration works such as entrainment of sediments. Potential exists for identified sites to become flooded depending on the relationship to identified zones of flooding.
- 3.1.26 Due to the direct and indirect nature of potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 300m outwards based on professional judgement.

Public access

- 3.1.27 This criterion considered the proximity of identified sites to PRoW such as public footpaths, byways, bridleways and national cycle routes.
- 3.1.28 Potential impacts are likely to be associated with site preparation, operational works and restoration works such as temporary or permanent diversion of designated routes.
- 3.1.29 Due to the direct and indirect nature of potential impacts associated with this topic, the study area considered the individual sites and an area extending approximately 100m outwards based on professional judgement.

Planning

- 3.1.30 The following secondary planning criteria were identified as potential option differentiators in the appraisal for planning:
 - a. Extant land use
 - b. Development Plan allocations
- 3.1.31 A planning history review of each identified site was undertaken to establish whether a site already has planning consent for an alternative use. These could be in the form of existing permissions and/ or planning conditions, or 'live' applications.
- 3.1.32 Minerals and waste policy was considered and more detail is presented in Appendix C of the Case for the Scheme [TR010044/APP/7.1]. Appendix C presents an analysis of compliance of the proposed borrow pits with the following adopted and emerging Development Plan policies:
 - a. Policy MSP9, Borrow Pits, of the Bedford Borough, Central Bedfordshire and Luton Borough Councils, Minerals and Waste Local Plan: Strategic Sites and Policies, (Adopted 30 January 2014)
 - b. Policy 7, Borrow Pits, of the emerging Cambridgeshire and Peterborough Minerals and Waste Local Plan, Proposed Submission (Publication) Draft, November 2019
- 3.1.33 A review of the presence of Development Plan allocations was also undertaken to establish whether the potential borrow pit sites were allocated for wider strategic development.

Transport

- 3.1.34 The following secondary transport criteria were identified as potential option differentiators in the appraisal:
 - a. Proximity to construction working areas
 - b. Proximity to the road network
 - c. Effects to the road network
- 3.1.35 Following the review of the haul distances for placing the excavated fill material in determining the Short List of options from the Long List, a further review of the proximity of the identified borrow pit sites to construction working areas was

undertaken. The preference would be for haul routes to be within the site boundaries such that vehicles do not need to travel on the local road network.

- 3.1.36 A review of the proximity of the borrow pits to the road network was undertaken to determine whether construction vehicles would need to cross any highways. The preference would be for the preferred borrow pit sites to be located on the same side of the road to the construction working areas to minimise effects on the local road network.
- 3.1.37 A review of the buildability assumptions on the type of construction vehicle required to transport the materials from the identified borrow pit sites was undertaken to determine the potential impacts on the local road network. Dumper trucks are not highway compliant, so if material is to be moved by the local road network, road wagons would be necessary.

Technical and logistics

- 3.1.38 The following secondary technical and logistics criteria was identified as a potential option differentiator in the appraisal:
- a. Existing operational constraints
- 3.1.39 Existing operational constraints such as the presence of overhead and underground utilities was seen as a key differentiator for the appraisal as existing utilities could hinder or prevent the accommodation of a borrow pit.

3.2 Identification of Sites

Long List Sites

- 3.2.1 The initial Long List comprised of the following twenty sites which are illustrated on **Figure 3.1** and **Figure 3.2**.
- a. **Site 1** (Caxton Gibbet roundabout) – a thin strip of land immediately north of the Existing A428 (Cambridge Road), approximately 170m east of farm buildings.
 - b. **Site 2** (Caxton Gibbet roundabout) – a thin strip of land immediately north of the Existing A428 (Cambridge Road) and east of site 1.
 - c. **Site 3** (Caxton Gibbet roundabout) – land immediately west of the A1198 (Ermine Street) and north of the Existing A428 (Cambridge Road).
 - d. **Site 4** (Caxton Gibbet roundabout) – land immediately east of the A1198 and north of the Existing A428 (Cambridge Road).
 - e. **Site 5** (Caxton Gibbet roundabout) – land immediately east of site 4 and west of St Neots Road.
 - f. **Site 6** (Caxton Gibbet roundabout) – land immediately south-west of the existing Caxton Gibbet roundabout, with the Existing A428 (Cambridge Road) immediately to the north and the A1198 (Ermine Street) immediately to the east.
 - g. **Site 7** (Caxton Gibbet roundabout) – land immediately south-east of the existing Caxton Gibbet roundabout, with the Existing A428 (Cambridge

- Road) immediately to the north and the A1198 (Ermine Street) immediately to the west.
- h. **Site 8** (Caxton Gibbet roundabout) – land immediately east of site 7 and south of the Existing A428 (Cambridge Road).
 - i. **Site 9** (Caxton Gibbet roundabout) – land immediately north of the Existing A428 (Cambridge Road) and east of St Neots Road.
 - j. **Site 10** (Black Cat roundabout) – a thin strip of land between the A421 in the south and Rockham Ditch in the north.
 - k. **Site 11** (Black Cat roundabout) – land extending west from Roxton Road, immediately north of Rockham Ditch.
 - l. **Site 12** (Black Cat roundabout) – land immediately east of Roxton Road and west of site 13.
 - m. **Site 13** (Black Cat roundabout) – land between site 12 and Gleneden Plant Sales construction equipment supplier.
 - n. **Site 14** (Black Cat roundabout) – land immediately east of the A1 and north of Black Cat Quarry.
 - o. **Site 15** (Black Cat roundabout) – land between the A421 and Bedford Road.
 - p. **Site 16** (Black Cat roundabout) – land north-east of Roxton and south of Roxton Garden Centre.
 - q. **Site 17** (Black Cat roundabout) – land between the A421 and Roxton Garden Centre.
 - r. **Site 18** (Black Cat roundabout) – land on the site of Black Cat Quarry.
 - s. **Site 19** (Black Cat roundabout) – land immediately east of Black Cat Quarry and west of the River Great Ouse.
 - t. **Site 20** (Black Cat roundabout) – land immediately south-east of Black Cat Quarry and west of the River Great Ouse.

- c. Sites 6, 7, 8, 9, 16 and 20 were located too far from where the material would be needed at the two extremes of the Scheme. This would mean longer haul routes, thus potentially greater local traffic effects. Sites 6, 7 and 8 were also identified as being on the wrong side of the existing A428 (and Sites 15, 16 and 17 on the wrong side of the A421) to where the material would be required, which would be problematic for construction traffic management.

Short Listed Sites

- 3.2.3 Following the completion of the appraisal of the Long List, Sites 3, 4, 5, 11, 13, 14 and 19 were taken forward as the Short List for the options appraisal. Three sites close to the existing Caxton Gibbet roundabout and four sites close to the existing Black Cat roundabout were considered.

4 Overview of short listed sites

4.1.1 This section presents an overview of the geographical location and the setting of each site considered in the appraisal.

4.2 Site 3

4.2.1 This site can be described as land immediately west of the A1198 (Ermine Street) and north of the existing A428 (Cambridge Road).

4.2.2 The site is approximately 14.8ha in size and located on ALC Grade 2 land classed as 'Oadby Member – Diamicton' and 'West Walton Formation, Ampthill Clay Formation' and 'Kimmeridge Clay Formation (undifferentiated)' in terms of soils and geology respectively.

4.2.3 The nearest human receptors include the Iway Inn Hotel on the other side of the A1198 (Ermine Street) within 50m to the east, and farm buildings, including residential property, more than 200m to the west. There are also a number of businesses on the existing Caxton Gibbet roundabout itself, including a convenience shop, a Costcutter supermarket and a Shell Petrol Station.

4.2.4 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.3 Site 4

4.3.1 This site can be described as land immediately east of the A1198 and north of the Existing A428 (Cambridge Road).

4.3.2 The site is approximately 23.2ha in size and located on ALC Grade 2 land classed as 'Oadby Member – Diamicton' and 'West Walton Formation, Ampthill Clay Formation' and 'Kimmeridge Clay Formation (undifferentiated)' in terms of soils and geology respectively.

4.3.3 The nearest human receptors include the Iway Inn Hotel within 10m to the west, and an isolated farm building approximately 150m to the east. There are also a number of businesses on the existing Caxton Gibbet roundabout itself, including a McDonald's, a Costa Coffee shop and takeaway food businesses.

4.3.4 There is a dedicated cycleway approximately 100m to the south of the site boundary.

4.3.5 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.4 Site 5

4.4.1 This site can be described as land immediately east of Site 4 and west of St Neots Road.

- 4.4.2 The site is approximately 16ha in size and located on ALC Grade 2 land classed as 'Oadby Member – Diamicton' and 'West Walton Formation, Amphill Clay Formation' and 'Kimmeridge Clay Formation (undifferentiated)' in terms of soils and geology.
- 4.4.3 There is a Noise Important Area approximately 100m south of this site which includes residential properties.
- 4.4.4 The nearest human receptors include isolated farm buildings, and residential properties within 20m to the north.
- 4.4.5 There is a Grade II Listed Building (Mile Post near Junction with Elsworth Road) approximately 100m south of the boundary of the site.
- 4.4.6 There is a dedicated cycleway directly to the south of the site boundary.
- 4.4.7 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.5 Site 11

- 4.5.1 This site can be described as land extending west from Roxton Road, immediately north of Rockham Ditch.
- 4.5.2 The site is approximately 11.7ha in size and located on ALC Grade 1 land classed as 'River Terrace Deposits – Sand and Gravel' and 'Kellaways Formation and Oxford Clay Formation (undifferentiated) – mudstone, siltstone and sandstone' in terms of soil and geology.
- 4.5.3 The nearest human receptors include isolated residential properties on the other side of Roxton Road (approximately 180m to the north-east) and residential properties, businesses and farm buildings along Spinney Road to the north (the nearest within 120m).
- 4.5.4 Rockham Ditch is immediately adjacent to the south of the site and South Brook (a tributary of the River Great Ouse) is located approximately 300m to the northern boundary of the site.
- 4.5.5 A public footpath dissects the western part of the site and runs alongside the southern boundary of the site adjacent to Rockham Ditch.
- 4.5.6 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.6 Site 13

- 4.6.1 This site can be described as land between Site 12 and Gleneden Plant Sales construction equipment supplier.
- 4.6.2 The site is approximately 5.9ha in size and located on ALC Grade 1 land classed as 'River Terrace Deposits – Sand and Gravel' and 'Kellaways Formation and Oxford Clay Formation (undifferentiated) – mudstone, siltstone and sandstone' in terms of soil and geology.
- 4.6.3 There are two Noise Important Areas within 300m of this site along the A1 (Great North Road).

- 4.6.4 The nearest human receptors include Gleneden Plant Sales construction equipment supplier immediately to the east. Isolated residential properties are located approximately 150m to the west. Residential properties to the north of the site are also within the study area (the nearest within 180m of the site).
- 4.6.5 South Brook (a tributary of the River Great Ouse) is located approximately 50m to the north of the site.
- 4.6.6 There are a number of Grade II Listed Buildings within 300m of the site, especially to the north in Chawston.
- 4.6.7 Public footpaths run approximately north to south adjacent to the western and eastern boundaries of the site.
- 4.6.8 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.7 Site 14

- 4.7.1 This site can be described as land immediately east of the A1 and north of Black Cat Quarry.
- 4.7.2 The site is approximately 5.1ha in size and located on ALC Grade 1 land classed as 'River Terrace Deposits – Sand and Gravel' and 'Kellaways Formation and Oxford Clay Formation (undifferentiated) – mudstone, siltstone and sandstone' in terms of soil and geology.
- 4.7.3 There are two Noise Important Areas within the study area within 50m to the west, and within 150m to the north of the site.
- 4.7.4 This site is located on agricultural land. The nearest human receptors include Black Cat Quarry immediately to the south; and farm buildings and a residential property approximately 50m to the north of the site.
- 4.7.5 South Brook (a tributary of the River Great Ouse) is located approximately 100m north of the site.
- 4.7.6 There is a Grade II Listed Building (Brook Cottages) located approximately 100m to the north-west of the site.
- 4.7.7 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

4.8 Site 19

- 4.8.1 This site can be described as land immediately east of Black Cat Quarry and west of the River Great Ouse (Main river).
- 4.8.2 The site is approximately 7.1ha in size and located on ALC Grade 1 land classed as 'River Terrace Deposits – Sand and Gravel' and 'Kellaways Formation and Oxford Clay Formation (undifferentiated) – mudstone, siltstone and sandstone' in terms of soil and geology.
- 4.8.3 The nearest human receptors include Black Cat Quarry (although this is not currently a working quarry) immediately to the west of the site and a residential property within 200m to the west (Green Acres).

- 4.8.4 The River Great Ouse (classified as a 'main river') is located within 25m of the site to the east which is also classified as a County Wildlife Site (CWS). The current site is occupied by ponds and wetlands.
- 4.8.5 Local environmental constraints within a 300m study area outwards from this site can be seen in Appendix B.

5 Appraisal of the Short Listed potential sites

5.1.1 This section presents the appraisal of each Short Listed potential site. All potential impacts would be temporary.

Table 5.1 Appraisal of Short Listed potential sites

Appraisal of Short Listed potential sites								
Site		Site 3	Site 4	Site 5	Site 11	Site 13	Site 14	Site 19
Criteria		Caxton Gibbet roundabout	Caxton Gibbet roundabout	Caxton Gibbet roundabout	Black Cat roundabout	Black Cat roundabout	Black Cat roundabout	Black Cat roundabout
Primary Criteria	Secondary Criteria							
Environment	Noise and vibration	Human receptors at Iway Inn Hotel and nearby farms (to the west) and businesses (to the south) may experience increases in noise due to operation of construction plant, machinery and vehicles.	Human receptors at Iway Inn Hotel in particular and nearby farms and businesses are likely to experience increases in noise due to operation of construction plant, machinery and vehicles. Human receptors using the nearby dedicated cycleway to the south may also experience increases in noise due to operation of construction plant, machinery and vehicles.	Human receptors at nearby farms and residential properties (to the north and south) and businesses to the south are likely to experience increases in noise due to operation of construction plant, machinery and vehicles. The two residential properties and isolated farm building directly to the north of the site could potentially experience a large increase in noise due to their close proximity. Human receptors using the nearby dedicated cycleway directly to the south are likely to experience increases in noise due to operation of construction plant, machinery and vehicles.	Human receptors to the north along Spinney Road and along Roxton Road may experience increases in noise due to operation of construction plant, machinery and vehicles. The existing footpath that intersects the site would need to be diverted to a route that would have less noise effects on human receptors.	This site has a relatively high number of human receptors within the 300m study area (e.g. to the north and west) that would potentially be affected by the construction works from a noise perspective. Human receptors using the two public footpaths that run adjacent to the east and west of the site would experience increases in noise effects as a result of the works.	This site has a relatively high number of human receptors within the study area that would potentially be affected by the construction works from a noise perspective, including a residential property within 50m to the north of the site.	The only residential receptor that lies within the study area includes a residential property within 200m of the site (Green Acres). It is expected that the noise effects from the site would be relatively minor due to the relative distance to this property.
	Landscape and visual	Human receptors at Iway Inn Hotel and nearby farms (to the west) and businesses (to the south) may experience visual effects due to potential visibility of construction plant, machinery and vehicles.	Human receptors at Iway Inn Hotel in particular and nearby farms and businesses are likely to experience visual effects due to potential visibility of construction plant, machinery and vehicles. Human receptors using the nearby dedicated cycleway to the south may experience visual effects due to potential	Human receptors at nearby farms and residential properties (to the north and south) and businesses to the south may experience visual effects due to visibility of construction plant, machinery and vehicles. The two residential properties and isolated farm building directly to the north of the site could	Human receptors to the north along Spinney Road and along Roxton Road may experience visual effects due to potential visibility of construction plant, machinery and vehicles. The existing footpath that intersects the site would need to be diverted to a route that would have less	This site has a relatively high number of human receptors within the 300m study area (e.g. to the north and west) that would potentially be affected by the construction works from a visual perspective. Human receptors using the two public footpaths that run adjacent to the east and west of the site would experience	This site has a relatively high number of human receptors within the study area that would potentially be affected by the construction works from a visual perspective, including residential property within 50m to the north of the site.	Human receptors at the residential property within 200m of the site (Green Acres) may experience visual effects from the site. It is expected that the visual effects from the site would be relatively minor for the residential property due to the relative distance to this property and the existing screening from vegetation.

Appraisal of Short Listed potential sites								
Site		Site 3 Caxton Gibbet roundabout	Site 4 Caxton Gibbet roundabout	Site 5 Caxton Gibbet roundabout	Site 11 Black Cat roundabout	Site 13 Black Cat roundabout	Site 14 Black Cat roundabout	Site 19 Black Cat roundabout
Criteria								
Primary Criteria	Secondary Criteria							
			visibility of construction plant, machinery and vehicles.	potentially experience visual intrusion due to their close proximity. Human receptors using the nearby dedicated cycleway to the south may experience visual effects due to potential visibility of construction plant, machinery and vehicles.	visual effects on human receptors.	increases in visual effects as a result of the works.		Recreational boat users would also experience adverse views of this site from the River Great Ouse.
	Ecology	There are no designated ecological sites within the study area.	There are no designated ecological sites within the study area.	There are no designated ecological sites within the study area.	There are no designated ecological sites within the study area. Potential for disturbance of ecological species within Rockham Ditch.	There are no designated ecological sites within the study area.	There are no designated ecological sites within the study area.	There is a CWS within 25m of the site. There is potential for ecological species within this designated site to be affected by the works due to the close proximity and nature of the works.
	Cultural heritage	No designated cultural heritage assets are present in the study area.	No designated cultural heritage assets are present in the study area.	The Grade II Listed Building to the south has the potential to be affected by the construction works at the site, e.g. effects on the setting of this asset.	No designated cultural heritage assets are present in the study area.	The Grade II Listed Buildings within the study area have the potential to be affected by the construction works at the site, e.g. effects on the setting of these assets.	The Grade II Listed Building (Brook Cottages) will be demolished as a result of constructing the Scheme.	No designated cultural heritage assets are present in the study area.
	Hydrology	There is a small watercourse that runs alongside the A1198 (Ermine Street) which is unlikely to be affected with best practice construction mitigation in place.	There is a small watercourse that runs alongside the A1198 (Ermine Street) which is unlikely to be affected with best practice construction mitigation in place.	No surface waterbodies are present in the study area.	There is a small watercourse (Rockham Ditch) that runs adjacent to the southern boundary of the site which is unlikely to be affected with best practice construction mitigation in place.	The northern extreme of the site is within the flood zones of South Brook (Flood Zone 2). It is likely that with further design development, the site boundary can be adjusted to avoid these flood zones so no flooding effects would be likely.	The eastern extreme of the site is within the flood zones of the River Great Ouse (Flood Zone 2 and Flood Zone 3). It is likely that with further design development, the site boundary can be adjusted to avoid these flood zones so no flooding effects would be likely.	The majority of the borrow pit site is within Flood Zone 3 (River Great Ouse), so there is a 1 in 100 or greater annual probability of river flooding at this site. The current site is occupied by ponds and wetlands which reduces its suitability.
	Public access	No PRow are present in the immediate vicinity of the site (within 100m).	There is a dedicated cycleway approximately 100m to the south of the site boundary. Aside from the potential indirect effects of noise	There is a dedicated cycleway directly to the south of the site boundary. Aside from the potential indirect effects of noise and visual intrusion for	The use of this land would require the temporary diversion / realignment of an existing Public Footpath.	Aside from the potential indirect effects of noise and visual intrusion for human receptors, the PRow's either side of this	No PRow are present in the immediate vicinity of the site (within 100m).	No PRow are present in the immediate vicinity of the site (within 100m).

Appraisal of Short Listed potential sites								
Site		Site 3	Site 4	Site 5	Site 11	Site 13	Site 14	Site 19
Criteria		Caxton Gibbet roundabout	Caxton Gibbet roundabout	Caxton Gibbet roundabout	Black Cat roundabout	Black Cat roundabout	Black Cat roundabout	Black Cat roundabout
Primary Criteria	Secondary Criteria							
			and visual intrusion for human receptors, the PRoW itself would not be affected by the works.	human receptors using the dedicated cycleway, the PRoW itself would not be affected by the works.		site are unlikely to be affected by the works.		
Planning	Extant land use	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture / not used	Quarry restoration
	Development Plan allocation	None	None	None	None	None	Green Infrastructure Network Opportunity Zone: Lower Great Ouse Valley, Saved Policy AD24. As a temporary operation the borrow pits would not be likely to affect the future delivery of green infrastructure in accordance with this policy.	Permitted Mineral Site (MSP8), associated with Black Cat Quarry. However, extraction at the quarry is almost complete and restoration is underway. Green Infrastructure Network Opportunity Zone: Lower Great Ouse Valley, Saved Policy AD24. As a temporary operation the borrow pits would not be likely to affect the future delivery of green infrastructure in accordance with this policy.
Transport	Proximity to construction working areas	The site is adjacent to the proposed embankment west of the new Caxton Gibbet junction.	The site is adjacent to the proposed embankment east of the new Caxton Gibbet junction.	The site is adjacent to the proposed embankment east of the new Caxton Gibbet junction.	The site is adjacent to the proposed new Roxton Road link and the new Roxton Road bridge embankments.	The site is approximately 200m east of the proposed new Roxton Road link and the new Roxton Road bridge embankments.	The site is adjacent to the proposed embankment for the new dual carriageway on the approach to the River Great Ouse.	The site is adjacent to the proposed embankment for the new dual carriageway on the approach to the River Great Ouse.
	Proximity to the road network	Located on the same side of the highway as the proposed embankment west of the new Caxton Gibbet junction.	Located on the same side of the highway as the proposed embankment east of the new Caxton Gibbet junction.	Located on the same side of the highway as the proposed embankment east of the new Caxton Gibbet junction.	Located on the same side of the highway to access the northern Roxton Road bridge embankment. A crossing would be required to access the eastern section of the link.	Located on the same side of the highway as the proposed new Roxton Road link, however, a side road crossing would be required for Roxton Road bridge embankment fill.	Located on the same side of the highway as the proposed embankment for the new dual carriageway on the approach to the River Great Ouse.	Located on the same side of the highway as the proposed embankment for the new dual carriageway on the approach to the River Great Ouse.
	Effects to the road network	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.	Material to be moved by dumper trucks to working areas.

Appraisal of Short Listed potential sites								
Site		Site 3 Caxton Gibbet roundabout	Site 4 Caxton Gibbet roundabout	Site 5 Caxton Gibbet roundabout	Site 11 Black Cat roundabout	Site 13 Black Cat roundabout	Site 14 Black Cat roundabout	Site 19 Black Cat roundabout
Criteria								
Primary Criteria	Secondary Criteria							
Technical and Logistics	Operational constraints	The site boundary has been adjusted to avoid an 11kV overhead line to the south.	No overhead or underground utilities identified at the site.	No overhead or underground utilities identified at the site.	A HP gas main is located outside of but close to the northern boundary of the site.	No overhead or underground utilities identified at the site.	No overhead or underground utilities identified at the site.	No overhead or underground utilities identified at the site.

6 Site appraisal conclusions

6.1 Site 3

- 6.1.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- Changes in noise levels for human receptors primarily at Iway Inn Hotel.
 - Changes to visual amenity for human receptors primarily at Iway Inn Hotel.
 - Potential cumulative effects from similar noise and visual impacts at the Iway Inn Hotel due to the proximity of Site 4.
- 6.1.2 The sensitive noise receptors identified (at Iway Inn Hotel) would be within 50m from the borrow pit. With the implementation of appropriate mitigation measures such as controlled working hours and installation of temporary hoarding fences at specific locations, the potential temporary noise impacts to these receptors are unlikely to result in significant adverse effects.
- 6.1.3 For potential impacts to visual amenity, bunds of material would be formed where required to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the receptors identified at the Iway Inn Hotel located within 50m from the site. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.
- 6.1.4 There are no active planning permissions within the site boundary. Access to the site could be acquired off the existing A1198 Ermine Street, with direct routes to the eastern extent of the Scheme during the construction phase.
- 6.1.5 Taking the above into consideration, the site would have no long term adverse environmental effects, and the potential environmental impacts associated with the site can be suitably mitigated with the implementation of standard best practice.

6.2 Site 4

- 6.2.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- Changes in noise levels for human receptors primarily at the Iway Inn Hotel and the dedicated cycleway to the south.
 - Changes to visual amenity for human receptors primarily at the Iway Inn Hotel and the dedicated cycleway to the south.
 - Potential cumulative effects from similar noise and visual impacts at the Iway Inn Hotel due to the proximity of Site 3.

- 6.2.2 The sensitive noise receptors identified, at Iway Inn Hotel and the nearby dedicated cycleway, would be approximately within 10m and 100m of the borrow pit site boundary respectively. With the implementation of appropriate mitigation measures such as controlled working hours and installation of bunded materials at specific locations, the potential temporary noise impacts are unlikely to result in long term significant adverse effects.
- 6.2.3 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the receptors identified at Iway Inn Hotel and the nearby dedicated cycleway to the south. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.
- 6.2.4 There are no active planning permissions within the site boundary. Access to the site could be acquired off the existing A1198 Ermine Street, with direct routes to the eastern extent of the Scheme during the construction phase.
- 6.2.5 Taking the above into consideration, the site would have no long term adverse environmental effects, and the potential environmental impacts associated with the site can be suitably mitigated with the implementation of standard best practice.

6.3 Site 5

- 6.3.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- a. Changes in noise levels at Common Farm Cottages, New Bungalow and Oak Tree Cottage (approximately 20m, 60m and 50m respectively from the site boundary), and the dedicated cycle way to the north of the A428.
 - b. Possible changes to noise levels within the Noise Important Area that encompasses New Bungalow and Oak Tree Cottage.
 - c. Changes to visual amenity at Common Farm Cottages, New Bungalow and Oak Tree Cottage and users of the existing dedicated cycle way to the north of the A428.
- 6.3.2 Given the proximity of the identified noise receptors to the site, even with the implementation of mitigation measures, the activities and processes associated with the abstraction of fill material are likely to generate significant temporary adverse effects at Common Farm Cottages.
- 6.3.3 With the implementation of appropriate mitigation measures such as controlled working hours and installation of bunds at specific locations, the potential temporary noise impacts to the New Bungalow and Oak Tree Cottage are unlikely to result in significant adverse effects.

- 6.3.4 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the receptors identified at Common Farm Cottages, New Bungalow, Oak Tree Cottages and the existing dedicated cycle way. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation. Notwithstanding this, given the sites proximity, potential significant adverse visual effects are likely at Common Farm Cottages.
- 6.3.5 There is the potential for a temporary change in setting for the Grade II listed property associated with Oak Tree Cottage.
- 6.3.6 There are no active planning permissions for this site. Access to the site could be acquired off the existing A1198 Ermine Street, with direct routes to the eastern extent of the Scheme during the construction phase.
- 6.3.7 Taking the above into consideration, the site would have no long term adverse environmental effects, but because of the potential for significant environmental effects, it is considered to perform less well than Sites 3 and 4.

6.4 Site 11

- 6.4.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- Changes in noise levels for human receptors on Spinney Road and Roxton Road (which at their nearest are approximately 70m from the site boundary).
 - Changes to visual amenity at the residential receptors located on Spinney Road and Roxton Road.
 - Impacts to features of biodiversity value such as Rockham Ditch
 - Temporary diversion / realignment of an existing footpath.
- 6.4.2 The sensitive noise receptors identified would be between approximately 70m to 200m from the borrow pit. With the implementation of appropriate mitigation measures such as controlled working hours and installation of temporary hoarding fences at specific locations, the potential temporary noise impacts to these receptors are unlikely to result in significant adverse effects.
- 6.4.3 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the human receptors identified as those on Spinney Road and Roxton Road located approximately 70m to 200m from the site. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.
- 6.4.4 There are no active planning permissions within the site boundary. Access to the site could be acquired off the existing Roxton Road, with direct routes to the western extent of the Scheme during the construction phase.

6.4.5 Taking the above into consideration, the site would have no long term adverse environmental effects, and the potential environmental impacts associated with the site can be suitably mitigated with the implementation of standard best practice.

6.5 Site 13

6.5.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:

- a. Changes in noise levels for human receptors on Chawston Lane, Roxton Road and the A1 Great North Road (which at their nearest are approximately 150m from the site boundary).
- b. Changes to visual amenity at the human receptors located on Chawston Lane, Roxton Road and the A1 Great North Road (which at their nearest are approximately 150m from the site boundary).
- c. Temporary indirect impacts to human receptors (noise and visual) using the footpaths directly adjacent to the east and west of the site.

6.5.2 The sensitive noise receptors on the local roads identified would be between approximately 150m to 300m from the borrow pit. With the implementation of appropriate mitigation measures such as controlled working hours and installation of temporary hoarding fences at specific locations, the potential temporary noise impacts to these receptors are unlikely to result in significant adverse effects.

6.5.3 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the human receptors identified as those on Chawston Lane, Roxton Road and the A1 Great North Road located approximately 150m to 300m from the site. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.

6.5.4 There is the potential for a temporary change in setting for a number of Grade II listed buildings on Chawston Lane.

6.5.5 There are no active planning permissions within the site boundary. Access to the site could be acquired off the existing Roxton Road, with direct routes to the western extent of the Scheme during the construction phase.

6.5.6 Taking the above into consideration, the site would have no long term adverse environmental effects, and the potential environmental impacts associated with the site can be suitably mitigated with the implementation of standard best practice. It is considered overall that the impacts at Site 11 and Site 13 are not too dissimilar, but Site 11 performs slightly better than Site 13 due to potential cultural heritage related impacts.

6.6 Site 14

- 6.6.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- Changes in noise levels for human receptors on the A1 Great North Road (which at their nearest are approximately 50m from the site boundary to the north and the south-west).
 - Changes to noise levels for the Noise Important Area, approximately 50m to the west of the site.
 - Changes to visual amenity for the human receptors located on the A1 Great North Road (which at their nearest are approximately 50m from the site boundary to the north).
 - Proximity to Flood Zones 2 and 3 within the eastern extreme of the site.
- 6.6.2 The sensitive noise receptors identified would be between approximately 50m to 300m from the borrow pit. With the implementation of appropriate mitigation measures such as controlled working hours and installation of temporary hoarding fences at specific locations, the potential temporary noise impacts to these receptors are unlikely to result in significant adverse effects.
- 6.6.3 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the human receptors identified as those on the A1 Great North Road. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.
- 6.6.4 In the event they are still in-situ, there is the potential for a temporary change in setting for a Grade II listed building (Brook Cottages) located approximately 100m to the north-west of the site. However, Brook Cottages will be demolished as a result of constructing the Scheme, in which case no change in setting arising from the borrow pits would occur.
- 6.6.5 It is likely that with further design development, the site boundary can be adjusted to avoid Flood zones 2 and 3 so no flooding effects would be likely.
- 6.6.6 There is an active planning designation within the site boundary - Green Infrastructure Network Opportunity Zone: Lower Great Ouse Valley, Saved Policy AD24. As a temporary operation the borrow pits would not be likely to affect the future delivery of green infrastructure in accordance with this policy.
- 6.6.7 Access to the site could be acquired off the A1 Great North Road, with direct routes to the western extent of the Scheme during the construction phase.
- 6.6.8 Taking the above into consideration, the site would have no long term adverse environmental effects, and the identified potential environmental impacts associated with the site can be suitably mitigated with the implementation of standard best practice.

6.7 Site 19

- 6.7.1 Potential environmental impacts and / or changes due to a borrow pit in this location relate to:
- Changes in noise levels for human receptors on the A1 Great North Road (approximately 200m from the site (Green Acres)).
 - Changes to visual amenity for the human receptors located on the A1 Great North Road (approximately 200m from the site (Green Acres)), and recreational boat users on the River Great Ouse.
 - Disturbance of ecological species within the CWS within 25m of the site.
 - Flooding impacts related to Flood Zones 2 and 3 which encompass the majority of the site.
- 6.7.2 With the implementation of appropriate mitigation measures such as controlled working hours and installation of temporary hoarding fences at specific locations, the potential temporary noise impacts to these receptors are unlikely to result in significant adverse effects.
- 6.7.3 For potential impacts to visual amenity, bunds of material would be formed adjacent to sensitive boundaries to provide screening and the retention of existing hedges and trees where possible would reduce the temporary impact as far as practicable at the human receptors identified as those on the A1 Great North Road. Where these measures are not practicable, temporary hoarding may be used as another potential measure to provide mitigation.
- 6.7.4 It would be difficult to fully mitigate the noise effects from this site for potential protected ecological species at the CWS within 25m, even with the noise control measures mentioned above. Therefore, there is potential for temporary significant adverse ecological effects.
- 6.7.5 In addition, as the majority of this site is within Flood Zone 3, and therefore has a 1 in 100 or greater annual probability of flooding, substantial mitigation e.g. flood defences would be needed to protect this site. The existing site is also currently occupied by ponds and wetlands which further reduces its suitability.
- 6.7.6 There is an active planning permission and planning designation within the site boundary including:
- Permitted Mineral Site (MSP8), associated Black Cat Quarry, however, extraction at the quarry is almost complete and restoration is underway.
 - Green Infrastructure Network Opportunity Zone: Lower Great Ouse Valley, Saved Policy AD24. As a temporary operation the borrow pits would not be likely to affect the future delivery of green infrastructure in accordance with this policy.
- 6.7.7 Access to the site could be acquired off the A1 Great North Road, with direct routes to the western extent of the Scheme during the construction phase.

- 6.7.8 In summary, the main environmental concerns for this site would be the ability to mitigate potential ecological impacts and flooding impacts associated with the River Great Ouse. As such, this site is considered less favourable than Site 14.

7 Conclusion

7.1 Proposed Borrow Pit Locations

7.1.1 Following the completion of the Long List and Short List appraisal of the candidate sites which identified the potential environmental, planning, transportation and technical and logistics opportunities and constraints, the following sites have been identified to be included within the preliminary design and form part of the buildability methodology for the Scheme.

Caxton Gibbet junction

7.1.2 Sites 3 and 4 were selected as the preferred borrow pit sites near Caxton Gibbet junction.

7.1.3 Site 3 performed well, and Site 4 performed better than Site 5 due to the lower magnitude of potential environmental impacts, e.g. significant temporary adverse noise and visual effects are anticipated at Common Farm Cottages (Site 5).

Black Cat junction

7.1.4 Site 11 was assessed against Site 13, and Site 14 was assessed against Site 19 due to the relative proximity to where the materials would be needed (and for avoidance of unnecessary crossing of highways) for construction of the new Roxton Road link and the new Roxton Road bridge embankments; and the embankment for the new dual carriageway on the approach to the River Great Ouse.

7.1.5 Sites 11 and 14 were selected as the preferred sites for borrow pits near the Black Cat junction.

7.1.6 It is considered overall that the impacts at Site 11 and Site 13 are not too dissimilar, but Site 11 is preferred as it performs slightly better than Site 13 due to potential cultural heritage related impacts at Site 13.

7.1.7 Site 14 was chosen over Site 19 mainly due to the fact that the siting of Site 19 would be less favourable from a flooding and ecological perspective due to the close proximity to the River Great Ouse. Site 19 presents potential for temporary significant adverse ecological effects, and the current land is occupied by ponds and wetlands which further reduces its suitability.

7.2 Further study

7.2.1 A preliminary review of available geotechnical information in the key areas being considered for the borrow pits was undertaken to check that there were no fundamental problems anticipated with sourcing the material required. Additional and directed ground investigation, including trial pits and sampling, was undertaken within the preferred borrow pit sites to verify the ground conditions. The findings of this additional investigation have been reported in the Ground Investigation Summary Report in **Appendix 9.1** of the Environmental Statement [TR010044/APP/6.3].

Appendix A Example operational photos







Appendix B Environmental constraints

