8. CULTURAL HERITAGE AND ARCHAEOLOGY

8.1 Introduction

8.1.1 This chapter considers the potential impacts of the Scheme on the cultural heritage resource (the heritage assets) within a predetermined study area surrounding the Limits of Land to be Acquired or Used (LLAU). A heritage asset is defined as a building, monument, site, place, area, or landscape, including archaeological remains (both known and potential), positively identified as having a degree of significance meriting consideration in the planning process. This is a preliminary assessment and the findings will be refined in the subsequent Environmental Statement (ES) as additional information becomes available, allowing for more detail to be given regarding the predicted effects and proposed mitigation measures.

8.1.2 Heritage assets are divided into two classes: designated heritage assets and non-designated heritage assets. Designated heritage assets are those that have some form of statutory or other protection within the planning system and includes World Heritage Sites, scheduled monuments, protected wrecks, listed buildings, conservation areas, registered parks and gardens and registered battlefields. Non-designated heritage assets are those that have been identified as having a degree of significance meriting consideration in planning decisions but which are not formally designated. This includes buildings and other structures that a local authority has identified as 'locally listed'.

8.1.3 The assessment comprises a brief summary of the baseline conditions, considers the archaeological potential of the Site and identifies built heritage features within, and in close proximity to, the application boundary. In addition, this assessment determines the likely impact of the Scheme during construction and operation upon the identified heritage assets including the potential below ground archaeological resource and identifies appropriate mitigation measures.

8.1.4 All drawings referenced within this chapter are presented in Volume 2 of the Preliminary Environmental Information Report (PEIR) and all appendices referenced in this chapter are presented in Volume 3.

8.2 Regulatory and policy framework

8.2.1 This impact assessment has been undertaken in accordance with current national legislation, and national, regional and local plans and policies

relating to the historic environment in the context of the Scheme. A summary of the relevant legislation and policies, the requirements of these policies and the Scheme response has been provided in Table 8-1 below.

Table 8-1 Cultural heritage regulatory and policy framework

Policy/legislation	Summary of requirements	Scheme response
Planning (Listed Buildings and Conservation Areas) Act 1990	This Act applies special protection to buildings and areas that are considered to be of special architectural and / or historic interest.	The assessment has identified the relevant designated heritage assets, assessed potential impacts and identified appropriate levels of mitigation.
Ancient Monuments and Archaeological Areas Act 1979	This Act gives statutory protection to any structure, building or area of archaeological remains that is considered to be of particular historic and / or archaeological interest.	The assessment has confirmed that there are no scheduled monuments or archaeological areas as defined by the Act within the study area or the immediate surrounding area.
National Planning Policy Statement for National Networks ('NN NPS') 2014	The NN NPS, paragraphs 5.126 and 5.127, contain guidance on the assessment of impacts from national road and rail projects on the historic environment. The applicant is required to describe the significance of any heritage assets affected, including any contribution made by their setting.	The assessment of the potential impacts of the Scheme on the cultural heritage resource has been undertaken in accordance with the requirements of the NN NPS.
National Planning Policy Framework ('NPPF') 2012 (Ref 8-1)	Section 12 of the NPPF 'Conserving the Historic Environment', contains policies relating to the treatment of the historic environment in the planning process. Planning Practice Guidance	The assessment of potential impacts of the Scheme on the historic environment has been undertaken in accordance with the requirements of the NPPF.
London Plan 2015	Policy 7.8 of the London Plan seeks to conserve and enhance the heritage assets and their settings. The policy requires applicants to undertake a qualitative assessment of the harm	The assessment of the potential impacts of the Scheme on the significance of heritage assets and their settings has been undertaken in accordance with Policy 7.8 of the London Plan.

Policy/legislation	Summary of requirements	Scheme response
	or loss to the significance of an asset or its setting.	
Royal Greenwich Local Plan 2014 (Ref 8-2)	The Royal Greenwich Local Plan contains a number of policies regarding the treatment of the historic environment within the planning process: DH3 Heritage Assets; DH4 Maritime Greenwich World Heritage Site; DH(h) Conservation Areas; DH(i) Statutory Listed Buildings; DH(j) Locally Listed Buildings; DH(m) Archaeology	The assessment of potential impacts of the Scheme on the historic environment has been undertaken with regard to the relevant policies contain with the Royal Greenwich Local Plan.
Newham Local Plan 2012 (Ref 8-3)	Policy SP5 of the the Newham Local Plan states that: 'The value of heritage and other assets (natural, cultural, architectural, and infrastructural) which contribute to local character and successful places will be recognised by protection, conservation and enhancement of the assets and their setting.	The assessment of potential impacts of the Scheme on the historic environment has been undertaken with regard to this policy.
Tower Hamlets Local Development Framework 2010 (Ref 8-4)	Policy SP10 of the Tower Hamlets Local Development Framework contains provisions for the protection, conservation and enhancement of the historic environment within the planning process.	The assessment of potential impacts of the Scheme on the historic environment has been undertaken with regard to this policy.

8.3 Methodology

General approach

8.3.1 This assessment follows the guidelines set out in Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 2 – Cultural Heritage (Ref 8-5). The following standards and guidance have also been taken into account: Standard and guidance for historic environment desk-based assessment (Institute for Archaeologists, Ref 8-6), Conservation Principles (English Heritage, Ref 8-7) and The Setting of Heritage Assets (English Heritage, Ref 8-8). The appropriateness of this approach has been acknowledged in the scoping opinion for the Scheme received from the Secretary of State (SoS) for Transport in June 2014.

8.3.2 Professional judgement, based on examination of previous archaeological investigations within the study area, has been used to assess the potential for currently unknown sub-surface heritage assets (archaeological remains) to be present.

8.3.3 The following timescales are used in this assessment:

- Palaeolithic: Pre 30,000 BC to 10,000 BC;
- Mesolithic: 10,000 BC to 3,500 BC;
- Neolithic: 4,000 BC to 2,200 BC;
- Bronze Age: 2,500 BC to 700 BC;
- Iron Age: 800 BC to AD 43;
- Roman: AD 43 to AD 410;
- Early medieval: AD 410 to AD 1066;
- Medieval: AD 1066 to AD 1540;
- Post-medieval: AD 1540 to AD 1900; and
- Modern: AD 1900 to present.

Consultation

8.3.4 Initial consultation on the scope of this assessment with the Greater London Archaeological Advisory Service (GLAAS) was undertaken in

June 2014. Recommendations were made to produce a geoarchaeological deposit model of the Scheme environs and the potential impacts to archaeological remains in the river channel and Silvertown foreshore from scour associated with the construction of a jetty within the river channel.

8.3.5 A subsequent meeting was held with GLAAS and English Heritage (now Historic England) Inspector of Ancient Monuments in January 2015 to define the scope of those recommendations. It was confirmed during the meeting that the geoarchaeological model could be produced using the pre-existing borehole data and the Thames Discovery Programme should be contacted with regard to information that they may hold on the archaeological potential and sensitivity of the river foreshore.

The study area

8.3.6 Two study areas have been chosen for this assessment, based on a combination of professional judgement and industry good practice. The first extends 500m from the LLAU and incorporates non-designated heritage assets such as the locations of archaeological remains, the findspots of archaeological artefacts recorded in the GLAAS Historic Environment Record and locally listed buildings. This study area is used to inform the assessment of direct physical impacts on heritage assets caused by the construction of the Scheme and to make a judgement on the potential presence of currently unknown archaeological remains within the application boundary.

8.3.7 The second study area extends 1000m from the LLAU and incorporates designated heritage assets such as World Heritage Sites, scheduled monuments and listed buildings. This study area is used to inform the assessment of direct impacts to the setting of those heritage assets caused by the presence of the Scheme, which can occur some distance from the LLAU. In addition to the 1000m study area, heritage assets of particularly high value further afield have also been taken into consideration. The study areas are shown on Drawing 8-1 located in Volume 2 of the PEIR.

Methodology for establishing baseline conditions

Establishing the existing baseline

8.3.8 The following sources have been consulted in order to provide the baseline information on known heritage assets within each of the relevant study areas:

- National Heritage List for England;
- Greater London Archaeology Advisory Service (GLAAS) Historic Environment Record (HER);
- London Archaeological Archive Research Centre; and
- British Library.

8.3.9 The identified heritage assets are listed in the gazetteer in Appendix 8-A and their locations are shown on Drawing 8-1. Where discussed in the chapter text, the ID numbers for the heritage assets are shown in bold type in brackets.

8.3.10 In addition to the data sources listed above, a geoarchaeological deposit model was commissioned from Quaternary Scientific (QUEST), Reading University, in order to better understand the potential for archaeologically significant remains to be located at depth within the application boundary. The deposit model (Appendix 8-B) was compiled using existing borehole and other geoarchaeological information.

Forecasting the future baseline ('without Scheme' scenario)

8.3.11 The forecast of the future baseline considers that ongoing development within the study area has the potential to change the setting of existing heritage assets. It also considers that new heritage assets may be identified over time, and existing heritage assets may be removed by ongoing development within the study area. However, the baseline conditions are not anticipated to alter significantly in the future.

Defining the importance/sensitivity of resource

8.3.12 The importance (value) of identified heritage assets has been determined using criteria derived from DMRB (Ref 8-5). Table 8-2 summarises the value ascribed to the various types of heritage asset.

Table 8-2 Determining the importance / sensitivity of resource

Importance/ sensitivity of resource or receptor	Criteria
Very High	• World Heritage Sites (including nominated sites) • Heritage assets of acknowledged international importance • Other buildings of recognised international importance • Historic landscapes or townscapes of international importance
High	• Scheduled monuments • Heritage assets of acknowledged national importance • Grade I and Grade II* listed buildings • Other listed buildings of acknowledged national importance • Conservation areas containing buildings of acknowledged national importance • Historic landscapes or townscapes of national importance
Medium	• Grade II listed buildings • Conservation areas • Heritage assets of acknowledged regional importance • Other buildings of acknowledged regional importance • Historic landscapes or townscapes of regional importance
Low	• Locally listed buildings • Other buildings of acknowledged local importance • Heritage assets of limited importance, but with potential to contribute to local research objectives. • Historic landscapes or townscapes of local importance
Negligible	• Historic buildings of no architectural or historical note • Heritage assets with very little or no surviving interest

Methodology for assessing impacts

8.3.13 The magnitude of each impact is assessed using the criteria provided in Table 8-3, derived from the criteria in DMRB. Two types of impact are considered in this assessment, for both the construction and operational phases.

8.3.14 The first type of impacts are direct physical impacts on heritage assets resulting from works associated with the construction of the Scheme.

These direct impacts take the form of disturbance to, or removal of, part or all of known or potential sub-surface heritage assets (archaeological remains) within the application boundary. They may also take the form of changes to the fabric or composition of above ground heritage assets within the application boundary, such as historic buildings, and may include impacts to designated heritage assets such as scheduled monuments, listed buildings, conservation areas and registered parks and gardens. It is not anticipated that any direct physical impacts will occur outside the application boundary.

8.3.15 The second type of impacts are direct impacts to the setting of a heritage asset, caused by the physical presence of the Scheme. Impacts to the setting of heritage assets usually takes the form of changes to the views to and from the assets, but may take the form of changes in the way the asset is experienced, such as due to increases in noise or night-time light levels. Types of heritage asset considered with regard to impacts to setting in this chapter include World Heritage Sites and listed buildings.

Table 8-3 Assessing magnitude of impact

Magnitude of impact*	Criteria
Major	• Change to most or all of the heritage asset, such that it is totally altered • Comprehensive changes to the setting of an asset
Moderate	• Changes to a large part of the heritage asset, such that it is clearly modified • Changes that affect the setting of an asset that affect its character
Minor	• Changes to a heritage asset, such that it is slightly altered • Slight changes to the setting of a heritage asset
Negligible	• Very minor changes to a heritage asset or its setting
No Change	• No change to the heritage asset or its setting

*Magnitude of impacts can be positive or negative.

8.3.16 Assessment of the significance of effects has been undertaken in accordance with DMRB. Table 8-4 summarises how information regarding the value of the asset and the magnitude of impact will be combined to arrive at an assessment of the significance of effect. The matrix is not intended to 'mechanise' judgement of the significance of effect but to act as a check to ensure that judgements are reasonable and balanced. In

order to allow for professional judgement, in some cases the matrix allows for a choice of significance of effect when a magnitude of impact and a value are combined. Those effects shaded bold are considered to be significant effects.

Table 8-4 Assessing significance of impact

Importance/ sensitivity of resource or receptor	**Criteria**				
	No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Major	Neutral	Slight	**Moderate or Large**	**Large or Very Large**	**Very Large**
Moderate	Neutral	Slight	**Moderate** or Slight	**Moderate or Large**	**Large or Very Large**
Minor	Neutral	Neutral or Slight	Slight	**Moderate**	**Moderate or Large**
Negligible	Neutral	Neutral or Slight	Neutral or Slight	Slight	**Moderate** or Slight
No Change	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Limitations and assumptions

8.3.17 This assessment has been compiled using heritage asset data obtained from third party sources and the prediction of effects is based on the accuracy of that data. Whilst the data from these sources is generally valid, there can be instances where asset data is mislabelled, placed in the wrong geographical location or omitted altogether.

8.3.18 The data sources utilised for this chapter are updated as new heritage assets are identified or data on existing ones refined. Despite the potential for additional assets to be identified, it is unlikely that the prediction of effects will change.

8.4 Description of the baseline conditions

Existing baseline

8.4.1 The identified heritage assets are listed in the gazetteer in Appendix 8-A and their locations are shown on Drawing 8-1. Where discussed in the chapter text below, the ID numbers for the heritage assets are shown in bold type in brackets.

8.4.2 No World Heritage Sites or scheduled monuments have been identified within the LLAU or the 1000m study area. However the northern edge of the Maritime Greenwich World Heritage Site is located approximately 1.5km to the south-west (see Volume 2 of the PEIR, Drawing 8.1). No listed buildings have been identified within the application site itself, although 22 Grade II listed buildings lie within the 1km study area. On the north side of the River Thames, the application site and the majority of the study areas lie within the Newham Archaeological Priority Area as designated by London Borough of Newham. On the south side of the river, the application site and the study areas lie within the Greenwich Peninsula and Foreshore Area of High Archaeological Potential as designated by Royal Borough of Greenwich.

8.4.3 The earliest evidence for human occupation within the study area lies within the sub-surface deposits relating to the evolution of the River Thames and its tributary the River Lea. Geoarchaeological analysis of borehole samples taken in advance of the construction of the Emirates Air Line cable car, adjacent to the application site, identified the presence of peat and alluvial clay sequences spanning the Mesolithic, Neolithic and Bronze Age periods. Whilst no direct evidence of human activity was found within these samples, prehistoric artefacts dating from the Palaeolithic onwards have been identified with the general area.

8.4.4 The geoarchaeological deposit model (Appendix 8-B) has identified the potential for peat and former land surface containing prehistoric period archaeological and palaeoenvironmental remains to be present at the locations of the tunnel portals and cut and cover sections of the tunnels.

8.4.5 A Neolithic worked flint was recovered from a deposit of peat within a test pit during geoarchaeological investigations on the Greenwich Peninsula, adjacent to the application site (**28**). The peat, which was located circa 4m below ground level, was found to be overlain by a deposit of alluvium that had accumulated from the Iron Age onwards (**29**). Peat dating to the

prehistoric period has also been identified at other locations on the Greenwich Peninsula (**34**) and at Silvertown (**37**).

8.4.6 The peat is thought to have formed over former grassy open Mesolithic land surfaces that sloped down towards the River Thames with potential for evidence of activity during that period. Rising river levels during the Neolithic and Bronze Age periods led to the accumulation of deposits of peat over these land surfaces, which were in turn overlain by alluvium during subsequent rises in river level during the Iron Age and Roman periods.

8.4.7 Based on the available evidence, it is likely that extensive deposits of peat dating to the Mesolithic to Bronze Age periods extend beneath the application site on both sides of the River Thames, overlain by alluvium and made ground. The peat deposits have potential to provide information on the past environment of the area as well as more direct evidence of early human activity. As the peat provides an environment conducive to the survival of organic remains, a wide range of artefacts and ecofacts may be preserved including wood and textiles. Interspersed with these deposits, there may be remnants of Mesolithic and Neolithic period land surfaces.

8.4.8 There are no heritage assets dating to the Roman period within the application site or study areas. Geoarchaeological investigations suggest that the application site and study areas would have consisted of mudflats and saltmarsh during the Iron Age and marshy meadowlands during the Roman period. Both the River Thames and the Lea would have been fished and used for transport during these periods, as evidenced at other locations along the rivers and there may be some potential for Iron Age and Roman period archaeological remains to be present within the application site and study areas.

8.4.9 Archaeological evidence for the early medieval period is rare for the London area as a whole and none has been identified within the application site of study areas. The evidence that does survive across Greater London suggests a continuity of settlement from the Roman period and as such there may be some potential for early medieval period archaeological remains to be present within the application site and study areas.

8.4.10 The medieval manor of Covelees (**25**), first recorded in AD 1248 is known to have been located circa 500m to the north-west of the application site. Flood defences (**26**) are known to have been located in that area since

the 12th century and it is possible that the putative causeway (**27**) also dates to this period, although it is equally possible that it may be of later date. The available evidence suggests that there is some potential for further medieval period archaeological remains to be present within the application site and study areas.

8.4.11 Mapping of the Greater London area began during the post-medieval period. The earliest map to show the application site and study area in any detail is Rocque's map of 1762, which shows the application site and study areas either side of the River Thames as agricultural fields. One heritage asset dating to the 18th century was identified within the 500m study area, the location of an incomplete whale skeleton (**32**) identified during an archaeological watching brief on dredging operations approximately 500m west of the application site. The orientation of the whale suggested that it had been dragged onto the foreshore rather than becoming beached. Other examples of whale skeletons from the River Thames are known and it is thought that they were caught in the Thames Estuary before being hauled upriver.

8.4.12 Although later in date, one other heritage asset relating to whaling has been identified within the 1km study area. The Grade II listed Enderby House (**8**), was constructed during the early to mid-19th century for the whaling firm of Samuel Enderby, whose flagship, also named Samuel Enderby, Hermann Melville describes in his book 'Moby Dick'. Enderby House is located approximately 750m to the south of the application site.

8.4.13 A number of the other listed buildings and structures identified within the 1km study area during this assessment date to the early 19th century, the period which saw the beginning of the development of the area from agricultural fields to London's urban periphery. The Grade II listed row of eight cottages at 70-84 Riverway (**11**), located approximately 750m south-east of the application site, was constructed in 1801 for workers at the adjacent tidal mill and chemical works, neither of which survive. The cottages were listed as they represent the earliest surviving residential development on the Greenwich Peninsula and represent a rare example of Georgian artisanal housing.

8.4.14 The Grade II listed houses at 1-7 Coldharbour were constructed in the early 19th century approximately 1km west of the application site and consist of a group of three listed structures (**1, 2** and **3**). Adjacent to this group are a further three Grade II listed buildings: 15 Coldharbour (**4**), constructed in 1843-44 as a workshop with living accommodation above;

Blackwall River Police Station (**5**), constructed in 1894 to designs by John Butler and thought to be the earliest purpose built River Police Station; and the 19th century public house The Gun (**6**). To the south of this group, approximately 750m to the south-west of the application site is the Grade II listed Millwall Wharf range of riverfront warehouses, constructed around 1879.

8.4.15 As can be seen from historic Ordnance Survey mapping, the southern side of the study area remained largely open toward the end of the 19th century, with some industrial development, whilst the northern side was occupied by open ground, industrial development and areas of docks and associated development. Residential development was increasing at the southern and northern margins of the 1km study area. Two places of worship constructed to serve the increasing population during the later 19th century were identified. The Grade II listed Church of St Luke (**13**) was constructed in 1873-75 to designs by Giles and Gane, approximately 600m north of the application site, whilst the Grade II listed Rothbury House (**9**), was constructed as a Congregational chapel in 1893-94 to design by TW Holland, approximately 1km south of the application site.

8.4.16 The development of the docks and associated infrastructure within the study areas began in the 19th century and a number of heritage assets associated with this development were identified within the 1km study area. The earliest is the Grade II listed Blackwall pier and entrance lock to the East India Dock Basin (**13**), constructed around 1803 and located approximately 800m to the north-west of the application site. To the east of Blackwall pier are the Grade II listed Trinity House Buoy Wharf and Orchard Dry Dock (**14**) and Trinity House Chain Locker and Lighthouse Block (**15**), both of which were constructed around 1860. The wharf and dry dock were constructed to serve Trinity House lightships and the block constructed as a chain locker and workshop. Both are located approximately 600m to the north of the assessment site.

8.4.17 The Royal Victoria Dock, the western end of which is located approximately 100m to the east of the application site, opened in 1855. It was considered to be the largest dock in the world and was specifically designed to accommodate large steam ships. Two mid-19th century Grade II listed buildings are associated with the docks, Warehouse W (**19**) and Warehouse K (**20**), both of which are located approximately 750m north-east of the application site. Also associated with the docks, but dating to the modern period, are the group of 14 Grade II listed Stothert and Pitt cranes (**18**) constructed between the 1920s and 1960s and the

Grade II listed Silo D, a grain silo constructed in 1920. The cranes are located approximately 400m to 800m to the east and north-east of the application site, whilst the silo is located approximately 1km to the east of the application site.

8.4.18 Lying immediately to the east of the application site is the Grade II listed entrance to the Blackwall Tunnel (**10**), constructed during the mid-1890s, a few years prior to the tunnel opening in 1897, to designs by T Blashill. Also associated with the tunnel is the Grade II listed ventilation shaft constructed in 1964-67 to designs by Terry Farrell and located approximately 500m north-west of the application site.

8.4.19 In addition to the cranes, grain silo and ventilation shaft, three further modern period heritage assets were identified during this assessment. Tunnel Avenue (Morden Wharf) grain silos (**31**) were constructed for the Tunnel Glucose Company's works between the 1930s and 1970s, approximately 500m south of the application site. The Grade II listed Chapel of St George and St Helena (**17**) was constructed as a chapel to a former mission settlement in 1929-30 by Geoffrey Raymond, approximately 1km north of the application site, and the Grade II listed Silvertown War memorial was constructed around 1920, approximately 1km to the east of the assessment site.

8.4.20 The site walk-over survey did not identify any further heritage assets, although it was not possible to inspect the entirety of the river embankment or foreshore within the study areas. Modern day construction activities at each end of the application site, particularly construction of the flyover to the north and the residential and commercial development to the south on the Greenwich Peninsula, may have resulted in negative impacts on any sub-surface archaeological remains that may exist. These developments may also have also impacted on the settings of any design assets within the vicinity.

Future baseline

8.4.21 Whilst new heritage assets may be identified over time, the baseline conditions are not anticipated to alter significantly in the future.

8.5 Scheme design and mitigation

8.5.1 It is not considered that there will be any foreseeable direct impacts to the settings of heritage assets during the construction and operational phases of the Scheme. Direct physical impacts to sub-surface archaeological

remains may occur during the construction phase of the Scheme. It is not possible to avoid these impacts by changes to the Scheme design.

Construction

8.5.2 It would be possible to mitigate any impacts to sub-surface archaeological remains caused during the construction phase of the Scheme through archaeological recording. This would take the form of archaeological excavation and watching briefs prior to and/or during construction. The approach to be taken will be agreed through ongoing consultation during the EIA process and secured in the DCO. The archaeological recording would be followed by an appropriate programme of assessment, analysis and reporting.

8.5.3 Mitigations solutions would be developed for any settlement impact that may potentially occur as a result of the construction of the Scheme. This would be limited to the Grade II listed Blackwall Tunnel entrance building located as a group of three listed structures (**1, 2** and **3**) on Drawing 8.1, located in Volume 2 of the PEIR. Should a potential impact be identified mitigation meaures may include ground engineering solutions such as injection grouting and remedial repairs. Potential settlement impacts will be assessed further in the Environmental Statement (ES).

8.5.4 Mitigation solution will also be developed in the ES for any potential impacts from scour associated with the proposed jetty and associated river traffic.

Operation

8.5.5 No impacts to cultural heritage assets are anticipated during the operational phase of the Scheme, therefore no design/mitigation measures are required.

8.6 Assessment of impacts

Construction impacts

8.6.1 The Scheme has potential to cause direct physical impacts to archaeological and palaeoenvironmental remains in the locations of the tunnel portals, cut and cover sections of the tunnels, and other areas of construction excavation to both the south and north of the river.

8.6.2 The Scheme also has potential to cause direct physical impacts to currently unknown archaeological remains through scour as a result of the

construction and operation of the proposed temporary jetty and associated river craft, described in Volume 1, Chapter 4 of the PEIR. A survey of the foreshore will be undertaken to determine the value of any archaeological and the significance of effect will be determined in the ES.

8.6.3 To the north of the river, archaeological remains may consist of the remains of post-medieval and modern period industrial structures and deeply buried evidence of activity during the Mesolithic, Neolithic and Bronze Age, such as artefacts, timber fish traps and walk-ways or the remains of river craft. Palaeoenvironmental remains may consist of preserved organic remains of plants or evidence of episodes of flooding that are valuable resources for the reconstruction of former landscapes and climate and could date from the Mesolithic period onwards.

8.6.4 To the south of the river, archaeological remains are likely to be confined to deeply buried evidence of activity during the Mesolithic, Neolithic and Bronze Age.

8.6.5 The archaeological and palaeoenvironmental remains are considered to be of medium value due to their regional importance and the impacts are considered to be of moderate magnitude as the remains will be clearly altered. Therefore, the significance of effect on archaeology is predicted to be **Moderate Adverse**. This would constitute a significant effect in EIA terms, but would be mitigated through 'preservation by record' during archaeological excavation and recording prior to construction.

8.6.6 The Grade II listed Blackwall Tunnel entrance building, an asset of medium value, is at potential risk of direct physical impacts due to settlement as a result of tunnel construction works. The potential magnitude of impact is currently unknown and as a result it is not possible to predict the significance of effect. This will be determined in the ES.

8.6.7 No potential direct impacts to the settings of heritage assets has been identified during the construction phase of the scheme due to the limited visibility of the Scheme.

Operational impacts

8.6.8 No potential impacts to cultural heritage assets have been identified during the operational phase of the Scheme.

8.7 Cumulative impacts

8.7.1 Cumulative impacts to heritage assets could occur as a result of the combination of impacts as a result of the Scheme and other developments. No impacts to the settings of heritage assets as a result of the Scheme have been identified during construction or operation and, therefore, there are no potential cumulative settings impacts.

8.7.2 There may be some potential for other developments to cause physical impacts to the archaeological and palaeoenvironmental deposits identified and predicted to be at risk of moderate adverse effects in this assessment as a result of the Scheme during construction. However, further information is required on the other developments in order to assess these potential cumulative physical impacts and this will be undertaken in the ES.

8.7.3 No impacts on archaeological and palaeoenvironmental deposits have been identified during operation, therefore there will be no cumulative effects.

8.8 Further work to be done

8.8.1 In order to assess any potential for impacts and predict the significance of effect to archaeological remains located in the area of the proposed jetty as a result of scour, it will be necessary to undertake a survey of the foreshore in that area. This will be undertaken as part of the ongoing EIA process, and findings will be reported in the ES.

8.8.2 As described in section 8.5, work is ongoing in order to formulate an appropriate mitigation strategy with regard to impacts to the potential archaeological and palaeoenvironmental remains in the areas of the tunnel portals, cut and cover sections and other areas of construction excavation. It will be necessary to integrate the results of the geoarchaeolgical model with the reference design information and consult with relevant stakeholders to agree the strategy that will be reported in the ES.

8.8.3 The Grade II listed Blackwall Tunnel building may be at risk of direct physical impacts due to settlement as a result of tunnel construction. Further information is required with regard to the potential for settlement in order to predict the likely significance of effect and to propose effective mitigation.

8.9 NPS compliance

8.9.1 The NN NPS requires that in considering the impact of a proposed development on any heritage asset, the Secretary of State should take into account the significance of the heritage asset. This assessment provides an opportunity for the Secretary of State to assess impacts in this manner as the relevant assets have been given a relative value.

8.10 Summary

8.10.1 The assessment has identified the cultural heritage resource within the study areas. Whilst there are a number of listed buildings within 1km of the Scheme, no impacts to their settings are predicted. The geoarchaeological deposits model commissioned for this assessment has identified the potential for the presence of peat containing archaeological and palaeoenvironmental remains at the locations of the tunnel portals and cut and cover sections of the tunnel. The assessment has predicted that the Scheme would have a **Moderate Adverse** impact on these remains. The assessment has also identified archaeological recording as appropriate mitigation.

8.10.2 A tabular summary of the significance of overall effects is provided in Table 8-5 below.

Table 8-5 Cultural heritage significance of effect summary table

Impact description	Temporary/permanent	Significance of effect
Removal of archaeological and palaeoenvironmental deposits during excavations for tunnel portals and cut and cover sections	Permanent	Moderate Adverse

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