18 Mitigation, Monitoring & Residual Effects

18.1 Introduction

18.1.1 This chapter of the Environmental Statement (ES) presents a summary of the residual effects of the Bank Station Capacity Upgrade (BSCU). Residual effects are those which remain following the implementation of the mitigation measures described for each topic, and summarised in this chapter.

18.1.2 The criterion applied to define the significance of residual effects is outlined within Chapter 6: Method of Assessment, with further detail provided within the individual technical chapters.

18.1.3 The effects are described according to whether they are:

- temporary or permanent;
- adverse or beneficial;
- negligible, minor, moderate or major (where relevant); and
- significant or not significant.

18.2 Delivery of Mitigation

18.2.1 The avoidance, and where necessary mitigation, of potentially significant adverse effects has been a fundamental objective of the Environmental Impact Assessment (EIA) process. From the outset, environmental considerations have influenced strategic decisions affecting the location, layout and form of the station proposals, as well as aspects of construction, including work site location, access arrangements and construction techniques. Where appropriate these considerations are set out in Chapter 5: Consideration of Alternatives.

18.2.2 As the design progressed, the EIA was able to inform more detailed elements of the design and construction proposals. The mitigation accomplished in this way is considered as 'incorporated mitigation' and the ES, in reporting likely significant effects, assumes these measures to be in place.

18.2.3 Most of the potential adverse effects of the BSCU will occur during the construction phase. The measures devised to ensure that, where practicable these are avoided or controlled to a non-significant level are set out in a Code of Construction Practice (CoCP). The CoCP reflects industry best practicable means and in particular it incorporates measures from the City of London Corporation's *Code of Practice for Deconstruction and Construction Sites* Guidance Document. London Underground Limited's (LUL) appointed contractor, Dragados, will implement these measures during the construction phase, underpinning adherence to the requirements through the inclusion of an

environmental management system (EMS). The EMS will also set performance standards, defining responsibilities, allocating resources, delivering training, specifying working practices (such as those in the CoCP), and monitoring performance. The EMS will therefore provide an assurance that mitigation set out in the ES and elsewhere will be delivered. Construction working practices will themselves be dictated by method statements where appropriate, which will specify environmental management requirements as necessary.

18.2.4 Other core documents that specify best working practices include:

- Outline Construction Logistics Plan (CLP), which describes the anticipated construction logistics relating to the BSCU, based on the current design stage;
- Traffic Management Plan (TMP), which will detail how traffic will be managed during construction; the type of construction vehicles required; access and parking arrangements; pedestrian, cyclist, bus and general traffic consideration; and details of proposed highway closures, diversion routes and traffic routes for works traffic and abnormal loads;
- Construction Worker Travel Plan, which will set out the measures to be adopted to encourage the use of sustainable forms of transport; and
- Archaeological Written Scheme of Investigation, which will provide details for the archaeological monitoring of the construction works.

18.2.5 As well as these control documents and the overarching EMS that defines how they are used, the City of London Corporation is also able to affect certain elements of the project's design and implementation by setting planning conditions. This reserves some capacity to dictate certain details where they are not yet defined. Planning conditions will ensure that all necessary measures are secured. It is expected that documents including the final CoCP and Detailed CLP will be submitted to, and agreed with, the City of London Corporation by condition.

18.2.6 Once the BSCU is in operation and under the direct control of LUL, environmental effects will be managed through application of the London Underground Management System (which is aligned to the principles of ISO 14001).

Table 18.1: Summary of Likely Residual Effects

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Chapter 7: Townscape and Visual Effects				
Deterioration in townscape character resulting from demolition and construction at the Whole Block and Arthur Street Work Sites and works at other utilities work sites affecting the:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• Bank Townscape Character Area (TCA)				**Moderate adverse (significant)**
• Fenchurch and Monument TCA				Moderate adverse (not significant due to only a small area of the TCA being affected)
• Riverside Walk TCA				Minor adverse (not significant)
• Walbrook TCA				Negligible (not significant)
Changes to views due to construction plant and activities at the Whole Block Work Site affecting visual amenity at King William Street and Cannon Street for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists and other recreational users				**Moderate adverse (significant)**
• local workforce and commuters				Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Changes to views due to construction plant and activities at the Whole Block Work Site affecting visual amenity at Abchurch Lane/Yard and Nicholas Lane for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists and other recreational users (on Abchurch Lane only)				**Major adverse (significant)**
• local workforce and commuters				Moderate adverse (not significant due to this being a temporary effect combined with the low sensitivity and nature of the receptor)
Changes to views due to construction plant and activities at the Whole Block Site affecting visual amenity for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• residents of 1 Abchurch Yard				Moderate adverse (not significant due to the rear of this property facing onto Abchurch Yard so no main living room windows overlooking the Whole Block Site)
• cyclists and people in vehicles and people working in buildings on King William Street and Cannon Street				Minor adverse (not significant)
• visitors to the viewing gallery of The				Moderate adverse (not significant due to construction

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Monument				sites being a typical feature of the City of London and the works representing only a small part of the overall townscape seen from the viewing gallery)
• people in tall office buildings in the wider area				Negligible (not significant)
Changes to views due to construction plant and activities at the Arthur Street Work Site affecting visual amenity on King William Street, Gracechurch Street and London Bridge including Monument Junction for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists and other recreational users				**Moderate adverse (significant)**
• local workforce and commuters				Negligible (not significant)
Changes to views due to construction plant and activities at the Arthur Street Work Site affecting visual amenity on Martin Lane and Laurence Pountney Hill for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists, visitors and other recreational users				Moderate adverse (not significant due to views of the construction works being only seen as glimpses through a narrow gap in the southern part of Arthur Street on the southward and eastward approaches respectively along these two lanes)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
• local workforce and commuters				Negligible (not significant)
Changes to views due to construction plant and activities at the Arthur Street Work Site affecting visual amenity for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• pedestrians at Upper Thames Street and Swan Lane				Minor adverse (not significant)
• visitors to The Monument at street level including Monument Street				**Moderate adverse (significant)**
• cyclists and people in vehicles in the vicinity of Arthur Street				Negligible (not significant)
• office workers with views overlooking Arthur Street				**Moderate adverse (significant)**
• residents of Flat 8 at 28 and at 8 Martin Lane				Moderate adverse (not significant due to the oblique views towards the southern part of Arthur Street)
Changes to views due to construction plant and activities at utilities work sites affecting visual amenity primarily on King William Street and Monument Junction, and the southern end of Prince's Street for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
• tourists, visitors and other recreational users				**Moderate adverse (significant)**
• local workforce and commuters and people in vehicles				Minor adverse (not significant)
Changes to views due to construction plant and activities at the utilities work sites affecting visual amenity on northern section of Walbrook, opposite The Mansion House for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists, visitors and other recreational users				**Moderate adverse (significant)**
• local workforce and commuters				Minor adverse (not significant)
Changes to views due to construction plant and activities at the utilities work sites affecting visual amenity on southern section of Walbrook passing the Walbrook building and Bloomberg Place for:	Set out in Section 12 of the CoCP.	CoCP	Temporary	
• tourists, visitors and other recreational users				Minor adverse (not significant)
• local workforce and commuters				Negligible (not significant)
Changes to views due to construction plant and activities at the utilities work sites	Set out in Section 12 of the	CoCP	Temporary	Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
affecting visual amenity for cyclists, people in vehicles and people working on King William Street, at Monument Junction, Walbrook and the southern end of Prince's Street.	CoCP.			
Changes to townscape character due to the introduction of the new Station Entrance Hall and building/retail frontage along Cannon Street, King William Street and Nicholas Lane resulting in improvements to the:	Design principles	Design specification	Permanent	
• Bank TCA				Moderate beneficial (not significant due to only a small part of this extensive TCA being directly affected)
• Fenchurch and Monument TCA				Minor beneficial (not significant)
• Riverside Walk TCA				Negligible (not significant)
• Walbrook TCA				Negligible (not significant)
Changes to views due to the introduction of the new frontage of the proposed retail unit on King William Street in conjunction with an OSD offering a marginal enhancement of visual amenity to:	Design principles	Design specification	Permanent	

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
• tourists, visitors and other recreational users				Moderate beneficial (not significant due to the new frontage of the proposed retail unit offering only a marginal enhancement to the visual amenity of Bank Conservation Area locally)
• local workforce and commuters				Negligible (not significant)
Changes to views due to the introduction of the new Station Entrance Hall and building frontage and improved urban realm in conjunction with an OSD resulting in improved visual amenity on Cannon Street:	Design principles	Design specification	Permanent	
• tourists, visitors and other recreational users				**Moderate beneficial (significant)**
• local workforce and commuters				Minor beneficial (not significant)
Changes to views due to the introduction of the new Station Entrance Hall and building frontage and improved urban realm in conjunction with an OSD resulting in improved visual amenity on Abchurch Lane/Yard and Nicholas Lane for:				
• tourists, visitors and other recreational users	Design principles	Design specification	Permanent	Moderate beneficial (not significant due to the modest positive enhancements to the urban realm having only a relatively small impact on the

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
				visitor's experience and enjoyment of the wider area as a whole)
• local workforce and commuters				Minor beneficial (not significant)
Changes to views due to the introduction of the new Station Entrance Hall in conjunction with an OSD bringing enhancements to visual amenity for:	Design principles	Design specification	Permanent	
• visitors to the viewing gallery of The Monument				Moderate beneficial (not significant due to much of the Station Entrance Hall being concealed by Phoenix House and other, intervening buildings, with the result that it will be largely obscured, except for the King William Street elevation seen at an oblique angle)
• cyclists and people in vehicles and people working on King William Street and Cannon Street				Minor beneficial (not significant)
• residents of 1 Abchurch Yard				Minor beneficial (not significant)
• people in tall office buildings in the wider area				Negligible (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Chapter 8: Transport and Movement				
Assessment Period 1 – Utility and Protective Works				
Additional construction traffic due to works and impact on highway users.	Up to six vehicles per hour are expected during construction. Typically there would be 1-2 per hour.	Traffic Management Plan	Temporary	Not Significant
Delays or diversions due to lane closures or other traffic management measures and impact on highway users.	Only one lane of a strategic road to be closed at a time during daytime.		Temporary	Not Significant
Increases in bus journey times or bus diversions and impact on public transport users.	Traffic management plan to include measures to manage impacts on buses.		Temporary	Not Significant
Reduced access to buildings or businesses adjacent to work sites and impact on parking, loading and servicing.	Servicing plan to be implemented to maintain existing ability to service.		Temporary	Not Significant
Additional construction traffic due to works and changes in traffic flows due to lane closures or other traffic management measures and impact on pedestrians and cyclists.	Traffic management plan to include measures to manage impacts on pedestrian sand cyclists including diversion routes and appropriate signing.		Temporary	Not Significant
Pedestrians may be required to divert around work sites	At least one footway around each work site is to be maintained meaning diversion routes are short.		Temporary	Not Significant
Cyclists may be required to divert around	Closure of two-lanes only occurs		Temporary	Not Significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
work sites when two lanes of a road are closed.	at night-time when cycle flows are low.			
Additional construction traffic due to works and changes in traffic flows due to lane closures or other traffic management measures and impact on collisions and safety.	Traffic management plan to include a range of measures to mitigate potential impacts of construction traffic.		Temporary	Not Significant
Assessment Period 2 – Demolition and Construction				
Additional traffic due to diversions caused by the Arthur Street Work Site and HGVs generated by construction activities will increase the amount of traffic in the Bank area and impact on highway users.	Traffic management plan to be implemented to manage and mitigate impacts.	Detailed Construction Logistics Plan Traffic Management Plan	Temporary	Not Significant
Diversions caused by the Arthur Street Work Site will add additional time and distance to journeys and impact on highway users.	Traffic management plan to be implemented to manage and mitigate impacts.		Temporary	Not Significant
Diversion of the northbound bus service. Route 344 may reduce access for some users and impact on public transport users.	Dense bus network provided in area and many other bus options are available.		Temporary	Not significant
Closure of Arthur Street will change access arrangements to nearby buildings and businesses, with nine motor cycle parking spaces to be relocated and impact on parking, loading and servicing.	Buildings will continue to be serviced through their existing service bays. Access will be provided through the work site and delivery vehicles will use a site delivery management system. Motorcycle parking		Temporary	Not significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
	moved under 100m.			
Increase in traffic due to diversions and construction vehicles and impact on pedestrians and cyclists.	Traffic management plan to be implemented to manage and mitigate impacts. Contractors will be required to be members of Fleet Operator Recognition Scheme and implement safety measures for construction vehicles and drivers.		Temporary	Not significant
Pedestrians may be required to divert around work sites and closure of Abchurch Lane and Nicholas Lane.	Pedestrian access will be maintained for buildings on Arthur Street. Some pedestrians may divert to routes via Martin Lane or Laurence Pountney Lane. Diversions will be less than 250m.		Temporary	Not significant
Closure of Arthur Street will require diversion around the work site and impact to cyclists.	Diversion will be less than 1.5km and traffic management plan to be implemented to manage and mitigate impacts.		Temporary	Not significant
Additional construction traffic due to works and changes in traffic flows due to lane closures or other traffic management measures and impact on collisions and safety.	Traffic management plan to include a range of measures to mitigate potential impacts of construction traffic.		Temporary	Not Significant
Construction works (closures, narrowing of platforms and corridors) will affect pedestrian circulation within the station.	Station management procedures will ensure safe movement of passengers through the station.		Temporary	Not Significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Assessment Period 3 – Northern Line Blockade				
Journey times for public transport users will increase due to the closure of the City branch of the Northern Line.	Impacts to be mitigated through enhanced service frequency on Charing Cross branch of the Northern Line. Replacement bus service and additional buses on existing services to be introduced. Travel demand management programme to be implemented.	Travel Demand Management Strategy	Temporary	**Significant (adverse)**
Change in passenger movements could increase crowding at other stations and impact on public transport users.	Operational strategies developed with station management to address crowding.		Temporary	Not Significant
Crowding will increase on the network as other routes are used to access stations served by the City branch of the Northern Line and impact on public transport users.	Impacts to be mitigated through enhanced service frequency on Charing Cross branch of the Northern Line. Replacement bus service and additional buses on existing services to be introduced. Travel demand management programme to be implemented.		Temporary	**Significant (adverse)**
Increased use of bus services.	Replacement bus service and additional buses on existing services to be introduced. Travel demand management programme to be implemented.		Temporary	Not Significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Increase in pedestrian movements on London Bridge-Bank-Moorgate corridor.	Pedestrian management system, optimisation of footway space by removing furniture.		Temporary	Not Significant
Increase in cycling to and from City of London.	Potential for increase in cycling to be considered as part of Travel demand management programme and pedestrian management system.		Temporary	Not Significant
Assessment Periods 4 and 5 – Operational Impacts within Bank Station following Completion of Project – 2026 and Additional Demand				
Reduction in crowding levels at Bank Station.	None required	Design specification	Permanent	**Significant (beneficial)**
Introduction of new station entrance and new step-free facilities improves quality of access and ambience of station.	None required		Permanent	**Significant (beneficial)**
Reduction in journey times in the AM peak	None required		Permanent	**Significant (beneficial)**
Additional pedestrian flows across Cannon Street	Requirement for new crossing facility to be considered as part of proposals by City of London Corporation to improve pedestrian conditions in nearby area.		Permanent	Not Significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Chapter 9: Noise and Vibration				
Airborne noise from demolition and construction at the Whole Block Site.	Set out in Section 6 of the CoCP. Additional mitigation in the form of acoustically insulated scaffold hoarding to reduce noise levels at R4 St Mary Abchurch and R6 15 Abchurch Lane.	CoCP Monitoring Site supervision	Temporary	No significant effects at eight out of the ten receptors assessed. **Significant effects** will remain at R4 and R6.
Airborne noise from construction at the Arthur Street Work Site.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Not significant
Potential vibration effects in terms of annoyance and building damage as a result of the proposed piling activities at the Whole Block Site.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Negligible (not significant)
Potential vibration effects in terms of annoyance and building damage as a result of the proposed piling activities at the Arthur Street Work Site.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Negligible (not significant)
Groundborne noise from below ground construction activities.	Best practicable means will be employed to reduce the time and number of locations where percussive breakers may be	CoCP Monitoring Site supervision	Temporary	With the exception of locations where there may be pile interceptions, significant effects from groundborne

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
	required. In addition, the groundborne noise and vibration effects of the works will be reviewed on a regular basis to ensure that any disturbance is kept to a minimum.			noise during construction are unlikely. Where pile interceptions do occur, and there is connectivity between the tunnel and the pile, alternative breakout techniques, or agreed timings with the affected parties, will be employed such that significant effects are considered unlikely.
Airborne noise from road traffic during construction, including utilities works.	None required	Not applicable	Temporary	Negligible to minor adverse (not significant)
Airborne noise from Arthur Street utility diversions.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Not significant
Airborne noise from Low Level 2 Sewer works.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	A **significant adverse effect** is predicted at R21 St Stephen's Church. No significant effects are predicted at the other assessed representative receptors.
Airborne noise from London Bridge Sewer works	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Not significant

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Airborne noise from the potential Grout Shaft on Walbrook.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	**Significant adverse effects** at R22 Mansion House, R21 St Stephen's Church and R26 Magistrates Court.
Airborne noise from the potential Grout Shaft at 10 King William Street within the Whole Block Site.	Set out in Section 6 of the CoCP.	CoCP Monitoring Site supervision	Temporary	**Significant adverse effects** at R4 St Mary Abchurch and R6 15 Abchurch Lane.
Potential noise and vibration impacts from additional bus movements and London Underground services to mitigate the total and partial blockades of the Northern Line.	None required.	Not applicable	Temporary	Negligible (not significant)
Airborne noise from building services and fixed plant.	Bespoke mitigation measures for all fixed plant e.g. use of silencers, screens/enclosures and careful positioning of fan outlets/louvres.	Design specification	Permanent	Negligible (not significant)
Groundborne noise and vibration from trains using the new southbound running tunnel.	The new track will be designed to achieve design criteria that will avoid significant effects. This may include a high performance track system where the tunnel directly intercepts the piles of existing buildings.	Design specification	Permanent	Groundborne Vibration: Minor adverse (not significant) at residential properties, hotels and places of worship. Negligible (not significant) at commercial properties. Groundborne Noise: Negligible to minor adverse (not significant).

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Chapter 10: Built Heritage				
Change to character and appearance due to utilities works including Low Level 2 and London Bridge Sewer works potentially resulting in an adverse effect on the Bank Conservation Area and potentially the setting of listed buildings.	Set out in Section 11 of the CoCP.	CoCP	Temporary	Negligible to minor adverse (not significant)
Change to character and appearance due to demolition and construction activities at the Whole Block Site affecting the Bank Conservation Area and the settings of streetscapes and associated heritage assets at Abchurch Lane, King William Street, Bank Junction, Cannon Street, Martin Lane and The Monument including:	Set out in Section 11 of the CoCP.	CoCP	Temporary	
• 29 Martin Lane; 113 Cannon Street; 115-117 Cannon Street; 121 Cannon Street; 123-127 Cannon Street; 129 Cannon Street; 1 and 5 King William Street; 1-6 Lombard Street; 1 Prince's Street; 1 Cornhill;				Negligible (not significant)
• St Clement Eastcheap; 15 Abchurch Lane; Bank of England; St Mary Woolnoth; The Mansion House; The Monument (from the viewing gallery)				Minor Adverse (not significant)
• St Mary Abchurch				Moderate adverse (not significant due to the temporary nature and low magnitude of the impact)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Change to setting due to the construction of the new Station Entrance affecting the Bank Conservation Area and the setting of 121, 123-127, and 129 Cannon Street.	None required	Not applicable	Temporary	Negligible (not significant)
Changes to the historic fabric due to the construction of the Arthur Street Shaft affecting the disused King William Street Station	Implementation of a programme of historic building recording allowing a record of significance and heritage value to be publically accessible.	Historic Building Record	Permanent	Minor adverse (not significant)
Change to setting due to the construction activities at the Arthur Street Work Site including construction traffic and site hoarding affecting:	Set out in Section 11 of the CoCP.	CoCP	Temporary	
• 6 Martin Lane (Old Wine Shades); Wall and railings at the former Churchyard of St Martin Ongar; 29 Martin Lane; Adelaide House				Negligible (not significant)
• Fishmongers Hall; The Monument				Minor adverse (not significant)
Minor damage from settlement due to the tunnelling activities potentially affecting Grade I, II* and II listed buildings within the 1mm zone of settlement.	Set out in Section 11 of the CoCP. Repair of any minor damage (e.g. making good of any fine cracking) will be implemented on completion of the BSCU.	CoCP Monitoring and repair of any minor damage.	Temporary	Minor to moderate adverse (not significant due to most instances of these potential impacts being repairable and therefore temporary).
Moderate damage from settlement due to the tunnelling activities potentially affecting heritage assets within the 1mm zone of settlement. These assets include:	Set out in Section 11 of the CoCP. Stage 3 Settlement Assessment will support the detailed design	CoCP Bespoke mitigation and repair of any	Temporary/ Permanent	Moderate adverse (not significant due to the fact that the majority of the cases where settlement impacts are

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
• St Mary Abchurch (Grade I); • 15 Abchurch Lane (Grade II); • The Mansion House (Grade I); • 1-6 Lombard Street (Grade II); • 1 King William Street (Grade II); • 5 King William Street (Grade II); • 1 Prince's Street (Grade II); and • 29 Martin Lane (Grade II).	of specific mitigation measures either in the form of pre-commencement repair, structural support or temporary removal of at risk features.	minor damage.		predicted, measures to protect or repair the fabric of designated assets will be implemented such that significant residual effects are unlikely. The majority of impacts would be temporary. Where there are permanent effects, i.e. where cracking affects marble finishes or stone and where repairs would remain visible, these would not reduce the overall heritage value of the asset).
Change to setting due to the possible introduction of the Walbrook Grout Shaft affecting the Grade I listed Mansion House.	Set out in Section 14 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)
Change to the appreciation of heritage assets resulting from investigatory surveys and mitigation measures may cause (secondary impacts, for instance through providing support to ceilings or other similar protective measures) affecting the following heritage assets:	Monitoring equipment would be removed on completion of the construction of the BSCU.	CoCP	Temporary/ permanent	
• 29 Martin Lane (if fixings are achieved internally)				Negligible
• The Mansion House; 1-6 Lombard Street; 1 and 5 King William Street; 1 Prince's Street; 15 Abchurch Lane; 29 Martin Lane (if external works are				Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
required)				
• St Mary Abchurch				Moderate adverse (not significant due to the mitigation only temporarily detracting from the aesthetic and historic value of the building whilst consolidation works take place and during the period where fixtures and features are removed. Strengthening of the dome, would be permanent, but would not impact the heritage value of the building.)
• 15 Abchurch Lane; 1-6 Lombard Street (on completion of consolidation or repair works)			Permanent	Minor beneficial (not significant)
Change to the appreciation of heritage assets resulting from the proposed external strengthening and repair of building façades, windows and finishes affecting people working in the City of London and visitors to the area.	Set out in Section 14 of the CoCP.	CoCP	Temporary	Moderate adverse (not significant due to the relatively short duration of the works)
Change to the character and appearance of the local area and listed buildings resulting from the construction of the Walbrook Grout Shaft, if required, affecting: the Bank Conservation Area; The Mansion House (Grade I); and 1 Queen Victoria Street (Grade II).	Set out in Section 14 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Chapter 11: Archaeology				
Direct impacts on previously unknown truncated archaeological remains of Roman, medieval or post-medieval date due to the construction of a secant piled structural box on 12 Nicholas Lane.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an appropriate programme of archaeological investigation and recording.	Design Specification Archaeological Written Scheme of Investigation Conservation by Record	Permanent	Minor adverse (not significant)
Direct impacts on previously unknown truncated archaeological remains of Roman, medieval or post-medieval date due to the construction of a secant piled structural box on 14 Nicholas Lane.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an appropriate programme of archaeological investigation and recording.	Design Specification Archaeological Written Scheme of Investigation Conservation by Record	Permanent	Minor to moderate adverse (not significant) (a range being due to the potential to impact upon low to medium sensitivity resources)
Direct construction impacts on any surviving archaeological remains associated with fire debris and a ragstone wall [A38] and the Roman road [A51] due to ground reduction, site clearance, and excavation to new basement level at 143-149 Cannon Street.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an appropriate programme of archaeological investigation and recording.	Design Specification Archaeological Written Scheme of Investigation Conservation by Record	Permanent	Minor adverse (not significant)
Direct impacts on potential Roman and medieval building remains and road/path services due to construction of a 40m deep access shaft at Arthur Street.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an	Design Specification Archaeological Written Scheme	Permanent	Minor to moderate adverse (not significant) (a range being due to the potential to impact upon low to medium sensitivity

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
	appropriate programme of archaeological investigation and recording.	of Investigation Conservation by Record		resources)
Direct impacts on Roman dump and demolitions layers, building remains and timber lined drain, possible Anglo-Saxon dark earths and medieval road surfacing layers due to construction of the Low Level 2 Sewer shaft at Walbrook.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an appropriate programme of archaeological investigation and recording.	Design Specification Archaeological Written Scheme of Investigation Conservation by Record	Permanent	Minor to moderate adverse (not significant) (a range being due to the potential to impact upon low to medium sensitivity resources)
Direct impacts on Roman timber structures and building remains arising from construction of the potential Grout Shaft at Walbrook.	Archaeological evaluation and investigation, where appropriate, followed by conservation by record comprising an appropriate programme of archaeological investigation and recording.	Design Specification Archaeological Written Scheme of Investigation Conservation by Record	Permanent	Minor to moderate adverse (not significant) (a range being due to the potential to impact upon low to medium sensitivity resources)
Chapter 12: Air Quality				
Increased dust from general construction and demolition activities and from the utilities works has the potential to affect the amenity of pedestrians, deposit on property and cause short-term elevation of PM_{10} concentrations.	Set out in Section 7 of the CoCP.	CoCP Monitoring Site supervision	Temporary	Negligible to minor adverse (not significant)
Emissions from on-site vehicles and plant have the potential to affect the amenity of pedestrians and cause short-term elevation of PM_{10} concentrations.	Set out in Section 7 of the CoCP.	CoCP	Temporary	Negligible (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Emissions of NO_2, PM_{10}, $PM_{2.5}$ from construction traffic on the public road network together with the proposed temporary changes to the vehicle flow and composition on local roads could adversely affect local air quality.	No additional site specific mitigation relating to construction phase vehicle emissions is considered necessary or practicable.	Not applicable	Temporary	Negligible (not significant) for PM_{10} and $PM_{2.5}$ Minor adverse (not significant) for NO_2 At R3 (on Cannon Street) – major adverse and at R15 (on Upper Thames Street) - moderate adverse (not significant due to the likelihood of this effect being of very short duration)
Chapter 13: Water Resources and Flood Risk				
Reduction in the quantity of water available as a result of dewatering during construction of the Low Level 2 Sewer shaft and the potential Walbrook Grout shaft, the Arthur Street Shaft and the Whole Block Site (escalator box) affecting the shallow aquifer.	Water proofing strategy which includes the use of secant pile walls and management of groundwater inflows at both the Arthur Street Shaft and the Whole Block Site.	Design specification	Temporary	Minor adverse (not significant)
Pollution due to spillages and discharges during construction affecting:	Set out in Section 10 of the CoCP.	Design Specification CoCP	Temporary / Permanent	
• surface water abstractions from the River Thames				Negligible (not significant)
• the shallow aquifer; the River Thames				Minor adverse (not significant)
Pollution of the deep aquifer if boreholes and wells are damaged during construction affecting the deep aquifer, groundwater and	Set out in Section 10 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
groundwater abstractions.				
Increased groundwater flood risk from the shallow aquifer due to the introduction of new below ground structures including the Arthur Street Shaft and the escalator box within the Whole Block Site affecting the basements at the Whole Block Site.	None required	Not applicable	Temporary / Permanent	Minor adverse (not significant)
Increased flood risk from the River Thames or from damaged water mains during the construction of the Arthur Street Shaft to the disused King William Street Station, the City and South London tunnel and the Northern Line new running tunnels.	Isolation of City and South London tunnels from the King William Street Station.	Design specification Monitoring	Temporary	Minor adverse (not significant)
	Permanent capping slab in the Arthur Street Shaft constructed between the disused King William Street Station and the new running tunnel.	Design specification	Permanent	
Chapter 14: Land Contamination				
Risk of contamination/ inhalation/ ingestion/ contact from contaminated soils during construction/demolition to construction/demolition workers, adjacent site users, surface water features and groundwater.	Set out in Section 7, 8 and 10 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)
Risk of an explosion from unexploded ordnance during construction/ demolition to impact on construction/ demolition workers, the built environment, and groundwater.	Set out in Section 8 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Risk of migration of waterborne contaminants in contaminated groundwater during construction/ demolition to impact upon groundwater and surface water features.	Set out in Section 8 and 10 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)
Risk of inhalation of contaminated dust during construction/demolition by adjacent site users	Set out in Section 7 of the CoCP.	CoCP	Temporary	Minor adverse (not significant)
Risk of explosion or inhalation of ground gases during construction/demolition to construction workers	Set out in Section 8 of the CoCP. Future ground investigation and laboratory analysis will inform and advise adherence to suitable guidance	CoCP Design specification (detailed design)	Temporary	Minor adverse (not significant)
Chapter 15: Waste Management and Resource Use				
Increase in waste being sent to landfill from the construction and demolition associated with the BSCU contributing to the baseline construction, excavation and demolition waste arisings for the City of London	Set out in Section 9 of the CoCP. The contractor will implement and monitor Key Performance Indicators (KPIs) which will support the identification of actions to minimise construction waste from being sent to landfill.	CoCP Design specification	Permanent	Negligible (not significant)
Increase in waste being sent to landfill associated with the operation of the BSCU contributing to the baseline commercial and	The design of the new Station Entrance Hall includes a designated waste/bin store,	Design specification	Permanent	Negligible (not significant)

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
industrial waste arisings for the City of London.	configured to accommodate the waste associated with increased passenger numbers and includes external access to facilitate collection by the waste management contractor. The bin storage area allows for on-site segregation of waste according to collection requirements.			
Chapter 16: Socio-economics				
Loss of office space due to the demolition of the buildings (site potentially supports around 1,200 gross full time jobs) at the Whole Block Site displacing office businesses and their employees.	Businesses and their employees will be able to find alternative premises / employment locally within the City of London.	Consultation and Engagement Strategy	Permanent	Negligible (not significant)
Loss of retail space due to the demolition of the buildings at the Whole Block Site displacing retail businesses.	Retail businesses may experience difficulty in relocating their activities owing to relatively low availability of alternative floorspace/premises. Businesses will be able to seek assistance with relocation from the City of London Corporation's City Property Advisory Team.	City of London Corporation's City Property Advisory Team	Permanent	Minor adverse (not significant)
Employment generation from the construction of the BSCU (including demolition at the Whole Block Site) (64 month period) resulting in the creation of around 200 jobs.	None required	Not applicable	Temporary	**Moderate beneficial (significant)**

Potential Impact	Mitigation Measures	Delivery Mechanism	Duration of Effect	Residual Effect
Businesses around Borough Station and businesses and their employees in the vicinity of other stations including Bank may be impacted by the disruption to passenger journeys during the blockade of the Northern Line resulting in some short term loss of trade.	None required	Not applicable	Temporary	Minor adverse (not significant)
Reduced station closures and disruption, reduced journey times and better access to the City of London for commuters as a result of the BSCU will support businesses and the London economy, particularly in terms of employment.	None required	Not applicable	Permanent	**Major beneficial (significant)**
The BSCU will create employment opportunities through station retail provision.	None required	Not applicable	Permanent	Minor beneficial (not significant)
Small amount of high quality retail floorspace will be provided as part of the BSCU in an area where there is already good supply of such premises / floorspace.	None required	Not applicable	Permanent	Negligible (not significant)

18.3 Summary and Conclusions

18.3.1 This chapter presents the residual effects that are likely to result from the construction and operation of the BSCU following the implementation of measures to avoid or reduce adverse effects, and to maximise the project's benefits. Most of these measures are incorporated within the scheme design, or in the control documents that will be used to manage the construction works. LUL's efforts to minimise the environmental impact of the BSCU can be traced back to the various optioneering exercises reported in Chapter 5: Consideration of Alternatives which acknowledged the densely urban and historic environment within which Bank Station is situated. The EIA process has involved a comprehensive examination of the construction works and scheme design by a range of environmental specialists, working alongside project engineers and architects, to develop an understanding of the likely significant environmental effects.

18.3.2 Residual significant adverse effects will only be experienced during construction, which means they will be temporary rather than permanent. Most of these relate to impacts on townscape and views as a result of construction activities at the BSCU Work Sites. At the very closest receptors, there will also be some residual significant effects from noise during certain construction activities. LUL is committed to implementing a CoCP and working with affected parties to ensure that disturbance from such activities is kept to a minimum. These residual effects during construction are not uncommon for development projects within the City of London.

18.3.3 The detailed Transport Assessment has shown that construction traffic, partial road closures and diversions caused by the closure of Arthur Street can be managed without significant adverse effects on the transport network. The only significant effects that might be experienced during construction are those associated with the blockade, whereby sections of the Northern Line (Charing Cross branch) and Waterloo and City Line experience additional crowding and journey times may increase. These impacts will be minimised through enhanced service frequency on the Charing Cross branch of the Northern Line and the introduction of replacement bus services. A Travel Demand Strategy will also be employed, encouraging London Underground passengers affected by the blockade to reduce the number of trips they make or re-time them, and to consider the use of alternative routes and modes of travel to avoid affected London Underground lines.

18.3.4 A significant positive effect during the construction phase will be the creation of around 200 jobs in Greater London. LUL is committed to engaging the local supply chain and providing employment and training opportunities for local people.

18.3.5 All of the permanent significant effects of the BSCU are beneficial. The Transport Assessment has shown that LUL's project objectives are delivered through implementation of the BSCU with the following significant beneficial effects:

- change in the level of service for passengers, with improved amenity and safety;
- reduction in interchange times in excess of 20 per cent; and
- improved quality of access, interchange and ambience, which help reduce demand and associated congestion at other entrances to the station.

18.3.6 The direct benefits of the BSCU represent important advantages for commuters and others who use Bank Station. They translate into real life enhancements in the quality of the everyday experience of city workers who themselves are important to the national economy. It is reasonable to anticipate that such benefits will result in the greater efficiency of the City of London as a place of work, greater potential for staff recruitment and retention and a consequent increased propensity for businesses to stay and to invest in the City of London.

18.3.7 The BSCU has a potential wider impact beyond the direct benefits. The scheme will help to facilitate the continuing economic growth of the City of London by protecting existing jobs and helping to attract further investment in the area.