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DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

JANUARY 2025

Revision A

The Infrastructure Planning (Examination Procedure) Rules 2010 – Rule 8(1)c

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DECARBONISATION

PART 1: IMMINGHAM GREEN ENERGY TERMINAL SUMMARY OF LIKELY EFFECTS

Cory Decarbonisation Project

JANUARY 2025

Immingham Green Energy Terminal

TR030008

Volume 6

6.2 Environmental Statement

Chapter 26: Summary of Likely Significant Effects (Clean)

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

June 2024

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

Immingham Green Energy Terminal

Development Consent Order 2024

6.2 Environmental Statement

Chapter 26: Summary of Likely Significant Effects

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Revision 1	21 September 2023	DCO Application
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26 Summary of Likely Significant Effects

26.1 Introduction

26.1.1 **Chapters 6 to 25** of this Environmental Statement ("ES") **[APP-043 to APP-068]** have considered the potential environmental impacts and effects of the Project. This chapter provides a summary of those adverse and beneficial environmental effects that are considered to be likely significant effects (i.e. moderate and major effects).

26.2 Significant Environmental Effects and Proposed Mitigation Measures

26.2.1 **Table 26-1** summarises the likely significant environmental effects of the Project that have been identified by the preliminary assessment, following the implementation of embedded mitigation and/or impact avoidance measures included in the design of the Project (as detailed in **Chapters 6 to 25 [APP-043 to APP-068]** where relevant). **Table 26-1** also summarises any additional mitigation measures that have been identified in the technical assessments contained in the ES.

26.2.2 For each topic, the reasonable worst-case scenario has been assessed, including the construction programme scenario and design parameters. Further details on the reasonable worst case (or 'the Rochdale Envelope') are set out in **Chapter 5: EIA Process [APP-047]**. The specific worst-case for each assessment is described in **Chapters 6 to 25 [APP-043 to APP-068]** as appropriate. Effects have been assessed for the Project construction, operation (including maintenance) and decommissioning scenarios (where the assessment has included the decommissioning phase of the Project).

26.2.3 The ongoing work on the detailed design of the Project may further reduce likely significant adverse environmental effects.

26.2.4 As outlined in **Chapter 5: EIA Process [APP-047]**, for the purposes of this Environmental Impact Assessment ("EIA"), an effect is considered to be 'significant' if it is assessed to be moderate (adverse or beneficial) or major (adverse or beneficial). Minor and negligible effects are only referenced in this chapter where a 'significant' (moderate or major) effect has been reduced to a 'not significant' effect following additional mitigation. Some technical chapters deviate from the generic methodology outlined in **Chapter 5: EIA Process [APP-047]** and follow more specific methodology applicable to their respective assessments, or use different terminology to describe the magnitude of effect identified, for example **Chapter 25: Cumulative and In-combination Effects [APP-067]**. Where this is the case, this is outlined in the methodology section of each technical chapter of this ES **[APP-043 to APP-068]**.

26.2.5 To provide further clarification on the nature of the effects, each effect has been identified for the purposes of this summary as:

a. Short term ("St") – effects occurring only over a short period of time e.g. An effect that only lasts for the duration of the construction period, or one that lasts for only part of the operational phase.

b. Medium term (“Mt”) – effects occurring for the duration of the Project’s operation, but which cease when operations cease.

c. Long term (“Lt”) – effects occurring beyond the operation of the Project, for example the permanent loss of a habitat due to the Project.

d. Temporary (“T”) – effects that are not permanent because the effect would no longer occur if the impact was removed within the relevant timescale (for example the visual amenity impact of construction structures would be described as St, T as the impact goes when the structures are removed).

e. Permanent (“P”) – effects that are permanent and cannot be readily reversed within the relevant timescale (for example an environmental feature that is lost and cannot be replaced until after decommissioning would be Mt, P. In the event that it could not be replaced at all, this would be Lt, P).

f. Direct (“D”) – effects that result from a direct impact, for example, the loss of an ecological habitat.

g. Indirect (“In”) – also known as secondary effects, effects that result indirectly, for example, increased traffic could indirectly impact on air quality.

Table 26-1: Summary of Likely Significant Residual Effects

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Chapter 6: Air Quality					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 7: Noise and Vibration					
Construction	Construction noise from landside works for residential Noise Sensitive Receptors ("NSRs") on Queens Road (NSR 1 and NSR 2)	Potentially up to **moderate adverse (significant)** (daytime) Potentially up to **major adverse (significant)** (Saturday afternoons)	Additional specific measures where possible (use of noise-control equipment such as jackets on pneumatic drills, acoustic covers on compressors, shrouds on piling rigs and cranes), temporary acoustic barriers and screens. No driven piling activities are to be undertaken on Saturday afternoons (between 13:00-19:00) in Work No. 7 near to NSRs 1 and 2 (if NSRs 1 or 2 remain in residential use at the relevant time)	**Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Construction	Construction vibration for Noise Sensitive Receptors ("NSRs") on Queens Road (NSR 1 and NSR 2)	Potentially up to **moderate adverse (significant)** (a significant effect could only arise if driven piling (in place of other forms of piling) were proposed to be used on Work No. 7 whilst either NSR 1 or NSR 2 remain in residential use)	Standard impact avoidance construction vibration mitigation measures. Use of non-vibratory rollers. Additional specific measures during driven piling operations in Work No. 7 whilst either NSR1 or NSR2 remain in residential use e.g. zones in proximity to Queens Road where driven piling is not permitted.	**Negligible-Minor adverse (not significant)**	St/T/D
Construction	Construction noise from landside works for residential NSRs on eastern edge of Immingham (NSR 3 and NSR 4)	Potentially up to **moderate adverse (significant)** (Saturday afternoons)	Standard impact avoidance construction noise and vibration mitigation measures. Additional specific measures where possible during site clearance works on Saturday afternoon e.g. use of noise-control equipment such as jackets on pneumatic drills, acoustic covers on compressors, shrouds on and cranes, temporary acoustic barriers and screens.	**Negligible-Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	On-site plant noise and operations on residential NSRs on eastern edge of Immingham	Up to **moderate/major adverse (significant)** (daytime) and up **to major adverse (significant)** (night-time)	Limits on noise emissions from plant and equipment at source. Acoustic barriers/screens or earth bunds to reduce transmission of noise from the Site to NSRs.	**Minor adverse (not significant)**	Mt/P/D
Decommissioning	Decommissioning effects are expected to be as per construction phase effects.				
Chapter 8: Terrestrial Ecology					
Construction	Pipe-rack and jetty access road construction resulting in loss of/ damage to mature deciduous woodland habitat	**Moderate adverse (significant**)	Woodland Compensation Strategy	**Moderate adverse (significant)**	Lt/P/D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Chapter 9: Marine Ecology					
Construction	Fish - underwater noise disturbance and vibration during marine piling, capital dredging and dredge disposal	**Minor (not significant)** to **moderate adverse (significant)** (migratory fish during marine piling)	Apply soft start procedures during piling. Use vibro piling where possible. Seasonal piling restrictions. Night time working restriction.	**Insignificant adverse**	St/T/D
Construction	Marine mammals - underwater noise disturbance and vibration during piling, capital dredging and dredge disposal	**Minor (not significant)** to **moderate adverse (significant)** (marine piling)	Apply soft start procedures during piling. Use vibro marine piling where possible. Marine Mammal Observer will follow JNCC protocol to minimise the risk of injury to marine mammals during percussive marine piling	**Minor adverse (not significant)**	St/T/D
Operation	No significant effects are predicted to occur.				
Decommissioning	Decommissioning not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Chapter 10: Ornithology					
Construction	Airborne noise and visual disturbance to coastal waterbirds using intertidal habitats	**Minor (not significant)** to **moderate adverse (significant)**	Winter marine construction restriction on approach jetty for works within 200m of exposed foreshore (1 October to 31 March) Noise suppression system for marine piling Acoustic barrier/visual screen on approach jetty from 1 October to 31 March Apply soft start procedures during marine piling Cold weather construction restriction (all construction activity)	**Minor adverse (not significant)**	St/T/In
Construction	Permanent loss of woodland habitat within Long Strip affecting breeding birds (non-SPA/ Ramsar)	**Moderate adverse (significant)**	Compensation for loss of woodland to be agreed; like-for-like replacement would take longer to establish than the lifetime of this Project (which is anticipated to be 25 years for the operation of the terrestrial elements of the Project).	**Moderate adverse (significant)**	
Operation	No significant effects are predicted to occur.				

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Decommissioning	Decommissioning not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				
Chapter 11: Traffic and Transport					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	Decommissioning not included within the scope of assessment as significant traffic and transportation effects are unlikely.				
Chapter 12: Marine Transport					
Construction	All risk events identified during the construction phase of the Project have been reduced to As Low As Reasonably Practicable ("ALARP").				
Operation	All risk events identified during the operational phase of the Project have been reduced to ALARP.				
Decommissioning	Decommissioning not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				
Chapter 13: Landscape and Visual					
Construction	Impact on landscape character to the Site and its immediate setting	**Moderate adverse (significant)**	None	**Moderate adverse (significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Construction	Impact on recreational users at viewpoint 2 Public Rights of Way ("PRoW") and proposed England Coast Path Route	**Major adverse (significant)**	None	**Major adverse (significant)**	St/T/D
Construction	Impact on recreational users at viewpoint 3 bridleway/PRoW and proposed England Coast Path Route	**Major adverse (significant)**	None	**Major adverse (significant)**	St/T/D
Construction	Impact on residential receptors located on Queens Road at viewpoint 11	**Major adverse (significant)**	None	**Major adverse (significant)**	St/T/D
Operation	Impact on recreational users at viewpoint 2 PRoW and proposed England Coast Path Route	**Moderate adverse (significant)**	None	**Moderate adverse (significant)**	Lt/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	Impact on recreational users at viewpoint 3 bridleway/PRoW and proposed England Coast Path Route	**Moderate adverse (significant)**	None	**Moderate adverse (significant)**	Lt/T/D
Decommissioning	It is considered that the effects identified associated with Project construction are also applicable to the Project decommissioning phase for the landside infrastructure associated with the Project.				
Chapter 14: Historic Environment Terrestrial					
Construction	Long Strip (MNL 1797) – Partial or complete, permanent truncation/ removal of below ground remains.	**Moderate adverse (significant)**	The work already being undertaken by the ecological/environmental teams will also act as a mitigation measure for the impact upon the historical nature of the woodland. Accordingly, no additional work is required in relation to this impact.	**Minor adverse (not significant)**	Lt/P/D
Construction	Peat deposits and organic alluvial deposits identified by Geoarchaeological evaluation - partial or complete, permanent truncation/removal of	**Major adverse (significant)**	Further analysis of the peat and organic alluvium samples obtained by the evaluation and report produced detailing the results of this work. Such work will provide useful information that would otherwise never been gained.	**Minor adverse (not significant)**	Lt/P/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	below ground remains within the West Site				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 15: Historic Environment Marine					
Construction	Direct impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of construction and capital dredging	**Major adverse (significant)**	Geophysical and geoarchaeological assessment of project survey data. Then, avoidance of known and potential receptors, implementation of archaeological exclusion zones ("AEZs") where deemed appropriate and reduction via a protocol for archaeological discoveries ("PAD") and specific measures agreed within a WSI for A2 anomalies within the construction footprint.	**Negligible positive (not significant)** (as long as geotechnical data are retained, analysed and reported on by qualified geoarchaeologist)	Lt/P/D
Operation	No significant effects are predicted to occur.				
Decommissioning	Decommissioning not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Chapter 16: Physical Processes					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	Decommissioning is not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				
Chapter 17: Marine Water and Sediment Quality					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	Decommissioning is not included within the scope of assessment as the marine infrastructure would, once constructed, become part of the fabric of the Immingham port estate.				
Chapter 18: Water Quality					
Construction	Direct spillage into North Beck Habrough Marsh Drain and local drains: Contamination from suspended solids or other chemical contaminants that may find their way into site	**Moderate/Major adverse (significant)**	Bunded operations and spill kits to be used on Site (to be specified in the **Outline Construction Environmental Management Plan ("CEMP") [TR030008/APP/6.5(5)]**.	**Negligible/Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.				
Construction	Runoff contamination into North Beck, Habrough Marsh drain and local drains: the effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	**Minor/Moderate adverse (significant)**	Bunded operations for all chemicals and fuels needed on Site (to be specified in the CEMP)	**Negligible/Minor adverse (not significant)**	St/T/D
Construction	Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials in the floodplain – for North Beck, Habrough Marsh drain and local drains	**Minor/Moderate adverse (significant)**	Areas for storage of construction materials to be carefully considered (to be specified in the CEMP)	**Negligible/Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Construction	Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from Site - North Beck, Habrough Marsh drain and local drains	Minor/Moderate adverse	Surface water runoff to be managed on site (to be specified in the CEMP)	**Negligible/Minor adverse (not significant)**	St/T/D
Construction	Increase in risk of fluvial/surface water flooding due to changes in surface water runoff rates/volumes due to compaction of soil, increases in impermeable area, disruption/alteration of existing surface water flow paths, works/structures within watercourses – for North Beck Drain, Habrough Marsh Drain, Imminhgam Pump Drain and Local land drainage ditches	Moderate adverse	Temporary drainage facilities (swales etc) provided during the construction phase to control discharge of surface water run-off.	**Minor Adverse (not significant)** for North Beck Drain, Habrough Marsh Drain and Imminhgam Pump Drain **Negligible (not significant)** for Local land drainage ditches	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Construction	Human Health (Construction workers and operatives) - exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	**Large adverse (significant)**	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site will be registered with the Environment Agency Flood Warnings Direct Service. No visitors or access during periods of inclement weather. No work onsite during a flood warning period.	**Minor Adverse (not significant)**	St/T/D
Construction	Human Health (Site Visitors) -exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	**Very large adverse (significant)**	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site will be registered with the Environment Agency Flood Warnings Direct Service. No visitors or access during periods of inclement weather. No work onsite during a flood warning period.	**Minor Adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	Impacts upon North Beck, Habrough Marsh Drain and local drains – potential operational pollution of surface watercourses from accidental spillages.	**Minor/Moderate adverse (significant)**	Containment areas and bunded operations and spill kits to be used on Site.	**Negligible/Minor adverse (not significant)**	St/T/D
Operation	Impacts upon North Beck Drain, Habrough Marsh Drain and local drains – potential run off of hazardous firefighting chemicals to surface water course	**Major adverse (significant)**	Containment areas and bunded operational area with spill kits to be used and treatment/removal of liquids	**Negligible/Minor adverse (not significant)**	St/T/D
Operation	Increase in risk of fluvial/surface water flooding due to changes in surface water runoff rates/volumes due to increases in impermeable area, disruption/alteration of existing surface water flow paths – for North Beck Drain, Habrough Marsh Drain,	**Moderate adverse (significant)**	Site/surrounding area registered with the Environment Agency Flood Warnings Direct Service. Provision of a drainage strategy to manage surface water run-off up to and including the 1% AEP plus 40% climate change allowance. Surface water is stored and retained within the Site. Provision of a drainage strategy to manage surface water run-off up to	**Minor beneficial (not significant)**	Mt/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	Immingham Pump Drain and Local land drainage ditches		and including the 1% AEP plus 40% climate change allowance. Surface water is stored and retained within the Project boundary.		
Operation	Human Health (Site operatives and future workforce) – exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences.	**Large adverse (significant)**	Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service. No work or visitors onsite during a flood warning period.	**Minor adverse (not significant)**	Mt/T/D
Operation	Human Health (Site Visitors)	**Very large adverse (significant)**	Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service. No work or visitors onsite during a flood warning period.	**Minor adverse (not significant)**	Mt/T/D
Decommissioning	Direct spillage into North Beck, Habrough Marsh drain and local drains: Contamination	**Moderate/Major adverse (significant)**	Bunded operations and spill kits to be used on site (to be specified in the Decommissioning Environmental Management Plan ("DEMP")).	**Negligible/Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.				
Decommissioning	Runoff contamination of North Beck, Habrough Marsh drain and local drains: the effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	**Minor/Moderate adverse (significant)**	Bunded operations for all chemicals and fuels needed on Site (to be specified in the DEMP).	**Negligible/Minor adverse (not significant)**	St/T/D
Decommissioning	Increase in risk of fluvial/surface water flooding due disruption/alteration of existing surface water flow paths, works/structures within	**Moderate adverse (significant)**	Overland flow paths maintained and surface water drainage system to remain in-situ.	**Minor adverse (not significant)** (for North Beck Drain, Habrough Marsh Drain and Immingham Pump Drain)	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	watercourses – for North Beck Drain, Habrough Marsh Drain, Immingham Pump Drain and Local land drainage ditches.			**Negligible adverse (not significant)** (for Local land drainage ditches)	
Decommissioning	Human health (construction workers and operatives) - exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences.	**Large adverse (significant)**	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. No visitors or access during periods of inclement weather Site will be registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period	**Minor adverse (not significant)**	St/T/D
Decommissioning	Human health (site visitors) - exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences.	**Very large adverse (significant)**	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. No visitors or access during periods of inclement weather Site will be registered with the Environment Agency Flood Warnings Direct	**Minor adverse (not significant)**	St/T/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
			Service. No work onsite during a flood warning period		
Chapter 19: Climate Change					
Construction	No significant effects are predicted to occur.				
Operation	Impact resulting from operational greenhouse gas emissions	**Significant beneficial**	None required.	**Significant beneficial**	Lt/P/D
Operation	Increased frequency and severity of extreme weather potentially causing damage to structures and infrastructure.	**Significant adverse**	All new structures to either be designed for the climatic conditions using appropriate design guidance where available, or adaptive capacity would be built into the designs.	**Not Significant**	Lt/P/D
Operation	Sea level rise potentially causing damage to structures and infrastructure.	**Significant adverse**	All new structures would either be designed for the climatic conditions using appropriate design guidance where available, or adaptive capacity would be built into the designs. Additional design measures to cope with flood/high water level conditions on Site would be implemented (see	**Not Significant**	Lt/P/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
			Section 19.6 of **Chapter 19: Climate Change [APP-061]**.		
Operation	Increased frequency and severity of extreme weather events (e.g. flooding, snow and ice, storms) causing potential damage to land-based infrastructure and disruption to power and water services which may impact the operation of the Project.	**Significant adverse**	All new assets and buildings would either be designed for the climatic conditions using appropriate design guidance where available, or adaptive capacity would be built into the designs. Storm-proof infrastructure would be incorporated where possible (e.g. underground power supplies). Addition of wind protection defenses (e.g. storm pin and tie-down procedures, crane buffers) across the Site. Specific measures to ensure safe storage of larger infrastructure (e.g. quay cranes). Regular maintenance of assets to be undertaken to detect deterioration and damage.	**Not Significant**	Lt/P/D
Operation	Increased temperatures causing a risk of destabilising chemicals /substances stored on site during operation.	**Significant adverse**	Storage and transfer of chemicals/ substances in line with safety regulations.	**Not significant**	Lt/P/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Decommissioning	Decommissioning not included within the scope of assessment for marine infrastructure as the development would, once constructed, become part of the fabric of the Immingham port estate. While it is likely that some Greenhouse Gas ("GHG") emissions would arise as part of the decommissioning of the landside hydrogen production facilities process, it is not possible to say with any certainty what they are likely to be due to the timeframe involved. Methods of deconstruction and disposal are not known at this time. It should also be noted that by the time the hydrogen production facilities are decommissioned, the UK has committed to achieving net zero emissions and therefore any impacts are unlikely to be significant.				
Chapter 20: Materials and Waste					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 21: Ground Conditions and Land Quality					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 22: Major Accidents and Disasters					
Construction	All risk events identified during the construction phase of the Project have been reduced to ALARP.				

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	All risk events identified during the operational phase of the Project have been reduced to ALARP.				
Decommissioning	All risk events identified during the decommissioning phase of the Project have been reduced to ALARP.				
Chapter 23: Socio-economics					
Construction	North East Lincolnshire's economy: employment generation during the construction phase	Temporary **major beneficial (significant)**	None required.	**Major beneficial (Significant)**	St/T/D
Construction	North East Lincolnshire's economy: Gross Value Added ("GVA") generation during the construction phase	Temporary **moderate beneficial (significant)**	None required.	**Moderate beneficial (significant)**	St/T/D
Construction	Loss of residential properties on Queens Road	Permanent **moderate adverse (significant)**	None required.	**Moderate adverse (significant)**	Lt/P/D

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	North East Lincolnshire's economy: employment generation during the operational phase	Permanent **moderate beneficial (significant)**	None proposed.	**Moderate beneficial (significant)**	Mt/T/D
Decommissioning	No significant effects are predicted to occur.				
Chapter 24: Human Health and Wellbeing					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 25: Cumulative and In-Combination Effects					
Construction	31 Queens Road and other residential properties along Queens Road, at the eastern end: in-combination effect as a result of construction dust, noise (landside construction and construction traffic),	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (Significant)**	St/T/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	vibration, visual effects, traffic and transport and increases in flood risk				
Construction	1 Queens Road and other residential properties along Queens Road, at the western end: in-combination effect as a result of construction dust, noise (landside construction and construction traffic), vibration, visual effects, traffic and transport and increases in flood risk	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (Significant)**	St/T/In
Construction	Commercial receptors along Queens Road: in-combination effect as a result of visual effects increases in flood risk.	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (Significant)**	St/T
Construction	Bridleway 36 and the proposed England Coastal Path: in-combination effect as a	Large adverse (Significant)	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	Large adverse (Significant)	ST/T/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	result of visual and socio-economic effects.				
Construction	'Long Strip' Woodland: in-combination effect as a result of the loss of woodland habitat, combined with the effect on the setting of the asset from a historic environment perspective.	**Moderate adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Moderate adverse (Significant)**	Lt/P/D
Construction	Cumulative socio-economic effects due to construction of the Project along with ten other developments (ID13, ID18, ID22, ID25, ID29, ID35, ID37, ID94, ID102 andID115) due to increases in employment opportunities during the construction phases.	**Large beneficial (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large beneficial (Significant)**	St/T/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Construction	Cumulative landscape effects on the Site and its immediate setting due to construction of the Project together with ID5 and ID 115.	**Moderate adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Moderate adverse (Significant)**	St/T/In
Construction	Cumulative visual effects on Viewpoint 2 as a result of construction of the Project together with ID13, ID18 and ID115.	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (significant)**	ST/T/In
Construction	Cumulative visual effects on Viewpoint 3 as a result of the construction of the Project and ID21, ID37, ID115 and ID116	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (Significant)**	ST/T/In
Construction	Cumulative visual effects on viewpoint 11 as a result of construction of the Project and ID13, ID18 and ID116.	**Large adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Large adverse (Significant)**	ST/T/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
Operation	Cumulative socio-economic effects due to operation of the Project along with other developments (ID22 and ID116) due to increases in employment opportunities during the operational phases.	**Moderate beneficial (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Moderate beneficial (Significant)**	Lt/P/In
Operation	Cumulative visual effects will occur on Viewpoint 2 as a result of the visibility of characteristic built structures slightly intensifying due to the operation of the Project cumulatively with three other developments (ID13, ID18 and ID115).	**Moderate adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Moderate adverse (Significant)**	Lt/P/In
Operation	Cumulative visual effects on Viewpoint 3 as a result of the visibility of characteristic built	**Moderate adverse (Significant)**	No worse effect than the effects in isolation, therefore no additional mitigation is proposed.	**Moderate adverse (Significant)**	Lt/P/In

Project stage	Environmental effect (following development design and impact avoidance measures (Embedded Mitigation)	Classification of effect prior to mitigation	Additional Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/Mt/St and P/T and D/In)
	structures slightly intensifying due to both the operation of the Project together with other developments (ID21, ID37, ID115 and ID116) due to the presence of the stacks associated with the identified cumulative developments slightly intensifying the visibility of characteristic built structures from this location.				

PART 2: VIKING CCS SUMMARY OF LIKELY EFFECTS

DECARBONISATION

Cory Decarbonisation Project

JANUARY 2025

VikingCCS

Viking CCS Pipeline

Environmental Statement Volume II – Chapter 21: Summary of Likely Significant Effects

Document Reference: EN070008/APP/6.2.21

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

Harbour Energy | AECOM

PINS Reference	Document Reference	Document Revision	Date
EN070008	EN070008/APP/6.2.21	Revision 1	October 2023

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Table 21-1: Summary of the Likely Significant Environmental Effects 21-2

21 Summary of Likely Significant Effects

21.1 Overview

21.1.1 Chapters 6 to 20 (*Application Document 6.2)* of this Environmental Statement (ES) Volume II have considered the potential environmental effects of the Viking CCS Pipeline (hereafter 'the Proposed Development'). This chapter provides a summary of those potential residual environmental effects that are currently considered to be significant, based on the assessments which have been undertaken.

21.1.2 The assessment of the potential residual effects has been predicted after due consideration of those embedded and additional mitigation that have been developed and committed to at this stage, as identified in each technical chapter. Further information on the agreed mitigation measures are included within *ES Volume IV Appendix 3.1 (Application document 6.4.3.1) and ES Volume IV Appendix 3.6 (Application Document 6.4.3.6).*

21.1.3 **Table 21-1** summarises these significant residual environmental effects, split by each technical topic, and covering each of the three key phases of the Proposed Development (Construction, Operation and Decommissioning). **Table 21-1** also provides a written description of the potential effect, the significance of the effect prior to additional mitigation (but post embedded mitigation), summarises the additional mitigation and confirms the significance of the remaining residual effects.

Table 21-1: Summary of the Likely Significant Environmental Effects

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Chapter 6: Ecology and Biodiversity				
Construction	**No significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				
Chapter 7: Landscape and Visual				
Construction	***Visual Receptors Viewpoint 6: PRoW NELC 16 Walk Lane, Irby Upon Humber (Lincolnshire Wolds AONB)*** Visual impact resulting from the Pipeline excavation/ works during construction.	Moderate adverse (Significant)	Opportunities to reduce impacts of nearby highly sensitive visual receptors should be sought through sensitive design of construction compounds e.g., organising compound features and using earthworks / fencing to screen internal activities during the construction phase.	**Moderate adverse (Significant)**
Construction	***Visual Receptors Viewpoint 7: PRoW NELC 17 Welbeck Hill, Irby Upon Humber (Lincolnshire Wolds AONB)*** Visual impact resulting from the Pipeline excavation/ works during construction.	Moderate adverse (Significant)	Opportunities to reduce impacts of nearby highly sensitive visual receptors should be sought through sensitive design of construction compounds e.g., organising compound features and using earthworks / fencing to screen internal activities during the construction phase.	**Moderate adverse (Significant)**

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Construction	***Visual Receptors*** ***Viewpoint 8: PRoW NELC 122 Welbeck Hill, Irby Upon Humber (Lincolnshire Wolds AONB)*** Visual impact resulting from the Pipeline excavation/ works during construction.	Moderate adverse (Significant)	Opportunities to reduce impacts of nearby highly sensitive visual receptors should be sought through sensitive design of construction compounds e.g., organising compound features and using earthworks / fencing to screen internal activities during the construction phase.	**Moderate adverse (Significant)**
Construction	***Visual Receptors*** ***Viewpoint 17: Station Road, Ludborough.*** Visual impact resulting from the Pipeline excavation/ works during construction.	Moderate adverse (Significant)	Opportunities to reduce impacts of nearby highly sensitive visual receptors should be sought through sensitive design of construction compounds e.g., organising compound features and using earthworks / fencing to screen internal activities during the construction phase.	**Moderate adverse (Significant)**
Operation	**No significant adverse effects** are predicted to occur.			
Decommissioning	**No significant adverse effects** are predicted to occur.			
Chapter 8: Historic Environment				
Construction	<u>Pipeline – Section 2</u> Direct physical permanent impact on any buried archaeological remains relating to historic settlement at Roxton.	Moderate adverse	Archaeological investigation prior to or during construction, though noting this does not reduce the significance of effects.	**Moderate adverse (Significant)**

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Construction	Pipeline – Section 2 Direct physical permanent impact on any buried archaeological remains relating to a former field system or enclosures southeast of Greenlands Farm.	Moderate adverse (Significant)	Archaeological investigation prior to or during construction, though noting this does not reduce the significance of effects.	**Moderate adverse (Significant)**
Construction	Pipeline – Section 2 Temporary construction activities within views towards the Grade II* Church of St Edmund in Riby.	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**
Construction	Pipeline – Section 3 Temporary construction activities will have a direct physical impact upon the area of surviving parkland at Barnoldby le Beck Park, resulting in further loss of its historic interest and its aesthetic value, prior to reinstatement and alter part of the setting of the Grade II Listed Manor House, Barnoldby le Beck.	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**
Construction	Pipeline – Section 5 Temporary construction activities will alter part of	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
	the farmland setting of the grade II listed 19th century Ashleigh Farm.			
Construction	Theddlethorpe Facility – Option 2 Temporary changes to the setting of Grade II listed Ashleigh Farm during construction.	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**
Construction	Theddlethorpe Facility – Option 2 Temporary changes to the setting of Dicote House during construction.	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**
Construction	All sections Direct physical permanent impact on any as yet unidentified archaeological remains within the DCO Site Boundary.	Negligible adverse (Not Significant) to Major Adverse (Significant)	Archaeological investigation prior to or during construction, though noting this does not reduce the significance of effects.	**Negligible adverse to Major adverse (Significant)**
Operation	Theddlethorpe Facility – Option 2 Changes to the setting of Grade II listed Ashleigh Farm which impact integrity and diminish the contribution of setting to significance.	Moderate adverse (Significant)	None proposed	**Moderate adverse (Significant)**
Decommissioning	**No significant adverse effects** are predicted to occur.			

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Chapter 9: Geology and Hydrogeology				
Construction	**No significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				
Chapter 10: Agriculture and Soils				
Construction	Permanent, irreversible loss of 0.2 ha of Grade 2 agricultural land, due to development and/or land use change.	Moderate adverse (Significant)	Design measures to avoid land of higher grading where possible have reduced the permanent loss of BMV land as far as practicable. However, this loss is unavoidable and cannot be mitigated as all land within the area where the Block Valve Station is required is classed as Grade 2. No additional measures can be applied.	**Moderate adverse (Significant)**
Construction	**No significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				
Chapter 11: Water Environment				
Construction	**No significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Chapter 12: Traffic and Transport				
Construction	Severance, Fear and Intimidation and Highway Safety associated with construction traffic for 50 – A1031 Grimsby Road in Section 3 of the pipeline route.	Moderate (Significant)	Construction Traffic Management Plan	**Moderate (Significant)**
Construction	Severance, Fear and Intimidation and Highway Safety associated with construction traffic for 51 – A1031 Humberston Road in Section 3 of the pipeline route.	Major (Significant)	Construction Traffic Management Plan	**Major (Significant)**
Construction	Severance, Fear and Intimidation and Highway Safety associated with construction traffic for 52 - A1031 Thoresby Road in Section 3 of the pipeline route.	Major (Significant)	Construction Traffic Management Plan	**Major (Significant)**
Construction	Severance, Fear and Intimidation and Highway Safety associated with construction traffic for 53 - A1031 Main Road in Section 4 of the pipeline route.	Major (Significant)	Construction Traffic Management Plan	**Major (Significant)**

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Construction	Severance, Fear and Intimidation and Highway Safety associated with construction traffic for 54 - A1031 Warren Road Section 4 of the pipeline route.	Major (Significant)	Construction Traffic Management Plan	**Major (Significant)**
Chapter 13: Noise and Vibration				
Construction	**No significant adverse effects** are predicted to occur.			
Operation	**No significant adverse effects** are predicted to occur.			
Decommissioning	**No significant adverse effects** are predicted to occur.			
Chapter 14: Air Quality				
Construction	**No significant adverse effects** are predicted to occur.			
Operation	The operation and decommissioning phases have been scoped out of the air quality assessment and **no significant effects** are anticipated.			
Decommissioning				
Chapter 15: Climate Change				
Construction	**No significant adverse effects** are predicted to occur.			
Operation	Effect of GHG emissions on the global climate - in consideration of the impact of the transportation of CO_2 through the Proposed Development and onward storage within the overall Viking CCS Project	Transportation and storage activities of CO_2 are considered **Beneficial** (**Significant**).	None required. The overall Viking CCS Project is expected to transport and store at least 10 million tonnes of CO_2 per annum once operational.	**Beneficial** (**Significant**)
Decommissioning	**No significant adverse effects** are predicted to occur.			

Phase	Description of Effect	Significance of Effect (prior to Additional Mitigation)	Summary of Additional Mitigation	Residual Significant Effects
Chapter 16: Socio-economics				
Construction	**No significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				
Chapter 17: Health and Wellbeing				
Construction	**No Significant adverse effects** are predicted to occur.			
Operation				
Decommissioning				
Chapter 18: Materials and Waste				
Construction	**No Significant adverse effects** are predicted to occur.			
Operation	The operation and decommissioning phases have been scoped out of the material and waste assessment and **no significant effects** are anticipated.			
Decommissioning				
Chapter 19: Major Accidents and Disasters				
Construction	Based on the embedded design measures and additional mitigation outlined in Chapter 19: Major Accidents and Disasters and as outlined in all other supporting technical chapters of this ES, it is considered that the impact of identified potential major accident and disaster events identified during the construction and operation of the Proposed Development will all be managed to be ALARP and will be classed as being **not significant**.			
Operation				
Decommissioning				
Chapter 20: Cumulative Effects				
Construction	**No Significant cumulative residual adverse effects** are predicted to occur.			
Operation				
Decommissioning				

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PART 3: SUMMARY OF EFFECTS FOR NORTHERN LIGHTS PROJECT

DECARBONISATION

Cory Decarbonisation Project

JANUARY 2025

9 Summary of impacts and mitigating measures

9.1 Summary of impacts

The impact assessments in relation to the various study topics are summarised in Table 9-1.

Table 9-1 Summary of impact assessments

	Impact assessments	
Study topic	**Construction phase**	**Operations phase**
Natural environment and biological diversity on land	Somewhat impaired	Somewhat impaired
Landscape	Significant environmental degradation	Significant environmental degradation
Outdoor recreation	Insignificant change	Insignificant change
Cultural artefacts and cultural environment on land	No change	No change
Plankton and benthic fauna (within PBA)	No change	No change
Important marine topography (within PBA)	Somewhat impaired	Somewhat impaired
Fish populations, incl. anadromous salmon fishing (within PBA)	Insignificant change	Insignificant change
Fisheries (within PBA)	Insignificant change	Insignificant change
Fish farming	Insignificant change	Insignificant change
Seabirds (within PBA)	Somewhat impaired	Somewhat impaired
Shell-sand	No change	No change
Kelp harvesting	No change	No change
Marine mammals (within PBA)	Insignificant change	Insignificant change
Marine archaeological assessments	Insignificant change	Insignificant change
Marine topography – corals (offshore)	No change	No change
Seabed habitat and benthic fauna (offshore)	Insignificant change	Insignificant change
Plankton (offshore)	Insignificant change	Insignificant change
Marine mammals (offshore)	Insignificant change	Somewhat impaired
Fish populations (offshore)	Insignificant	Somewhat impaired
Seabirds (offshore)	Insignificant	Insignificant
Particularly valuable areas (SVO)	Insignificant	Insignificant
Fisheries (offshore)	Somewhat impaired	Somewhat impaired
Social consequences	Insignificant change	Insignificant change
Socio-economic consequences	Somewhat improved	Somewhat improved
Tourism and business development opportunities	Somewhat improved	Somewhat improved
Risk and vulnerability analyses	Somewhat impaired	Somewhat impaired
Climate	Somewhat impaired	Significantly improved
Seismic activity – pipeline	No change	No change
Shipping, incl. anchoring areas	Insignificant change	Insignificant change
Offshore wind	No change	No change
Petroleum activity	No change	No change
Agriculture	No change	No change
Other industries on land	Somewhat impaired	Insignificant change

DECARBONISATION

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APPENDIX B – EXQ ANNEX: CA/TP OBJECTIONS SCHEDULE

APPENDIX B: COMPULSORY ACQUISITION AND TEMPORARY POSSESSION OBJECTION SCHEDULE

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

JANUARY 2025

Revision A

Appendix B

Cory Decarbonisation Project:
List of all objections to the grant of Compulsory Acquisition or Temporary Possession powers (ExQ1: Question Q1.5.0.4)

In the event of a new interest in the land, or Category 3 person, being identified the Applicant should inform those persons of their right to apply to become an Interested Party under s102A PA2008.

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
N/A	Creek Side Developments (Kent) Limited	N/A	RR-059	N/A	N/A	1, 2	Permanent acquisition	1-012	Yes	Outstanding
								1-014		
								1-017		
								1-025		
								1-026		
N/A	Environment Agency	N/A	RR-065	REP1-035	AS-037	1, 2	Permanent acquisition	1-004	Yes	Outstanding
								1-015		
								1-018		
								1-020		
							Permanent acquisition of new rights	1-024		
							Temporary possession	1-027		
								1-031		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-036		
								1-039		
							Permanent acquisition of new rights	1-040		
							Permanent acquisition	1-041		
								1-044		
								1-045		
								1-046		
								1-047		
								1-050		
							Permanent acquisition of new rights	1-051		
								1-052		
								1-056		
							Permanent acquisition	1-057		
							Permanent acquisition of new rights	1-058		
								1-062		
								1-063		
								1-067		
								1-069		
								1-071		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
								1-074		
								1-075		
								1-078		
								1-091		
							Permanent acquisition	1-093		
								1-096		
								1-105		
							Temporary possession	1-112		
N/A	Jay Anderson	N/A	RR-092	N/A	N/A	1, 2	Permanent acquisition	1-020	Yes	Outstanding
								1-036		
								1-037		
								1-038		
								1-041		
								1-042		
								1-044		
								1-046		
								1-047		
								1-049		
								1-050		
								1-057		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
								1-090		
								1-093		
N/A	Landsul Limited	N/A	RR-101	REP1-059	PDA-016	1, 2	Permanent acquisition	1-012	Yes	Outstanding
								1-014		
								1-017		
								1-022		
N/A	London Power Networks plc	N/A	N/A	N/A	N/A	1, 2	Permanent acquisition	1-003	Yes	Outstanding
								1-004		
								1-009		
								1-011		
								1-012		
								1-013		
								1-015		
								1-018		
								1-019		
							Permanent acquisition of new rights	1-028		
							Permanent acquisition	1-029		
								1-031		
								1-053		
								1-063		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary [vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition of new rights	1-064		
								1-067		
								1-068		
								1-070		
								1-071		
								1-073		
								1-078		
								1-079		
								1-080		
								1-084		
								1-091		
N/A	Munster Joinery (U.K.) Limited	N/A	RR-101	REP1-060	PDA-016	1	Permanent acquisition	1-022	Yes	Outstanding
N/A	Peabody Land Limited	N/A	RR-197	N/A	REP1-017, REP1-062	1	Permanent acquisition	1-001	Yes	Outstanding
							Permanent acquisition of new rights	1-002		
							Permanent acquisition	1-003		
N/A	Port of London Authority	N/A	RR-162	REP1-039,	REP1-041, REP1-042, REP2-026	1	Temporary possession	1-104	Yes	Outstanding
								1-104A		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
				REP1-040			Permanent acquisition	1-107		
								1-110		
								1-111		
								1-113		
							Temporary possession	1-116		
								1-117		
							Permanent acquisition	1-118		
							Temporary possession	1-119		
								1-120		
								1-121		
								2-003		
							Permanent acquisition	2-004		
							Temporary possession	2-005		
								2-006		
							Permanent acquisition	2-006A		
N/A	Seamus Gannon	N/A	RR-180	N/A	N/A	1, 2	Permanent acquisition	1-009	Yes	Outstanding
								1-011		
								1-012		
								1-014		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary [vii]	Plot(s)	CA?[viii]	Status of objection
								1-016		
								1-017		
								1-019		
								1-022		
								1-025		
								1-026		
N/A	Thames Water Utilities Limited	N/A	RR-195	REP1-057, REP1-058	REP1-058a, REP2-032	1, 2	Permanent acquisition of new rights	1-002	Yes	Outstanding
								1-005		
							Permanent acquisition	1-006		
							Permanent acquisition of new rights	1-007		
							Permanent acquisition	1-020		
								1-021		
							Permanent acquisition of new rights	1-023		
								1-024		
							Temporary possession	1-027		
							Permanent acquisition of new rights	1-028		
								1-028A		
								1-028B		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-033		
								1-036		
								1-037		
								1-038		
								1-039		
							Permanent acquisition of new rights	1-040		
							Permanent acquisition	1-041		
								1-042		
								1-044		
								1-046		
								1-047		
								1-049		
								1-050		
							Permanent acquisition of new rights	1-051		
								1-054		
							Permanent acquisition	1-054A		
							Permanent acquisition of new rights	1-054B		
								1-055		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-057		
							Permanent acquisition of new rights	1-059		
								1-060		
								1-061		
								1-063		
								1-064		
								1-067		
								1-068		
								1-070		
								1-071		
								1-075		
								1-085		
								1-088		
							Permanent acquisition	1-090		
							Permanent acquisition of new rights	1-091		
							Permanent acquisition	1-093		
								1-099		
							Temporary possession	1-102		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-106		
							Temporary possession	1-108		
								1-112		
								1-114		
N/A	The London Borough of Bexley	N/A	RR-124	REP1-032	REP1-033, REP1-034, REP2-010, REP2-024	1	Permanent acquisition	1-001	Yes	Outstanding
							Permanent acquisition of new rights	1-002		
							Permanent acquisition	1-003		
								1-004		
							Permanent acquisition of new rights	1-005		
							Permanent acquisition	1-006		
							Permanent acquisition of new rights	1-007		
								1-008		
							Permanent acquisition	1-009		
								1-018		
								1-019		
								1-021		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition of new rights	1-023		
								1-024		
								1-028A		
								1-028B		
								1-030		
								1-034		
							Permanent acquisition	1-036		
							Permanent acquisition of new rights	1-040		
								1-043		
							Permanent acquisition	1-045		
							Permanent acquisition of new rights	1-048		
								1-051		
								1-052		
								1-054B		
								1-055		
								1-074		
								1-089		
							Temporary Possession	1-098		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-100		
							Temporary possession	1-100B		
								1-100C		
								1-102		
							Permanent acquisition	1-103		
								1-105		
							Temporary possession	1-108		
								1-109		
								1-112		
								1-114		
								1-115		
N/A	Tilfen Land Limited	N/A	RR-197	N/A	REP1-017, REP1-062	1	Permanent acquisition	1-004	Yes	Outstanding
								1-006		
								1-013		
								1-015		
								1-018		
								1-029		
								1-031		
N/A	Western Riverside Waste Authority	N/A	RR-204	REP1-043	REP1-044, REP1-045	1, 2	Permanent acquisition of new rights	1-052	Yes	Outstanding
								1-054		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
							Permanent acquisition	1-054A		
							Permanent acquisition of new rights	1-056		
								1-058		
								1-059		
								1-060		
								1-061		
								1-062		
								1-063		
								1-064		
								1-065		
								1-066		
								1-067		
								1-068		
								1-069		
								1-070		
								1-071		
								1-073		
								1-074		
								1-076		
								1-077		

Obj No.[i]	Name/ Organisation	IP/AP Ref No[ii]	RR Ref No[iii]	WR Ref No[iv]	Other Doc Ref No[v]	Interest[vi]	Permanent / Temporary[vii]	Plot(s)	CA?[viii]	Status of objection
								1-078		
								1-079		
								1-080		
								1-081		
								1-084		
								1-085		
								1-086		
								1-087		
								1-091		
							Permanent acquisition	1-096		
								1-105		
							Temporary possession	1-109		
								1-112		

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i Obj No = objection number. All objections listed in this table should be given a unique number in sequence.
ii Reference number assigned to each Interested Party (IP) and Affected Person (AP)
iii Reference number assigned to each Relevant Representation (RR) in the Examination library
iv Reference number assigned to each Written Representation (WR) in the Examination library
v Reference number assigned to any other document in the Examination library
vi This refers to parts 1 to 3 of the Book of Reference:

- Part 1, containing the names and addresses of the owners, lessees, tenants, and occupiers of, and others with an interest in, or power to sell and convey, or release, each parcel of Order land;
- Part 2, containing the names and addresses of any persons whose land is not directly affected under the Order, but who "would or might" be entitled to make a claim under section 10 of the Compulsory Purchase Act 1965, as a result of the Order being implemented, or Part 1 of the Land Compensation Act 1973, as a result of the use of the land once the Order has been implemented;

- Part 3, containing the names and addresses of any persons who are entitled to easements or other private rights over the Order land that may be extinguished, suspended or interfered with under the Order.

vii This column indicates whether the applicant is seeking compulsory acquisition or temporary possession of land / rights

viii CA = compulsory acquisition. The answer is 'yes' if the land is in parts 1 or 3 of the Book of Reference and National Grid are seeking compulsory acquisition of land/ rights.

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APPENDIX C – FLOOD RISK TECHNICAL NOTE - BREACH ASSESSMENT SCENARIOS - THIS IS A SEPARATE FILE DUE TO LARGE FILE SIZE

APPENDIX D – USE OF OTHER JETTIES FOR RIVER TRANSPORT APPRAISAL

APPENDIX D: USE OF OTHER JETTIES FOR RIVER TRANSPORT APPRAISAL

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

JANUARY 2025

Revision A

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INTRODUCTION

1.1. PURPOSE

1.1.1. This Technical Note presents an appraisal of the jetties and wharves ('structures') along the River Thames that may have the potential to be utilised for the loading/offloading and transporting of materials and equipment such as Abnormal Indivisible Load (AIL) to the Site for the construction of the Proposed Scheme.

1.1.2. Structures available immediately adjacent to the Proposed Scheme were initially considered and the assessment was then extended to a wider Study Area.

1.1.3. The Study Area for this appraisal is between Victoria Deep Wharf on the western side of the Greenwich Peninsula, as the westernmost extent of the Study Area, and the Dartford Crossing, as the easternmost extent of the Study Area.

1.1.4. The easternmost extent of the Study Area has been selected as any structure eastward of the Dartford Crossing would mean construction material traffic would need to route through Junction 1a of the A282/A206 (which is a sensitive junction to increased Heavy Good Vehicle (HGV) movements during peak travel periods). It would then subsequently follow the same route to the Site which has already been assessed within **Chapter 18: Landside Transport** of the **Environmental Statement (Volume 1) (APP-067)** and **Appendix 18-1: Transport Assessment** of the **Environmental Statement (Volume 3) (APP-114)**. The conclusions of both documents describe that there are no significant residual effects anticipated as a result of the construction phase of the Proposed Scheme.

1.1.5. The westernmost extent of the Study Area would typically have been the Thames Barrier to avoid increased marine traffic across the Barrier, however, the Victoria Deep wharf, a few miles upstream of the Barrier, was considered as it has recently been renovated/strengthened and is a deep-water wharf.

1.1.6. Only locations on the southern bank of the River Thames have been assessed due to the Proposed Scheme being on the southern side and to avoid increasing traffic volumes on the river crossing bridges in the area.

1.1.7. This appraisal highlights the details and practicalities of each structure on the southern bank of the river between Dartford Crossing and the Victoria Deep Wharf, as well as the risks and opportunities in the usage of each of them. It seeks to determine the potential for each structure to be used to support greater transport of construction materials and equipment by river and then by road for the 'last' mile (the short final leg of a journey undertaken from a local, centralised centre) as a delivery solution.

1.1.8. The construction materials suitable for the Proposed Scheme that would be required to potentially transit through a berth include:

- Dry bulk such as gravel, sand, etc.;
- Large bulk and breakbulk items such as piles, precast units, etc; and

- Abnormal Indivisible Load (AIL) required for the components of the Carbon Capture Facility etc.

1.1.9. The suitability of the structures is dependent on the ability to offload the construction materials. It is expected that dry bulk materials would be offloaded and transferred via conveyor belts, while large bulk items and AIL would be sought to be transferred via mobile cranes fed to trucks at the berth.

1.1.10. **Figure 1-1** below shows the easternmost and westernmost extents of the Study Area, as well as the location of the Proposed Jetty for the Proposed Scheme.

Figure 1-1: Appraisal Study Area

1.1.11. The 'bed level at berth' of each structure detailed in the following section is against measured Chart Datum (CD) and is taken from the most recently published Port of London Authority (PLA) chart, available from the PLA website[1].

1.1.12. These charts also show the highest High Astronomical Tide (HAT) and lowest Mean Low Water Spring (MLWS) level of the tides, also against CD. To the westernmost extent of the Study Area, the HAT is +7.75mCD and the MLWS is +0.63mCD. To the easternmost extend of the Study Area the HAT is +6.58mCD and the MLWS is +0.51mCD.

1.2. APPRAISAL CHALLENGES

1.2.1. There are a number of overarching challenges with using existing offsite structures to handle construction materials and equipment for the Proposed Scheme. These are summarised below:

- Suitability: Not all structures are suitable to receive and transfer construction materials and equipment to vehicles for onward transportation to the Site.

[1] [redacted]

- Access: A number of structures are in private ownership and therefore would require agreements to be in place to enable use for third party deliveries and loading operations.
- Risk: It is likely that there would be substantial challenges in reaching agreement to use a privately owned structure due to the increased risk associated with managing the additional movements of Proposed Scheme construction materials and vehicles, agreeing risk mitigation measures and managing existing and additional operations.
- Restriction on Use: Existing structures may have planning restrictions / licence agreements that restrict their use. In lieu of undertaking a detailed planning review for every berth, an assumption has been made that only structures with existing similar use of the berth and therefore not requiring substantial topside modifications are suitable.
- Landside Infrastructure: Suitable space is needed to safely load materials from the boats onto vehicles, alongside storage of the transport vehicles (to minimise travel distances otherwise 'last' mile benefits are eroded) and to provide safe and suitable access for HGV.
- Location: The further the structure from the Site, the lower the benefits in terms of reducing the distance travelled by HGV on the road network.
- Cost: The transfer of construction materials from boat to road transport for 'last mile delivery' to the Site increases the cost and can result in increased delays to deliveries and risk damage during the additional loading and unloading process.

1.3. STRUCTURES ADJACENT TO THE PROPOSED SITE

1.3.1. Suitability of jetties and wharves available immediately adjacent to the Proposed Site were initially considered and the assessment has concluded that none are suitable for handling of construction materials and plant/equipment as presented below.

1.3.2. **Middleton Jetty**: It is not possible for Middleton Jetty to be used for construction transport for terrestrial elements as the movements required would cause unacceptable disruption to the operation of Riverside 1 and Riverside 2 (due to be operational in 2026).

1.3.3. **Re-use of Belvedere Power Station Jetty (BPSJ)**: The BPSJ is not suitable for the following reasons:

- Existing condition of the structure would require significant rehabilitation works.
- The jetty is connected to land via a pedestrian only access trestle, which is elevated over the Thames Path and accessed by a set of stairs at either end. The landside end of this trestle is located on land owned by a third party with limited access for construction vehicles.
- Usage of the BPSJ would impact development of the Proposed Jetty (i.e. construction of the Access Trestle).

1.3.4. **Thames Water Jetty**: The jetty is part of Thames Water's undertaking, so unlikely to be acceptable to them for its use. Even if it was operationally acceptable, traffic movements between that jetty and the Order limits, would either have to involve extensive HGV movements through the Thames Water STW and then through the middle of Crossness LNR, or along the Thames Path, neither of which are considered to be appropriate courses of action in policy or environmental terms.

1.3.5. **Proposed Jetty**: It would also not be possible to use the Proposed Jetty itself to first take on construction material. Not only would this delay delivery of the Proposed Scheme, but it would also be unlikely to be physically possible as it has been designed to handle bulk liquids rather than heavy construction materials and AIL and so would by physically unsuitable.

1.4. WIDER STUDY AREA

1.4.1. In light of the above challenges, the structures identified within the Study Area have been reviewed against the following exclusion criteria:

- **Usage compatibility**. Structures not suitable to handle construction materials and equipment without additional works, not compatible due to current utilisation, or type of structures not supporting material handling have been excluded from the appraisal.
- **Condition**. Structures that would require substantial or major works to be brought into use have been excluded from the appraisal.

1.4.2. The assessment is presented in **Annex A**.

1.4.3. Based on the above criteria, the following structures have been shortlisted:

- Victoria Deep Water Terminal
- Angerstiens Wharf
- Murphy's Wharf
- Pioneer Wharf
- Conways Jetty

1.4.4. The structures that have been shortlisted have been assessed against the following criteria:

- **Construction Material Type** their ability to take the potential construction materials highlighted in Section 1.1.8; and
- **Land transport connection**. Assessment of the transport route from the potential structures to the Proposed Scheme.

1.4.5. It is to be noted that all shortlisted structures have the Safeguarded Status which ensures the wharves remain dedicated to water borne freight handling by the Mayor of London and PLA as published on the London website Safeguarded Wharves Directions | London City Hall.

1.4.6. **Figure 2-1** shows the locations of the shortlisted structures.

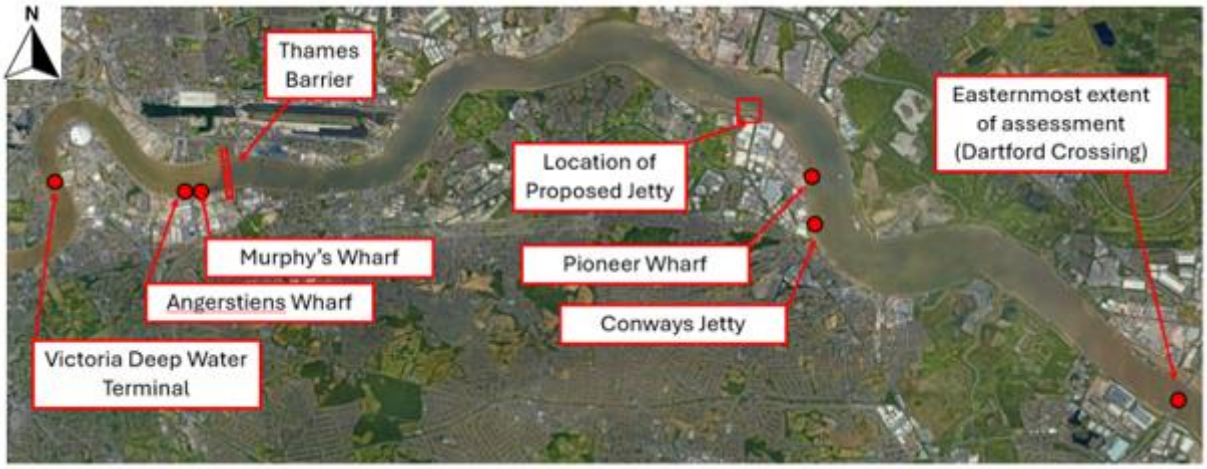
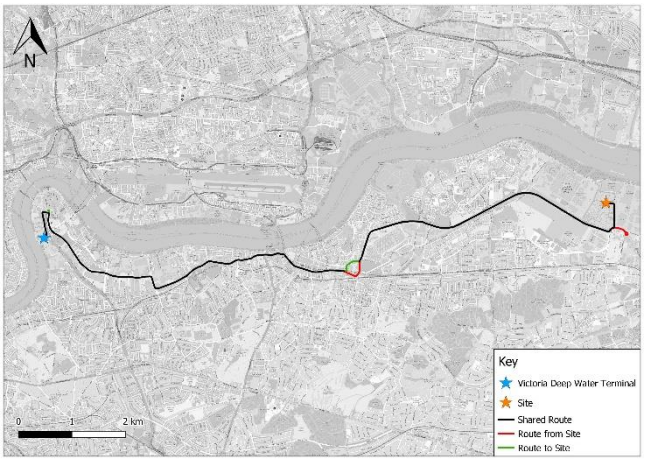


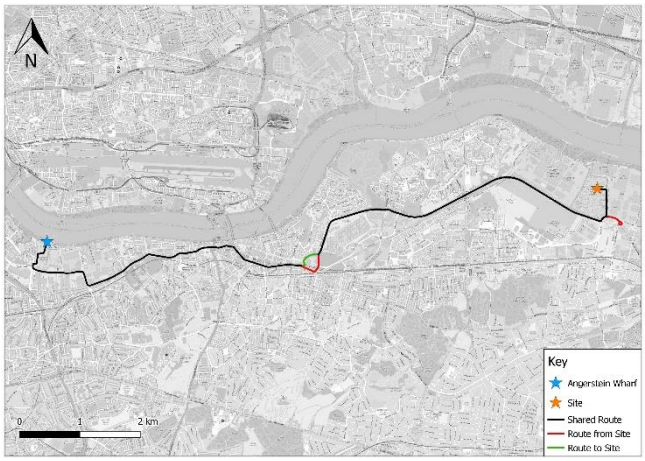
Figure 2-1: Shortlisted Structures

1.4.7. **Figure 2-2** illustrated the land transport connections to the Site for the shortlisted structures.

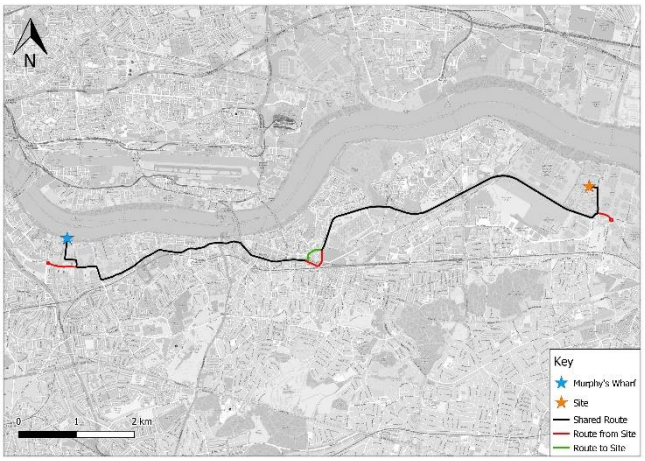
Victoria Deep Water Terminal



Angerstiens Wharf



Murphy's Wharf



Pioneer Wharf

Conways Jetty

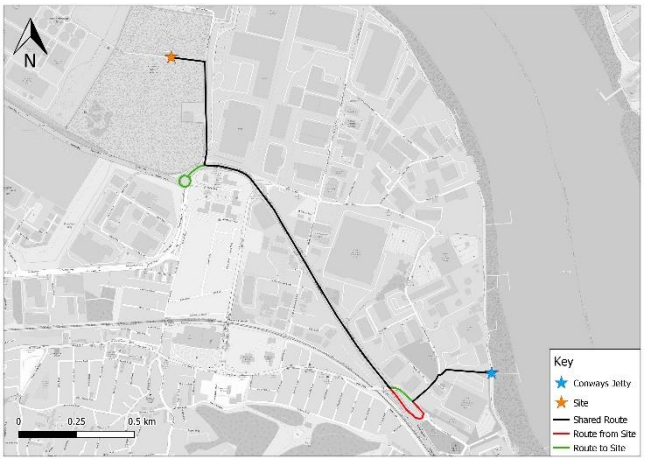


Figure 2-2: Land Transport Connections to the Proposed Scheme

1.4.8. **Table 2-1** below presents the shortlisted structures and provides a summary of the appraisal regarding their suitability for marine transport (loading/offloading) and then subsequent land transport (by road) of construction materials.

Table 2-1: Summary of the Appraisal of River Transport Options

Structure	Construction Material Type	Land Transport Connection	Suitability Summary
Victoria Deep Water Terminal (Safeguarded)	(+++) All construction materials as listed in **Section 1.1.8**.	(-)	Potential option for marine quay transaction and transport; however, it is less suitable from a land transport perspective. Transfer activities (vessel to shore) would sever the England Coast Path (which would need to remain accessible and require extensive management or diversions).The route to Site (whilst of a reasonable standard – urban dual carriageways – largely utilising the A206) is approximately 13.0km with a journey time of circa 30-minutes. This minimises the benefits of utilising this wharf as part of a 'last mile delivery' solution. In addition, some of the route (A206 through Woolwich) is not part of the London Lorry Control Scheme (LLCS) permitted routes, which would limit out of hours deliveries, if required. Additional challenges may be experienced regarding access given its private ownership and restrictions for use, prioritising existing activities associated with the Concrete Plant.
Angerstiens Wharf (Safeguarded)	(+) Dry Bulk handling only.	(-)	Potential option for dry bulk (i.e. aggregates, cement and concrete) handling only. The access trestle is not suitable for vehicles (pedestrian only) and handling of large bulk items or AIL would not be possible in its current form. The route to Site (whilst of a reasonable standard – urban dual carriageways – largely utilising the A206) Error! Reference source not found. is approximately 11.5km with a journey time of circa 20-minutes. This minimises the benefits of utilising this wharf as

Structure	Construction Material Type	Land Transport Connection	Suitability Summary
			part of a 'last mile delivery' solution, particularly as this wharf can only handle dry bulk (cement and concrete) further reducing efficiencies. In addition, some of the route (A206 through Woolwich) is not part of the LLCS permitted routes, which would limit out of hours deliveries, if required. Additional challenges may be experienced regarding access given its private ownership and restrictions for use, prioritising existing Aggregate Industries activities.
Murphy's Wharf (Safeguarded)	(+) Dry Bulk handling only.	(-)	Potential option for dry bulk (cement, concrete, asphalt and aggregates) handling only. The access trestle is not suitable for vehicles (pedestrian only) and handling of breakbulk or AIL would not be possible in its current form. The route to Site (whilst of a reasonable standard – urban dual carriageways – largely utilising the A206) is approximately 11.5km with a journey time of circa 20-minutes. This minimises the benefits of utilising this wharf as part of a 'last mile delivery' solution, particularly as this wharf can only handle dry bulk (cement, concrete, asphalt and aggregates) further reducing efficiencies. In addition, some of the route (A206 through Woolwich) is not part of the LLCS permitted routes, which would limit out of hours deliveries, if required. Additional challenges may be experienced regarding access given its private ownership and restrictions for use, prioritising existing Tarmac activities.
Pioneer Wharf (Safeguarded)	(+) Dry Bulk handling only.	(+)	Potential option for dry bulk (sand) handling only. The access trestle is not suitable for vehicles (pedestrians only) and handling of

Structure	Construction Material Type	Land Transport Connection	Suitability Summary
			breakbulk or AIL would not be possible in its current form. The route to Site is approximately 1.5km from the Site through the Belvedere Industrial Area (Strategic Industrial Location) via Church Manorway, Mulberry Way, Anderson Way, the A2016 Picardy Manorway and Norman Road. The route would take circa 5-minutes, which maximises the benefits of utilising this wharf as part of a 'last mile delivery' solution; however, it is limited to dry bulk (sand) handling only thereby reducing efficiencies. Additional challenges may be experienced regarding access given its private ownership and restrictions for use, prioritising existing Tarmac activities.
Conways Jetty (Safeguarded)	(+) Dry Bulk handling only.	(+)	Potential option for dry bulk (asphalt) handling only; handling of breakbulk or AIL would not be possible in its current form. The access trestle is not suitable for vehicles without modifications (no vehicular egress route – vehicles would need to reverse which is not permitted on marine structures). The route to Site is approximately 2.0km via Church Manorway, Lower Road, Anderson Way, the A2016 Bronze Age Way, the A2016 Picardy Manorway and Norman Road. The route would take circa 5-minutes. This maximises the benefits of utilising this jetty as part of a 'last mile delivery' solution; however, it is limited to dry bulk (asphalt) handling only thereby reducing efficiencies. Additional challenges may be experienced regarding access given its private ownership and restrictions for use, prioritising existing activities associated with the existing Asphalt Plant.

1.5. STRUCTURES ADJACENT TO THE PROPOSED SITE

1.5.1. Suitability of jetties and wharves available immediately adjacent to the Proposed Site were initially considered and the assessment has concluded that none are suitable for handling of construction materials and plant/equipment as presented below.

1.5.2. **Middleton Jetty**: It is not possible for Middleton Jetty to be used for construction transport for terrestrial elements as the movements required would cause unacceptable disruption to the operation of Riverside 1 and Riverside 2.

1.5.3. **Re-use of Belvedere Power Station Jetty (BPSJ)**: The BPSJ is not suitable due to the existing condition of the structure, the jetty connection to land via a pedestrian only access trestle and the landside end of this trestle location on land owned by a third party with limited access for construction vehicles.

1.5.4. **Thames Water Jetty**: the jetty is part of Thames Water's undertaking, so unlikely to be acceptable to them for its use and the Scheme construction associated extensive traffic movements between that jetty and the Order limits.

1.5.5. **Proposed Jetty**: It would also not be possible to use the Proposed Jetty itself to first take on construction material – not only would this delay delivery of the Proposed Scheme, but it would also be unlikely to be physically possible due proposed usage compatibility as it has been designed to handle bulk liquids rather than heavy construction materials and abnormal indivisible loads.

1.6. VICTORIA DEEP WATER TERMINAL FOR ALL CONSTRUCTION MATERIALS

1.6.1. The only viable option that could practicably be considered for the loading/ offloading of all construction materials and equipment such as AIL, to the Site for the construction of the Proposed Scheme, from a marine perspective, is the Victoria Deep Water Terminal. However, there are likely to be associated challenges, for example, increased marine movements across the Thames Barrier, severance of the England Coast Path during material transfer from vessel to shore, third party land access rights, restrictions of use to prioritise existing operations and cost implications. These challenges may limit the attractiveness of this wharf and cause adverse impacts (i.e. delay and increased risk) to the wider construction programme for the Proposed Scheme.

1.6.2. Furthermore, the onward road-based route to the Site, whilst utilising good, standard urban dual carriageways (including Millenium Way, Bugsby's Way, Anchor and Hope Lane and the A206), is some 13.0km, with a journey time of circa 30-minutes. This minimises the benefits (by increasing HGV kilometres travelled and increasing emissions) of utilising this wharf as part of a 'last mile delivery' solution.

1.7. OTHER OPTIONS FOR DRY BULK MATERIALS ONLY

1.7.1. There are four further options for handling dry bulk materials only. This reduces the opportunity and efficiencies of using these structures as part of a 'last mile delivery' solution. Each option has specialised existing conveyor belts which may undermine the compatibility with other dry bulk construction materials.

1.7.2. The onward road-based route to the Site from the two western options (Angerstiens Wharf and Murphy's Wharf), whilst utilising good, standard urban dual carriageways (including Bugsby's Way, Anchor and Hope Lane and the A206), results in an 11.5km journey taking approximately 20-minutes. This minimises the benefits (by increasing HGV kilometres travelled and increasing emissions) of utilising these wharfs as part of a 'last mile delivery' solution.

1.7.3. The onward road-based routes to the Site from the two eastern options (Pioneer Wharf and Conways Jetty) utilise good standard roads through/adjacent to the Belvedere Industrial Area (Strategic Industrial Location). The routes are relatively short (up to 2km; 5-minute journey time); thereby conducive to a 'last mile delivery' solution; however, the material type that could be accommodated/ transported limits the attractiveness of these structures as options.

1.7.4. As with the Victoria Deep Water Terminal, there are likely to be associated challenges with these four structures, for example, third party land access rights, restrictions of use to prioritise existing operations which may further limit their attractiveness and similarly cause adverse impact (i.e. delay and increased risk) to the wider construction programme for the Proposed Scheme

1.8. SUMMARY

1.8.1. As a summary, the assessment considers that Angerstiens Wharf, Murphy's Wharf, Pioneer Wharf and Conways Jetty are only suitable for handling a limited type of construction material and are therefore not suitable to be utilised for the construction of the Proposed Scheme. While Victoria Deep Water Terminal has the potential for handling various type of construction material and equipment, the route is some distance away to the Proposed Scheme with sections of the route not within the London Lorry Control Scheme permitted routes. This therefore minimises the benefits of utilising the wharf as part of the 'last mile delivery' solution. In conclusion, all shortlisted structures presented in this assessment are not appropriate to be relied upon to support the construction of the Proposed Scheme such that they should be required to be used.

Annex A

ANNEX A - AVAILABLE STRUCTURES

Table A-1 below details each of the structure on the southern bank of the River Thames, from west to east within the Study Area.

Each structure has been assessed against various criteria such as use of the structure, land occupancy, berth access, road connection, condition of structures and has been marked as follows for the loading/offloading and transporting of materials and equipment such as Abnormal Indivisible Load (AIL) to the Site for the construction of the Proposed Scheme:

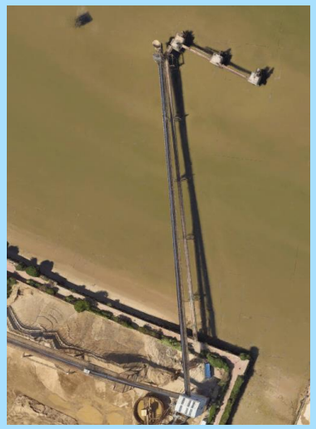
- (+) Positive
- (-) Negative

Table A-1: Assessment of Structures on Southern Bank of River Thames

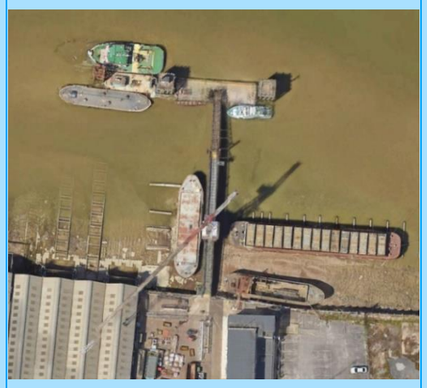
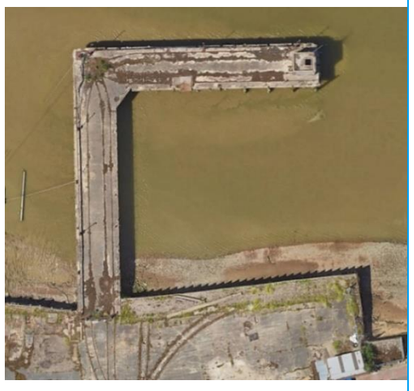
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Victoria Deep Water Terminal	 Type of structure: Quay Wall Approximate length of berth: 240m Bed level at berth: 5.8m below CD Ownership: Unknown Operator: Hanson Aggregates	*Use of the structure* (+) Existing and operational heavy-duty quay. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is occupied by an active Concrete Plant. (-) Adjacent site with private ownership so access and use would need to be negotiated. (+) Space to store transport vehicles on site. *Berth access* (+) Suitable for handling construction material. (+) No dredging required. *Road connection* (-) Travel distance on road to and from the Site (Tunnel Avenue, Millenium Way, Bugsby's Way, Anchor and Hope Lane and A206) is approximately 13km through the built-up urban areas of Greenwich and Woolwich. Some of the route is not part of the LLCS permitted routes. (-) On-road journey time of approximately 30 minutes reducing 'last mile' benefits of river transport. (+) Good standard of road access for HGV transport movements. *Condition of the structure* (+) Operational and in good working condition. *Other*	(+) Suitable for handling all construction materials.	(+) Working condition.	(+) Potential option but some distance away from the Proposed Scheme (approximately 13.0km from the Site).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		(-) A management system will be required for the England Coast Path user safety.			
Bethells Wharf	 Type of structure: Quay Wall Approximate length of berth: 105m Bed level at berth: 3.1m above CD Ownership: Unknown	*Use of the structure* (-) Not currently used for river transport. *Land occupancy* (-) Currently a Skateboarding Zone (Greenwich Outdoor Skating Zone). (-) Land immediately behind structure is occupied (Golf driving range). *Berth access* (-) Dredging required and potentially quay wall strengthening works. *Road connection* (-) No existing vehicular access. *Condition of the structure* (-) Unknown condition. Would require upgrading to be developed into an operational wharf. *Other* (-) A management system will be required for the Thames Path user safety.	(-) Not currently operational nor suitable to handle construction materials.	(-) Substantial upgrading works required.	(-) Unsuitable option due to current usage, lack of access and requirement for substantial modifications (dredging and land access required) to get the berth operational.
Delta Wharf Jetty	 Type of structure: 2 No. dolphins with walkway between. Extends approximately 47m into river Approximate length of berth: 44m Bed level at berth: 0m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (+) Jetty previously used for dry bulk handling (aggregate). *Land occupancy* (+) Land behind structure not occupied. *Berth Access* (-) Dredging potentially required or only small access tidal window available at high tides. (-) No existing vehicular access onto platform and existing conveyor belt material suitability is unknown and would need to be checked. *Road Connection* (-) No existing vehicular access. *Condition of the structure* (-) State of structure unknown.	(+) Suitable for dry bulk handling only.	(-) Substantial upgrading works required.	(-) Unsuitable option due to substantial work required (dredging) and lack of access. Dry bulk handling only.

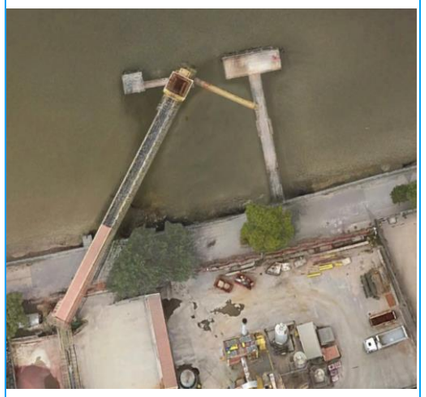
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		Other (-) A management system will be required for the Thames Path user safety.			
Ordnance Wharf	 Type of structure: Solid Jetty structure with 2 No. dolphins at each end. Extends approximately 26m into river Approximate length of berth: 84m Bed level at berth: 0.4m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for construction of material handling as quay needs to be potentially deepened and updated with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/roads). *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. *Road connection* (-) Structure located near the O2 with no existing vehicular access. *Condition of the structure* (-) Unknown condition and might require strengthening works. *Other* (-) A management system will be required for the Thames Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial upgrading works required.	(-) Unsuitable option due to substantial modifications required (land connection, egress route and potential dredging required).
North Greenwich Pier	 Type of structure: Pontoon. Extends approximately 88m into river Approximate length of berth: 90m	*Use of the structure* (-) Structure currently regularly utilised by Uber Thames Clippers. (-) Structure not suitable for handling of construction materials. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/roads). *Berth access* (-) No vehicle access to the Pier. (-) Small access tidal window restriction may apply at low tides. *Road connection* (-) The vehicle access through Edmund Valley Way is through the residential area and onto the pedestrian Thames Path so it is not suitable for large construction material traffic volumes.	(-) Type of structure not supporting material handling.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty type and usage (ferry pier).

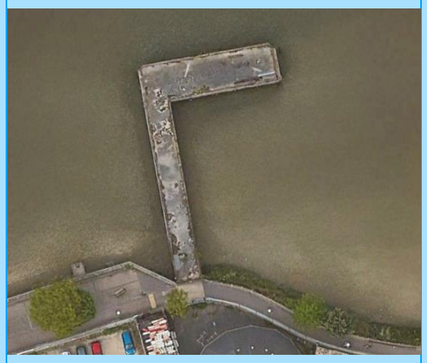
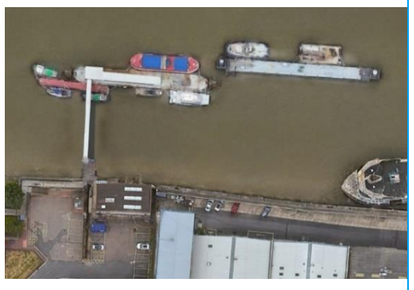
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
	Bed level at berth: 1.8m below CD Ownership: Transport for London	*Condition of the structure* (+) Good operational conditions for ferry / uber operations however not compatible with material handling. *Other* (-) A management system will be required for the Thames Path user safety.			
Unknown Jetty	 Type of structure: Solid Jetty structure Approximate length of berth: Bed level at berth: Ownership: Transport for London	*Use of the structure* (-) Jetty occupied by greenhouses so no longer an operational berth. *Land occupancy* (-) No space available. *Berth access* (-) Marine Access obstructed by leisure boat moorings. *Road connection* (-) No existing vehicular access. *Condition of the structure* (-) Unknown condition.	(-) Type of structure not supporting material handling (greenhouse).	(-) Unknown and no further consideration given lack of compatibility..	(-) Unsuitable option due to current jetty type (greenhouse).
Angerstiens Wharf	 Type of structure: Skeletal dolphin structure with 3 no. dolphins connected by walkways. Extends approximately 133m into river	*Use of the structure* (+) Wharf with conveyor used for dry bulk handling only. Not suited for breakbulk or AIL. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (CEMEX). *Berth access* (-) No existing vehicular access onto platform and existing conveyor belt material suitability is unknown and will need to be checked. (+) No dredging required. *Road connection* (-) Travel distance on road to and from the Site (Bugsby's Way, Anchor and Hope Lane and A206) is approximately 11.5km through the built-up urban	(+) Suitable for dry bulk handling only.	(+) In operational condition.	(+) Potential option for dry bulk handling only (access trestle not suitable for vehicles).

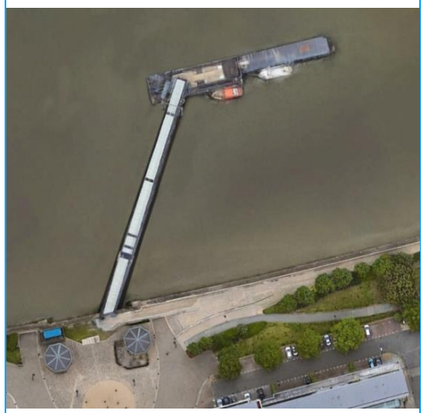
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
	Approximate length of berth: 46m Bed level at berth: 4.9m below CD Ownership: CEMEX	areas of Greenwich and Woolwich. Some of the route is not part of the LLCS permitted routes. (-) On-road journey time of approximately 20 minutes reducing 'last mile' benefits of river transport. (+) Good standard of road access for HGV transport movements. *Condition of the structure* (+) Conditions of the jetty unknown but appears operational for dry bulk handling.			
Murphy's Wharf	 Type of structure: Skeletal dolphin structure with 2 no. dolphins connected by walkway. 3 additional dolphins part of structure, but no pedestrian access. Extends approximately 118m into river Approximate length of berth: 170m Bed level at berth: 2.2m to 4.9m below CD Ownership: Tarmac	*Use of the structure* (+) Wharf with conveyor used for dry bulk handling only. Not suited for breakbulk or AIL. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (Tarmac). *Berth access* (+) Potentially no dredging required. (-) No existing vehicular access onto platform and existing conveyor belt material suitability is unknown and will need to be checked. *Road connection* (-) Travel distance on road to and from the Site (Bugsby's Way, Anchor and Hope Lane and A206) is approximately 11.5km through the built-up urban areas of Greenwich and Woolwich. Some of the route is not part of the LLCS permitted routes. (-) On-road journey time of approximately 20 minutes reducing 'last mile' benefits of river transport. (+) Good standard of road access for HGV transport movements. *Condition of the structure* (+) Conditions of the jetty unknown but appears operational for dry bulk handling.	(+) Suitable for dry bulk handling only.	(+) In operational condition.	(+) Potential option for dry bulk handling only (access trestle not suitable for vehicles).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Charlton Pier	 Type of structure: Solid Jetty structure. Extends approximately 60m into river Approximate length of berth: 48m Bed level at berth: 2.4m below CD Ownership: Unknown Operator: Cory	*Use of the structure* (-) Jetty currently used by Cory for tug berthing operation. (-) Jetty is regularly utilised and has limited spare capacity to handle additional traffic. (-) Jetty not currently handling construction material. *Land occupancy* (+) Land immediately behind structure is leased and occupied Cory. (-) Limited available space to handle construction material. *Berth access* (+) Potentially no dredging required. (-) Existing vehicular access onto platform is narrow and unsuitable for large construction traffic volume. (-) Berth is too short for anticipated vessels to berth and moor (berth intended for tugs size vessels rather than long construction material barges). *Road connection* (-) Site HGV access and routing along Riverside is limited for large vehicles and may not be feasible. *Condition of the structure* (+) Condition of the jetty unknown but likely to be adequate as operational.	(-) Not compatible due to current utilisation.	(+) In operational condition.	(-) Unsuitable option due to current usage and high utilisation of the existing berth.
Durham Wharf	 Type of structure: Solid deck on piles structure. Extends approximately 50m into the river	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for handling of construction material as quay needs to be upgraded with an egress route to be operational. *Land occupancy* (+) Land behind structure does not appear to be occupied. *Berth access* (-) Dredging likely required or only small access tidal window available at high tides. (-) Existing vehicular access onto platform is unsuitable for large construction traffic volume unless an egress route is added. *Road connection*	(-) Not suitable to handle construction materials without additional works.	(-) Substantial upgrading works required.	(-) Unsuitable option due to substantial work required (dredging, egress route and possibly need for upgrading structure condition).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
	Approximate length of berth: 50m Bed level at berth: 1m above CD Ownership: Unknown	(-) Site HGV access and routing along Riverside appears to be limited for large vehicles and may not be feasible. *Condition of the structure* (-) Unknown condition. Appears to be in derelict condition and might require strengthening works.			
Duresco Wharf Jetty	 Type of structure: Solid deck on piles structure. Extends approximately 28m into the river Approximate length of berth: 43m Bed level at berth: 2m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf suited for construction of material handling but quay needs to be deepened to accommodate anticipated barge draft. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/roads). *Berth access* (-) Dredging required or only small access tidal window available at high tides. (-) Existing vehicular access onto platform would be required to be strengthened if trucks can access the water frontage. *Road connection* (-) No existing vehicular access from the road network as the vehicle access to the river frontage is cut off. *Condition of the structure* (-) Unknown condition. Appears to be in derelict condition and might require strengthening works. *Other* (-) A management system will be required for the Thames Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial upgrading works required.	(-) Unsuitable option due to major modifications required (connection to road network required). .

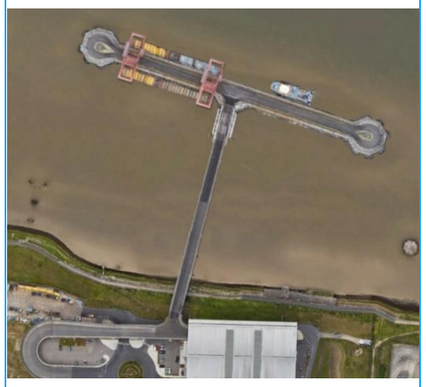
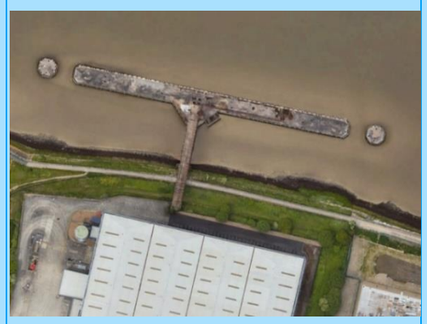
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Riverside Wharf Jetties	 Type of structure: Skeletal deck on piles jetty. Extends approximately 34m into the river Approximate length of berth: 33m Bed level at berth: 1.2m above CD Ownership: Unknown Operator: Tarmac	*Use of the structure* (-) Jetty used by Tarmac Plant to import dry bulk to mix into asphalt exported by trucks. (+) Wharf used for dry bulk handling not well suited for construction of material handling fed by vehicles. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/plant). (-) Connects directly to the Tarmac Plant as the regular user of the wharf. *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. (-) No existing vehicular access onto platform and existing conveyor belt material suitability is unknown and will need to be checked. *Road connection* (-) No direct vehicular access. *Condition of the structure* (-) State of structure unknown but deepening required. *Other* (-) A management system will be required for the Thames Path user safety.	(+) Suitable for dry bulk handling only.	(-) Substantial work required.	(-) Unsuitable option due to substantial work required (dredging, adaptation of the loading equipment, and connection to road network required).

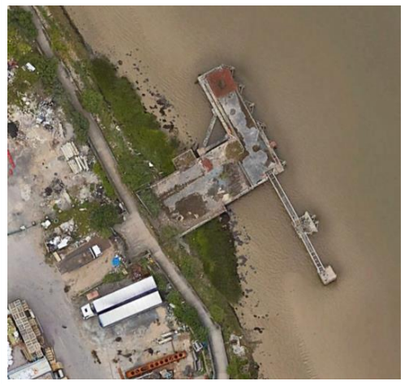
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Thames Wharf Jetty Structure	 Type of structure: Solid L shaped deck on piles structure. Extends approximately 34m into the river Approximate length of berth: 24m Bed level at berth: 0m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for construction of material handling as quay needs to be upgraded with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/plant). *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. *Road connection* (-) No direct vehicular access. *Condition of the structure* (-) Unknown condition. Appears to be in derelict condition and might require strengthening works. *Other* (-) A management system will be required for the Thames Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial upgrading works required.	(-) Unsuitable option due to substantial upgrading works required (dredging, land connection and egress route required).
Barrier Gardens Pier	 Type of Structure: Assumed to be pontoons. Extends approximately 37m into the river Approximate length of berth: 46m Bed level at berth: 3m below CD Ownership: Port of London Authority	*Use of the structure* (-) Structure fully utilised by PLA. (-) Jetty structure not suitable to support handling of construction materials. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/roads). *Berth Access* (-) No direct vehicular access onto platform. (+) Potentially no dredging required. *Road Connection* (+) Good road access to the Site. *Condition of the structure* (+) In operational conditions for small vessels berthing operations however not compatible with material handling.	(-) Not compatible due to current utilisation.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty utilisation.

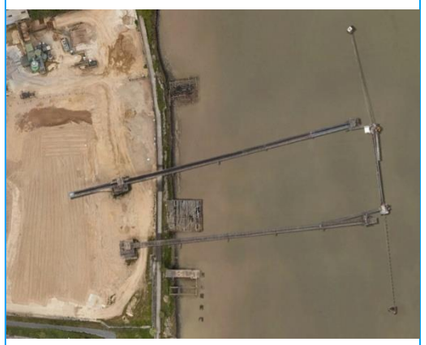
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Woolwich Ferry South Terminal	 Type of structure: Solid Jetty structure. Extends approximately 80m into the river Approximate length of berth: 16m Bed level at berth: 2m below CD Ownership: Woolwich Ferry	*Use of the structure* (-) Jetty type not suitable for material handling. (-) Structure is owned, fully occupied and used by current user (Transport for London). *Land occupancy* (-) Currently no landside HGV storage and loading space. *Berth access* (-) Suitable for ferries but not freight barges. (+) Good standard of road access onto structure. *Road connection* (+) Good standard of road access to the Site (A206). *Condition of the structure* (+) In operational condition for ferry usage.	(-) Not compatible due to current utilisation.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty utilisation.
Woolwich Arsenal Pier	 Type of structure: Pontoon Approximate length of berth: 66m Bed level at berth: 4.3m below CD Ownership: Unknown	*Use of the structure* (-) Structure currently regularly utilised by Uber Thames Clippers. (-) Structure not suitable for handling of construction materials. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/roads). *Berth access* (-) No vehicular access onto platform. (+) Potentially no dredging required. *Road connection* (-) The road access to the Site would be crossing the pedestrian routes to the pier and is therefore not suitable. *Condition of the structure* (+) In operational conditions for ferry / uber operations however not compatible with material handling.	(-) Not compatible due to current utilisation.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty utilisation.

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Iron Pier	 Type of Structure: Dismantled Jetty Approximate length of berth: Bed level at berth: Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Substantial modifications required as it seems to be a dismantled jetty. *Land occupancy* (-) Not assessed as discarded due to the dismantled jetty state. *Berth Access* (-) Not assessed as discarded due to the dismantled jetty state. *Road Connection* (-) Not assessed as discarded due to the dismantled jetty state. *Condition of the structure* (-) Dismantled jetty.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial work required (Dismantled jetty).
Coaling Pier	 Type of structure: Solid Jetty structure. Extends approximately 90m into river Approximate length of berth: 92m Bed level at berth: 0m below CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for construction of material handling as quay needs to be upgraded with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (residential buildings). *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. *Road connection* (-) No existing vehicular access. *Condition of the structure* (-) State of structure unknown but anticipated to be in a state of disrepair with the following warning sign observed: “DANGEROUS STRUCTURES KEEP OUT”. *Other*	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial work required (land connection, egress route and structure condition upgrade required).

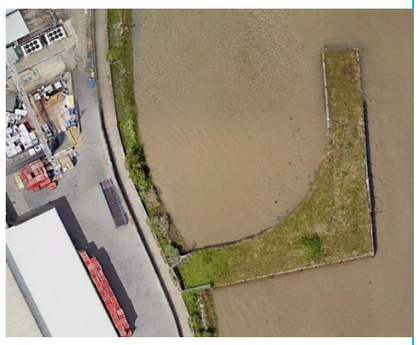
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		(-) A management system will be required for the England Coast Path user safety.			
Thames Water Jetty	 Type of structure: Deck on piles structure. Extends approximately 200m into river Approximate length of berth: 200m Bed level at berth: 0m below CD Ownership: Thames Water	*Use of the structure* (-) Structure owned and utilised by Thames Water. (-) Wharf not well suited for construction of material handling as quay needs to be upgraded with an egress route to be operational. *Land occupancy* (-) Statutory undertaker's operational land immediately behind structure and fully occupied. *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. (-) Vehicle access directly onto structure is narrow and does not appear suitable for HGV access. *Road connection* (-) Loading and the onward route to the Site would occur through the active Crossness Sewage Treatment Works site or via the emergency access through the Crossness Local Nature Reserve. (-) Traffic movements between that jetty and the Order limits, would either have to involve extensive HGV movements through the Thames Water STW and then through the middle of Crossness LNR, or along the Thames Path. *Condition of the structure* (-) State of structure unknown but in operational condition. *Other* (-) A management system will be required for the England Coast Path user safety. (+) Proximity to the Site.	(-) The structure is part of Thames Water's undertaking and in operation.	(+) In working condition but no further consideration given lack of compatibility.	(-) The jetty is part of Thames Water's undertaking, so unlikely to be acceptable to them for its use and the Scheme construction associated extensive HGV movements between that jetty and the Order limits.

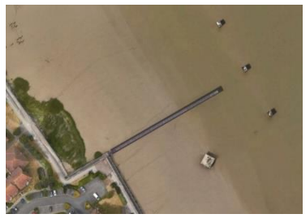
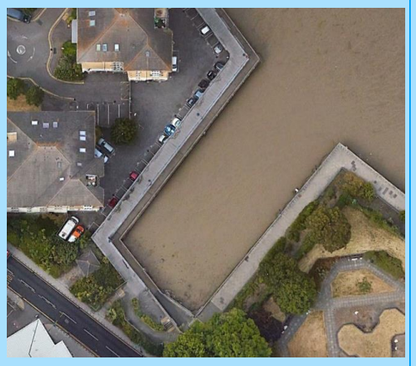
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Middleton Jetty	 Type of structure: Solid deck on piles structure. Extends approximately 180m into river Approximate length of berth: 272m Bed level at berth: 2m – 6m below CD Ownership: Cory	*Use of the structure* (-) Structure already at full utilisation. The Middleton Jetty, in its current form, will be wholly utilised (24 hours per day) when Riverside 2 is operational. There is no available capacity for other quay transactions. (+) Safeguarded Wharf Status. *Land occupancy* (+) Land immediately behind structure is owned and occupied Cory. *Berth access* (+) Vehicle access onto structure. *Road connection* (+) Good vehicular access between the jetty and the Site. *Condition of the structure* (+) In operational condition. *Other* (+) Proximity to the Site.	(-) Not compatible due to current utilisation.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option as the movements required would cause unacceptable disruption to the operation of Riverside 1 and Riverside 2.
Belvedere Power Station Jetty	 Type of structure: Solid deck on piles structure. Extends 50m into river Approximate length of berth: 230m Bed level at berth: 2m above CD Ownership: Aviva	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for construction of material handling as quay needs to be upgraded with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (Iron Mountain Warehouse). *Berth access* (-) Dredging potentially required or only small access tidal window available at high tides. (-) No existing vehicular access due to raised trestle. The jetty is connected to land via a pedestrian only access trestle, which is elevated over the Thames Path and accessed by a set of stairs at either end. The landside end of this trestle is located on land owned by a third party with limited access for construction vehicles. *Road connection*	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging, land connection and required upgrade works).

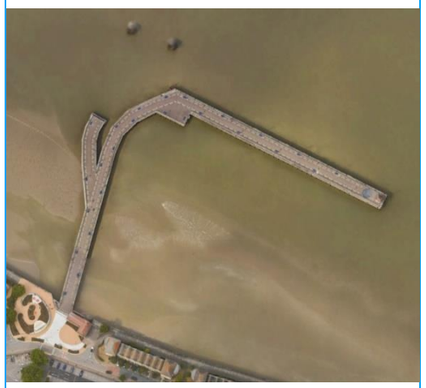
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		(-) No current vehicle access to the river frontage. *Condition of the structure* (-) Existing condition of the structure would require significant rehabilitation works. *Other* (-) A management system will be required for the England Coast Path user safety. (-) This jetty is in alignment with the Proposed Jetty, potentially impeding the construction programme of the Proposed Jetty. (+) Close proximity to the Site.			
Mulberry Wharf	 Type of structure: Solid deck on piles with dolphins extending out to one side, connected by walkways. Extends approximately 25m in the river Approximate length of berth: 51m Bed level at berth: 3m below CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for handling construction material as quay needs to be upgraded with an egress route to be operational. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land adjacent to wharf is occupied. *Berth access* (+) Vehicular access onto wharf. (+) Potentially no dredging required. *Road connection* (+) Vehicular access to the Site. *Condition of the structure* (-) Unknown condition. Appears to be in derelict condition and might require strengthening works. *Other* (-) A management system will be required for the England Coast Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (upgrade works and egress route).

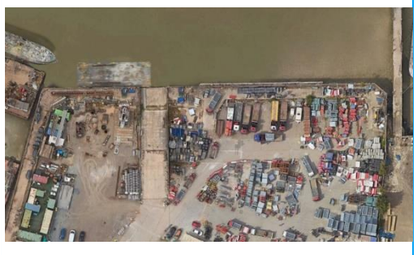
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
River Wharf	 Type of structure: Solid Quay Wall Approx length of berth: 110m Bed level at berth: 4m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not well suited for construction of material handling as quay needs to be deepened to be operational. *Land occupancy* (-) Land immediately behind structure is already fully occupied (HGV parking/Storage) and therefore may not be available. *Berth access* (-) Dredging required or only small access tidal window available at high tides. *Road connection* (+) Vehicular access to the Site. *Condition of the structure* (-) State of structure unknown - may not be suitable to support loading/ unloading. *Other* (-) A management system will be required for the England Coast Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging and potentially upgrade works).
Pioneer Wharf	 Type of structure: Skeletal structure with 2 no. dolphins. Extends approximately 110m into the river Approximate length of berth: 56m Bed level at berth:4.5m below CD Ownership: Tarmac	*Use of the structure* (+) Wharf with conveyor used for dry bulk handling only. Not suited for breakbulk or AIL. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (Tarmac). *Berth access* (+) No dredging required. (-) No existing vehicular access onto platform and existing conveyor belt material suitability is unknown and will need to be checked. *Road connection* (+) Travel distance on road to and from the Site is approximately 1.5km through Belvedere Industrial Area (Strategic Industrial Location). On-road journey time of approximately 5 minutes conducive to ‘last mile’ solution.	(+) Suitable for dry bulk handling only.	(+) In operational condition.	(+) Potential option for dry bulk handling only (access trestle not suitable for vehicles).

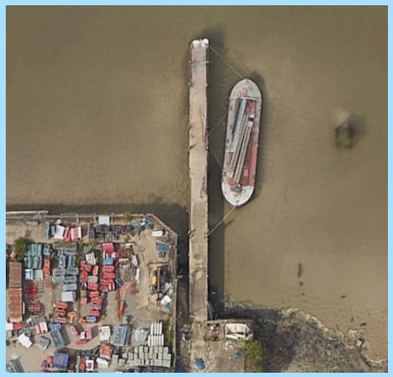
Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		(+) Good standard of road access for HGV transport movements. *Condition of the structure* (+) Conditions of the jetty unknown but appears operational for dry bulk handling.			
Erith Oil Works Jetty	 Type of structure: Solid deck on piles structure. Extends approximately 100m into the river Approximate length of berth: 124m Bed level at berth: 6m – 7m below CD Ownership: Unknown Operator: Erith Oil Works	*Use of the structure* (-) Jetty currently in operation and handling liquid bulk product. (-) Jetty not well suited for handling construction material as quay needs to be updated with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (Erith Oil Works). *Berth access* (-) Direct vehicle access onto the jetty is not suitable as it seems to be obstructed by existing overhead pipelines and there is no egress route. (+) No dredging required. *Road connection* (-) Road access though the oil terminal only. *Condition of the structure* (-) State of structure unknown. *Other* (+) Close proximity to the Proposed Scheme, accessed via Church Manorway (good standard of road). (-) Oil exclusion zone could be in place.	(-) Not compatible due to current utilisation.	(+) In working condition but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty utilisation.

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Doulton's Jetty	 Type of structure: Solid L shaped deck on piles structure. Extends approximately 50m in the river Approximate length of berth: 44m Bed level at berth: 4m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not currently in operation. (-) Wharf not well suited for construction of material handling as quay needs to be upgraded with an egress route to be operational. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is occupied (buildings). *Berth access* (-) Dredging required or only small access tidal window available at high tides. (-) Marine access may prove difficult due to nearby longer jetties. *Road connection* (-) HGV access through an operational, private site. *Condition of the structure* (-) Unknown condition. Appears to be in derelict condition and might require strengthening works. *Other* (-) A management system will be required for the England Coast Path user safety.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging, egress route required and potentially upgrade works).
Conways Jetty	 Type of structure: solid deck on piles structure. Extends approximately 135m into the river Approximate length of berth: 90m Bed level at berth: 4.5m below CD Ownership: Unknown	*Use of the structure* (+) Wharf with conveyor used for dry bulk handling only. Not suited for breakbulk or AIL. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/factory). *Berth access* (+) No dredging required. (-) Vehicle access onto structure is narrow and not suitable for large construction traffic volume. (-) Existing conveyor belt suitability for construction materials needs to be checked.	(+) Suitable for dry bulk handling only.	(+) In operational condition.	(+) Potential option for dry bulk handling only (egress route required for vehicles).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
		Road connection (+) Travel distance on road to and from the Site is approximately 1.5km (via the A2016). On-road journey time of approximately 5 minutes conducive to 'last mile' solution. (+) Good standard of road access for HGV transport movements. *Condition of the structure* (+) Conditions of the jetty unknown but seems operational for dry bulk handling.			
Monarch Pier	 Type of structure: Three isolated dolphins and a trestle, all unconnected. Extends approximately 117m into the river Approximate length of berth: 78m Bed level at berth: 3m below CD Ownership: Unknown	*Use of the structure* (-) Substantial modifications required as it seems to be a dismantled jetty. *Land occupancy* (-) Not assessed as discarded due to the dismantled jetty state. *Berth access* (-) Not assessed as discarded due to the dismantled jetty state. *Road connection* (-) Not assessed as discarded due to the dismantled jetty state. *Condition of the structure* (-) Dismantled jetty.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial work required (dismantled jetty).
Town Wharf	 Type of structure: Solid Quay Wall Approximate length of berth: 51m Bed level at berth: 6m above CD	*Use of the structure* (-) Wharf not well suited for construction of material handling as quay needs to be deepened to be operational. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is occupied (buildings/car parks/ public park) so nowhere for loading to take place or to store HGV. (-) Riverside gardens would need to be converted into a construction materials storage area. *Berth access* (-) Dredging required due to the shallow bed level. (+) Vehicular access to the berth is available.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging, upgrade strengthening works and new land site area).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
	Ownership: Unknown	*Road connection* (-) Vehicle access to the Site via streets fronted by residential developments. *Condition of the structure* (-) State of structure unknown but deepening required so probably strengthening works as well. *Other* (-) A management system will be required for the England Coast Path user safety.			
Erith Pier	 Type of structure: Solid L shaped deck on piles structure. Extends approximately 175m into the river Approximate length of berth: 172m Bed level at berth: 2.5m above CD - 2m below CD Ownership: Unknown	*Use of the structure* (-) Wharf not well suited for construction of material handling as publicly accessible and the need of an egress route structure. *Land occupancy* (-) No obvious landside space for loading and HGV storage. *Berth access* (-) Vehicular access onto structure is narrow and not suitable for large construction traffic volume and would conflict with leisure use. (-) Dredging required or only small access tidal window available at high tides. *Road connection* (+) Vehicular access to the Site via good standard roads (typically urban dual carriageway – A2016). *Condition of the structure* State of structure unknown.	(-) Not suitable to handle construction materials without additional works.	(-) Major work required.	(-) Unsuitable option due to major modifications required (egress route and closure to public access required).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
European Metal Recycling (51) Quay Wall	 Type of structure: Solid Quay Wall Approximate length of berth: 180m Bed level at berth: 3.5m above CD Ownership: Unknown Operator: EMR Erith	*Use of the structure* (-) Wharf not well suited for construction of material handling as quay needs to be deepened to be operational. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (EMR Erith). *Berth access* (-) Dredging required or only small access tidal window available at high tides. (+) Vehicular access to the berth. *Road connection* (+) Vehicular access to Site. *Condition of the structure* (-) State of structure unknown but deepening required.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging, upgrade works).
Anchor Bay Wharf	 Type of structure: Solid Quay Wall Approximate length of berth: 135m Bed level at berth: 4m above CD Ownership: Unknown	*Use of the structure* (-) Wharf not well suited for construction of material handling as quay needs to be deepened to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (HGV parking/heavy storage). *Berth access* (-) Dredging required or only small access tidal window available at high tides. *Road connection* (+) Vehicular access to the Site. *Condition of the structure* (-) State of structure unknown but deepening required.	(-) Not suitable to handle construction materials without additional works.	(-) Substantial work required.	(-) Unsuitable option due to substantial modifications required (dredging, upgrade works).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Standard Wharf	 Type of structure: Deck on piles pier. Extends approximately 56m into the river Approximate length of berth: 56m Bed level at berth: 3m - 5m above CD Ownership: Unknown	*Use of the structure* (-) Jetty structure and configuration not suitable to support handling of construction material as the finger pier is too narrow for conveyor belt and vehicles. (+) Safeguarded Wharf Status. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user. *Berth access* (-) Dredging required or only small access tidal window available at high tides. (+) Vehicular access onto structure. *Road connection* (+) Vehicular access to the Site. *Condition of the structure* (-) State of structure unknown. May not be suitable to support loading /unloading and deepening required.	(-) Type and configuration of structure not suitable to handle construction material.	(-) Unknown but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty type (narrow finger pier).
Standard Wharf Pier	 Type of structure: Deck on piles pier. Extends approximately 60m in the river. Approximate length of berth: 60m Bed level at berth: 3m - 5m above CD Ownership: Unknown	*Use of the structure* (-) Jetty structure and configuration not suitable to support handling of construction material as the finger pier is too narrow for conveyor belt and vehicles. *Land occupancy* (-) Land immediately behind structure is owned and occupied by constant user (Express Concrete). *Berth access* (-) Dredging required or only small access tidal window available at high tides. *Road connection* (+) Vehicular access to the Site. *Condition of the structure* (-) State of structure unknown. May not be suitable to support loading /unloading.	(-) Type and configuration of structure not suitable to handle construction material.	(-) Unknown but no further consideration given lack of compatibility.	(-) Unsuitable option due to current jetty type (narrow finger pier).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
Littlebrook Pier	 Type of structure: Solid deck on piles structure. Extends approximately 52 into the river Approximate length of berth: 210m Bed level at berth: 1m – 4.8m below CD Ownership: Unknown	*Use of the structure* (-) Wharf not well suited for construction of material handling as quay needs to be updated with an egress route to be operational. *Land occupancy* (-) Land immediately behind structure is occupied (warehouse and container storage). *Berth access* (-) No vehicular access onto structure. (+) Dredging may not be required, or small access tidal window restriction may apply at low tides. *Road connection* (-) No connection to the local road network. Existing flood wall to be crossed over. *Condition of the structure* (-) State of structure unknown. May not be suitable to support loading /unloading. *Other* (-) A management system will be required for the England Coast Path user safety. (-) Increasing distance from the Proposed Scheme (approximately 11km).	(-) Not suitable to handle construction materials without additional works.	(-) Major work required.	(-) Unsuitable option due to major modifications required (egress route, land storage and connection to local road network required).
Littlebrook Main Jetty	 Type of structure: Deck on piles structure with main platform and 2 no. dolphins either side. Extends approximately 144m into the river	*Use of the structure* (-) Wharf was used for liquid bulk handling so not well suited for handling of construction material fed by vehicles. *Land occupancy* (-) Land immediately behind structure is occupied (Wincanton). *Berth access* (-) No existing vehicular access onto platform. (-) All (dry bulk handling equipment) topsides required for dry bulk material handling. (+) No dredging required. *Road connection*	(-) Type and configuration of structure not suitable to handle construction material.	(-) Major work required.	(-) Unsuitable option due to major work required (land storage and dry bulk handling topsides required).

Structures	Available Details	Assessment	Usage Compatibility	Condition	Status
	Approximate length of berth: 308m Bed level at berth: 6m – 9m below CD Ownership: Unknown	(+) Good vehicular access to the Site. *Condition of the structure* (-) State of structure unknown. *Other* (-) A management system will be required for the England Coast Path user safety. (-) Increasing distance from the Proposed Scheme (approximately 11km).			

APPENDIX E – GREENHOUSE GAS TECHNICAL NOTE – TERRESTRIAL SITE ALTERNATIVES

APPENDIX E: GREENHOUSE GASES TECHNICAL NOTE - TERRESTRIAL SITE ALTERNATIVES

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

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Revision A

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1. GREENHOUSE GASES TECHNICAL NOTE – TERRESTRIAL SITE ALTERNATIVES

1.1. PURPOSE OF THIS TECHNICAL NOTE

1.1.1. The Applicant has carefully considered the location of the Proposed Scheme, with due evaluation of multiple alternative locations for the Carbon Capture Facility, as described in the **Terrestrial Site Alternatives Report (TSAR) (APP-125)** and the **Applicant's Response to Relevant Representations (AS-044)** particularly **Appendix H** to that Response, the **Terrestrial Site Assessment Addendum**.

1.1.2. This technical note extends the assessment undertaken of the development zones in the **TSAR (APP-125)** to provide a comparative review of potential greenhouse has (GHG) emissions for each of the reasonable alternatives considered. This GHG emissions assessment has not been extended to the additional zones considered in the **TSAR Addendum (AS-044)** because the original development zones provide a reasonable and proportionate basis of assessment.

1.2. APPROACH AND ASSUMPTIONS

1.2.1. A qualitative assessment of expected GHG emissions has been completed for the development zones identified in the **TSAR (APP-125)** (see **Table 1-2** of this technical note). Commentary for each of the alternatives is provided at **Section 1.4** of this technical note, with a summary of the comparative review provided in **Section 1.5**.

1.2.2. A number of key assumptions underpin this assessment of GHG emissions for the development zones, specifically:

- Existing buildings and structures occupying the development zones would need to be demolished and removed, which would generate GHG emissions associated with use of plant and equipment, along with the removal and disposal of materials.
- The services currently provided at the development zones would need to be met by new development at other unspecified location(s), therefore GHG emissions would be generated by the provision of equivalent replacement buildings and infrastructure elsewhere, requiring either construction of new-build facilities or refurbishment/fit-out of existing facilities.
- It is not possible to determine where replacement services would be provided; however, it is assumed that activities for replacement services at other locations and the associated operational GHG emissions would be the same as at the existing locations, there would be no change to operational GHG emissions associated with the existing services and activities.
- There is potential for minor changes to the current design of the Carbon Capture Facility to accommodate its provision within the development zones, but precise details are unknown. The associated operational GHG emissions for the Proposed Scheme are assumed to be the same for each of the development zones.

1.2.3. Based on the above assumptions, the GHG assessment is focussed on a comparative review of emissions related to construction and demolition activities for the development zones. It is assumed that operational GHG emissions for the Carbon Capture Facility and any replacement services would be the same for each of the alternatives, so these are not considered further in this technical note.

1.2.4. For context, the construction phase GHG emissions for the Proposed Scheme reported in **Chapter 13: Greenhouse Gases of the Environmental Statement (Volume 1) (APP-062)** are presented in **Table 1-1** (aligned with construction lifecycle stages for PAS 2080[1]). These provide an indication of the source and scale of GHG emissions determined for construction and demolition activities for the design of the Carbon Capture Facility in South Zone 1 (chosen location). The construction categories identified in **Table 1-1** provide the basis for the comparative review, representative of key emissions sources considered to differ for the development zones.

Table 1-1: Estimated construction GHG emissions for development of the Proposed Scheme in South Zone 1 (chosen location)

Emissions Sources	Emissions (tCO_2e)
Product Stage (manufacture and transport of raw materials to suppliers) (A1-3)	73,895 (75% of total)
Transport of Materials to Site (A4)	10,130 (10% of total)
Plant and Equipment Use during Construction (A5)	9,085 (9% of total)
Transport of Waste (A5)	4,489 (5% of total)
Disposal of Waste (A5)	271 (<0.5% of total)
Land use, Land Use Change and Forestry (A5)	463 (0.5% of total)
Total	**98,332**

1.2.5. There is insufficient information to quantify GHG emissions across the construction categories in **Table 1-1** for each of the alternatives. However, where practicable, an indication of the potential scale of change for the development zones is provided in the commentary at **Section 1.4**. Given the level of information available for each

[1] Institute of Civil Engineers (2023). 'Guidance Document for PAS 2080: carbon management in buildings and infrastructure'. Available at: [redacted]

development zone, a qualitative assessment of GHG emissions is considered to be appropriate and proportionate for the comparative review.

1.3. DEVELOPMENT ZONES

1.3.1. As described in the **TSAR (APP-125)**, the Riverside Campus is located in an urban area and site options for the Proposed Scheme are not extensive. The zone to the north comprises the River Thames and is limited by existing, safeguarded and operational infrastructure and the England Coast Path (FP3/NCN1). The zone to the east comprises Belvedere Industrial Estate and is limited by existing, operational (including large scale) business. The zone to the west is limited by development constraining policy allocations (including Metropolitan Open Land and Accessible Open Land designated as public space), Public Rights of Way (PRoW) and operational infrastructure associated with the Crossness Sewage Treatment Works (STW). The zone to the south is also substantially limited by development constraining policy allocations (including Metropolitan Open Land and Accessible Open Land designated as public space) and a PRoW, although it does also provide land allocated for development. There is no unconstrained choice, which is not an unusual situation for an infrastructure project of national significance.

1.3.2. The development zones described in the **TSAR (APP-125)** are summarised in **Table 1-2**.

Table 1-2: Development Zones for Carbon Capture Facility

Development Zone	Description
North Zone	Comprising the intertidal zone of the River Thames, to the north of the of the Iron Mountain Records Storage Facility, where the current Belvedere Power Station Jetty (disused) is located. This development zone would require the creation of land within the intertidal zone. Given limitations on land available in the North Zone (due to navigational restrictions, safeguarded wharves and associated activities), this alternative may also consider extension into a portion of the East Zone occupied by the existing Iron Mountain storage facilities (i.e. North Zone 1 in the **TSAR Addendum (AS-044)**).
East Zone	Comprising the Iron Mountain Records Storage Facility and Lidl Warehouse/ Belvedere Regional Distribution Centre (an operating business). It is considered that the emissions associated with demolishing and replacing the ASDA facilities located within the East Zone would be comparable to Lidl.
West Zone	Comprising the Thames Water disused sludge incinerator and the Great Breach Pond and a parcel adjacent to Riverside 2 which includes the Great Breach Pumping Station. This

	development zone would also contain parts of Crossness Local Nature Reserve (LNR) land, Metropolitan Open Land (MOL), public of space, PRoW and Erith Marshes Site of Importance for Nature Conservation (SINC) land.
South Zone	Comprising elements of the following land uses as described in **Chapter 2: Site and Proposed Scheme Description of the Environmental Statement (Volume 1) (APP-051)**: • open grassland, hardstanding, ditches and the Thames Water Access Road; • Metropolitan Open Land; • Public Rights of Way (FP2); • the Accessible Open Land (used as and designated as public open space and as the South London Green Chain); • areas of Crossness LNR (including land known as the East Paddock and West Paddock), Erith Marshes SINC and Thames Marshes Strategic Green Wildlife Corridor; and • land allocated as SIL including land occupied by Munster Joinery (an operating business).

1.4. ASSESSMENT OF GHG EMISSIONS FOR THE DEVELOPMENT ZONES

1.4.1. As noted in **Section 1.2** the sources of GHG emissions that are considered to differ for the development zones relate to construction and demolition activities. The estimated GHG emissions for construction and demolition activities for the Carbon Capture Facility in South Zone 1 (chosen location) is provided in **Table 1-1**. For comparison, **Table 1-3** provides commentary on estimated differences between the construction phase GHG emissions identified for South Zone 1, and development of the Carbon Capture Facility in the North, East and West development zones and additionally South Zones 2, 3, 4 and 5 (identified in Section 3.5 of the **TSAR (APP-125)**).

Table 1-3: Carbon Capture Facility GHG Emissions Comparative Review

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
Product Stage (manufacture and transport of raw materials to suppliers) (A1-3) (75% of total construction emissions for South Zone 1)	There would be an increase in GHG emissions compared to South Zone 1, proportionate to the embodied carbon in imported materials used to create land for an indicative area of 28,000 m^2 within the River Thames' intertidal zone. In addition to aggregate materials this will include materials for connecting pipework required to cross PRoW and materials for foundation/piling works. If North Zone 1 is considered (including land occupied by the existing Iron Mountain Records Storage Facility), this would also require the development of replacement storage facilities at an alternative location. An increase in GHG emissions would be expected compared to South Zone 1, associated with additional embodied carbon, either for construction of new-build replacement facilities with an indicative footprint of 37,000 m^2 or refurbishment/fit-out of an existing facility of an equivalent scale.	There would be a significant increase in GHG emissions compared to South Zone 1, proportionate to the embodied carbon in materials required for construction of replacement new-build storage and distribution facilities at an alternative location, with an indicative combined footprint of 75,000 m^2. If the displaced storage and distribution facilities were able to occupy existing facilities at an alternative location, there would be less embodied carbon than for a new-build facility. However, it is expected that there would still be a substantial increase in GHG emissions compared to South Zone 1, associated with the embodied carbon for refurbishment/fit-out materials for facilities of an equivalent scale. With respect to construction of the Carbon Capture Facility, compared to South Zone 1, there is also expected to be additional embodied carbon associated with connecting pipework	There would be an increase in GHG emissions compared to South Zone 1, primarily associated with additional pipework required to cross existing land uses for the West Zone, including PRoW, the Erith Marshes SINC and Crossness LNR, and through the operational Riverside Campus. Development in the West Zone may require the relocation of office space within the disused sewage sludge incinerator building but is not expected to require significant replacement facilities (the sewage sludge incinerator has not operated for some time) or creation of land.	Compared to South Zone 1 there is potential for a marginal increase in embodied carbon emissions for South Zones 3 and 5, associated with the installation of pipework crossing the Crossness LNR and longer pipework routes for connecting to the Proposed Jetty and Riverside 1 and Riverside 2. The embodied carbon emissions for South Zone 1 are not expected to change significantly for South Zone 2 and 4.

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
		required to cross PRoW for development in the East Zone.		
Transport of Materials to Site (A4) (10% of total construction emissions for South Zone 1)	There would be an increase in GHG emissions compared to South Zone 1, proportionate to emissions for the transport of additional materials required to create land for an indicative area of 28,000 m^2, additional pipework and establishing suitable foundations within the River Thames' intertidal zone. If North Zone 1 is considered (including land occupied by the existing Iron Mountain Records Storage Facility) then there would be additional GHG emissions for the transport of construction materials required for development of replacement storage facilities with an indicative footprint of 37,000 m^2 at an alternative location (either for new-build or refurbishment/fit-out of existing facilities).	There would be a significant increase in GHG emissions compared to South Zone 1, proportionate to emissions for the transport of additional materials required for development of new-build replacement distribution and storage facilities with an indicative combined footprint of 75,000 m^2 at an alternative location. If the displaced services were able to occupy existing facilities at an alternative location, emissions for transport of construction materials would be lower than for a new-build facility but there would still be a relative increase in emissions compared to South Zone 1 for transport of additional materials required for refurbishment/fit-out for facilities of an equivalent scale. There would also be an increase in GHG emissions compared to South Zone 1, proportionate to emissions for the transport of materials required for additional pipework for development of the Carbon Capture Facility in the East Zone.	There would be an increase in GHG emissions compared to South Zone 1, proportionate to emissions for the transport of materials expected to be required for additional pipework.	For South Zones 3 and 5 there may be a marginal increase in GHG emissions compared to South Zone 1, proportionate to emissions for the transport of materials required for additional pipework. No change to transport related GHG emissions for construction materials is expected for South Zones 2 and 4.

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
Plant and Equipment Use during Construction (A5) (9% of total construction emissions for South Zone 1)	Differences in the type of plant and equipment required to establish suitable ground conditions and foundations in the River Thames' intertidal zone compared to South Zone 1 are not known. However, it is expected that compared to South Zone 1 this would require more extensive energy and fuel in plant and equipment use, and therefore an associated increase in GHG emissions. If North Zone 1 is considered (including land occupied by the existing Iron Mountain Records Storage Facility) then it is expected there would be additional GHG emissions for use of plant and equipment compared to South Zone 1, both for demolition of the existing storage facilities and development of equivalent replacement storage facilities at an alternative location.	There would be an increase in GHG emissions compared to South Zone 1, proportionate to the additional use of plant and equipment required for the demolition of existing storage and distribution facilities in the East Zone. Considering the combined footprint of 75,000m^2 for the existing storage and distribution facilities in the East Zone, this would be significantly more than that required for demolition of the Munster Joinery premises (indicative footprint of 2,000m^2) under the chosen option (South Zone 1). There would also be an increase in GHG emissions associated with the additional use of plant and equipment at an alternative location, either for construction of replacement new-build facilities or (to a lesser extent) for refurbishment/fit-out of existing facilities of an equivalent scale.	There would be a proportionate increase in GHG emissions associated with the use of plant and equipment for installation of additional pipework for this alternative. This alternative is also expected to require demolition of the disused sludge incinerator building, a substantially larger (indicative footprint of 4,700 m^2) and more complex structure than the Munster Joinery premises (indicative footprint of 2,000m^2), which would be demolished under South Zone 1. On balance it is considered there would be an increase in GHG emissions associated with use of plant and equipment required for demolition activities compared to South Zone 1.	The **TSAR (APP-125)** identifies that South Zones 2, 4 and 5 would not require demolition of the Munster Joinery premises, therefore there would be a minor decrease in GHG emissions associated with plant and equipment used for demolition activities, which would not apply to these options. However, emissions from the use of plant and equipment is assumed to be comparable to South Zone 1 for other construction activities for these options. There is also expected to be a marginal increase in GHG emissions associated with the use of plant and equipment for installation of additional pipework for South Zones 3 and 5.
Transport of Waste (A5)	Compared to South Zone 1, works to create land within the River Thames' intertidal zone is expected to generate additional quantities of	There would be a significant increase in GHG emissions compared to South Zone 1, proportionate to the transport of additional waste material	Works for installation of additional pipework is not expected to generate significant quantities of	For South Zones 3 and 5 there is potential for a marginal increase in GHG emissions for transport of construction waste

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
(5% of total construction emissions for South Zone 1)	dredging material that would need to be transported offsite for disposal, with an associated increase in GHG emissions. There may also be a marginal increase in transport related GHG emissions compared to South Zone 1, related to the disposal of excess concrete and steel required for foundations/piling and additional pipework. If North Zone 1 is considered (including land occupied by the existing Iron Mountain Records Storage Facility) then there would be additional GHG emissions associated with the transport of waste from demolition of the existing storage facilities and transport of waste arisings for development of replacement storage facilities at an alternative location.	arising from the demolition of existing storage and distribution facilities in the East Zone. This would be more extensive than that required for demolition of the Munster Joinery premises under the chosen option (South Zone 1), which is considerably smaller than the buildings considered for demolition in the East Zone. There would also be an increase in GHG emissions for the transport of construction waste arising from the construction of replacement new-build facilities (or refurbishment/fit-out activities for existing facilities). Works for installation of additional pipework is not expected to generate significant quantities of waste that would need to be transported offsite. However, there may be a marginal increase in GHG emissions for the transport of construction waste from development of the Carbon Capture Facility in the East Zone.	waste that would need to be transported offsite. However, there may be a marginal increase in GHG emissions for the transport of construction waste compared to South Zone 1. Waste arisings from demolition of the disused sludge incinerator are expected to be greater than those for demolition of the Munster Joinery premises proposed under South Zone 1. GHG emissions associated with the offsite transport of demolition waste is therefore expected to be greater for this development zone.	compared to South Zone 1, related to waste arising from installation of additional pipework. The **TSAR (APP-125)** identifies that South Zones 2, 4 and 5 would not require demolition of the Munster Joinery premises, therefore there would be a nominal decrease in GHG emissions for these options, compared to the emissions attributed to South Zone 1 for the transport of demolition waste.
Disposal of Waste (A5) (<0.5% of total construction emissions for South Zone 1)	Compared to South Zone 1, works to create land within the River Thames' intertidal zone would generate additional quantities of dredging material requiring disposal. Waste from dredging activities is expected	It is assumed that the majority of waste materials arising from demolition of the existing storage and distribution facilities in the East Zone, would similarly be considered for recycling (e.g. metals, glass,	Works for installation of additional pipework is not expected to generate significant quantities of waste requiring disposal, which is expected to	For South Zones 3 and 5, there is potential for a marginal increase in GHG emissions for the disposal/recycling of waste arising from the installation of additional pipework (expected

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
	to be predominantly inert material, with limited associated GHG emissions for disposal; however, this is dependent on any contamination within the material, with the potential for additional GHG emissions for the management of materials classified as hazardous waste. Otherwise, the type of waste generated is expected to be minor additional quantities waste suitable for recycling (i.e. concrete and steel arising from foundations/piling activities and additional pipework). It is expected there would be an increase in GHG emissions for waste disposal/recycling compared to South Zone 1, in line with the type and additional quantities of waste generated. If North Zone 1 is considered (including land occupied by the existing Iron Mountain Records Storage Facility) then there would be a relative increase in GHG emissions compared to South Zone 1, associated with the disposal and/or recycling of demolition materials and construction waste generated from the development of replacement storage facilities at an alternative location.	concrete etc). However, given the additional quantity of waste generated there would be a proportionate increase in GHG emissions for the onward management of demolition waste compared to South Zone 1. It is also expected that there would be a relative increase in construction waste arising from the construction of replacement new-build facilities or refurbishment/fit-out of existing facilities. There is expected to be a marginal increase in GHG emissions associated with the disposal/recycling of waste arising from the installation of additional pipework for development of the Carbon Capture Facility in the East Zone.	consist mainly of material suitable for recycling (e.g. excess steel). It is expected there would be a proportionate increase in GHG emissions for waste disposal/recycling compared to South Zone 1, in line with the additional waste generated. Waste arisings from demolition of the disused sludge incinerator are expected to be greater than those for demolition of the Munster Joinery premises proposed under South Zone 1. GHG emissions associated with the disposal and/or recycling of demolition waste is therefore expected to be greater for this development zone.	to be predominantly recyclable material e.g. excess steel). The **TSAR (APP-125)** identifies that South Zones 2, 4 and 5 would not require demolition of the Munster Joinery premises, with a nominal reduction in GHG emissions considered for these options compared to South Zone 1, for avoiding the disposal of demolition waste.

Emissions Sources	North Zone	East Zone	West Zone	South Zone (Options 2, 3, 4 and 5)
Land use, Land Use Change and Forestry (A5) (0.5% of total construction emissions for South Zone 1)	It is understood that development of the River Thames' intertidal zone would lead to loss of intertidal habitat that would require offsite mitigation and would also impact the adjoining Belvedere Dykes SINC. The extent to which loss of these habitats would affect GHG emissions has not been determined but in the absence of a detailed assessment is assumed to be of a similar scale to that for South Zone 1. Considering North Zone 1 (including land occupied by Iron Mountain Records Storage Facility) is expected to have minimal impact in terms of loss of habitat or GHG emissions associated with land use change. North Zone 1 would avoid impacts to Crossness LNR and Erith Marshes SINC and the associated GHG emissions. However, it is unclear whether this would be matched by GHG emissions associated with loss of intertidal habitats.	It is expected that there would be a decrease in GHG emissions associated with land use change compared to South Zone 1, as although development in the East Zone may lead to the partial loss of habitat associated with the Belvedere Dykes SINC, it would avoid impacts to Crossness LNR and Erith Marshes SINC. The location of replacement storage and distribution facilities is unknown so GHG emissions for the associated land use change is unknown, although it is assumed there would be no change in emissions for this category for refurbishment/fit-out of an existing facility.	Based on the **TSAR (APP-125)** the loss of land within the Crossness LNR and the Erith Marshes SINC would be greater for development within the West Zone (at 4.43 ha), compared to development in South Zone 1 (at 2.55 ha). It is therefore expected there would be a relative increase in loss of habitat and associated GHG emissions for the land use change for this alternative.	The loss of land within the Crossness LNR and the Erith Marshes SINC would be 2.55 ha for development in South Zone 1. It is understood from the **TSAR (APP-125)** that the equivalent loss of land (and associated habitat) identified for the other South Zone options would be 5.64 ha for option 2; 3.64 ha for option 3; 5.76 ha for option 4; and 4.28 ha for option 5. It is therefore expected that compared to South Zone 1 there would be a relative increase in loss of habitat and associated GHG emissions for land use change for each of the alternative South Zone options.

1.5. SUMMARY OF COMPARATIVE REVIEW

1.5.1. The review of potential GHG emissions has identified that whilst operation phase emissions are likely to remain substantially the same for each of the development zones, when compared to the South Zone 1 (the chosen location), there is expected be an increase in GHG emissions generated from construction and demolition activities for development of the proposed Carbon Capture Facility within the North, East and West Zones. There is also expected to be an increase in GHG emissions for development in the South Zone options 2, 3, 4 and 5, relative to South Zone 1, although not to the same extent as the other development zones.

1.5.2. It is considered that the most significant increase in GHG emissions appear in the North, East and West Zones relative to South Zone 1, which would be attributable to embodied carbon, transport of increased quantities of construction materials and use of plant and equipment required for the development of replacement services and facilities at an alternative location, and for demolition of existing structures. This would primarily relate to the removal and replacement of storage and distribution facilities identified in the East Zone, which as may be expected is considered to be greatest where the provision of replacement facilities requires new-build construction (rather than refurbishment of existing facilities at an alternative location if available). Further, though not assessed here, the potential relocation of these businesses out of the Borough of Bexley could have increased transport implications (for example staff accessing their place of work), and consequent carbon emissions. It is also expected to apply to a lesser extent to additional construction and demolition activities identified for the North Zone and West Zone. A marginal increase in GHG emissions associated with the transport and disposal of waste arisings is also identified compared to South Zone 1, which given the extent of demolition and removal for structures within the East Zone is expected to be greatest for this option.

1.5.3. With respect to GHG emissions associated with land use change, the review identifies that there is potential for a marginal reduction in GHG emissions for the East Zone, as loss of habitat for the Crossness LNR and Erith Marshes SINC would be avoided. The change in GHG emissions relating to land use change for the North Zone was not determined; however, there is potential that loss of habitat for the River Thames' intertidal zone in the North Zone would be comparable, or worse, to the GHG emissions estimated by loss of the habitat in South Zone 1. Development in the West Zone is expected to result in a marginal increase in GHG emissions associated with the potential for increased loss of habitat for the Crossness LNR/Erith Marshes SINC under this option.

1.5.4. For South Zones 2, 3, 4 and 5, marginal increases in GHG emissions are identified relative to South Zone 1. It is considered that the greatest impact on GHG emissions would be for South Zones 3 and 5, due to the requirement for additional pipework identified for these options, along with increased land take from the Erith Marshes SINC and associated loss of habitat; noting though that South Zone 5 would avoid some GHG emissions associated with demolition of the Munster Joinery premises.

For South Zone 2 and 4 there would be additional GHG emissions compared to South Zone 1, associated with the increased loss of habitat for Crossness LNR/Erith Marshes SINC, although these options would also avoid GHG emissions associated with demolition of the Munster Joinery premises. On balance, given the scale of additional land take for South Zones 2 and 4 compared to South Zone 1, and the nominal level of emissions associated with demolition of the Munster Joinery premises, the GHG emissions for South Zone 2 and 4 are likely to be higher than those for South Zone 1.

1.5.5. In conclusion, the assessment identifies that South Zone 1 would minimise GHG emissions compared to the North, East and West development zones, and also relative to the other South Zone options. Alongside the factors considered in the **TSAR (APP-125)**, the GHG assessment supports the view that South Zone 1 represents the most appropriate option for development of the Carbon Capture Facility.

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