

18 INFRASTRUCTURE

18.1 Introduction

18.1.1 This section of the ES describes the existing environment in relation to infrastructure within the study area and assesses the potential impacts of the construction, operation and decommissioning phases of the proposed scheme. Mitigation measures are detailed and a discussion of the residual impacts presented.

18.1.2 Flood and coastal defences are addressed within **Section 17**. Land drainage issues are addressed within **Section 6** (see **Table 18-1**).

18.2 Policy and consultation

Policy

NPS for Ports

18.2.1 The NPS for Ports (Department for Transport, 2012) is of direct relevance to the proposed scheme. Paragraph 5.13.1 of the NPS states that a port infrastructure project will have direct effects on the existing use of the proposed site and may have indirect effects on the use, or planned use, of land in the vicinity for other types of development. The NPS does not, however, provide guidance on the assessment of impacts with regard to existing infrastructure assets.

National Planning Policy Framework

18.2.2 Section 7 of the NPPF sets out the Government's guidance with regard to the design of proposed developments; the most appropriate guidance of relevance to this section of the ES includes:

- The Government attaches great importance to the design of the built environment. Good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people (Paragraph 56 of the NPPF).
- Planning policies and decisions should not attempt to impose architectural styles or particular tastes and they should not stifle innovation, originality or initiative through unsubstantiated requirements to conform to certain development forms or styles (Paragraph 60 of the NPPF).
- Applicants will be expected to work closely with those directly affected by their proposals to evolve designs that take account of the views of the community (Paragraph 66 of the NPPF).

Redcar and Cleveland Borough Council Local Plan

18.2.3 RCBC Development Plan Document policies of relevance when considering the proposed scheme in relation to infrastructure include:

- CS20: Good quality and inclusive design will be promoted in all new developments. This policy states that all development proposals will incorporate sustainable construction techniques and design concepts for buildings and their layouts to reduce the local and global impact of the development particularly on climate change.

- DP3: Sustainable development – all development will need to be designed to a high standard.

Stockton-on-Tees Borough Council Local Plan

18.2.4 SBC Development Plan Document policies of relevance when considering the proposed scheme in relation to infrastructure include:

- CS1: A range of employment sites will be provided throughout the Borough, both to support existing industries and to encourage new enterprises. Development will be concentrated in the conurbation, with emphasis on completing the development of existing industrial estates.

Consultation

18.2.5 A summary of comments included in the PINS Scoping Opinion, along with responses received to consultation under Section 42 of the Planning Act 2008, relevant to infrastructure are presented in **Table 18-1**.

Table 18-1 Summary of comments included in the PINS Scoping Opinion and received in response to Section 42 consultation with regard to infrastructure

Consultation comment	Response / Section of ES in which the comment has been addressed
Scoping Opinion (January 2014)	
<i>Secretary of State</i>	
The scoping report provides details of a number of pipelines which run along the southern boundary of the site. However it is unclear if these are within or outside of the proposed site boundary and how they would relate to the development of the conveyor presented in Option 3.	Refer to Figure 18-1 and Sections 18.5, 18.6 and 18.7
The ES should provide a detailed description of the existing baseline in relation to infrastructure on and around the site. It is noted that this assessment will be primarily desk based.	Section 18.4
The applicant is advised to identify all infrastructure users and operators that may be affected by the proposed development and investigate potential effects of the development on their infrastructure.	Section 18.4, Section 18.5 and Section 18.6
The ES should consider the impacts of connecting into the existing utility infrastructure and the capacity to do so.	Section 18.2
The Secretary of State advises consideration of potential impacts on land drainage is provided within the proposed hydrology, hydrogeology and soils chapter of the ES as land drainage is considered to be an integral part of this assessment.	Section 6
Section 42 consultation responses	
<i>Environment Agency</i>	
Within the waste body of the landfill, leachate monitoring boreholes and an array of	Section 18.3.4

Consultation comment	Response / Section of ES in which the comment has been addressed
landfill gas extraction boreholes are installed. These are connected to horizontal pipework which lead to a gas utilisation plant and flare at the north-east corner of the site.	
The route of the elevated conveyors and the indicative access routes do seem to impinge on the waste boundary and are certainly in areas which contain existing monitoring infrastructure. This infrastructure must not be damaged and access to them must be maintained. The Environment Agency can provide further information on the location of this infrastructure if required.	Section 18.4
The proposed use of the whole of the surface of the landfill as a lay down area is of great concern given the implications on potential damage to the engineered cap and restoration, gas and leachate monitoring and extraction pipeworks (and required access). Although these proposals will need to be agreed under the Environmental Permitting regime, careful consideration needs to be given at this stage to the suitability of using this area.	The scheme design has been amended in light of this concern and the site compound is no longer proposed to be located on the Bran Sands landfill site, removing the potential for damage to the gas and leachate monitoring pipework at the surface of the landfill site due to the site compound.
<i>Various operators</i>	
<p>National Grid</p> <p>National Grid's overhead line(s) is protected by a Deed of Easement / Wayleave Agreement which provides full rights of access to remain, maintain, repair and inspect the asset.</p> <p>Statutory electrical safety clearances must be maintained by all times. Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3m of any of National Grid's high voltage conductors.</p> <p>Drilling or excavation works should not be undertaken if they have potential to disturb or adversely affect the foundations or pillars of support of any existing tower. These foundations always extend beyond the base area of the existing tower.</p>	<p>Consultation with the owners and operators of existing infrastructure in the zone of proposed works is ongoing regarding the protective measures that would be put in place to ensure that existing infrastructure is not damaged or compromised in any way as a result of the construction of the proposed scheme. Draft Protective Provisions are under discussion and have been included in the Draft DCO.</p> <p>Section 18.5</p>
<p>Network Rail</p> <p>Network Rail will seek to obtain certain assurances and protections in connection with the proposed scheme. Network Rail also expects to see its standard Protective Provisions in a schedule to the DCO, and that the promoter will enter into any such asset protection or other required agreements as are identified once further details regarding the works have been provided.</p>	
<p>Northumbrian Water Limited</p> <p>The southern conveyor has potential to affect the access road bridge especially if it passes over the bridge. NWL requires full clearance for traffic in this location. The southern route could also affect NWLs pipe work where access would need to be retained for maintenance. Access for the NWL jetty, jetty compound and pipelines</p>	

Consultation comment	Response / Section of ES in which the comment has been addressed
<p>would be required for maintenance and inspection.</p>	
<p>Bond Dickinson (on behalf of RWE and Sterling, SABIC and Huntsman)</p> <p>Bond Dickinson provided information regarding the presence of existing apparatus for each of the operators that they were acting on behalf of, as well as detail on title issues and protective measures. With regard to title deeds, YPL was urged to consult closely with the respective operators to understand the precise location and nature of each of the assets, and to review the leases and information available at the Land Registry. It was also stated that the operators have legal rights to retain pipeline assets within the Order Land. Continuous and uninterrupted safe operation and access for maintenance of those assets are key to various businesses. It was stated that if the proposed application is to proceed, the north conveyor option should be adopted in preference to the south conveyor route. It was stated that the authorised development in the Draft Order (in the vicinity of the existing apparatus) should not commence until a scheme to protect and accommodate assets has been approved by Bond Dickinson's clients and the respective clients have adequate assurance that it will be implemented in accordance with the timescales so approved.</p>	
<p>BP</p> <p>BP is an operator of Central Area Transmission System (CATS) and have an interest in the conveyor route options, particularly the southern route. The southern route is close to and parallel to BPs CATS major hazard pipeline and consequently it will be problematic to design and construct the conveyor in compliance with BPs easement working restrictions and current industry safe distance guidelines for above ground structures.</p>	
<p>GDF SUEZ</p> <p>GDF SUEZ highlighted the position of its gas pipeline which runs along the trench in the area known locally as Dabholm Gut, before crossing underneath the Tees. Concerns in relation to the project would therefore include the potential for impact on the future operation of this pipeline as a result of the proposed scheme.</p>	
<p>ERER-G Natural Power Limited</p> <p>ERER-G are keen to understand how the proposed development would impact upon its agreement with Akzo Nobel, and its ability to function during the construction and operational phase.</p>	
<p>SembCorp</p> <p>In principle, terms to enable the routing of the conveyor exist, with SembCorp continuing to work with YPL to finalise the terms; although, the design and detail (including exact location) of the supports for that conveyor are yet to be agreed. SembCorp does have some concerns however, including:</p> <ul style="list-style-type: none"> • The benefits of the project need to be balanced against the economic contribution of the petrochemical, speciality and other process 	

Consultation comment	Response / Section of ES in which the comment has been addressed
<p>manufacturing industries already at Wilton international.</p> <ul style="list-style-type: none"> Any development by YPL should include appropriate mitigation so as not to hinder or disrupt existing operations as well as to allow the YPP to proceed alongside other significant projects which are planned at Wilton International. 	
<p>Turley (acting on behalf of Tata Steel UK) and SSI Steel</p> <p>Tata Steel UK raised concerns with the proposal and its potential impact on Tata Steel's business operations. Further analysis on how the conveyor is proposed to interact with existing infrastructure is required. The proposed conveyor route crosses over rail and road infrastructure used by Tata Steel. Tata Steel has a requirement to transport oversized equipment via an access road from the Redcar Site Entrance Roundabout to Universal Beam Mill. The use of this access is essential to Tata Steel's business. Tata Steel would wish to object to any development which would restrict this access.</p> <p>The hot metal line transfers hot metal from the blast furnace to the steel plant via Torpedo Ladles Cars (Torpedo). A malfunction of the torpedo could result in a breakout of liquid iron from the Torpedo. In these events, blasts and spills from the breakout can reach significant heights. The potential for a derailment from the track underneath the proposed conveyor system exists. The torpedo gives off extreme heat, and therefore the risk imposed by the development to this operation and the safety implications are substantial.</p> <p>Any development proposals should not affect existing operations at RBT.</p>	

- 18.2.6 The power requirements during the operational phase of the proposed scheme have been determined through consultation with design engineers to inform the assessment of potential for impacts to arise during installation of any utility infrastructure. The power supply to the Harbour facilities is proposed to be provided from the MHF at Wilton via an 11kV power supply cable. The cable is suitable for Phase 1 only; a second power supply cable would be required for Phase 2. It is proposed that the power supply cables for both phases of the proposed scheme would run along the overhead bridges of the overland conveyor and connect into the National Grid network.
- 18.2.7 Consultation with the owners and operators of existing infrastructure in the zone of proposed works is ongoing regarding the protective measures that would be put in place to ensure that existing infrastructure is not damaged or compromised in any way as a result of the construction, operation or decommissioning of the proposed scheme. Draft Protective Provisions are under discussion and have been included in the Draft DCO

18.3 Methodology

Study area

18.3.1 The study area for this section of the ES comprises the area which has the potential to be directly and indirectly impacted by the proposed scheme, as illustrated on **Figure 1-2**.

Existing environment

18.3.2 The description of the existing environment with regard to infrastructure has been informed by desk based assessment and site visits. A number of documents have been reviewed as part of the desk based assessment, including the ESs produced for the NGCT, the QEII Berth Development and the Tees Dock No.1 Quay, and a review of Ordnance Survey mapping and aerial photography publicly available online (Google Earth) has been undertaken.

18.3.3 Data collected during site visits undertaken by Royal HaskoningDHV during December 2013 and April 2014 has been used to assist with the identification of existing infrastructure within the study area; as has information regarding the nature and location of infrastructure provided within the Section 42 consultation responses from other operators within the immediate vicinity of the proposed scheme footprint. Specialist consultants, Px Engineering Consultants Limited (who have previous operations knowledge of the study area), have been engaged to assist in the resolution of the issues associated with existing infrastructure in the study area and with this section of the ES.

18.3.4 The results of a 3D laser scan of existing above ground facilities and assets within the proposed scheme footprint have also been used.

18.3.5 Consultation with the Environment Agency has been undertaken in order to source information regarding the location of leachate and ground gas monitoring boreholes within and adjacent to the Bran Sands landfill site.

Methodology for assessment of potential impacts

18.3.6 The assessment methodology used to determine the potential environmental impacts on infrastructure associated with the proposed scheme is as provided within **Section 4**. However, for a number of potential environmental impacts on infrastructure (presented in **Sections 18.5** and **18.6**), a risk based approach to the assessment has been adopted, as this was considered more appropriate than the methodology presented in **Section 4**.

18.4 Existing environment

Infrastructure within the vicinity of the proposed port terminal

18.4.1 The Tees estuary is bordered by industrial developments including chemical, petrochemical and steel works, sites of former industry and open areas of ground originally intended for industrial use. There is a concentration of oil-related industry near the river mouth including a large petrochemical works and an oil refinery at Seal Sands, together with two large storage terminals and two gas producing facilities. There is a large titanium pigment plant south of Seaton Carew, on the north side of Teesmouth, and a

second oil refinery and chemicals processing plant is located next to Teesport on the south side of the estuary at Wilton, adjacent to the major steelworks at Bran Sands.

- 18.4.2 Hartlepool nuclear power station is located on the east side of Seaton Channel. Further upstream in the Tees estuary, there is a former ICI agrochemical plant at Billingham which was a sister to the former ICI chemical plant at Wilton (now owned by SembCorp). There are also several ship repair yards and large port facilities, including Tees Dock, on the south shore.
- 18.4.3 NWL's Bran Sands STW, which incorporates the Regional Sludge Treatment Centre (RSTC), is located directly adjacent to the footprint of the proposed scheme. This is the largest STW (Ofwat size band 5) in the Northumbria area of NWL's activities. The STW discharges into Dabholm Gut through an outfall.
- 18.4.4 A small jetty and pumping station are located at the confluence of Dabholm Gut and the Tees estuary. This infrastructure is owned by NWL and was historically used for the import of sludge to its sewage treatment works. As stated within **Section 3**, Phase 2 of the proposed scheme requires the removal of the NWL jetty.
- 18.4.5 Bran Sands lagoon is located immediately landward of the proposed port terminal. At the eastern end of the lagoon, the land rises at a gradient of approximately 1 in 3 to a level track at approximately +11m OD before rising again at a gradient of approximately 1 in 20 to a top level of approximately +16m OD. The northern side of the lagoon is close to the boundary fence with the SSI Steel Works. The steel plant land beyond the fence forms a coal stockyard.
- 18.4.6 Along its western side, the lagoon is separated from the estuary by a slag bund. The bund has been formed behind a training wall towards the edge of the main estuary channel. The masonry remains of a navigation marker are visible which delineates the line of the training wall.
- 18.4.7 The proposed quay is located adjacent to the RBT. The continued operation of RBT is critical to SSI's ability to import raw materials for its on-going manufacturing operations.
- 18.4.8 The above infrastructure is considered to be imperative to on-going practices within the Tees estuary (with the exception of the NWL jetty), and is therefore considered to be of high sensitivity.

Infrastructure within the vicinity of the proposed conveyor routes

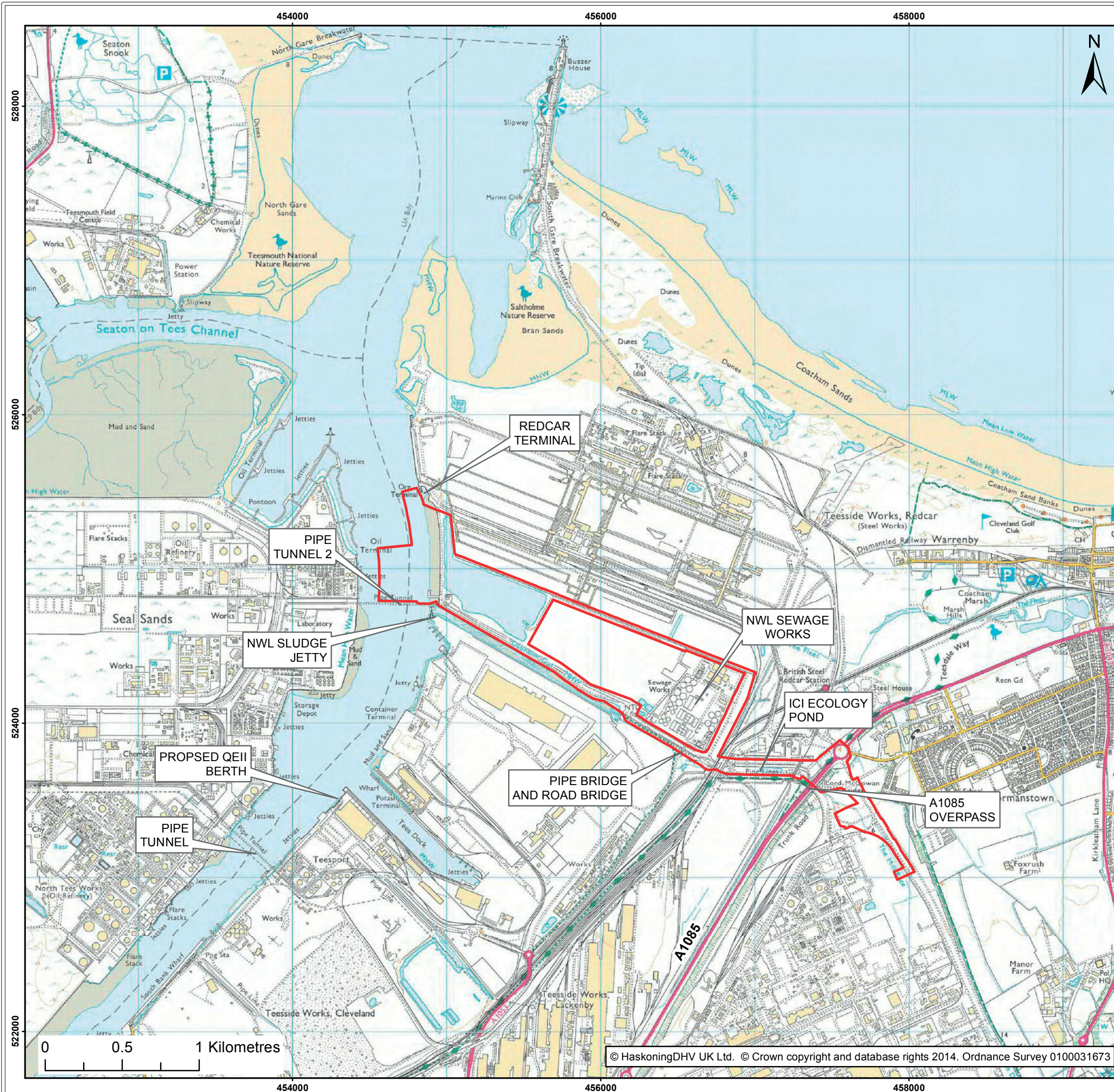
- 18.4.9 The proposed conveyor system envelope is located adjacent to the Wilton Industrial Complex at its southern end, which is the largest integrated chemical complex in the UK in terms of manufacturing capacity. The routes of the proposed overland conveyor systems from the MHF to the port terminal intercept a range of existing infrastructure, including:
- roads and access tracks, including the A1085;
 - an embankment approximately 6m in height (Redcar Trunk Road Landscaping historic landfill site);
 - road and railway bridges including the SSI 'Hot Metal' rail bridge (which allows transport of hot metal from the blast furnace to the SSI steel plant via Torpedo Ladles Cars and is therefore of

paramount importance to the steel working process), TATA/SSI access road bridges and the NWL road bridge;

- SembCorp drains, sewers and main site outfall culvert to penstock;
- underpasses under internal roads and public railway track;
- pipelines located within the existing service corridor, including several underground gas mains designated as 'Major Accident Hazard Pipelines' (further discussed below);
- high voltage (275kV) power lines owned by the National Grid (which form an essential part of electricity transmission network in England and Wales) and high level cable crossings;
- a section of railway line owned and operated by Network Rail;
- NWL water lines; and,
- the pipe and road bridge to the south of the NWL sewage works.

18.4.10 In addition to the infrastructure outlined above, the Bran Sands landfill site contains a number of leachate monitoring boreholes and an array of landfill gas extraction boreholes. The landfill gas extraction boreholes are connected to horizontal pipework which leads to a gas utilisation plant and flare in the north-east corner of the site (adjacent to the NWL water treatment plant). The landfill gas utilisation plant provides gas migration control and electricity generation activities at Bran Sands landfill site.

18.4.11 The location of the above infrastructure in relation to the proposed conveyor routes is illustrated on **Figure 18-1** and **Drawings PB1586-SK1040 to PB1586-SK1046** and **Drawings PB1586-SK490 to PB1586-SK497**. It can be seen from these Drawings that the most significant existing infrastructure constraints are located within the section of the conveyor route which both route options follow and within the southern conveyor envelope. Significant known infrastructure constraints located within the northern envelope are limited to the BP AMOCO CATS pipeline (discussed within the 'Pipelines' section below).



Legend:
 DCO Order Limits

Location of pipelines and tunnels illustrated on drawings PB1586 SK441 to 446

DCO Order Limits as of 24/02/15

Client:	Project:
York Potash Limited	York Potash Project Harbour Facilities

Title:
 Environmental Statement: Existing Infrastructure near Harbour Facilities

Part:	Figure:	Drawing No:			
HF	18.1	9Y0989-HF-18-001			
Rev:	Date:	Drawn:	Checked:	Size:	Scale:
1	03/03/2015	JE	SR	A3	1:25,000
0	09/12/2014	JE	SR	A3	1:25,000

Co-ordinate system: British National Grid

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- 18.4.12 On the basis of the opportunity it offers for more effective and efficient design, the southern conveyor route is preferred by YPL to the northern route. Discussions are ongoing with existing operators in order to ensure that any interference with existing infrastructure is minimised. If, during the detailed design phase, it is determined that the southern route is not technically feasible, the northern route would be progressed.
- 18.4.13 Overall the above infrastructure is considered to be imperative to on-going practices within the Tees estuary. The loss of the above infrastructure would have significant impacts to third party users and is, therefore, considered to be of high sensitivity.

Surface water abstractions within the Tees estuary

- 18.4.14 Two surface water abstractions are located within the vicinity of the proposed scheme. The first is located in Tees Dock (NZ 546 235) and is held by Tees Bulk Handling Ltd. The second is located within the main navigable channel (NZ 547 259) and is held by Corus UK Ltd. A third abstraction licence located further outside of the vicinity of the scheme is held by Hartlepool nuclear power station. The nuclear power station is licensed to abstract $35.5 \text{ m}^3 \text{ s}^{-1}$ of surface water from Seaton Channel for cooling water.
- 18.4.15 The receptor which could be impacted as a result of a reduction in water quality within the Tees estuary (with regard to infrastructure), is the infrastructure which is reliant on water abstracted from the Tees estuary (i.e. third party users). It is considered that such infrastructure has a limited capacity to accommodate chemical changes to water quality, and as such, it is concluded that this receptor is of high sensitivity.

Pipelines

- 18.4.16 An existing infrastructure corridor, containing several sections of dedicated pipeline infrastructure, runs from the Wilton Industrial Complex, past Bran Sands, and towards the south bank of the Tees estuary. Pipelines which run within this infrastructure corridor are both buried and above ground.
- 18.4.17 The following infrastructure runs between the access road (shown on **Drawings PB1586-SK1040 to PB1586-SK1046** and **Drawings PB1586-SK490 to PB1586-SK497** in **Section 3**) and the Bran Sands lagoon:
- A pipeline used for the transport of over 250,000 tonnes of chemical raw materials annually to the Huntsman production facility at Wilton (which travels overland until it reaches the Tees estuary at which point the pipeline travels through Pipe Tunnel No.1).
 - A pipeline used for the transport of chemicals manufactured by Huntsman from its production facility (which travels overland until it reaches the Tees estuary at which point the pipeline travels through Pipe Tunnel No.2).
 - Numerous pipelines owned and operated by SABIC which transport feed to, and the majority of products from, SABICs Olefins 6 and Butadiene 3 plants at Wilton.
 - Three pipes associated with the treatment and transfer of sludge from the NWL jetty to the Bran Sands sewage treatment plant.

- Several pipelines carrying effluent from various manufacturing facilities within the Wilton Industrial Complex to the Bran Sands effluent treatment facility.
- A pipeline carrying bio-ethanol from Wilton to a storage facility on the north side of the estuary.
- Several redundant / out of service pipelines which run between Wilton, Bran Sands, and the north side of the estuary. Although out of service, these retain both strategic and commercial value.
- A buried 36" natural gas pipeline which takes gas from the south side of the river via a second pipe tunnel to the north side of the estuary (BP AMOCO CATS Pipeline). This is designated as a Major Accident Hazard Pipeline.
- A buried 20" pipeline transporting gas from the Breagh platform in the North Sea to the Teesside Gas Processing Plant (TGPP) located within the Seal Sands area of Teesside (the RWE Breagh Onshore Gas Pipeline). This is designated a Major Accident Hazard Pipeline. A 3" Mono Ethylene Glycol pipeline is also installed alongside this pipeline.
- A buried 24" natural gas pipeline which brings gas from the north side of the estuary to the south side via a third under river crossing (Teesside Power Gas Pipeline – formerly referred to as the Enron Pipeline, currently owned by GDF Suez). This is designated a Major Accident Hazard Pipeline. An 8" Propane pipeline is also installed alongside this pipeline.

18.4.18 Pipelines / tunnels which are known to cross underneath the Tees estuary in the vicinity of the proposed quay footprint comprise:

- ICI Tunnel No. 2 (Pipe Tunnel No. 2), containing numerous pipelines (now owned and operated by SembCorp) (this is a traditional tunnel with plate sections lining the inside of the tunnel).
- BP AMOCO CATS pipeline (the pipeline is contained within a tunnel formed under the Tees estuary using traditional tunnel construction; the tunnel is known to be flooded (Sean Gleeson *Px pers. comm.* 2014))
- Former Enron (now GDF Suez) 1.0m diameter crossing (installed using horizontal directional drilling).
- BOC 1m diameter thrust bore crossing (installed using horizontal directional drilling).
- BOC 0.15m diameter thrust bore crossing (installed using horizontal directional drilling).
- RWE Breagh Onshore Gas crossing (installed using horizontal directional drilling).

18.4.19 Pipe Tunnel No. 2 is thought to consist of a 3.85m internal diameter, 4.08m outside diameter, cast iron segmental tunnel. The crown level of the tunnel dips from approximately -27.8mCD on the western (Seal Sands) side of the river, to approximately -31.5mCD on the eastern (Bran Sands) side of the river. The crown level of the tunnel in mid-channel is approximately -26.6mCD. The vertical shafts at either end of the tunnel are thought to be 5.75m internal diameter, 6.11m outer diameter cast iron segmental shafts, encased in concrete to a diameter of 7.11m. These shafts rise to ground level, where they are protected by brick built head houses. The pipe tunnel lies to the south of the proposed quay and area to be dredged.

18.4.20 The RWE Breagh Onshore Gas Pipeline (and associated Mono Ethylene Glycol pipeline) runs beneath the proposed berth pocket, the footprint of the proposed quay and the existing NWL jetty. The location of the pipeline in relation to the footprint of the proposed scheme is illustrated on **Drawings PB1586-SK1040 to PB1586-SK1046**.

18.4.21 The above infrastructure is considered to be imperative to on-going practices within the Tees estuary; the loss of the above infrastructure would result in significant impacts to the human environment. Hence the above infrastructure is considered to be of a high sensitivity.

18.5 Assessment of potential impacts during construction

Potential direct impacts on existing infrastructure due to dredging and piling for quay construction

18.5.1 With respect to capital dredging and piling, the potential direct effect of the construction phase is limited to impacts on pipelines and cables that cross the Tees estuary. However, the proposed dredge footprint and the location of the proposed quay are downstream of the route of Pipe Tunnel No.2, the BP AMOCO CATS pipeline, the former Enron pipeline and the BOC 1m and 0.15m diameter thrust bores. No dredging or construction would occur above this infrastructure, and **no impact** would arise on this infrastructure.

18.5.2 The highly sensitive RWE Breagh Onshore Gas Pipeline runs directly beneath the footprint of the proposed berth pocket and quay. There is therefore potential for direct impacts to this pipeline due to the installation of piles for the proposed quay structure.

18.5.3 The detailed design of the proposed quay structure is taking the presence of existing infrastructure into account, in order that its construction would not result in an impact on it. This is being - and will continue to be - achieved through consultation with owners and operators of the RWE Breagh Onshore Gas Pipeline to ensure that the design and construction of the quay would not jeopardise continued safe operation of on-going practices.

18.5.4 It is not possible to predict the significance of disturbance to existing assets, as this will be dependent on the nature of the incident and the asset affected (e.g. location, scale, type of asset and nature of disturbance). Therefore, with respect to the Breagh Onshore Gas Pipeline, the assessment has been undertaken in terms of the risk of a damaging event occurring. Based on the approach proposed, the installation of the quay within the overall quay envelope would be designed so as not to affect existing infrastructure and, as such, the risk of such an impact on the Breagh pipeline occurring is considered to be **low**.

Mitigation measures and residual impact

18.5.5 The detailed design stage would take the presence of the Breagh pipeline into account and, consequently, the risk of impact arising would be **low**.

Direct and indirect impacts associated with installation of the overland conveyor

18.5.6 As discussed within **Section 18.4**, there is a range of highly sensitive above and below ground infrastructure assets present within the footprint of the southern conveyor envelope which have the potential to be impacted by the construction of the overland conveyor within this corridor. Known infrastructure within the footprint of the northern conveyor corridor is limited to the buried BP AMOCO CATS pipeline. It is emphasised that the southern and northern envelopes are alternative options and

a conveyor would not be constructed within both envelopes; the preferred option from an operational perspective is the southern corridor on the grounds of effective and efficient design of the conveyor system. If, during the detailed design, it is determined that development of the southern route is not technically feasible, the northern route would be progressed.

- 18.5.7 Potential direct impacts to existing infrastructure during the construction phase could include damage to the above ground assets due to accidental collisions from moving construction machinery, or damage due to construction equipment accidentally falling during installation of the conveyor. There is also potential for direct damage to buried underground pipelines due to the advancement of piles for the conveyor supports. However, conveyor foundations would be placed outside a nominated exclusion zone around the existing pipelines. Moreover, it is proposed that the works would start with ground penetrating surveys to determine the exact location of underground pipes, and then controlled excavations with hand digging wherever required would be undertaken. This would avoid direct disturbance to existing pipelines.
- 18.5.8 Hence the precise routing and detailed design of the conveyor system within both conveyor envelopes will take the presence of existing infrastructure into account, in order that its construction would not result in an impact on the existing infrastructure. This is being and will continue to be undertaken through consultation with owners and operators of existing infrastructure along the route of the conveyor envelopes, in order to understand the precise location and nature of each asset. This will help to ensure that the design and construction of the conveyor would not jeopardise the continued safe operation of assets. The location of existing access to this infrastructure has also been taken into account in the design of the conveyor and its supports.
- 18.5.9 The northern corridor has fewer constraints than the southern corridor, although constraints do exist within the northern corridor route due to the presence of the BP AMOCO CATS pipeline. Various operators have stated within their responses to consultation under Section 42 of the Planning Act 2008, that the northern route would be preferable to the southern route from an infrastructure perspective; however, as noted previously, the southern route offers advantages to YPL from an operational perspective. If it emerges through further consultation with owners and operators of the infrastructure and the development of the design details for the conveyor that it is not possible to construct the conveyor within the southern route, the procedure outlined above would be adopted for the northern route to ensure that the presence of existing infrastructure is taken into account in the detailed design of the conveyor system.
- 18.5.10 Because the proposed overland conveyor requires the installation of foundations along the length of its route, the construction phase also has the potential to cause indirect damage to pipelines (and consequently third party users) as a result of piling induced vibration. The potential for piling induced vibration as a result of the proposed scheme has been significantly reduced, however, by proposing bored concrete piles for the conveyor supports rather than impact piling, along both conveyor route options. It is also proposed that, where appropriate, existing buried assets would be exposed by hand in the areas where piling activities are in close proximity to them, prior to any piling commencing.
- 18.5.11 It is not considered to be possible to assess the significance of direct and indirect disturbance to existing assets, as this will be dependent on the nature of the incident and the asset affected. Therefore, the assessment has been undertaken in terms of the risk of a damaging event occurring.

The implementation of control measures and adoption of good practice (e.g. use of bored concrete piles rather than impact piling for conveyor supports, carrying out precise detailed design and extensive consultation to determine the precise location for piles, exposing all existing buried assets where piling activities are required prior to piling commencing) means that the likelihood of damage to existing assets would be minimised. Based on the above, it is considered that the risk of damage to infrastructure due to installation of the conveyor along the northern and southern routes would be **low**.

- 18.5.12 It should be noted that because the section of the conveyor route which both options follow, and the southern conveyor route, is within a corridor of land designated for the installation of industrial infrastructure, a well-defined system and methodology for controlling and co-ordinating construction and maintenance activities within this corridor already exists. This system is focused on the removal or mitigation of risk.

Mitigation measures and residual risk

- 18.5.13 No further control measures (beyond the implementation of best practice, consultation and the detailed design work which is currently on-going, and the exposure of existing buried assets by hand) can be implemented to reduce the risk of an incident occurring, Therefore the risk of an incident would remain **low** for both the northern and southern routes.
- 18.5.14 If, in due course, it is determined that the physical limitations associated with the southern route are unacceptable, the northern conveyor option would be progressed.

Potential impact on water abstraction points

- 18.5.15 The proposed dredging and piling activities within the Tees estuary have the potential to impact upon water quality by temporarily increasing total suspended solid concentrations within the water column. This has potential to impact upon third parties who abstract surface water from the Tees estuary (an increase in total suspended solid concentrations within the water abstracted from the estuary could impact upon the processes for which the water is used). The third party users of abstracted water are considered to represent a highly sensitive receptor.
- 18.5.16 As discussed in **Section 8.5**, the tidal exchange within the Tees estuary during dredging and piling would remain unrestricted, with peaks in total suspended solid concentrations expected on a short term basis during both Phase 1 and Phase 2 of the proposed scheme.
- 18.5.17 The results of the sediment plume dispersion modelling for a backhoe dredger and CSD, presented and discussed within **Section 5**, show that mean increases in the concentration of total suspended solids would not impact on any of the surface water abstractions within the vicinity of the proposed scheme. It is, therefore, predicted that there would be **no impact** on surface water abstractions due to sediment that is suspended during capital dredging using a CSD or backhoe. Furthermore, it is proposed that an enclosed grab would be utilised to dredge the contaminated sediment that overlies the geological sediments beneath. The enclosed grab would result in negligible losses of sediment to the water column.

18.5.18 The results of the sediment plume dispersion modelling undertaken for the TSHD show that mean increases in the concentration of total suspended sediment (in the region of 10mg/l to 20mg/l above background) extend to the vicinity of the Corus UK water abstraction point. This is a minor elevation above background levels, and any minor reduction in water quality in the vicinity of the abstraction point due to increased suspended sediment would be temporary in nature. Based on the above, the magnitude of the effect is considered to be very low, and an impact of **negligible** significance is predicted with regard to the TSHD.

Mitigation measures and residual impact

18.5.19 No mitigation measures are required and there would be **no residual impact**. However, the controls outlined within **Section 7.5** (with regard to minimising sediment plume dispersion during dredging) would be implemented in line with best practice.

18.6 Assessment of potential impacts during operation

Potential indirect impact on existing infrastructure due to dredging

18.6.1 The location of infrastructure that runs beneath the Tees estuary is the key factor that has informed the siting of the proposed port terminal (and associated capital dredging) on the Bran Sands frontage. The proposed port terminal is located seaward (downstream) of the location of the infrastructure running beneath the Tees, with the exception of the Breagh Onshore Gas Pipeline.

18.6.2 Capital dredging within the estuary would reduce the depth of cover overlying the Breagh Onshore Gas Pipeline and, as such, the potential exists for indirect impacts on this asset due to heave (upwards movement) of the seabed that could arise due to a reduction in depth of cover overlying the pipeline

18.6.3 The assessment of this impact has been undertaken in terms of the risk of a damaging event occurring. It is considered that the consequence of indirect damage to the Breagh Onshore Gas Pipeline would be highly detrimental. In the absence of detailed geotechnical information on the material overlying the pipeline, the potential for this impact to arise (i.e. the likelihood) cannot be confirmed. As such, the precautionary principle has to be applied, and a **high** risk of impact predicted.

Mitigation measures and residual impact

18.6.4 The potential for the above risk to materialise would be considered in more detail once the further overwater (marine) ground investigation has been undertaken to confirm the geotechnical properties of the ground overlying the pipeline.⁸ If the identified risks are considered to be significant based on the findings of the ground investigation, measures to control heave would be implemented prior to dredging works being undertaken.

⁸ Note that sufficient ground investigation work has been undertaken to inform the EIA and DCO application. The further work proposed, would be in support of the detailed design phase, should consent be forthcoming.

- 18.6.5 Subject to detailed geotechnical information and assessment, a strategy of soil stiffening above the pipeline could be implemented prior to the dredging works being undertaken. One method which could be adopted to stiffen the material above the pipeline is jet grouting. In this process, a high pressure cementitious grout is injected, which forms a matrix of cement grout with the surrounding material, resulting in a column of stiffened material. A series of grouted columns could be installed in a grid, resulting in a modified stiffness over an extended area.
- 18.6.6 With an appropriate mitigation strategy in place (such as that outlined above), it is anticipated that the risk of an indirect impact occurring due to dredging (e.g. heave) would reduce to a **low** level.

Reduced access to monitoring infrastructure

- 18.6.7 During consultation with the Environment Agency in October 2014, concerns were raised regarding the potential for reduced access to leachate and ground gas monitoring boreholes along the route of both the northern and southern conveyor corridors during the operational phase (within the boundary of Bran Sands landfill site). However, as discussed within **Section 3**, the conveyor system would be elevated at a height of at least 20m above ground level in the vicinity of the monitoring boreholes and, although there would be supporting structures for the conveyor, there is no potential for the conveyor system to prevent access to monitoring boreholes on Bran Sands landfill. On this basis, **no impact** is predicted.

Mitigation measures and residual impact

- 18.6.8 No mitigation measures are required. There would be **no residual impact**.

18.7 **Assessment of potential impacts during decommissioning**

- 18.7.1 As discussed within **Section 3**, the port terminal is proposed to be a long term infrastructure project with no decommissioning phase. Decommissioning of the port terminal has not, therefore, been considered further herein. However, the conveyor system would be decommissioned at the end of its operational life. The potential impacts considered below relate to the decommissioning of the conveyor system only.

Direct impacts to existing infrastructure

- 18.7.2 Given the presence of existing highly sensitive infrastructure within the immediate location of the conveyor (particular along the route of the southern conveyor option), the potential exists for adverse impacts to arise for existing operators and assets during the decommissioning phase (as the decommissioning works would be undertaken using a similar set of activities required to install the conveyor, e.g. large vehicle movements). During the decommissioning phase, the conveyor foundations would remain in situ, removing the potential for impacts to below ground infrastructure. The decommissioning works would be undertaken sensitively and in agreement with existing operators in order to ensure that impacts are avoided. Hence it is predicted that a **low** risk of damage/disturbance to existing infrastructure during removal of the conveyor would exist.

- 18.7.3 As noted above, a well-defined system and methodology for controlling and coordinating maintenance activities within this infrastructure corridor is in place. This system is focussed on the removal or mitigation of risk and would be applied to decommissioning activities.

Mitigation measures and residual impact

- 18.7.4 Given the number of existing assets and land owners present along the routes of the conveyor system, extensive consultation with land owners and asset owners would be carried out prior to the decommissioning phase commencing, under both formal and information engagement processes. This would be designed to ensure that the decommissioning phase of the conveyor system would accommodate the existing infrastructure.
- 18.7.5 No further control measures (beyond the implementation of practice, detailed consultation and detailed design) are available to reduce the risk of an incident occurring during decommissioning further. Therefore the risk would remain **low** for both the northern and southern routes.

18.8 Summary

- 18.8.1 This section of the ES has been informed by desk based assessment, interrogation of 'Linesearchbeforeudig.com', the results of site walkovers undertaken by Royal HaskoningDHV during December 2013 and April 2014, and consultation responses received during the EIA scoping process and under Section 42 of the Planning Act 2008, along with subsequent discussions with asset owners and Px Engineering Consultants.
- 18.8.2 The Tees estuary is bordered by a number of industrial developments, including chemical, petrochemical and steel works, sites of former industry and open areas of ground originally intended for industrial use. The route of the two conveyor corridor options intercepts a number of infrastructure assets, including an underground gas main pipeline, the Hot Metal line, a railway line, roads, an embankment (classified as a landfill site) and bridges. There are numerous other pipelines and assets present within the immediate vicinity of the southern conveyor corridor, as well as pipelines and tunnels which cross underneath the Tees estuary. The potential therefore exists for adverse impacts to occur on such assets during construction, operation and decommissioning. There are fewer infrastructure constraints within the northern corridor.
- 18.8.3 Although this potential exists, the conveyor system will be designed (in the detailed design phase) to ensure that its construction, operation and decommissioning would not impact upon existing infrastructure assets. If it is determined that the southern route is not technically feasible due to physical limitations, the northern route would be progressed.
- 18.8.4 The port terminal and capital dredging within the estuary would reduce the depth of cover overlying the Breagh Onshore Gas Pipeline and, as such, the potential exists for indirect impacts to this asset due to heave. In the absence of further geotechnical information, a precautionary approach has been adopted and a high risk of impact occurring predicted. However, with the implementation of a strategy to stiffen the material above the pipeline, this risk reduces to low.

- 18.8.5 The ongoing extensive consultation with existing operators and asset owners will be and would be maintained throughout construction, operation and decommissioning.
- 18.8.6 **Table 18-2** presents a summary of the impact assessment undertaken with regard to infrastructure.

Table 18-2 Summary of impacts, mitigation measures and residual impacts with regard to infrastructure

Impact	Sensitivity of receptor	Magnitude of effect	Significance of impact	Mitigation	Residual impact
Construction					
Direct impacts on existing infrastructure due to dredging and piling for quay construction	Low risk			The presence of the Breagh pipeline is to be taken into account within the detailed design stage.	Low risk
Direct and indirect impact associated with installation of the overland conveyor	Low risk			No further control measures are possible above those already proposed.	Low risk
Potential impact on water abstraction points	High	Very low	Negligible	None required. Control measures outlined in Section 7.5 would be implemented.	Negligible impact
Operation					
Potential indirect impact on existing infrastructure due to dredging	High risk			Implementation of a strategy to stiffen the soils above the Breagh Onshore Gas Pipeline. One such method would be jet grouting to form a series of grouted columns in a grid over an extended area above the tunnels / pipelines.	Low risk
Reduced access to monitoring infrastructure	High	N/A	No impact	None required.	No impact

Decommissioning			
Direct impacts to existing infrastructure	Low risk	No further control measures are possible beyond those already proposed.	Low risk

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