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York Potash Project
Harbour Facilities
Port Technical Lighting Assessment Report

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1 INTRODUCTION

1.1 This report provides a Technical Lighting Assessment of the proposed York Potash Project (YPP) Harbour Facilities (the proposed scheme) at Teesside. The proposed scheme is designed to export up to 13 million tonnes per annum (mtpa) of polyhalite bulk fertiliser (the product).

1.2 It assesses the existing lighting arrangements at the harbour site (the Site) and within the study area. It provides an assessment of the existing lighting environment (the baseline) in the study area in the context of the proposals for the development in relation to obtrusive light and visual obtrusion in respect of Environmental Lighting Zones as defined by the Institution of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive light[1].

1.3 This report assesses the 'obtrusiveness' of the existing and proposed Site lighting from various vantage points external to the Site in technically measureable terms.

1.4 The Technical Lighting Assessment aims to provide a baseline for the development of a Lighting Strategy for the proposed scheme so that the effect of any new lighting does not have any significant adverse effects upon the existing Site and its study area.

1.5 The boundary of the Site is indicated within Annex C. The lighting study area covers the land within the proposed scheme footprint (Annex C) and extends approximately 5.8km beyond the footprint to include distant views of the Site.

1.6 Throughout this report, use is made of standard lighting terminology to describe lighting types, quality, and effect. These terms are explained within the Glossary (Annex A).

Site Location and Proposals

1.7 The Site is located on the south bank of the Teesside estuary, on the north coast of England and lies between the towns of Stockton-On-Tees, Hartlepool, Redcar, Middlesbrough and Billingham. The Site boundary extends from land to the south of the Tees Dock area, southeast towards Dormanstown, and northwards towards Bran Sands steel works.

1.8 Teesport, on the northern bank of the estuary, and Teesside, on the southern bank, are well developed, heavy industrial areas. The traditional and primary industries within this area consist of steel works and chemical processing, with a range of other industrial sectors.

[1] Guidance Notes for the Reduction of Obtrusive Light, GN01:2011.

1.9 Located to the southeast of the Site, excluded from the Site boundary, is the Northumbria Waste Water (NWW) treatment plant. Bran Sands Lagoon is located within the port boundary. The industrial site of Bran Sands steel works borders the northern Site boundary.

1.10 The topography of the Site is generally flat and in areas, specifically along the southern boundary, the Site is separated from the surrounding industrial areas by a fence line.

1.11 The developed areas of Dormanstown, Kirkleatham, Wilton, Redcar and Grangetown are located on the south side of the estuary, within 2.5km of the Site. Wilton Industrial Complex is located 1.5km to the southeast of the Site, inbetween Kirkleatham and Grangetown.

1.12 The proposed facilities consist of the following elements:

- a conveyor system between the port terminal and the Material Handling Facility (MHF) at Wilton, including conveyor bridges and transfer stations;
- product storage facilities adjacent to the quay;
- a port terminal on the southern bank of the Tees estuary;
- dredging (i.e. deepening beyond the current maintained depth) of a section of the approach channel and to create a berth pocket;
- existing retained structures;
- support infrastructure facilities;
- access roads and car parks; and
- pedestrian walkways.

1.13 The conveyor system is proposed to consist of two parallel belt conveyors running in both combined and separate (depending on location) elevated conveyor bridges. The conveyor bridges are proposed to be enclosed from the MHF until the crossing of the A1085. After this point the conveyors would run on open trestles (except at crossings).

1.14 The elevated conveyor bridges are proposed to pass over all existing infrastructure between the MHF and the port terminal, excluding the National Grid Power line, which is proposed to be under-passed.

1.15 The conveyor system would be inclined to gain a maximum height of approximately 25m (at the top of the conveyor, including the conveyor bridge) to feed into the transfer tower.

2 METHODOLOGY

2.1 The following methodology was adopted to consider the effect of the proposed lighting at the Site and the effect it would have on the surrounding environment:

- Carry out a lighting technical assessment in accordance with Institution of Lighting Professionals - Guidance on Undertaking Environmental Lighting Impact Assessments (ILP:PLG04, 2013).
- Consultation was undertaken with Estell Warren Landscape Architects[3] to coordinate the assessment methodology for the project and with York Potash Limited (YPL) to understand the proposals and recommended lighting requirements.
- A site visit was undertaken to ascertain the context of the study area by day and night. This included describing the current sources of illumination within the existing site and the adjacent surrounding environment.
- An assessment from the coordinated viewpoints[4] was undertaken in accordance with Estell Warren Landscape Architects' selected photo viewpoints. Heights/distances between the proposed development and viewpoints were taken from a geographic information system (GIS) and ordnance survey maps.
- The proposed lighting environment and design criteria during both the construction and operational phases were considered.
- An appraisal of the proposed lighting systems was carried out, with an assessment of the effects of lighting upon the selected viewpoints.

2.2 A site visit was made on 20th and 21st September 2014 by Royal HaskoningDHV. The weather conditions were reasonable, with overcast skies, enabling daytime and night time surveys to be carried out at all designated viewpoints (as defined within **Section 3.3**).

2.3 The information obtained from the various agreed viewpoints and adjacent locations was sufficient to illustrate the local situation very clearly. This assessment is, therefore, based on the data obtained and evaluated from the assessed viewpoint locations. Heights, bearings and other information were taken from the project GIS and proposed layouts produced by the Project Engineers (Royal HaskoningDHV).

2.4 The images (included within **Section 5**) are taken from the viewpoint locations defined within **Table 3-2**. They are not 'stitched' panoramic scenes and are not to the same scale as any prepared for the landscape assessment. They are used to provide context for the lighting assessment.

[3] Various discussions were held to ascertain the specific viewpoints and receptors that it was advised should be included in the lighting assessment, and to identify any key issues or effects associated with these viewpoints.
[4] Viewpoint locations were derived in consultation to ensure that the lighting assessment is coordinated with the overall project assessment.

2.5 Day time camera settings were left as standard and the photos were taken in landscape mode, with auto white balance. Night time camera settings were set to manual mode and manual focus in order to capture a true representation of the lighting environment. No post-processing of day or night images was undertaken, other than:

- de-skewing;
- cropping to letterbox format; and
- reduction of JPEG sizes for printing purposes.

2.6 No changes to gamma parameters were made.

Report Structure

2.7 This report is structured as follows:

- Methodology;
- Baseline lighting environment;
- Lighting design proposals;
- Lighting appraisal, mitigation and residual effects; and
- Residual effects, summary and conclusion.

2.8 The baseline lighting environment section describes the existing baseline lighting environment, providing a review of the existing baseline from both a day and night time perspective. This section also identifies the existing lighting sources and types within the area.

2.9 The lighting design proposals section describes the high level strategy for the proposed lighting scheme. This details the performance criteria required to ensure that the design achieves both construction and operational design criteria; that is, both the temporary lighting required during the construction phase and the permanent lighting scheme once the site is operational.

2.10 The lighting appraisal evaluates the effects of the proposed site lighting upon the environment, outlining mitigation techniques that are proposed. This section provides an understanding of the predicted residual effects on the representative viewpoints as a result of the Site lighting, following mitigation.

2.11 The residual effects, summary and conclusion section summarises the overall findings of the report, identifying any of the assessed viewpoints which require further mitigation.

2.12 The eleven representative viewpoints consdiered herein were selected in accordance with the Preliminary Environmental Report (PER), and specifically the Landscape and Visual Character Assessment for the Site (refer to Annex B for the site and viewpoint location plan).

3 BASELINE LIGHTING ENVIRONMENT

3.1 Existing landscape by day

3.1.1 Within the Site boundary, there is a small number of existing industrial type structures located adjacent to the dock area. There is a small brick type building and a number of storage cylinders, as well as associated pipework, pipe gantries and roadways. The dock area has a small quay, with a road causeway separating the quay from the Bran Sands lagoon and landfill.

3.1.2 The roadway within the Site routes along the southern perimeter boundary, and passes beneath the railway line and road bridge. The roadway leads directly into the Wilton Industrial Complex. By day, there are no visible lighting sources within the Site boundary.

3.1.3 The Bran Sands steel works is a prominent visible development within the short range view, as represented within **Figure 3-1**. The steel works has a number of crane loading structures, as well as conveyors, storage sheds and cylinders which are clearly visible. Within the Bran Sands steel works site boundary, there are a number of 16-20m lighting masts located along the site boundary, as represented within **Figure 3-2**.

Figure 3-1 Landscape by day (taken from Viewpoint 4)

Figure 3-2 Existing high mast lighting within Bran Sands steel works

3.1.4 The NWW treatment site, located to the southeast of the Site, has a number of industrial structures and infrastructure which is clearly visible when looking towards the Site from west and southern Site boundaries.

3.1.5 The NWW site has a vast amount of pipework which appears to route from the direction of the Wilton Industrial Complex, and routes parallel to the Site boundary before entering the NWW site. A pipe and road bridge, as well as a railway bridge, spans over the pipework and infrastructure, running along the southeast boundary of the Site.

3.1.6 Within the NWW site, a number of 16 to 20m lighting masts are visible and located around the perimeter of the site; as represented within **Figure 3-3**. The lighting masts are fitted with six high output, high pressure sodium floodlights, directed towards the NWW site.

Figure 3-3 Northumbria Waste Water treatment plant high mast lighting

3.1.7 Located within 100m of the southwest Site boundary (off Dabholm Road) is a recently constructed large Tesco warehouse building, with an associated car park area, facilities buildings and dock loading quay.

Figure 3-4 Landscape by day (taken from Viewpoint 17)

3.1.8 Further afield, the heavy industrial areas of Teesport are clearly visible on the horizon; as represented within **Figure 3-1**. A large number of chimney stacks are prominent on the horizon, as well as large industrial sheds, storage cylinders and industrial structures.

3.2 Existing landscape by night

3.2.1 During the hours of darkness, it is apparent that there are no existing lighting sources within the Site boundary and the proposed scheme area is therefore in relative darkness.

3.2.2 In the short range view, the adjacent local environment experiences vast amounts of lighting produced by the adjoining Bran Sands steel works, NWW treatment site, the Tesco warehouse facility and other industrial and commercial industries surrounding the Site. Sky glow in the form of an aura above these site areas is visible against the dark night sky.

3.2.3 Many of the existing industrial and commercial industries surrounding the Site operate on a 24 hours basis. Transitory lighting is clearly visible along the main access routes surrounding the Site. The majority of transitory lighting is produced by heavy goods vehicles (HGVs) moving along the roads.

3.2.4 Tees Dock Road, which is the main access road into NWW treatment site, is illuminated by 8 to 10m street lighting columns, although only 50% of the luminaires were active at the time of this assessment.

3.2.5 Street lighting is provided along all of the main roadways within the industrial area of Teesside. The majority of street lighting appears to be low pressure sodium luminaires mounted on 6 to 10m lighting columns.

3.2.6 As outlined within **Section 3.1**, lighting masts with high output floodlights are utilised within the Bran Sands steel works and the NWW treatment site to illuminate work areas. The steel works and NWW treatment site appear to operate on a 24 hour basis; therefore all of the lighting masts appear to be active, as represented by **Figure 3-5** and **Figure 3-6**. Light spill from these lighting masts was visible within the proposed scheme site boundary along the northern perimeter edge.

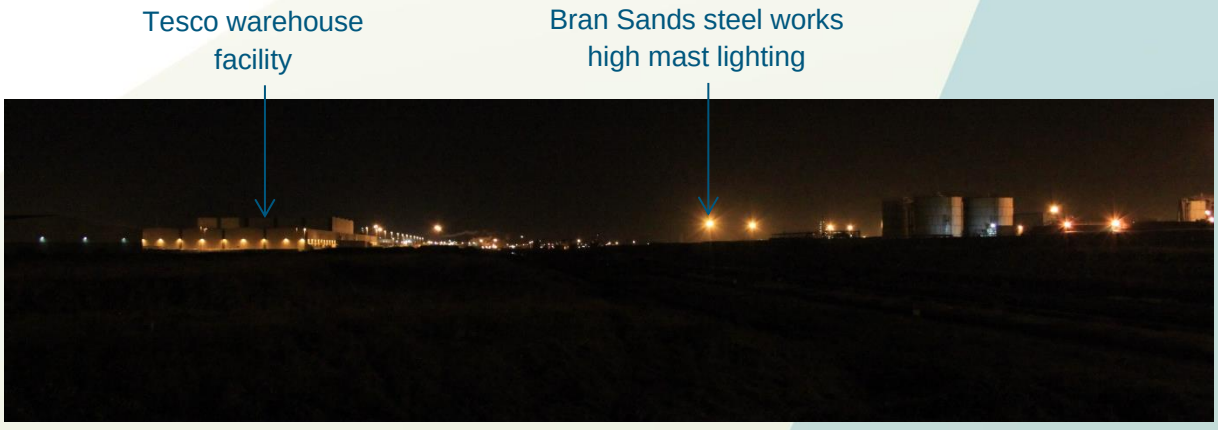

Figure 3-5 Existing landscape by night view 1 (taken from Viewpoint 17)

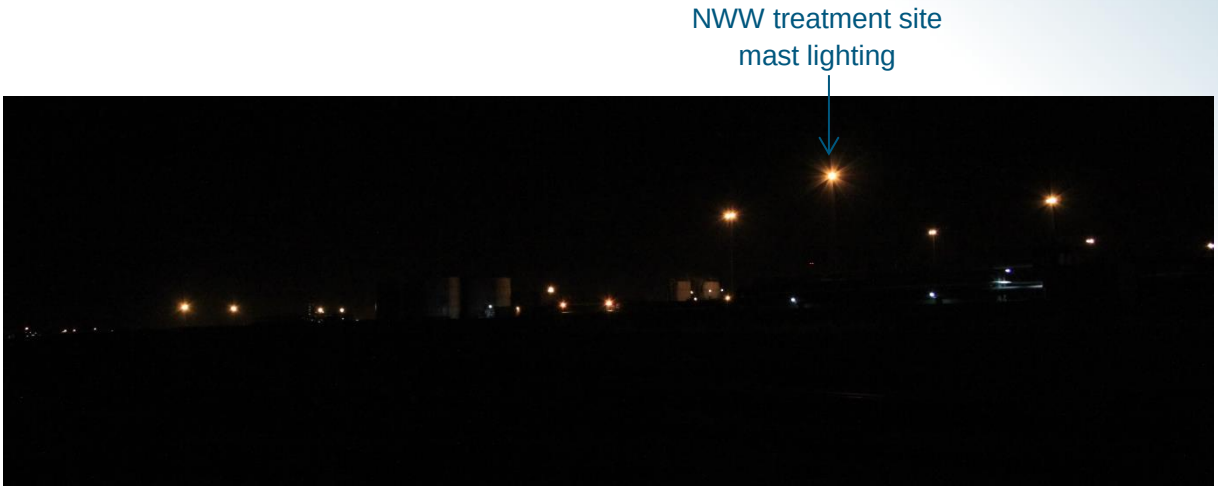

Figure 3-6 **Existing landscape by night view 2 (taken from Viewpoint 17)**

3.2.7 Although the lighting masts are clearly visible, a burning flame from the chimney stack within the Bran Sands steel works (**Figure 3-7** and **Figure 3-8**) is the most intense source of illumination during the hours of darkness.

3.2.8 In the medium to long range view, the surrounding environment of the Site is extensively illuminated and well populated with lighting sources, as represented in **Figure 3-7**. The high mast lighting and burning chimney flame are the most intense lighting sources visible.

3.2.9 The Tesco warehouse facility, as well as the container storage area located adjacent to its quay (to the right of **Figure 3-7**), are well populated with lighting sources. The 'orange' type lighting sources visible are typical of low and high pressure gas-discharge sodium lamps, the 'whiter' light sources visible are typical of LED or white sodium light sources.

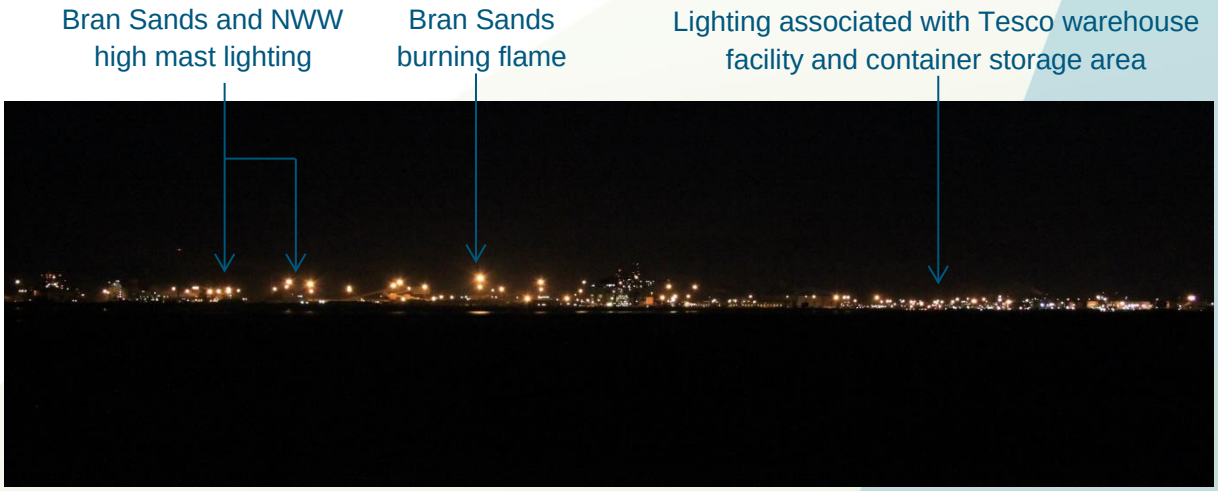

Figure 3-7 **Medium range view towards the Site (taken from Viewpoint 1)**

Figure 3-8 **Medium range view towards the site showing the burning flame (taken from Viewpoint 20)**

3.2.10 Although not clearly visible within **Figure 3-8**, aviation lighting mounted to a number of chimney stacks and tall structures is visible in the direction and vicinity of the Site.

3.2.11 During the assessment, transitory lighting from vessels heading in and out of the estuary was also visible.

3.3 Lighting Obtrusion

3.3.1 There are many publications and organisations that provide advice on controlling light pollution. The Campaign for Dark Skies (CfDS) is particularly active in raising public awareness of the issues, but they have not, as yet, issued technical guidance notes. However, there are two publications, from the Commission International de l'Eclairage (CIE) and the Institution of Lighting Professionals (ILP), which are recognised as technically correct and useful for designers and planners.

3.3.2 The ILP publication 'Guidance Notes for the Reduction of Light Pollution'[5] is now cited by many UK local authorities as best practice. The ILP guidance note lists five environmental zones for lighting control and these, together with recommmendations and typical area examples, are shown within **Table 3-1 Obtrusive Light Limitations**.

3.3.3 The existing Site lighting environment, therefore, can be assessed and categorised based on this criteria.

3.3.4 Based upon our site assessment, the existing Site can be classified in terms of environmental zone by relating the levels of sky glow, light trespass and luminaire source intensity to the data defined within **Table 3-1 Obtrusive Light Limitations**.

[5] ILP, Guidance Notes for the Reduction of Light Pollution, ref: PLG04, 2013.

3.3.5 The existing Site can therefore be defined as falling within Environmental Zone E4, which is defined as high district brightness area, such as Towns/ City Centres with high night time activity levels.

Table 3-1 Obtrusive Light Limitations

Obtrusive Light Limitations – ILE UK Recommendations						
Environmental Zone	**Sky Glow ULR (Max) %**	**Light Trespass (into windows) Ev lux**		**Source Intensity (I) kCd**		**Building Luminance L (Cd/m^2)**
		Pre-curfew	**Post-curfew**	**Pre-curfew**	**Post-curfew**	**Pre-curfew**
E0 – protected dark lighting environment, i.e. UNESCO Starlight Reserves, IDA Dark Sky Parks	0	0	0	0	0	0
E1 – Intrinsically dark landscapes, National Parks, Area of Outstanding Natural Beauty (AONB)	0	2	1	2.5	0	0
E2 – Low district brightness. Rural, small village, relatively dark urban location	2.5	5	1	7.5	0.5	5
E3 – Medium district brightness Small town centres or urban location	5	10	2	10	1.0	10
E4 – High district brightness areas Town / city centres with high night-time activity levels	15	25	5	25	2.5	25
ULR – Upward Light Ratio of Installation (maximum permitted 5 of luminaire f lux for total installation going directly skywards. Ev – vertical illuminance in lux (Lumens per square m) – measured on glazing at centre of window. I – Light source intensity Candelas (Cd). L – Luminance in Candelas per square m (Cd/m^2). Curfew – The time after which more stringent requirements (for control of obtrusive light) will apply; often a condition of use of lighting by the Local Planning Authority. If not otherwise stated, 23:00hrs is suggested by the ILP.						

3.3.6 Refer to **Section 5** for further details on lighting criteria values.

3.4 Viewpoints

3.4.1 **Table 3-2** identifies each of the assessed viewpoints. The distances identified within **Table 3-2** are based upon the direct line of sight distance from the viewpoint to the nearest point of the Site. The height of the viewpoint above ordnance datum is taken from GIS and ordnance survey maps.

Table 3-2 Viewpoint Locations

View Point No.*	Viewpoint Location	Viewpoint Distance From Site (Direct Distance)	Viewpoint Height Above Ordinance Datum
1	Looking south east from North Gare Sands (Teesmouth National Nature Reserve)	2.1km	2m
3	Looking south from South Gare Breakwater across Bran Sands (Saltholme Nature Reserve)	1.8km	3m
5	Looking west from Tod Point Road near Warrenby	1.8km	4m
6	Looking south west from A1085 roundabout	0.7km	6m
8	Looking west from rear of Broadway West Street, Dormanstown	1.1km	6m
10	Looking north west from Wilton Avenue, Dormanstown	1.1km	5m
14	Looking south east from southern cycleway on A1085 at Lord McGowan Bridge	0.7km	6m
15	Looking north from northern cycleway on A1085 at Lord McGowan Bridge	0.7km	7m
17	Looking north and west from footpath 116/31/2, adjacent Tees Dock Road	100m	8m
18	Looking north from Eston Nab Northern Rock	5.8km	230m
20	Looking east from A178 near Grantham Creek and Teesmouth National Nature Reserve visitor car park	3.9km	3m

* Numbers relate to the relevant LVIA (landscape and visual impact assessment) viewpoint.

4 LIGHTING DESIGN PROPOSALS

4.1 Introduction

4.1.1 This section of the report outlines the performance criteria for any proposed lighting for the development in respect of:

- Statutory and operational requirements during the construction phase.
- Statutory and operational requirements for operation and maintenance.
- The design of an appropriate lighting scheme, including the review of environmental considerations associated with the provision of artificial lighting.

4.2 Lighting for the construction process

4.2.1 The fundamental considerations for temporary lighting schemes during construction are:

- To satisfy Health and Safety requirements.
- To minimise the potential effect of lighting upon the surrounding area by minimising sky glow, glare and light spillage.

4.2.2 The construction phase lighting would be provided in accordance with the lighting design standards and guidance documents for a permanent lighting installation. Lighting would comply with the relevant regulations, standards and guidance documents, including:

- HSE: Lighting at Work, 2002 - Lighting at Work.
- HSE: HSG 38, 1997 - Health and Safety Guide 38 – Lighting at Work.
- BS EN 12464-2 Part 2 2014 - Lighting of Work Places - Outdoor Work Places.
- CIBSE: Lighting Guide 1, 2012 - Lighting Guide 1 – The Industrial Environment.
- CIBSE: Lighting Guide 6, 1992 - Lighting Guide 6 – Outdoor Environment Lighting.

4.2.3 The lighting strategy for the proposed development is described herein, giving due regard to visual and ecological constraints, in accordance with the following standards and other relevant guidance:

- UK Parliament, 1990; The Environmental Protection Act 1990;
- The Environmental Protection Act 1990 (as amended by the Clean Neighbourhoods and Environment Act 2005), (Section 79, Statutory Nuisance: Lighting).
- BS-EN 12464-2:2014; Lighting of work places - Outdoor work places.
- BS 5489:2003 Part 1; Code of Practice for the design of Road Lighting.
- BS-EN 13201:2003 Parts 1-4; Road Lighting.
- Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6:1992; Outdoor Environment.
- Institution of Lighting Professionals (ILP formerly ILE); Guidance Notes for the reduction of Light Pollution.
- Bat Conservation Trust (Version 3, May 2009); ILE Bats and Lighting in the UK.

4.2.4 Artificial lighting during the construction phase would only be used during the hours of darkness, during low levels of natural light or during specific construction methods or tasks. This would assist the health, safety and welfare of the construction staff and visitors to the development.

4.2.5 Lighting during the construction phase would predominantly be provided by a combination of both temporary mobile diesel generator lighting towers, up to approximately 9m in height, and semi-permanent post-top mounted flat glass lanterns and asymmetrical reflector floodlights. Lighting would be directed to focus inwards to the site wherever possible to reduce external glare.

4.2.6 Lighting for the construction phase would be provided in accordance with the illumination levels specified within **Table 4-1**.

Table 4-1 Illumination Levels for the Construction Phase

	Horizontal Illuminance	
Proposed Site Task / Classification	**Average Lux**	**Uniformity (Uo)**
BS EN 12464-2:2014 Lighting of work places – Part 2: Outdoor Work Places		
Walkways exclusively for pedestrians (Ref: 5.1.1)	5 lux	0.25 Uo
Traffic areas for slowly moving vehicles, max 10km/h, e.g. trucks and excavators (Ref: 5.1.2)	10 lux	0.4 Uo
Clearance, excavation and loading (Building Sites, ref: 5.3.1)	20 lux	0.25 Uo
Construction areas, storage tasks (Building Sites, ref: 5.3.2)	50 lux	0.4 Uo
Parking areas, light traffic (Ref: 5.9.1)	5 lux	0.25 Uo
Parking areas, medium traffic (Ref: 5.9.2)	10 lux	0.25 Uo
General lighting of shipyard area, storage areas (Shipyards and Docks, ref: 5.14.1)	20 lux	0.25 Uo
Contractors compound / temporary storage area – short term handling of large units and raw materials, load and unloading of solid bulk goods (Ref: 5.7.1 and 5.14.2)	20 lux	0.25 Uo
Contractors compound / temporary storage area – continuous handling of large units and raw materials, load and unloading of solid bulk goods (Ref: 5.7.2)	50 lux	0.4 Uo
Laydown area (Ref: 5.3.1)	20 lux	0.25 Uo

Construction programme

4.2.7 The current programme of works proposes that mobilisation of construction plant, machinery and personnel to site is to commence in January 2017 for a period of 2 months. Phase 2 works are programmed to commence within 6 years of completion of Phase 1[6].

4.2.8 The minimum construction period for Phase 1 works is 17 months for both forms of quay structure. The minimum construction period for Phase 2 works is also 17 months for both forms of quay structure[7].

4.2.9 Given the above, the worst case lighting scenario during construction phase is likely to occur during late autumn / winter months where daylight hours are reduced, typically November to February. Climatic conditions, such as a cloudy overcast day, may also require the construction lighting to be active at various times during daytime hours, due to reduced levels of natural daylight.

4.2.10 Lighting during the construction phase generally would be required to provide illumination for:

- Access and roads surrounding the proposed development site.
- The safe movement of staff / operatives / visitors around the proposed development site.
- The proposed development and on-site structures and plant.
- Specific construction tasks.
- Plant and equipment.

4.2.11 Typically, a maximum lighting column height of 10m would be utilised during the construction phase. These columns generally would be located around the perimeter of the Site or works area. Where practicable, the mounting height of luminaires would be reduced to 6m, unless specific operations, construction methods, plant or equipment necessitate the mounting height to be increased, but this would be limited to the specific operation or duration of that construction phase.

4.2.12 The luminaires to be mounted on lighting columns would comprise of a flat glass construction, appropriate to the construction and location of installation. The aiming angle of the peak intensity of the luminaire would be limited to maintain the light output from the luminaire within five degrees from the downward vertical. This would control the lighting of the area and minimise any potential glare, sky glow and obtrusive lighting to the surrounding areas.

4.2.13 The luminaires to be mounted on the lighting columns would incorporate the appropriate photometry reflectors to control the distribution of light from the luminaires and maintain the illumination within the construction development areas, boundary or task.

[6] Harbour Facilities ES Section 3, Rev 1, Section 3.1.92.
[7] Harbour Facilities ES Section 3, Rev 1, Section 3.1.93.

4.2.14 Where required by specific localised tasks, mobile lighting would be mounted on telescopic poles to meet the respective health and safety requirements; this would include crane-mounted lighting used to illuminate the required work areas.

4.2.15 The proposed horizontal lighting illuminance levels (minimum and average levels) would comply with the lighting standard and guidance documents relevant to the method and construction work being undertaken. Lighting levels are designed to be the minimum necessary as far as is practicably possible, in line with safe working practices. Lighting levels would be established in accordance with, but not limited to, the relevant regulations, standards and guidance documents, listed within this report.

4.2.16 Where a high level of illumination is required, it would be suitably controlled by the utilisation of flat glass luminaires and provided to minimise the effect upon local residents, the environment and road and construction traffic. Where a level of lighting greater than 150 lux is required, it would be limited to the specific construction task area and for the duration of the task only.

4.2.17 Contractors would be required to ensure that all plant, equipment and machinery used in the construction of the facility have the appropriate lighting for the safety of operation. This would be controlled and operated to minimise any 'obtrusive' light into the surrounding area by directing light onto and into the area of construction work.

4.2.18 The construction lighting, whilst temporary by nature, would be designed, installed and controlled by the contractors in such a way that it meets fully with the statutory obligations for the health, safety and welfare of the construction staff, whilst minimising the effects on the surrounding environment.

4.2.19 During low levels of activity, public holidays or lulls in construction, the contractors would be required to maintain only appropriate minimum levels of illumination around the proposed development. The minimum levels would be commensurate with the proposed development's security and safety requirements during hours of darkness or low levels of natural light; however this would be reviewed on an area by area basis to provide the minimum levels required. These details will be included within the Harbour facilities Construction Environmental Management Plan.

4.2.20 As part of the construction process, contractors would be required to monitor the lighting levels and spillage, and records should be retained on site showing the lighting levels. Where lighting levels are found to be inadequate or excessive, mitigation strategies to remedy the effects would be implemented.

Construction phase traffic road lighting

4.2.21 The site roads around the Site would be illuminated by column mounted luminaires positioned at the side of the road.

4.2.22 Traffic areas would be illuminated to an average of 10 lux (BS EN 12464-2, Traffic areas for slow moving vehicles, max 10km/h, e.g. trucks and excavator, ref: 5.1.2), using post top mounted flat glass

luminaires on up to 8m columns. Where possible, the operational road lighting scheme would be utilised during construction.

4.2.23 The control and switching of the lighting circuits is such that in normal operation a photocell provided adjacent to the road lighting feeder pillar would switch the lights on at dusk and off at dawn. A detailed lighting control philosophy should be developed during the detailed design phase to explain the lighting control methods applied in accordance with the operational requirements.

4.2.24 The final lighting control strategy would be developed in accordance with the construction operational times. The levels of illumination and the switching of lighting circuits would be controlled such that the lighting is only at full output during the operational times of the site. Perimeter fence lighting, road way lighting and security lighting would also be required to be operational during hours of darkness.

Construction phase contractors compound area lighting

4.2.25 The compound areas are anticipated to provide the following:

- Office facilities.
- Storage facilities.
- Welfare facilities.
- Car parking.
- Materials storage.
- Equipment storage.
- Plant storage.
- Pre-assembly / fabrication areas.

4.2.26 The compound area would be illuminated to an average level between 20 and 50 lux depending on the tasks being undertaken. The contractors compound / storage areas where short term handling of large units and raw materials, loading and unloading of solid bulk goods is undertaken, would be illuminated to 20lux[8], using post top mounted flat glass lanterns on 6m and 8m columns utilising asymmetrical reflector floodlights.

4.2.27 Areas within the contractors compound, such as the pre-assembly / fabrication areas, where tasks being undertaken would include continuous handling of large units and raw materials, loading and unloading of solid bulk goods etc will be illuminated to 50lux[9], using post top mounted flat glass lanterns on 6m and 8m columns utilising asymmetrical reflector floodlights.

[8] BS EN 12464-2:2014 Lighting of work places – Part 2: Outdoor Work Places, ref: 5.7.1 and 5.14.2.
[9] BS EN 12464-2:2014 Lighting of work places – Part 2: Outdoor Work Places, ref 5.7.2.

4.3 Operational lighting

4.3.1 This section covers the proposed operational lighting and the provision of lighting to the access roads.

4.3.2 The following Design Standards are being applied within the proposed development design to ascertain the most appropriate method for illuminating the development:

- UK Parliament, 1990; The Environmental Protection Act 1990 (as amended by the Clean Neighbourhoods and Environmental Act 2005), specifically 79 and 80;
- BS-EN 12464-2:2014; Lighting of work places - Outdoor work places;
- BS 5489:2003 Part 1; Code of Practice for the design of Road Lighting;
- BS EN 13201:2003 Part 2 - Road Lighting – Performance Requirements;
- BS EN 13201:2003 Part 3 - Road Lighting – Calculation of Performance; BS EN 13201:2003 Part 4 - Road Lighting – Methods of Measuring;
- Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6:1992; Outdoor Environment;
- Institution of Lighting Professionals (ILP formerly ILE); Guidance Notes for the reduction of Light Pollution;
- Bat Conservation Trust (Version 3, May 2009); ILE Bats and Lighting in the UK;
- HSE: HSG 38, 1997 - Health and Safety Guide 38 – Lighting at Work.

4.3.3 Whilst every effort will be made to limit the spill light due to this project through mitigation during the design phase, following completion of the construction phase, in the event that light spill is found to be obtrusive, further investigations would be carried out to assess the use of shields and baffles which could reduce light spill.

4.3.4 It should be noted that there is currently no proposed lighting design for the operation of the proposed scheme. It is anticipated that a lighting design strategy will be produced during the detailed design stage. Therefore, for the purposes of this Technical Lighting Assessment, the effects of the proposed scheme's lighting upon the identified viewpoints is based upon prediction of the anticipated effects and professional judgement following the application of best design practices, standards, guidance documents and the Local Authority lighting policies that will apply to the lighting design.

4.3.5 Lighting for the operational phase would be provided in accordance with the illumination levels specified within **Table 4-2**.

Table 4-2 Illumination Levels for the Operational Phase

	Horizontal Illuminance	
Proposed Site Task / Classification	**Average Lux**	**Uniformity (Uo)**
General Areas (BS EN 12464-2:2014 Lighting of work places – Part 2: Outdoor Work Places)		
Walkways exclusively for pedestrians (Ref: 5.1.1)	5 lux	0.25 Uo

Traffic areas for slowly moving vehicles, max 10km/h, e.g. trucks and excavators (Ref: 5.1.2)	10 lux	0.4 Uo
Parking areas, light traffic (Ref: 5.9.1)	5 lux	0.25 Uo
Parking areas, medium traffic (Ref: 5.9.2)	10 lux	0.25 Uo
Dock Areas (BS EN 12464-2:2014 Lighting of work places – Part 2: Outdoor Work Places)		
General lighting of shipyard area, storage areas (Shipyards and Docks, ref: 5.14.1)	20 lux	0.25 Uo
Gangways and passages exclusively for pedestrians	10 lux	0.25 Uo
Cargo handling, loading and unloading (Ref: 5.4.4)	30 lux	0.25 Uo
Dangerous part of walkways (Ref: 5.4.7)	50 lux	0.4 Uo
Proposed Site Access Roads		
BS 5489-1:2013 - Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas, currently based on lighting CE4[10]	10 lux	0.4 Uo
Industrial Areas		
Short-term handling of large units and raw materials, loading and unloading of solid bulk goods (Ref: 5.7.1)	20 lux	0.25 Uo
Continuous handling of large units and raw materials, loading and unloading of freight, lifting and descending location for cranes, open loading platforms (Ref: 5.7.2)	50 lux	0.4 Uo

Operational phase site access roads

4.3.6 During the operational phase, access to the Harbour facilities would be gained from the Bran Sands Access Road and / or Bran Sands Access Track.

4.3.7 As indicated within **Table 4-2**, the Site access road would be illuminated to an average of 10 lux, with 0.4 uniformity being provided. The lighting would be provided by flat glass lanterns mounted to lighting columns up to 8m high.

Operational phase car park areas

4.3.8 During the operational phase, local parking capacity for approximately ten cars is envisaged. There is sufficient area available for the required parking provision at the location of the proposed port terminal and around the proposed storage surge bins

[10] Lighting class of roadway to be confirmed.

4.3.9 As indicated within **Table 4-2**, the car park areas would be illuminated to an average of 5 lux, with a uniformity of 0.25 depending on the traffic flow. The lighting would be provided by 6m to 8m lighting columns, utilising flat glass lanterns.

Operational phase pedestrian walkways

4.3.10 As indicated within **Table 4-2**, during the operation of the proposed scheme, the pedestrian walkways would be illuminated to an average of 5 lux, with 0.25 uniformity being provided. The lighting would be provided by suitable luminaires mounted to buildings where possible, and 6m to 8m column mounted flat glass lanterns.

Operational areas

4.3.11 During the operation of the proposed scheme, the general activities are located adjacent the dock area and this would be illuminated to an average of 50 lux with 0.4 uniformity, as indicated within **Table 4-2**. The lighting would be provided by suitable luminaires mounted to the structures where possible, with the use of lighting columns using flat glass, asymmetric flood lights.

4.4 Lighting effect on ecology and nature conservation

Nature conservation

4.4.1 The proposed scheme is near to the following designated nature conservation sites[11]:

Table 4-3 Designated Nature Conservation Sites

Designated Site	Distance from proposed Port development
South Gare and Coatham Sands SSSI (Site of Special Scientific Interest)	0.7km
Teesmouth and Cleveland Coast SPA and Ramsar site	1km
Seal Sands SSSI	1.2km
Teesmouth NNR (National Nature Reserve)	1.3km
Seaton Dunes and Common SSSI	1.3km
Tees and Hartlepool Foreshore and Wetlands SSSI	3km
Cowpen Marsh SSSI	4km
Redcar Rocks SSSI	5.5km

[11] Port Facility Preliminary Environment Report (PER), Rev 0, Section 9.4.2.

4.4.2 Based upon the on-site assessment, and professional judgement given that the distance of the proposed scheme from the designated nature conservation areas is a minimum of 0.7km, it is considered that the construction and operational lighting for the proposed scheme would have no adverse effects upon these designated sites.

Ecology

4.4.3 Artificial lighting can have an adverse effect upon ecology, specifically bats. Bats are protected by the Wildlife and Countryside Act (1981) and the Conservation of Habitats and Species Regulations 2010. This makes it illegal to kill, injure, capture or disturb bats, obstruct access to bat roosts or damage/destroy bat roosts. Lighting in the vicinity of a bat roost causing disturbance could constitute an offence. There is no legislation relating directly to lighting effects on bats; however, guidance has been produced by the Bat Conservation Trust.

4.4.4 The Bat Conservation Trust Guidance states that no bat roost (including access points) should be directly illuminated. If it is considered necessary to illuminate an area known to be used by roosting bats, the lights should be positioned to avoid the sensitive areas. It also states that the height of lighting should be as low as possible. The times during which the lighting is active should be limited to provide some dark periods.

4.4.5 Roads or track ways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route.

4.4.6 Where tungsten halogen lamps are to be utilised either during the construction or operational phases, these luminaires shall be equipped with glass covers to provide greater UV filtration characteristics to detract insects and in-turn foraging bats. In addition, tungsten lamps emit low levels of UV light which attracts insects and therefore foraging bats. The use of tungsten lamp sources should be avoided where possible.

4.4.7 As indicated within Section 11 of the Terrestial Ecology Chapter of the Environmental Statement (ES), an independent bat survey was carried out in February 2014 which identified specific areas which are likely to offer potential bat roosting habitats. The location of potential bat roosts is indicated within Annex D herein.

4.4.8 Five bridges within the Site boundary and the existing industrial plant at Bran Sands lagoon have been identified as potential bat roosting habitat (refer to Annex D). The proposed lighting design for the scheme, specifically the lighting located within identified areas, is required to be sympathetic to the identified bat roosts.

4.4.9 The proposed luminaires would be positioned such that they are not immediately adjacent the bat roosts. The luminaires would be directed such that the light output of the luminaire does not direct towards the roost. Suitable cowls and diffusers would be used to direct light to the required task areas.

Lamp types would not be of the halogen type and a preference for an LED lamp type would be applied (with less effect upon foraging bats and insects).

5 LIGHTING APPRAISAL, MITIGATION AND RESIDUAL EFFECTS

5.1 Introduction

5.1.1 The following appraisal summarises the lighting assessment that has been undertaken for the proposed Harbour facilities and its associated effects. A description of the existing baseline lighting environment is provided for each relevant viewpoint. This describes any sources of existing lighting as well as identifying the location of the viewpoint. The sensitivity of the viewpoint is also considered.

5.1.2 An assessment of the lighting environment during the construction phase (short term) and the operational phase (long term) of the proposed scheme is then provided. The effects of the construction and operational phase lighting are assessed using the Lighting Assessment Criteria as defined within **Table 5-1**.

5.1.3 Any adverse issues which are identified are further assessed. To reduce the significance of impacts, mitigation strategies are proposed. The mitigation strategies identified are specific to each viewpoint, and assist in reducing the overall significance of any impacts.

5.1.4 Finally, the residual impacts of the proposed lighting, taking into account the mitigation strategies identified, are assessed.

5.2 Lighting assessment criteria

5.2.1 The predicted effects of the proposed scheme lighting have been assessed based on the following significance criteria:

- Major Beneficial / Adverse.
- Moderate Beneficial / Adverse.
- Minor Beneficial / Adverse.
- Negligible.
- No Effect.

5.2.2 The effects for both the construction and operational phases are assessed against the criteria set out in **Table 5-1 Effects Criteria**[12].

[12] ILP:PLG04, 2013; Institution of Lighting Professionals; Guidance on Undertaking Environmental Lighting Impact Assessments

5.2.3 **Table 5-1** is based upon the standard format for the evaluation of various environmental effects, but has been adapted for the purposes of lighting assessment. The magnitude of any change and its overall significance must be assessed; however in some circumstances magnitude and significance may not be linked, for example increased lighting levels may be substantial but, if the local sensitivity to light is low, the significance may be low.

5.2.4 The effects of new lighting are often considered to be adverse; however there are situations where changes in the lighting environment may be beneficial.

Table 5-1 **Effects Criteria (ILP:PLG04, 2013; Institution of Lighting Professionals; Guidance on Undertaking Environmental Lighting Impact Assessments)**

Nature	Ref	Level	Description	Effects / Remedial Needs
Positive	1	Major / substantial beneficial effects	Significant improvement in night environment and / or reductions in glare, light spill and sky glow etc.	Creating a safer environment from a security aspect; Creating a safer environment from a health and safety point of view, contributing to reducing the number of accidents along roadways, footpaths and the environment in general.
	2	Moderate beneficial effects	Noticeable improvement in night environment and / or reductions in glare, light spill and sky glow etc.	Creating a safer environment from a security aspect; Creating a safer environment from a health and safety point of view, contributing to reducing the number of accidents along roadways, footpaths and the environment in general.
	3	Minor beneficial effects	Slight improvement in night environment and / or reductions in glare, light spill and sky glow etc.	Creating a safer environment from a security aspect; Creating a safer environment from a health and safety point of view, contributing to reducing the number of incidents along roadways, footpaths and the environment in general.
Neutral	4	Negligible	No significant effect or overall effects balancing out.	The proposed lighting, during both the construction and operational phases of the development, does not have either positive or negative effects upon the lighting environment or its receptors.
	5	No effect	The proposed lighting is assessed as having no effect upon the viewpoint or its receptors.	No effects / remedial strategies required.
Negative	6	Minor adverse effects	Slight increase in lighting levels increasing the site visibility, glare, and sky glow etc.	Develop appropriate levels and type of mitigation.

Nature	Ref	Level	Description	Effects / Remedial Needs
	7	Moderate Adverse	The impact gives rise to some concern but it is likely to be tolerable in the short-term (e.g. during the construction phase); mitigation to reduce the impact should be sought or the issue will require a value judgement as to its acceptability.	Loss of an access route / a recreational opportunity over the long term.
	8	Major Adverse	The impact is large scale, giving rise to great concern; it should be considered unacceptable and requires mitigating, compensating or a significant change to the development if no alternative is available. If no mitigation is possible then the impact will require a value judgement as to its acceptability.	Loss of numerous access routes / multiple recreational opportunities over the long term.

5.2.5 The effects of the proposed lighting have been categorised based on the criteria below defined in the ILP Guidance Notes for the Reduction of Obtrusive Light (GN01:2011):

- Sky glow upward light ratio (ULR).
- Light intrusion (light intrusion into windows).
- Luminaire intensity.

Sky glow

5.2.6 Sky glow, or upward light ratio, is the level of light spill which is either directed upwards into the night sky in the form of light spill or light pollution. Sky glow is often witnessed by the brightening of the night sky above developed urban areas.

Table 5-2 Sky Glow Values

Sky Glow Control	E0	E1	E2	E3	E4
Upward light ratio	0%	0%	2.5%	5%	15%

5.2.7 The ILP Guidance Note for the reduction of Light Pollution sets out maximum upward light ratio (ULR) values (**Table 5-2**) for the five, previously mentioned, environmental zones (see **Table 3-1**).

5.2.8 The ratio, formerly known as upward waste light ratio (UWLR), is expressed for the complete installation, and not individual luminaires, with this maximum value representing the limit of luminous flux, which is projected directly into the sky from all the luminaires. This percentage figure does not include light reflected upwards from the ground or from adjacent buildings or structures and although no

technical recommendations have been published as guidance on the likely limiting value of this light, this report provides a baseline calculated assessment of the combined upward content to compare with the redevelopment proposals since its effects are visible from many distant viewpoints round the site.

Light intrusion

5.2.9 Light intrusion is often caused by excessive, or misdirected obtrusive artificial light which passes beyond the boundaries of the Site for which it is intended, into other areas. Light intrusion is often the spilling of light beyond the boundary of the property or area being lit. Light intrusion may result in artificial lighting sources entering areas which are not required to be illuminated, i.e. misdirected light sources which allow light to enter through a window of a nearby property.

Table 5-3 Light Intrusion Values

Light Intrusion Control	E0	E1	E2	E3	E4
Pre curfew (lux)	0	2	5	10	25
Post curfew (lux)	0	0	1	2	5

5.2.10 The ILP Guidance Note for the reduction of Light Pollution considers the intrusive effect of light entering through windows and sets out suggested maximum permitted values of light measured as vertical illuminance, in lux, at windows.

5.2.11 These maximum values need to take account of existing ambient trespassing light and should not be assumed to be the permissible additional limits from a new installation. Curfew is a time after which stricter requirements (for control of obtrusive light) will apply and is often a condition of use of the lighting installation imposed by a local government controlling authority.

Luminaire intensity

5.2.12 Luminaire intensity is light emitted from a lighting source in a particular direction, also referred to as glare. For the purpose of this assessment, luminaire intensity is often defined as the magnitude of direct views of the lighting source(s).

Table 5-4 Luminaire Intensity Values

Light Source Intensity	E0	E1	E2	E3	E4
Pre curfew (cd)	0	2,500	7,500	10,000	25,000
Post curfew (cd)	0	0	500	1,000	2,500

5.2.13 When considering luminaire intensity or glare it is necessary to look inwards from the surrounding environment observer locations to each of the light sources in turn. The orientation of each source towards any inwards viewpoint, the distribution characteristics of each luminaire and the lamp within each luminaire will determine the value of source intensity, sometimes referred to by planners as direct light, towards that viewpoint. The ILP and CIE Guidance on limiting intensity values are for individual luminaire assessment and are represented in candela values in **Table 5-4**.

5.3 Viewpoint 1

Location:	Looking south east from North Gare Sands (Teesmouth National Nature Reserve)
Distance to site:	2.1km
Viewpoint height above ordnance datum:	2m
Conditions during site assessment:	Cloudy, strong wind.

Viewpoint 1 – Existing lighting baseline

Figure 5-1 Viewpoint 1, North Gare Sands, Day Time View

Figure 5-2 Viewpoint 1, North Gare Sands, Night Time View

5.3.1 This viewpoint is located at North Gare Sands, 2.1km from the Site, on the north west side of Tees estuary. The tide was out at the time of assessment, and the surrounding environment at this viewpoint is predominantly long flat beach areas with sand dunes located at the estuary. From this viewpoint, the many buildings and structures located at Teesside Industrial Area are clearly visible across the estuary.

5.3.2 Views towards the Site are clearly visible, although the Site is not easily identifiable due to the vast number of the industrial buildings and structures in the view and 2.1km distance to Site.

5.3.3 During the night time assessment, the viewpoint and its immediate surroundings were in darkness. However there was vast lighting visible in the direction of the Site associated within the Teesside industrial area. The high mast, high output floodlights illuminating the industrial work areas are the predominant visible lighting sources. Many of the Teesside industries appear to operate on a 24 hour basis, therefore the areas surrounding the Site are heavily populated with light sources.

5.3.4 General lighting in the form of high output floodlights, aviation lighting, road lighting, navigational buoy beacons, building internal lighting and transitory lighting from vehicles and vessels is clearly visible in the direction of the Site. The Site area is not clearly visible due to the amount of existing lighting visible from this viewpoint.

5.3.5 The magnitude of change at this viewpoint due to the proposed works is predicted to be **negligible**, as this viewpoint has no clear views of the Site.

5.3.6 The receptors at this viewpoint would be walkers using the beach, although it is unlikely there would be many users of the beach during the hours of darkness.

Viewpoint 1 – Construction phase lighting effects

5.3.7 Due to the distance from Site, the construction phase lighting would have **no effect** upon this viewpoint due to the amount of existing lighting currently visible from this viewpoint.

Table 5-5 Viewpoint 1, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

Viewpoint 1 – Operational phase lighting effects

5.3.8 Due to the distance from Site, and the amount of existing lighting currently visible within the Teesside Industrial area, the operational lighting effects at this viewpoint would have **no effect** upon this viewpoint in terms of light intrusion and luminaire intensity. The operational lighting would contribute towards the overall levels of sky glow, although the level of contribution is considered to be **negligible** in respect of the sky glow levels currently visible.

Table 5-6 Viewpoint 1, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	No Effect	No Effect

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Winter Months:	Negligible	No Effect	No Effect

5.4 Viewpoint 3

Location:	Looking south from South Gare Breakwater across Bran Sands (Saltholme Nature Reserve)
Distance to site:	1.8km
Viewpoint height above ordnance datum:	3m
Conditions during site assessment:	Cloudy, strong wind.

Viewpoint 3 – Existing lighting baseline

Figure 5-3 Viewpoint 3, South Gare Sands, Day Time View

Figure 5-4 Viewpoint 3, South Gare Sands, Night Time View

5.4.1 Along this roadway are a number of coastal properties and beach houses overlooking the sea. Facing the Site, 100m from the viewpoint is a marina and associated buildings.

5.4.2 Views towards the Site are clearly visible across the bay, although the Site is not easily identifiable due to the vast number of the industrial buildings, structures and 1.8km distance to Site.

5.4.3 During the night time assessment, the viewpoint and its immediate surroundings were in darkness. The roadway was not illuminated and most of the private properties along the private road appear to be vacant. There is vast amount of lighting visible in the direction of the Site associated within the Teesside and Teesport industrial area. The high mast, high output floodlights illuminating the industrial work areas are the predominant visible lighting sources. Many of the industries appear to operate on a 24 hour basis, therefore the areas surrounding the Site are heavily populated with light sources.

5.4.4 General lighting in the form of high output floodlights, aviation lighting, road lighting, navigational buoy beacons, building internal lighting and transitory lighting from vehicles and vessels is clearly visible in the direction of the Site. The Site area is not clearly visible due to the amount of existing lighting visible from this viewpoint.

5.4.5 The magnitude of change at this viewpoint is predicted to be **negligible**, as this viewpoint has no clear views of the port or conveyor.

5.4.6 The receptors at this viewpoint would be users of the private road and the adjacent properties, although it appears the beach properties and marina are only used during day time hours / summer periods.

Viewpoint 3 – Construction phase lighting effects

5.4.7 Due to the distance from Site, the construction phase lighting would have **no effect** upon this viewpoint due to the amount of existing lighting currently visible from this viewpoint.

Table 5-7 Viewpoint 3, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

Viewpoint 3 – Operational phase lighting effects

5.4.8 Due to the distance from Site, and the amount of existing lighting currently visible within the Teesside industrial area, the operational lighting effects at this viewpoint would have **no effect** upon this viewpoint in terms of light intrusion and luminaire intensity. The operational lighting would contribute towards the overall levels of sky glow, although the level of contribution is predicted to be **negligible** in respect of the sky glow levels currently visible.

Table 5-8 Viewpoint 3, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	No Effect	No Effect
Winter Months:	Negligible	No Effect	No Effect

5.5 Viewpoint 5

Location:	Looking west from Tod Point Road near Warrenby
Distance to site:	1.8km
Viewpoint height above ordnance datum:	4m
Conditions during site assessment:	Cloudy, light wind.

Viewpoint 5 – Existing lighting baseline

Figure 5-5 Viewpoint 5, Tod Point Road, Warrenby, Day Time View

Figure 5-6 Viewpoint 5, Tod Point Road, Warrenby, Night Time View

5.5.1 This viewpoint is located on Tod Point Road, Warrenby, 1.8km from the Site. This viewpoint is located on the access road into Warrenby Industrial Estate.

5.5.2 Along this roadway are a number of industrial premises within Warrenby Industrial Estate. The viewpoint offers clear panoramic views of the Teesside and Teesport industrial buildings and structures.

5.5.3 Views towards the Site are obscured by the industrial buildings and structures located at Teesside. Tod Point Road is illuminated by 6 to 8m lighting columns along its route.

5.5.4 During the night time assessment, the viewpoint and its immediate surroundings were illuminated by the street lighting along Tod Point Road. There are vast amounts of lighting visible in the direction of the Site associated within the Teesside and Teesport industrial area. The high mast, high output floodlights illuminating the industrial work areas are the predominant visible lighting sources. Many of the industries appear to operate on a 24 hour basis, therefore the areas surrounding the Site are heavily populated with light sources.

5.5.5 General lighting in the form of high output floodlights, aviation lighting, road lighting, navigational buoy beacons, building internal lighting and transitory lighting from vehicles and vessels is clearly visible in the direction of the Site. The Site area is not clearly visible due to the amount of existing lighting visible from this viewpoint.

5.5.6 The magnitude of change at this viewpoint is predicted to be **negligible**, as this viewpoint has no clear views of the port or conveyor.

5.5.7 The receptors at this viewpoint would be vehicles and pedestrians using Tod Point Road, although Warrenby Industrial Estate appears to operate during day time hours only. The use of Tod Point Road, therefore, would be very infrequent during the hours of darkness and in the evening.

Viewpoint 5 – Construction phase lighting effects

5.5.8 Due to industrial buildings and structures obscuring views of the Site, the construction phase lighting would not be visible from this viewpoint. It is therefore considered the construction lighting would have **no effect** upon this viewpoint.

Table 5-9 Viewpoint 3, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

Viewpoint 5 – Operational phase lighting effects

5.5.9 The industrial buildings and structures located at Teesside obstruct views of the Site. The operational lighting associated with the proposed scheme, therefore, would not be visible from this viewpoint. However, the proposed scheme's operational lighting would contribute towards the overall levels of sky glow, although the level of contribution is predicted to be **negligible** in respect of the sky glow levels currently visible.

Table 5-10 Viewpoint 5, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	No Effect	No Effect
Winter Months:	Negligible	No Effect	No Effect

5.6 Viewpoint 6

Location:	Looking south west from A1085 roundabout
Distance to site:	0.7km
Viewpoint height above ordnance datum:	6m
Conditions during site assessment:	Cloudy, light rain and wind

Viewpoint 6 – Existing lighting baseline

Figure 5-7 Viewpoint 6, A1085 roundabout, Day Time View

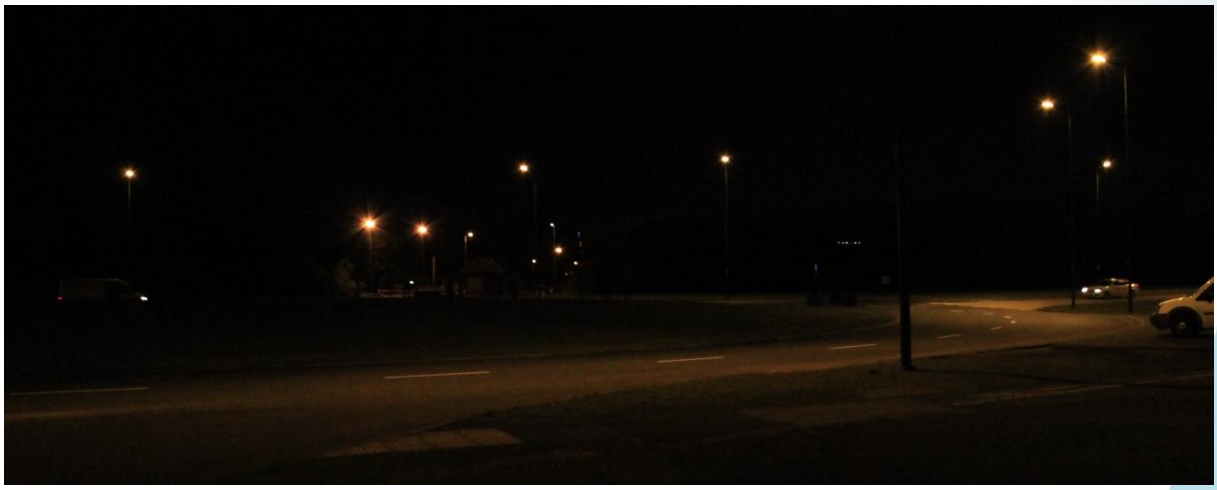

Figure 5-8 Viewpoint 6, A1085 roundabout, Night Time View

5.6.1 This viewpoint is located adjacent the roundabout junction on the A1085, 0.7km from the Site. It is surrounding by roadways which exit from the A1085 roundabout, with an access road leading into the Teesside industrial area.

5.6.2 The roadways and roundabout are well illuminated by 8 to 10m lighting columns with low pressure sodium lamps.

5.6.3 Views towards the Site are obscured by the woodland, however glimpses of the proposed conveyor route where it passes over the A1085 road are possible; although the roadside vegetation provides some screening of the proposed conveyor.

5.6.4 During the night time assessment, the viewpoint and the roadway surroundings were well illuminated by the street lighting columns. Transitory lighting from vehicles using the A1085 and associated roundabout was clearly visible on a frequent basis. Security lighting in the form of high output floodlights is visible along West Coatham Lane, opposite this viewpoint.

5.6.5 The magnitude of change at this viewpoint is predicted to be **moderate** as a result of views of the conveyor crossing the A1085.

5.6.6 The receptors at this viewpoint would be vehicles and pedestrians using the A1085 and its associated footpath.

Viewpoint 6 – Construction phase lighting effects

5.6.7 The port facility is not visible from this viewpoint. However the proposed conveyor route is partially visible above the A1085 roadway, it is therefore likely that the construction phase lighting associated with the conveyor would be partially visible. It is considered that the construction lighting would have a

moderate adverse impact upon motorists using the roadway in terms of luminaire intensity as a result of direct views of the construction lighting.

Table 5-11 Viewpoint 6, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Negligible	Moderate Adverse
Winter Months:	No Effect	Negligible	Moderate Adverse

Viewpoint 6 – Construction phase mitigation

5.6.8 The following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 6 – Construction phase residual impact

5.6.9 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual impact is likely to be **minor adverse** (in the context of luminaire intensity).

Table 5-12 Viewpoint 6, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Negligible	Minor Adverse
Winter Months:	No Effect	Negligible	Minor Adverse

Viewpoint 6 – Operational phase lighting effects

5.6.10 The port facility is not visible from this viewpoint. It is understood that the conveyor would have no visible external lighting. Therefore the operational lighting associated with the conveyor lighting would have **no effect** upon this viewpoint or its receptors.

Table 5-13 Viewpoint 6, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

5.7 Viewpoint 8

Location:	Looking west from rear of Broadway West Street, Dormanstown
Distance to site:	1.1km
Viewpoint height above ordnance datum:	6m
Conditions during site assessment:	Cloudy, light rain and wind

Viewpoint 8 – Existing lighting baseline

Figure 5-9 Viewpoint 8, Broadway West Street, Dormanstown, Day Time View

Figure 5-10 Viewpoint 8, Broadway West Street, Dormanstown, Night Time View

5.7.1 This viewpoint is located on the access road to the rear of the private properties on Broadway West Street, 1.1km east of the Site. The viewpoint is surrounded by the property gardens, secure fencing and vegetation immediately in front of the viewpoint. There are no clear views of the Site, although the conveyor corridor is partially visible in the medium range view.

5.7.2 Views of the port and conveyor corridor may be more visible from the upper storey windows of the adjacent properties, although the vegetation along the fence line of Broadway West Street is likely to provide some screening.

5.7.3 The access road to the rear of the properties is illuminated by 6 to 8m lighting columns utilising low pressure sodium lamps.

5.7.4 During the night time assessment, the viewpoint and the roadway surroundings were well illuminated by the street lighting columns. Transitory lighting from vehicles in the medium range view moving along West Coatham Lane was partially visible through gaps with the vegetation. Existing lighting located at the substation inbetween the Site and viewpoint was also partially visible through gaps within the vegetation. It is likely that views from this viewpoint would be more obscured during summer months, when vegetation is more dense.

5.7.5 The magnitude of change at this viewpoint is predicted to be **minor**, as this viewpoint is likely to have partial views of the conveyor corridor during winter months when there is less vegetation to provide screening.

5.7.6 The receptors at this viewpoint would be the local residents within the properties along Broadway West, specifically the properties with rear views towards the Site and conveyor corridor.

Viewpoint 8 – Construction phase lighting effects

5.7.7 The port facillity is not visible from this viewpoint. However the proposed conveyor route is partially visible above the A1085 roadway. It is therefore likely the construction phase lighting associated with the conveyor would be partially visible.

5.7.8 It is considered the construction lighting would have a **minor adverse** impact upon the residents of the adjacent properties in terms of luminaire intensity as a result of direct views of the construction lighting.

Table 5-14 Viewpoint 6, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Minor Adverse
Winter Months:	Negligible	Negligible	Minor Adverse

Viewpoint 8 – Construction phase mitigation

5.7.9 The following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 8 – Construction phase residual impact

5.7.10 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual impact is likely to be as detailed below.

Table 5-15 Viewpoint 8, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Negligible	Negligible
Winter Months:	Negligible	Negligible	Minor Adverse

Viewpoint 8 – Operational phase lighting effects

5.7.11 The port facility is not visible from this viewpoint. However, as identified, the conveyor corridor is likely to be partially visible during winter months. It is understood the conveyor would have no visible external lighting. Therefore the operational lighting associated with the Site and conveyor lighting would have **no effect** upon this viewpoint or its receptors.

Table 5-16 Viewpoint 8, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

5.8 Viewpoint 10

Location:	Looking north west from Wilton Avenue, Dormanstown
Distance to site:	1.1km
Viewpoint height above ordnance datum:	5m
Conditions during site assessment:	Cloudy, light rain and wind

Viewpoint 10 – Existing lighting baseline

Figure 5-11 Viewpoint 10, Wilton Avenue, Dormanstown, Day Time View

Figure 5-12 Viewpoint 10, Wilton Avenue, Dormanstown, Night Time View

5.8.1 This viewpoint is located on the on Wilton Avenue, 1.1km south east of the Site. The viewpoint is surrounded by the private properties of Wilton Avenue and Broadway West. The short range view shows the secure fencing and vegetation that forms the boundary of the Wilton International Site. There are no clear views of the Site, although the conveyor corridor is partially visible in the medium range view through gaps within the vegetation.

5.8.2 Views of the port and conveyor corridor may be more visible from the upper storey windows of the properties with rear facing views towards the Site, although the vegetation along the fence line of Wilton Avenue and Broadway West Street is likely to provide some screening.

5.8.3 Wilton Avenue is illuminated by 6 to 8m lighting columns utilising low pressure sodium lamps.

5.8.4 During the night time assessment, the viewpoint and the roadway surroundings were illuminated by the street lighting columns. Existing lighting in the direction of the Site was visible through gaps within the vegetation. It is assessed that this lighting is the street lighting along the A1085 and associated roundabout. It is likely that views from this viewpoint would be more obscured during summer months, when vegetation is more dense.

5.8.5 The magnitude of change at this viewpoint is considered to be **minor**, as this viewpoint is likely to have partial views of the conveyor corridor during winter months when there is less vegetation to provide screening.

5.8.6 The receptors at this viewpoint would be the local residents within the properties along Wilton Avenue, specifically the properties with rear views towards the Site and conveyor corridor.

Viewpoint 10 – Construction phase lighting effects

5.8.7 The port facility is not visible from this viewpoint. However the proposed conveyor route is partially visible above Wilton Industrial Complex boundary fence line. It is therefore likely that the construction

phase lighting associated with the conveyor would be partially visible from the upper storey windows of the adjacent properties.

5.8.8 It is considered that the construction lighting would have a **minor adverse** impact upon the residents of the adjacent properties in terms of luminaire intensity as a result of direct views of the construction lighting.

Table 5-17 Viewpoint 10, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Minor Adverse
Winter Months:	Negligible	Negligible	Minor Adverse

Viewpoint 10 – Construction phase mitigation

5.8.9 The following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 10 – Construction phase residual impact

5.8.10 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual impact is likely to be as detailed below.

Table 5-18 Viewpoint 10, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Negligible	Negligible
Winter Months:	Negligible	Negligible	Minor Adverse

Viewpoint 10 – Operational phase lighting effects

5.8.11 The port faciliity is not visible from this viewpoint. However, as identified, the conveyor corridor is likely to be partially visible during winter months. It is understood the conveyor would have no visible external

lighting. Therefore the operational lighting associated with the Site and conveyor lighting would have **no effect** upon this viewpoint or its receptors.

Table 5-19 Viewpoint 10, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

5.9 Viewpoint 14

Location:	Looking south east from southern cycleway on A1085 at Lord McGowan Bridge
Distance to site:	0.7km
Viewpoint height above ordnance datum:	6m
Conditions during site assessment:	Cloudy, moderate wind

Viewpoint 14 – Existing lighting baseline

Figure 5-13 Viewpoint 14, A1085 at Lord McGowan Bridge looking south, Day Time View

Figure 5-14 Viewpoint 14, A1085 at Lord McGowan Bridge looking south, Night Time View

5.9.1 This viewpoint is located on the cycleway alongside the A1085 road, at Lord McGowan Bridge, 0.7km from the Site. The viewpoint offers elevated views of the north area of Wilton Industrial Complex. The proposed port facility is not visible, however, the conveyor corridor is visible.

5.9.2 Immediately adjacent to this viewpoint, to the west (left), is the busy A1085 dual carriageway. The roadway is well illuminated by 8 to 10m lighting columns with low pressure sodium lamps.

5.9.3 During the night time assessment, there were a number of existing light sources visible from this viewpoint. These included high output floodlights within the Wilton Industrial Complex illuminating plant areas. Street lighting is also visible located directly behind the plant area, within the Wilton Industrial Complex. Further afield, in the towns of Guisborough (8.5km) and Saltburn-by-the-Sea (9.5km), residential and public street lighting is clearly visible.

5.9.4 The magnitude of change at this viewpoint is predicted to be **moderate**, as this viewpoint would have views of the conveyor during both winter and summer months.

5.9.5 Receptors at this viewpoint would be cyclists using the cycleway, pedestrians using the pathway and motorists travelling along the A1085 road between Redcar and Grangetown. A1085 is a main road to and from Grangetown, with moderate traffic flow during the hours of darkness. There is likely to be a low frequency of pedestrians and cyclists using the A1085 during the hours of darkness.

Viewpoint 14 – Construction phase lighting effects

5.9.6 The port facility is not visible from this viewpoint. However the proposed conveyor route is visible. It is therefore likely the construction phase lighting associated with the conveyor wouldl be visible from this viewpoint.

5.9.7 The Wilton Industrial Complex would obscure some direct views of the conveyor from this viewpoint; however views of the proposed conveyor would still be possible.

5.9.8 The effect of the construction phase lighting upon this viewpoint is predicted to be **minor adverse** in terms of luminaire intensity and light intrusion.

Table 5-20 Viewpoint 14, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Minor Adverse	Minor Adverse
Winter Months:	Negligible	Minor Adverse	Minor Adverse

Viewpoint 14 – Construction phase mitigation

5.9.9 As above, the following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 14 – Construction phase residual impact

5.9.10 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual impact is likely to be as detailed below.

Table 5-21 Viewpoint 14, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Negligible
Winter Months:	Negligible	Minor Adverse	Minor Adverse

Viewpoint 14 – Operational phase lighting effects

5.9.11 The port facility is not visible from this viewpoint. However as identified, the conveyor corridor would be visible during winter and summer months. It is understood the conveyor would have no visible external lighting. Therefore the operational lighting associated with the Site and conveyor lighting will have **no effect** upon this viewpoint or its receptors.

Table 5-22 Viewpoint 14, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

5.10 Viewpoint 15

Location:	Looking north from northern cycleway on A1085 at Lord McGowan Bridge
Distance to site:	0.7km
Viewpoint height above ordnance datum:	7m
Conditions during site assessment:	Cloudy, moderate wind

Viewpoint 15 – Existing lighting baseline

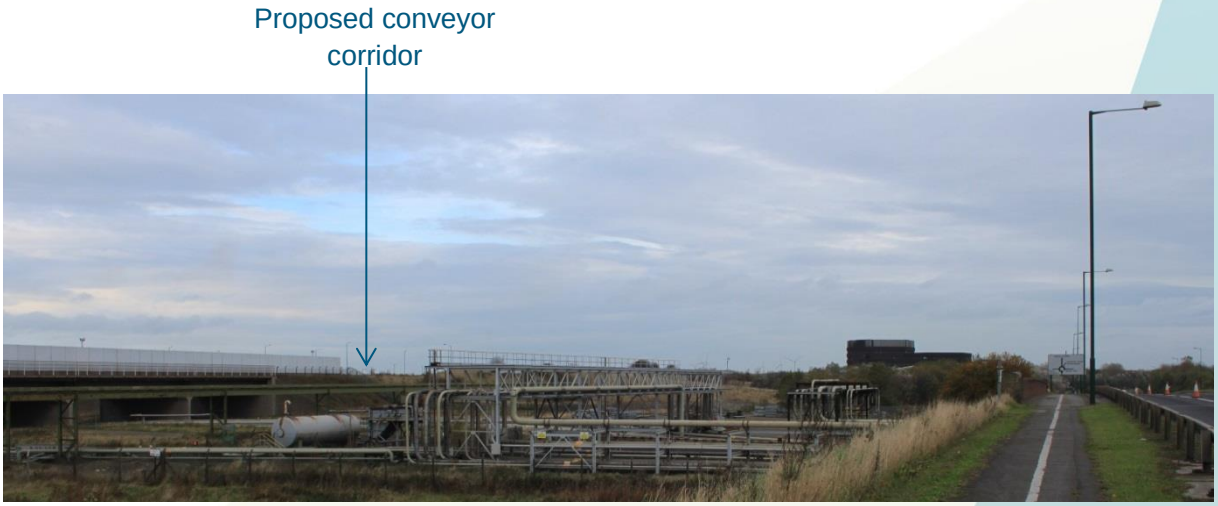

Figure 5-15 Viewpoint 14, A1085 at Lord McGowan Bridge looking north, Day Time View

Figure 5-16 Viewpoint 14, A1085 at Lord McGowan Bridge looking north, Night Time View

5.10.1 This viewpoint is located opposite viewpoint 14 on the cycleway alongside the A1085 road, at Lord McGowan Bridge, 0.7km from the Site. The viewpoint offers elevated views looking north of the Wilton Industrial Complex where the existing pipelines and infrastructure pass beneath the bridge in the direction of the Port. The proposed port facility is obscured behind the bridge structure and is therefore not visible, however the proposed conveyor corridor is visible.

5.10.2 Immediately adjacent the viewpoint to the west (right of the view) is the busy A1085 dual carriageway.

5.10.3 During the night time assessment, the A1085 roadway was well illuminated by 8 to 10m lighting columns utilising low pressure sodium lamps. The existing pipeline and infrastructure, and proposed conveyor area was not illuminated. There are two metal halide floodlights visible on the railway bridge within the Wilton Industrial Complex which appear to illuminate the railway area.

5.10.4 Further afield, within the medium range view towards the north of the proposed Site, a number of lighting sources are visible which are assessed to be located at the Bran Sands steel works site.

5.10.5 The magnitude of change at this viewpoint is predicted to be **moderate**, as this viewpoint would have views of the conveyor during both winter and summer months.

5.10.6 Receptors at this viewpoint would be cyclists using the cycleway, pedestrians using the pathway and motorists travelling along the A1085 road between Grangetown and Redcar. There is likely to be a low frequency of pedestrians and cyclists using the A1085 during the hours of darkness.

Viewpoint 15 – Construction phase lighting effects

5.10.7 The port facility is not visible from this viewpoint. However the proposed conveyor route is visible. It is therefore likely the construction phase lighting associated with the conveyor would be visible from this viewpoint.

5.10.8 The effect of the construction phase lighting upon this viewpoint is considered to be **minor adverse** in terms of luminaire intensity and light intrusion.

Table 5-23 Viewpoint 15, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Minor Adverse	Minor Adverse
Winter Months:	Negligible	Minor Adverse	Minor Adverse

Viewpoint 15 – Construction phase mitigation

5.10.9 The following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 15 – Construction phase residual effects

5.10.10 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual effect is likely to be as detailed below.

Table 5-24 Viewpoint 15, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Negligible
Winter Months:	Negligible	Minor Adverse	Minor Adverse

Viewpoint 15 – Operational phase lighting effects

5.10.11 The port facility is not visible from this viewpoint. However, as identified above, the conveyor corridor would be visible during winter and summer months. It is understood the conveyor would have no visible external lighting. Therefore, the operational lighting associated with the conveyor lighting would have **no effect** upon this viewpoint or its receptors.

Table 5-25 Viewpoint 15, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

5.11 Viewpoint 17

Location:	Looking north and west from footpath 116/31/2, adjacent Tees Dock Road
Distance to site:	100m
Viewpoint height above ordnance datum:	8m
Conditions during site assessment:	Cloudy, moderate wind

Viewpoint 17 – Existing lighting baseline

Figure 5-17 Viewpoint 17, Tees Dock Road, Day Time View

Figure 5-18 Viewpoint 17, Tees Dock Road, Night Time View

5.11.1 This viewpoint is located on Tees Dock Road, which is the main access road into the NWW treatment plant. The Site boundary is 100m from this viewpoint, beyond the earth mound visible within the photo. The proposed Site quay is not visible from this viewpoint.

5.11.2 Immediately adjacent this viewpoint is the Tees Dock Road and NWW boundary security fence with column mounted CCTV. The roadway is illuminated by 6m lighting columns with column mounted low

pressure sodium luminaires. Either side of the roadway is grass land, with an unilluminated truck park 200m from the viewpoint.

5.11.3 During the night time assessment, Tees Dock Road was well illuminated, although only 50% of the lighting columns were active. The NWW treatment site appears to operate on a 24hour basis, with heavy goods vehicles entering and exiting the site. Transitory lighting was therefore visible.

5.11.4 In the medium range view, the high output lighting masts located within the NWW treatment plant are active and clearly visible. The lighting masts, which are approximately 16 to 18m in height, appear to utilise six high output metal halide lamp sources. Red aviation warning beacons are also visible mounted to the highest structure within the Northumbria Waste Water treatment plant.

5.11.5 Further afield, lighting sources are visible mounted to the external façade of the large industrial warehouse type units along Dabholm Road, and also lighting masts within the car storage area. Towards the Site, high output lighting sources are visible which are assessed to be luminaires lighting the dock area.

5.11.6 Within the Bran Sands steel works area, a chimney stack with a burning flame provides an intense visible lighting source.

5.11.7 The magnitude of change at this viewpoint is predicted to be **moderate**, as this viewpoint would have views of the conveyor and Harbour facility buildings during both winter and summer months.

5.11.8 Receptors at this viewpoint would be walkers using the footpath and motorists travelling along Tees Dock Road, towards the Northumbria Waste Water treatment plant. Due to the remote and industrial location of the footpath, it is likely there would be a very low frequency of walkers using the footpath during the hours of darkness.

Viewpoint 17 – Construction phase lighting effects

5.11.9 The port and proposed conveyor route would be visible from this viewpoint. It is therefore likely that the construction phase lighting associated with the facilities would be visible when active. It is considered that the construction lighting would have a **moderate adverse** impact upon motorists using the roadway in terms of luminaire intensity as a result of direct views of the construction lighting, and a **minor adverse** impact in terms of light intrusion.

Table 5-26 Viewpoint 17, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Minor Adverse	Moderate Adverse
Winter Months:	No Effect	Minor Adverse	Moderate Adverse

Viewpoint 17 – Construction phase mitigation

5.11.10 The following mitigation techniques would be adopted to reduce the overall effect of the proposed lighting associated with the conveyor construction phase:

- All lighting equipment would utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights would utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If the construction area is not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed, subject to safety and security requirements.

Viewpoint 17 – Construction phase residual impact

5.11.11 Based on the mitigation strategies identified above, if the strategies are applied through the design and construction phases, the residual impact is likely to be as detailed below.

Table 5-27 Viewpoint 17, Construction Phase Residual Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	Negligible	Minor Adverse
Winter Months:	No Effect	Negligible	Minor Adverse

Viewpoint 17 – Operational phase lighting effects

5.11.12 The port facility and its associated lighting would be visible from this viewpoint. The conveyor would also be visible although it is understood the conveyor will have no visible external lighting.

5.11.13 Although the operational lighting would be visible, the Site lighting would be in-keeping with the existing well illuminated industrial buildings, structures and areas, therefore reducing the overall effect of the lighting.

5.11.14 The operational lighting associated with the port facility and conveyor lighting is therefore predicted to have a **negligible** impact upon this viewpoint and its receptors in terms of luminaire intensity.

Table 5-28 Viewpoint 17, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Negligible
Winter Months:	Negligible	Negligible	Negligible

5.12 Viewpoint 18

Location:	Looking north from Eston Nab Northern Rock
Distance to site:	5.8km
Viewpoint height above ordnance datum:	230m
Conditions during site assessment:	Cloudy, moderate wind

Viewpoint 18 – Existing Lighting Baseline

Figure 5-19 Viewpoint 18, Eston Nab looking north, Day Time View

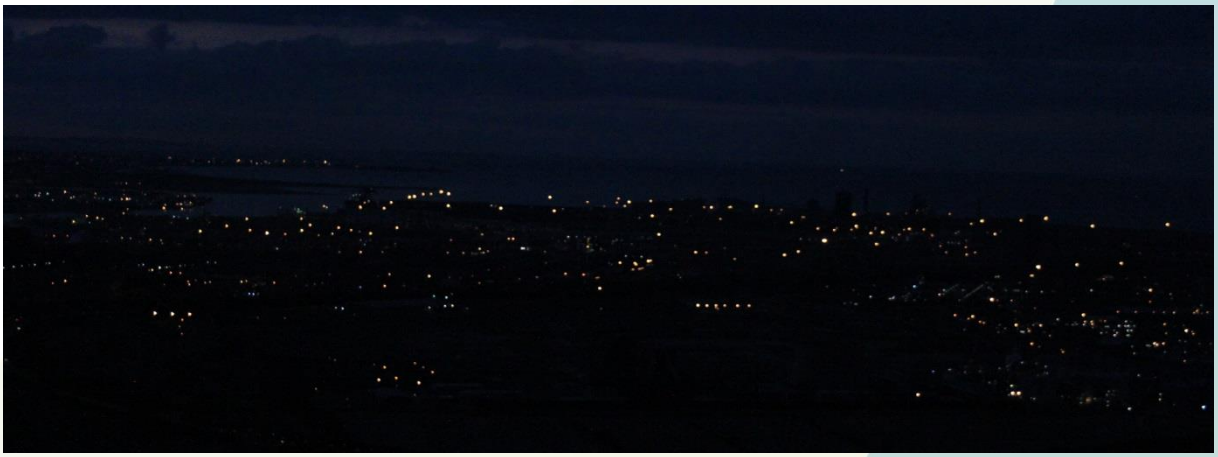

Figure 5-20 Viewpoint 18, Eston Nab looking north, Night Time View

5.12.1 This viewpoint is located at the top of Eston Nab, on the northern rock outcrop. At 230m AOD, this viewpoint has long distant elevated views over the Site and the wider study area of Teesside. The Bran

Sands steel works site is visible on the northern side of the Site, with the NWW treatment plant visible to the east of the Site, and the Wilton Industrial Complex visible to the east.

5.12.2 The proposed Site is 5.8km to the north of this viewpoint. Views towards Site are clear, although the quay area is partially obstructed by the large warehouse type building.

5.12.3 As indicated within the night time view, there are many light sources visible in the direction of the Site from this viewpoint. The light sources range in intensity, type, colour and output, with floodlights, LED street lighting, sodium 'orange' type street lighting, private dwelling lighting, aviation warning beacons and transitory vehicle lighting visible in all directions from this viewpoint.

5.12.4 The magnitude of change at this viewpoint is predicted to be **minor**, as this viewpoint would have views of the conveyor and Site buildings during both winter and summer months.

5.12.5 Receptors at this viewpoint would be walkers using the footpath. Due to the remote location of the footpath, it is likely there would be a very low frequency of walkers using the footpath during the hours of darkness.

Viewpoint 18 – Construction phase lighting effects

5.12.6 Views towards the proposed Site are clear, although the site construction phase lighting would not be clearly discernible due to the 5.8km distance between this viewpoint and the Site, and the substantial other visible lighting.

5.12.7 Due to the high elevation point of this viewpoint (230m AOD), the construction phase lighting associated with the proposed development would not be discernible from this viewpoint. It is therefore considered that the construction phase lighting impact from this viewpoint during both summer and winter months would be **negligible**.

Table 5-29 Viewpoint 18, Construction Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Negligible
Winter Months:	Negligible	Negligible	Negligible

Viewpoint 18 – Operational phase lighting effects

5.12.8 Views towards the Site are clear and vast, with no obstructions. However the Site is not clearly discernible due to the distance from the proposed scheme.

5.12.9 Due to this distance, and the presence of vast substantial existing lighting visible within all directions, the operational phase lighting associated with the proposed scheme would be insignificant when viewed from this location.

5.12.10 It is therefore anticipated that the effects of the operational phase lighting would not result in any significant change in relation to the current lighting environment. The proposed operational phase lighting is therefore predicted to have a **negligible** impact in terms of sky glow, light intrusion and luminaire intensity.

Table 5-30 Viewpoint 18, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	Negligible	Negligible
Winter Months:	Negligible	Negligible	Negligible

5.13 Viewpoint 20

Location:	Looking east from A178 near Grantham Creek and Teesmouth National Nature Reserve visitor car park
Distance to site:	3.9km
Viewpoint height above ordnance datum:	3m
Conditions during site assessment:	Cloudy, moderate wind

Viewpoint 20 – Existing lighting baseline

Figure 5-21 Viewpoint 20, A178 near Grantham Creek, Day Time View

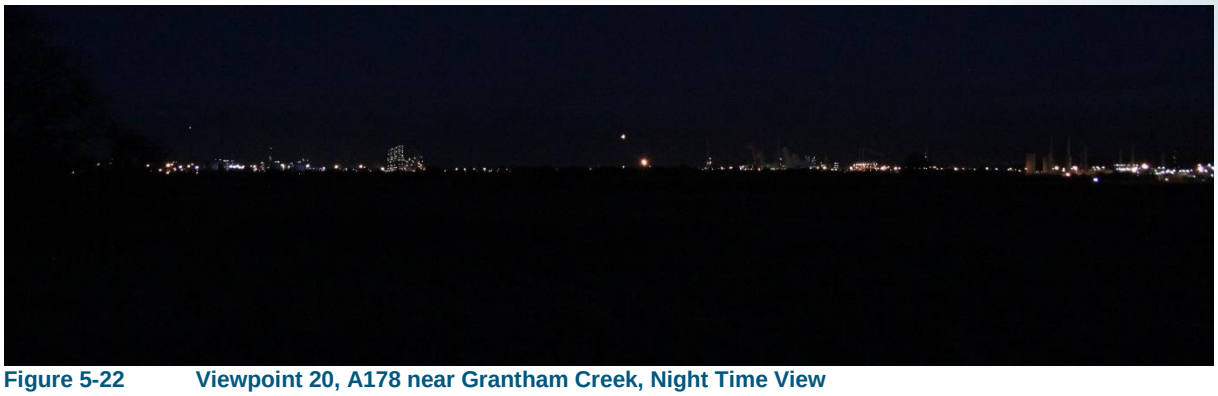

Figure 5-22 Viewpoint 20, A178 near Grantham Creek, Night Time View

5.13.1 This viewpoint is located adjacent the A178 Seaton Carew Road, which is a main road from the towns of Seaton Carew to Port Clarence. The viewpoint is sited in the grass verge at the side of the road, with Grantham Creek Nature Reserve visible in the short range view.

5.13.2 The industrial port areas of Teesport are visible in the medium range view, with Teesside visible in the long range view across the estuary.

5.13.3 The Site is not clearly visible due to the 3.9km distance to the Site, and the existing industrial buildings and structures visible.

5.13.4 Immediately adjacent the viewpoint is the A178 Seaton Carew Road which is not illuminated. The roadway is bordered by fields and marsh land.

5.13.5 During the night time assessment, transitory lighting along the A178 was clearly visible at the viewpoint location. The short and medium range view in all directions was that of darkness, with no visible lighting sources other than vehicle headlights.

5.13.6 Further afield, the long distant view towards the Site provides views of vast existing lighting associated with Teesport and Teesside industrial port areas. Aviation lighting mounted to chimney stacks and cooling towers, building internal lighting, high output lighting masts and general external lighting is clearly visible on the horizon.

5.13.7 The magnitude of change at this viewpoint is predicted to have **no effect**, as the viewpoint would have no clear views of the proposed port facilities or conveyor.

5.13.8 Receptors at this viewpoint would be motorists, cyclists and pedestrians travelling along the A178 road between Seaton Carew and Port Clarence, although there is limited roadside footpath along this section of road. It is considered there would be a low frequency of pedestrians and cyclists using the A178 during the hours of darkness.

Viewpoint 20 – Construction phase lighting effects

5.13.9 Due to the distance from Site, the construction phase lighting would have **no effect** upon this viewpoint due to the amount of existing lighting currently visible from this viewpoint.

Table 5-31 Viewpoint 20, Construction Phase Lighting Effect

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	No Effect	No Effect	No Effect
Winter Months:	No Effect	No Effect	No Effect

Viewpoint 20 – Operational phase lighting effects

5.13.10 Due to the distance from Site, and the amount of existing lighting currently visible within the Teesport and Teesside industrial area, the operational lighting effects at this viewpoint would have no effect upon it in terms of light intrusion and luminaire intensity.

5.13.11 The operational lighting would contribute towards the overall levels of sky glow, although the level of contribution is considered to be **negligible** in respect of the sky glow levels currently visible.

Table 5-32 Viewpoint 20, Operational Phase Lighting Effects

Period	Sky Glow ULR (Upward Light Ratio)	Light Intrusion	Luminaire Intensity
Summer Months:	Negligible	No Effect	No Effect
Winter Months:	Negligible	No Effect	No Effect

6 RESIDUAL EFFECTS AND CONCLUSION

Summary

6.1 The lighting effects of the proposed Harbour facilities are assessed in the preceding sections of this report. An assessment of the proposed artificial lighting environment upon the viewpoints and receptors identified is provided in **Section 5**.

6.2 The existing surrounding landscape within the study area is dominated by lighting from industrial activities and buildings, chimney stacks and burning flares, cooling towers, general building lighting and transitory lighting which is visible in all directions from the Site.

6.3 The proposed lighting for the Site is identified as having predominantly **negligible** effects, however as identified within **Table 6.1**, it is anticipated there would be **minor adverse** effects with regard to luminaire intensity at viewpoints 6, 8, 10, 14 and 15, with **moderate adverse** effects at viewpoint 17. However, the construction phases would be short term only, with each phase being for a minimum of seventeen months.

6.4 The effects of the proposed schemes lighting, therefore, can be assessed as two separate categories, construction phase lighting effects and operational phase lighting effects, as defined below.

Construction phase conclusion

6.5 The results of assessment of the artificial lighting effects predicted during the construction phase are summarised in **Table 6.1**.

Table 6-1 Summary of the proposed schemes lighting effects during the construction phase

Lighting Effects of the Proposed Scheme during the Construction Phase				
VP No.	**Period**	**Sky Glow ULR (Upward Light Ratio)**	**Light Intrusion**	**Luminaire Intensity**
1	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
3	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
5	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
6	Summer Months:	No Effect	Negligible	Minor Adverse
	Winter Months:	No Effect	Negligible	Minor Adverse

Lighting Effects of the Proposed Scheme during the Construction Phase				
VP No.	**Period**	**Sky Glow ULR (Upward Light Ratio)**	**Light Intrusion**	**Luminaire Intensity**
8	Summer Months:	No Effect	Negligible	Negligible
	Winter Months:	Negligible	Negligible	Minor Adverse
10	Summer Months:	No Effect	Negligible	Negligible
	Winter Months:	Negligible	Negligible	Minor Adverse
14	Summer Months:	Negligible	Negligible	Negligible
	Winter Months:	Negligible	Minor Adverse	Minor Adverse
15	Summer Months:	Negligible	Negligible	Negligible
	Winter Months:	Negligible	Minor Adverse	Minor Adverse
17	Summer Months:	No Effect	Negligible	Minor Adverse
	Winter Months:	No Effect	Negligible	Minor Adverse
18	Summer Months:	Negligible	Negligible	Negligible
	Winter Months:	Negligible	Negligible	Negligible
20	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect

6.6 To summarise the lighting assessment and mitigation strategies identified during the construction phase, and the key mitigation principles that would need to be adopted in order to assist with reducing the overall effects of sky glow and luminaire intensity are as follows:

- All lighting equipment on the proposed site access roads to utilise flat glass luminaires, set horizontally, to eliminate any direct upward light and maximise control of spill light.
- Floodlights to utilise flat glass asymmetric optics. Upwards light spill from the proposed luminaires would be limited by the angle of the luminaire, i.e. the floodlight would be angled at no greater than five degrees above the horizontal plane.
- If areas of the proposed development are not operational throughout the night, the opportunity to dim fittings or switch lighting circuits off would be assessed by the lighting designer, subject to safety and security requirements.

Operational phase conclusion

6.7 The results of assessment of the artificial lighting effects during the operational phase are summarised in **Table 6-2**.

Table 6-2 Lighting effects of the proposed scheme during the operational phase

Lighting Effects of the Proposed Scheme during the Operational Phase				
VP No.	**Period**	**Sky Glow ULR (Upward Light Ratio)**	**Light Intrusion**	**Luminaire Intensity**
1	Summer Months:	Negligible	No Effect	No Effect
	Winter Months:	Negligible	No Effect	No Effect
3	Summer Months:	Negligible	No Effect	No Effect
	Winter Months:	Negligible	No Effect	No Effect
5	Summer Months:	Negligible	No Effect	No Effect
	Winter Months:	Negligible	No Effect	No Effect
6	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
8	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
10	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
14	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
15	Summer Months:	No Effect	No Effect	No Effect
	Winter Months:	No Effect	No Effect	No Effect
17	Summer Months:	Negligible	Negligible	Negligible
	Winter Months:	Negligible	Negligible	Negligible
18	Summer Months:	Negligible	Negligible	Negligible
	Winter Months:	Negligible	Negligible	Negligible
20	Summer Months:	Negligible	No Effect	No Effect
	Winter Months:	Negligible	No Effect	No Effect

6.8 It can be concluded that the impacts of the proposed operational phase lighting, which would characterise the long term (i.e. present for the life of the proposed scheme), would be of **negligible** significance or have **no effect** in terms of sky glow, light intrusion and luminaire intensity.

6.9 As denoted within **Section 3** of this report, the proposed scheme is located within the existing industrial area of Teesside. There is currently substantial existing lighting visible within all directions of the Site. There is also significant existing lighting within the surrounding developed areas of Stockton-On-Tees, Hartlepool, Redcar, Middlesbrough Billingham and Teesport.

6.10 As stated within **Section 3.3**, the existing lighting environment is classified as an E4 zone. Based upon the findings of this report, the proposed scheme lighting would be in keeping with this classification, and the existing surrounding lighting environment.

6.11 Therefore, the long term operational impacts of the proposed scheme are predicted to be **negligible** in terms of sky glow, light intrusion and luminaire intensity.

7 ANNEX A – GLOSSARY

AOD	A vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD for 'above ordnance datum'.
Atmospheric Conditions (for Aura / Sky Glow)	The amount of particle pollution and presence of moisture and other gases in the atmosphere. Light is scattered by the particles and that coming back to an observer below causes the veiling effect of Sky Glow.
Aura	Localised halo of light above a lit area, caused by direct upward light or reflections from the ground and other surfaces. More obvious where light units are grouped relatively close together and / or of high power.
Environmental Zone E1 – E4	A classification method developed by the ILE to match appropriate lighting controls to the local environment e.g. an E1 Zone is an area of outstanding natural beauty (ANOB) and an E4 Zone a City Centre area.
LED	Light emitting diode.
Lighting Illuminance	The illuminance or light level is the amount of light energy reaching a given point on a defined surface area, namely the luminous flux (i.e. lumens) per square meter. Illuminance is measured in lux.
Lux	The lux is the unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre. In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface.
Sky Glow	Wide area of night sky scattering direct and indirect upward light back to an observer. Depends on atmospheric conditions and the amount of upward light. Very typical above urban areas.
SON	High-pressure sodium discharge lamp. Golden orange light. Very poor CRI of 20.
ULOR	Upward light output ratio
Uniformity (Uo)	The uniformity of illumination is the lowest calculated illuminance and the average illuminance of the working plane. Uniformity is calculated to ensure the lighting design provides a uniform illuminance in line with the required standards.

8 ANNEX B – SITE AND VIEWPOINT LOCATION PLAN

NORTH

532000N
531000N
530000N
529000N
528000N
527000N
526000N
525000N
524000N
523000N
522000N
521000N
520000N
519000N

445000E
446000E
447000E
448000E
449000E
450000E
451000E
452000E
453000E
454000E
455000E
456000E
457000E
458000E
459000E
460000E
461000E
462000E

Hartlepool
Tees Road
Zinc Works Road
South Gare Breakwater
North Gare Sands
Paddy's Hole Marina
Bran Sands
3km
2km
Seaton Carew Road
SSI steelworks
Redcar
A178
Seal Sands
Dormanstown
Teesport
A1085 Trunk Road
Kirkleatham Lane
Kirkleatham
Wilton International
Riverside Park Industrial Estate
Port Clarence
Fellbeck Road
Yearby
New Marske
Southbank
Grangetown
Greystone Road
A1085
Middlesbrough
Lazenby
Wilton
Yearby Wood
Resr.
Resr.
Scrath Farm
Dunsdale
Dunsdale Beck
Old Jackenby
Eston Nab

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

KEY

- DCO ORDER LIMITS AS OF 24/02/15
- 1km — 1Km OFFSETS FROM DCO ORDER LIMITS
- 5 — PHOTOGRAPH LOCATIONS

Revision 05. 2015/03/05. DCO boundary updated
Revision 04. 2014/12/08. Site boundary amended
Revision 03. 2014/11/25. Site boundary amended
Revision 02. 2014/08/01. Site boundary amended
Revision 01. 2014/06/10. Site boundary added

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Project:

YORK POTASH - PORT LANDSCAPE & VISUAL ASSESSMENT

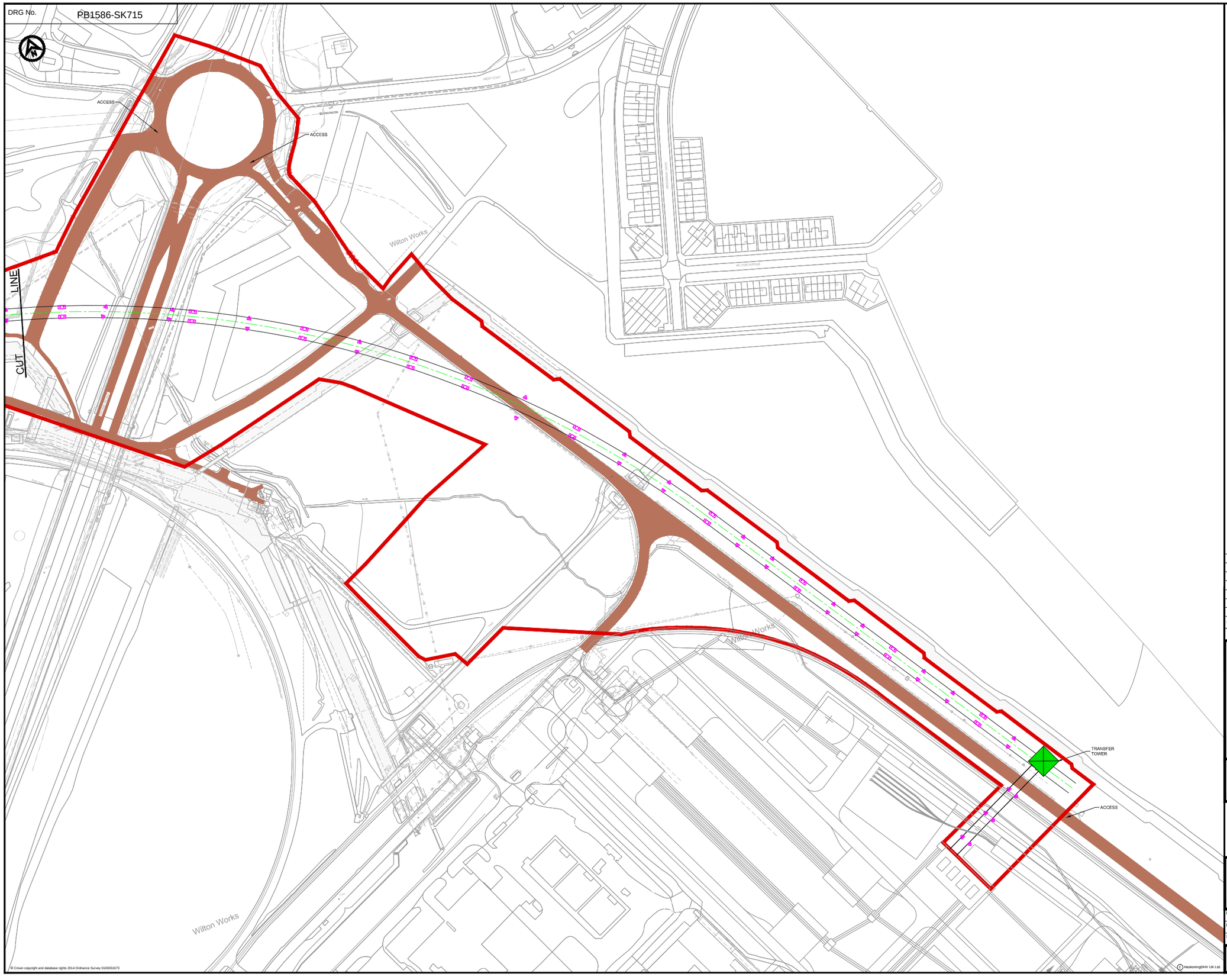
Drawing Title:

AERIAL VIEW & PHOTOGRAPH LOCATIONS

Drawing Number:	Revision:
2316-LVIA-01	**05**
Scale:	Date:
1:25,000 @ A1	**APRIL 2014**
Drawn:	Checked:
MW	SW

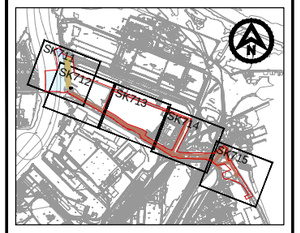
9 ANNEX C – PROPOSED SITE PLAN

DRG No. PB1586-SK715



NOTES

1. ALL STRUCTURE HEIGHTS ARE GIVEN ABOVE ADJACENT GROUND LEVEL.
2. FOR HEIGHTS ALONG THE ROUTE OF THE CONVEYOR PLEASE SEE DRAWING NUMBERS PB1586-SK420 AND PB1586-SK421.
3. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

- ORDER LIMITS
- QUAYSIDE (ENGINEERING FILL)
- DREDGED AREA
- DREDGED SIDE SLOPES
- EXTENT OF BERTH POCKET
- TRANSFER TOWER
- SURGE BINS
- CONVEYORS AT THE QUAY
- QUAY STRUCTURE
- SECTION MARKER
- ROADS
- ADMINISTRATIVE AREAS ETC.
- TYPE 3 - OPEN CONVEYOR - 2 LEGS
- TYPE 4 - OVAL ENCLOSED CONVEYOR - 2 LEGS
- HARDSTAND AREA
- WALKWAYS
- CONVEYOR FOUNDATION LOCATIONS INDICATIVE ONLY
- EXISTING BUILDING
- CROWN ESTATES LANDOWNERSHIP BOUNDARY

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DRAWING No. PB1586-SK715

REVISION F

DRG No. PB1586-SK714

LINE

CUT

ACCESS TRACK

ACCESS ROAD

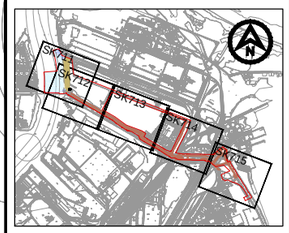
Sewage Works

Teesside Works Redcar

Teesside Works Lackenby

NOTES

1. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



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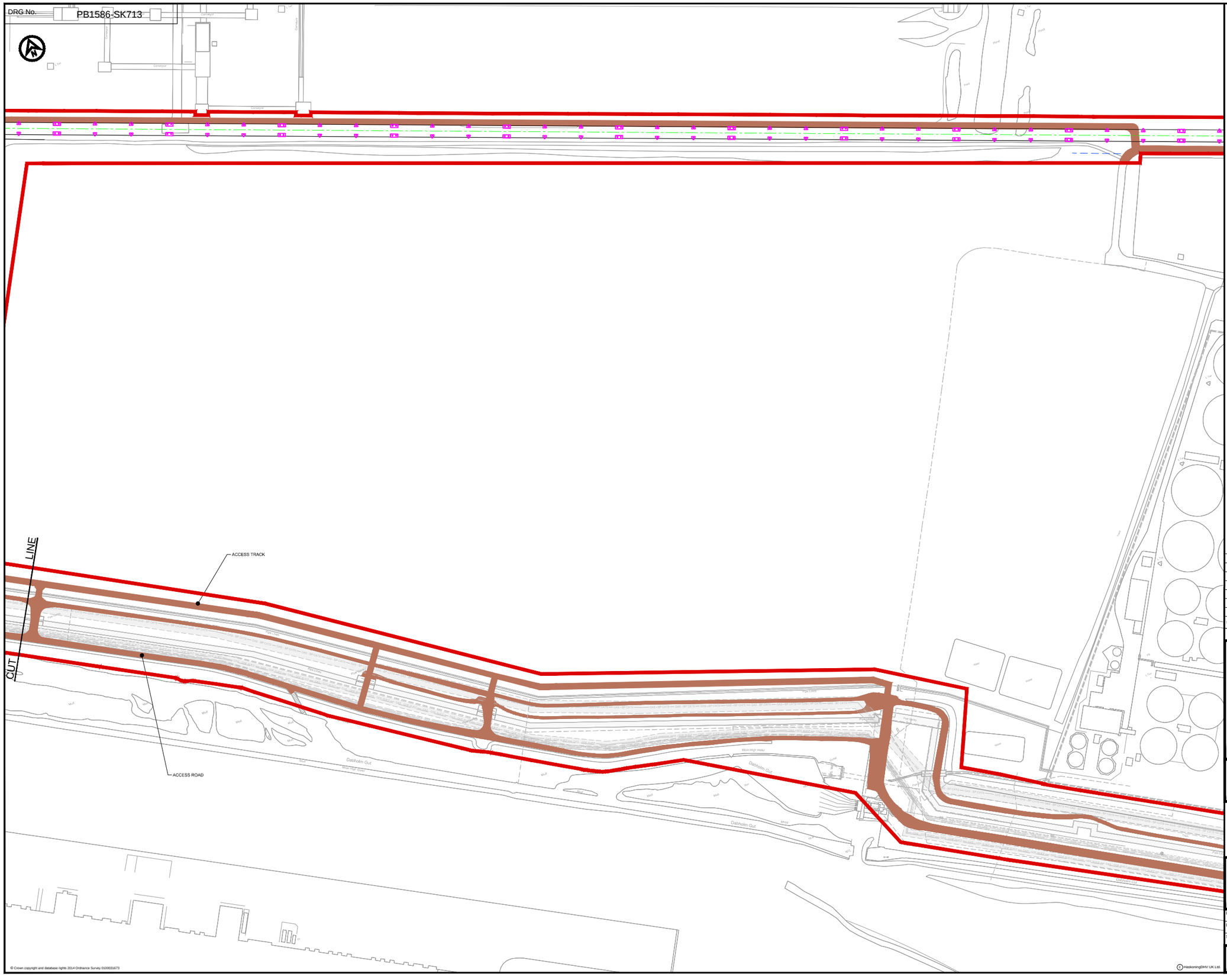
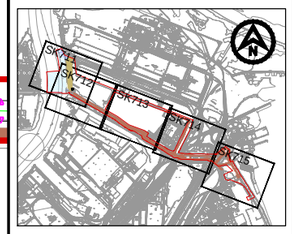


NOTES

1. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

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DRG No. PB1586-SK712

SURGE BIN

CONVEYOR TO BRIDGE OVER LAGOON WITH 2 FOUNDATIONS IN LAGOON, MAXIMUM TOP OF CONVEYOR STRUCTURE HEIGHT = 17m.

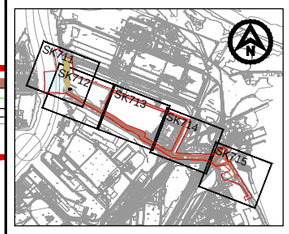
HABITAT ENHANCEMENT

SITE C (DRAWING PB1586-SK1027)

EXCELERATE ENERGY
0.6mØ THRUST BORE

CUT LINE

ACCESS ROAD



KEY PLAN

NOTES

1. FOR DETAILS OF THE WETLANDS REFER TO BRAN SANDS LAGOON MITIGATION AND MONITORING STRATEGY DRAFT APPENDIX 3.1 TO DOCUMENT 6.3
2. DRAWING BASED ON SOLID QUAY CONSTRUCTION.
3. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.

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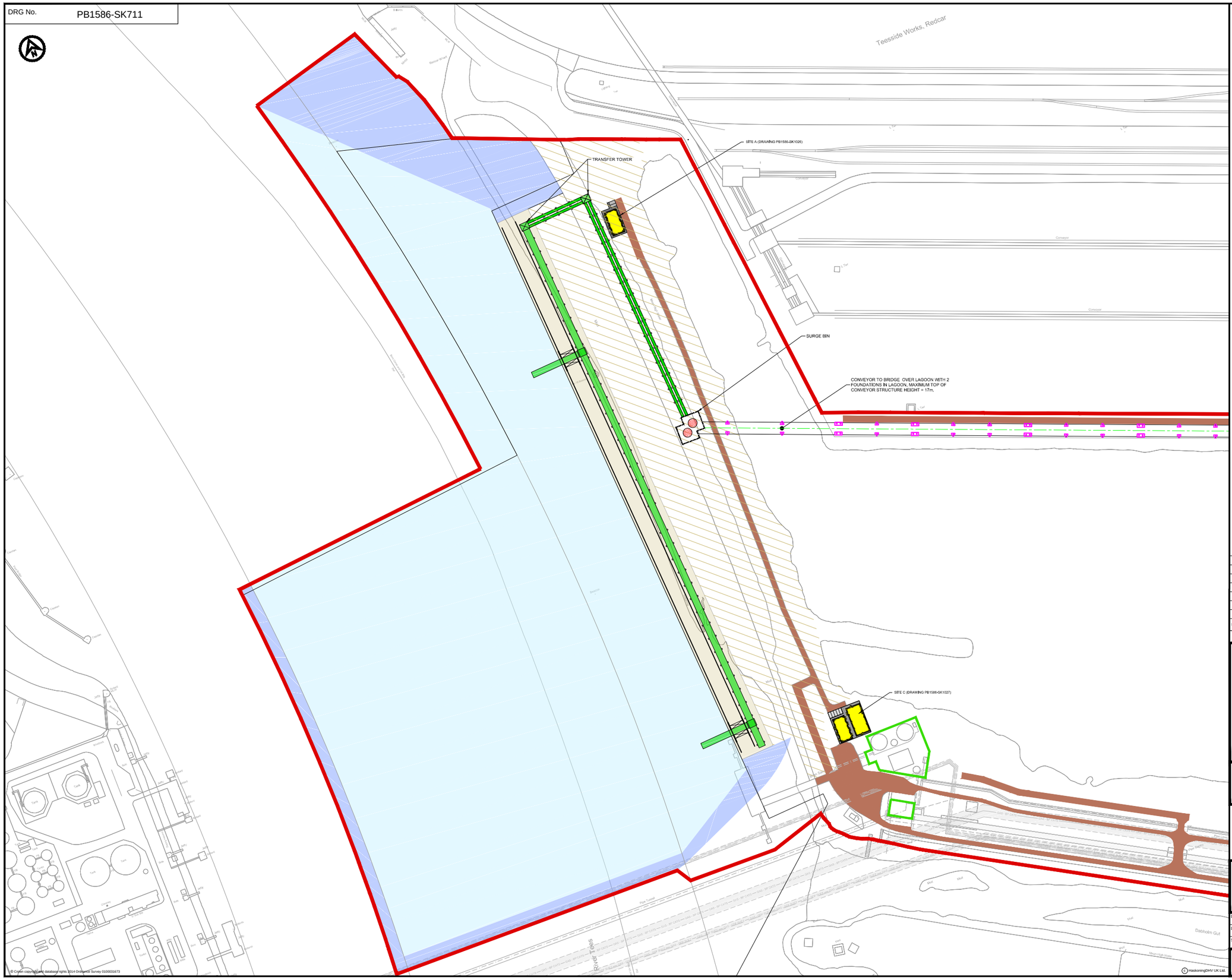
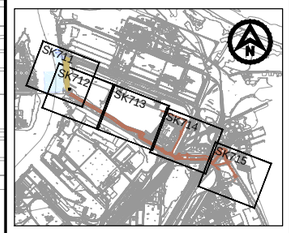


NOTES

1. FOR DETAILS OF THE WETLANDS REFER TO BRAN SANDS LAGOON MITIGATION AND MONITORING STRATEGY DRAFT APPENDIX 3.1 TO DOCUMENT 6.3.
2. DRAWING BASED ON SOLID QUAY CONSTRUCTION.
3. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

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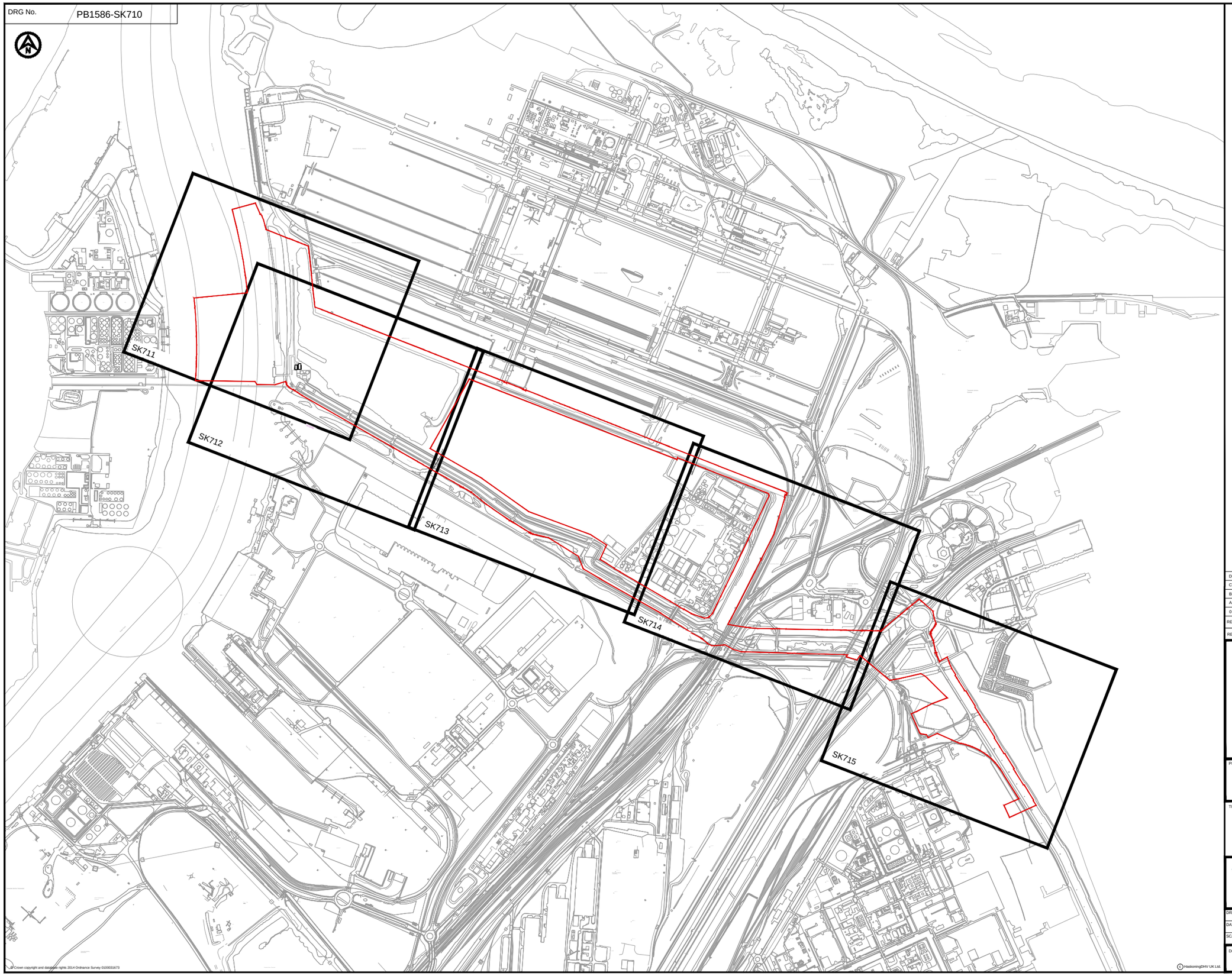
PB1586-SK711	F

DRG No. PB1586-SK710



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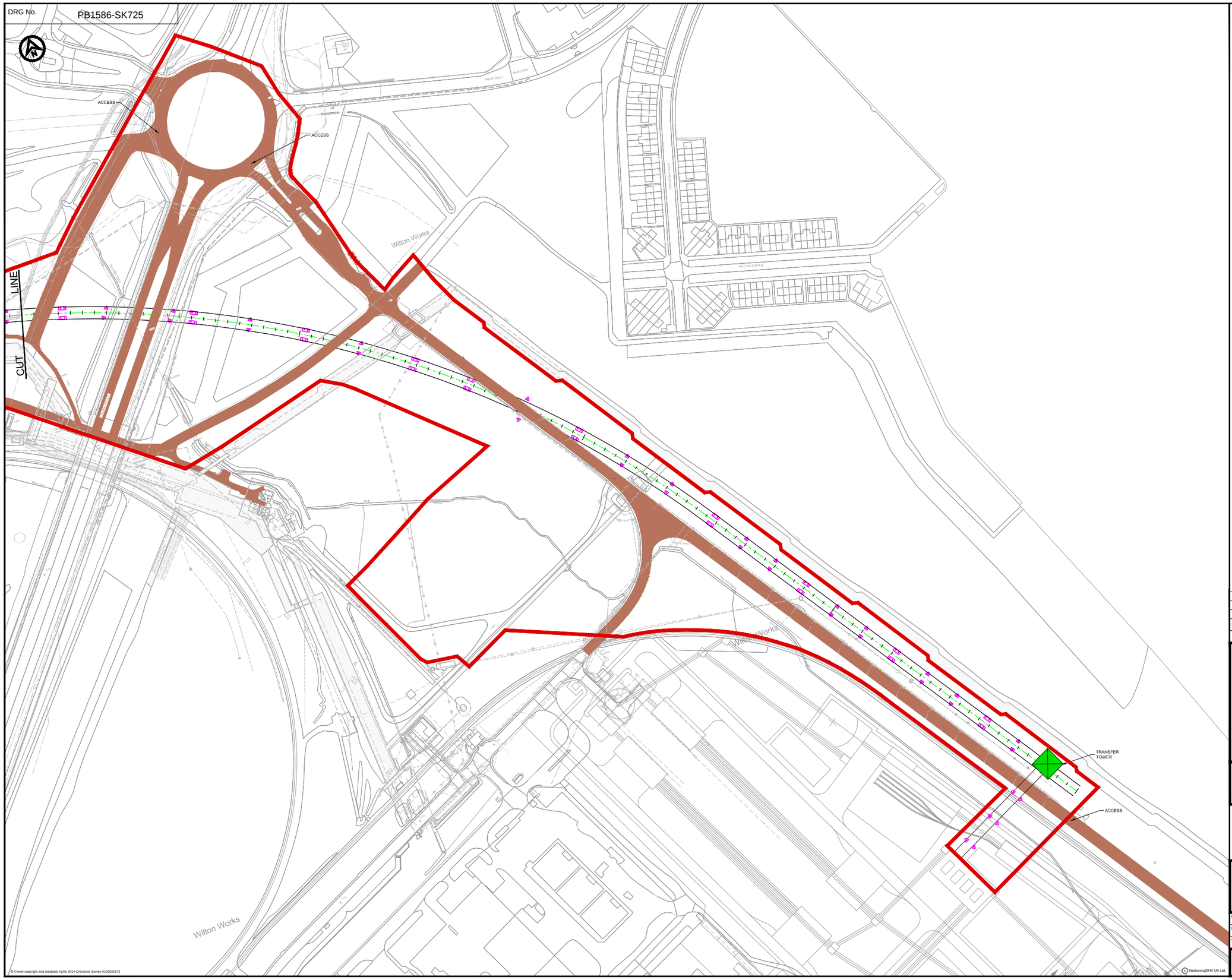
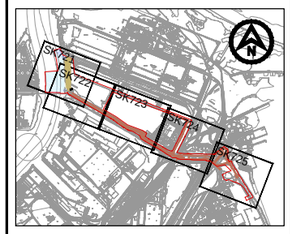


NOTES

1. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

- ORDER LIMITS
- QUAYSIDE (ENGINEERING FILL)
- DREDGED AREA
- DREDGED SIDE SLOPES
- EXTENT OF BERTH POCKET
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- SURGE BINS
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- QUAY STRUCTURE
- SECTION MARKER
- ROADS
- ADMINISTRATIVE AREAS ETC.
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- CONVEYOR FOUNDATION LOCATIONS INDICATIVE ONLY
- EXISTING BUILDING
- CROWN ESTATES LANDOWNERSHIP BOUNDARY

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A	11/03/15	PLANNING ISSUE	CH	MH	RP

REVISIONS

YORKPOTASH
A Sirius Minerals Project

PROJECT
YORK POTASH

TITLE
THE YORK POTASH
HARBOUR FACILITIES ORDER 201X
LAYOUT PLANS (GROUND LEVEL)
SOUTHERN ROUTE SHEET 5
REGULATION 5 (2)(o)
DOCUMENT 3.2L

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DRAWING No. PB1586-SK725

REVISION C

DRG No. PB1586-SK724

CUT LINE

CUT LINE

ACCESS TRACK

ACCESS ROAD

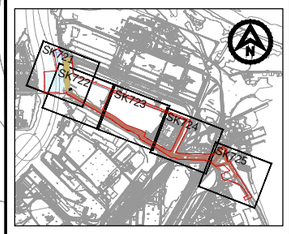
Sewage Works

Teesside Works Redcar

Teesside Works Lackenby

NOTES

1. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

- ORDER LIMITS
- QUAYSIDE (ENGINEERING FILL)
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DRG No. PB1586-SK723

ACCESS TRACK

ACCESS ROAD

CUT LINE

CUT LINE

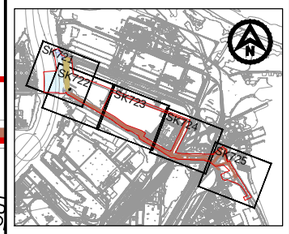
Dabholm Gut

Mud

Mean High Water

NOTES

1. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

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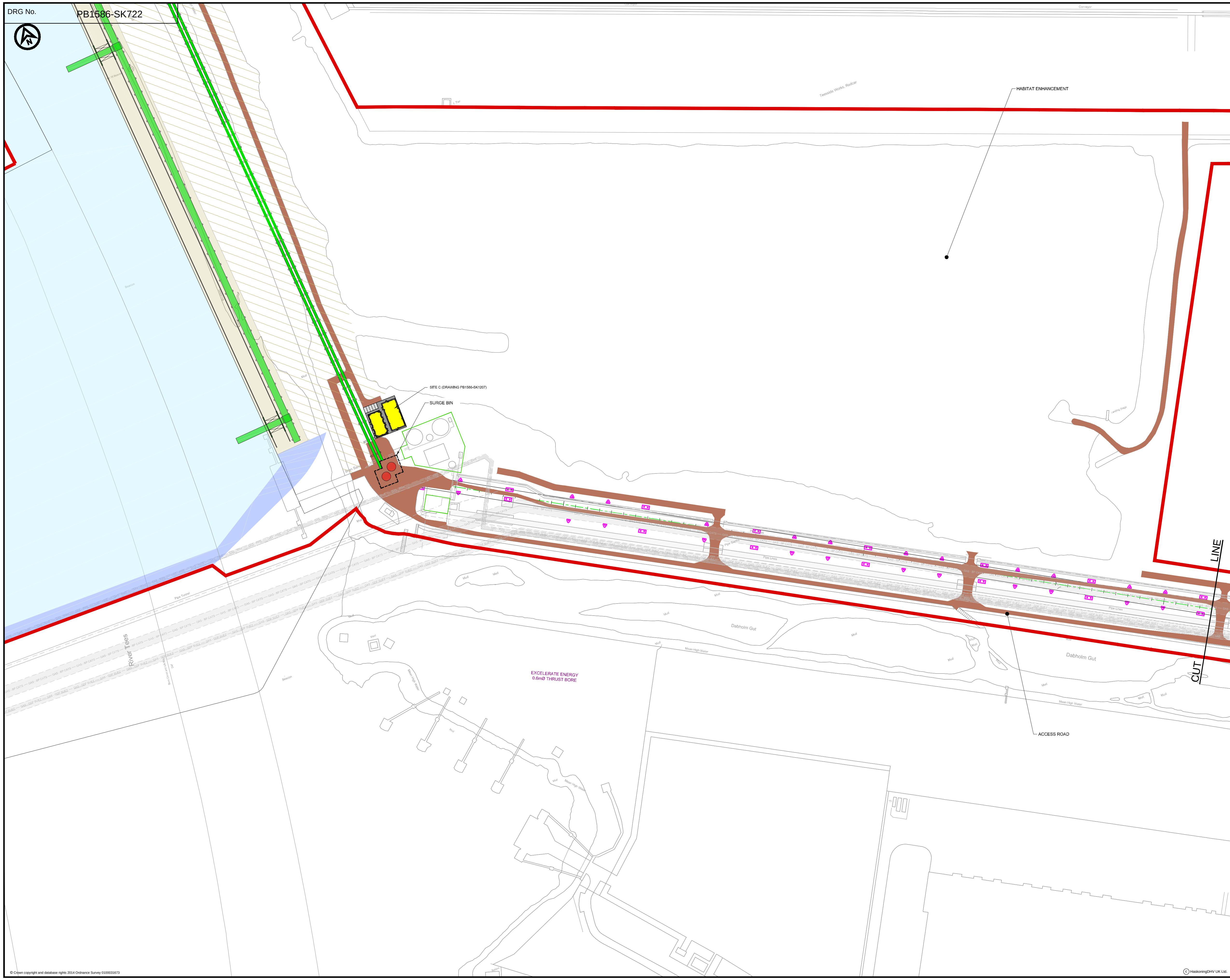
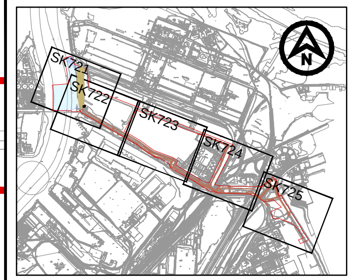
REVISION C

DRG No. PB1586-SK722



NOTES

1. FOR DETAILS OF THE WETLANDS REFER TO BRAN SANDS LAGOON MITIGATION AND MONITORING STRATEGY DRAFT APPENDIX 3.1 TO DOCUMENT 6.3.
2. BASED ON SOLID QUAY CONSTRUCTION.
3. FOR ABOVE GROUND PIPES SEE DRAWINGS PB1586-SK490 TO PB1586-SK497 AND PB1586-SK1040 TO PB1586-SK1046.



KEY PLAN

LEGEND

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LAYOUT PLANS (GROUND LEVEL)
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REGULATION 5 (2)(o)
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REVISION	C

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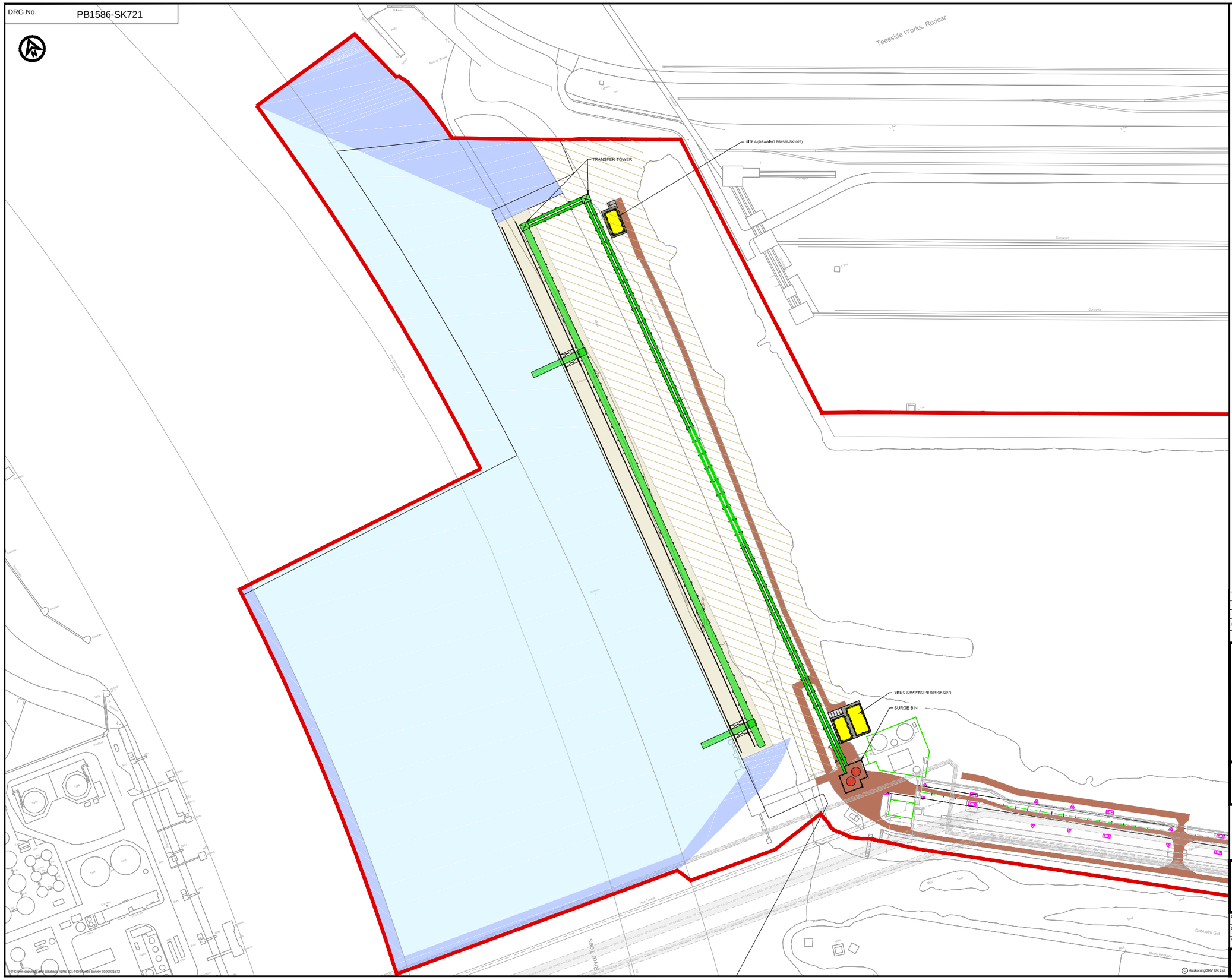

NOTES

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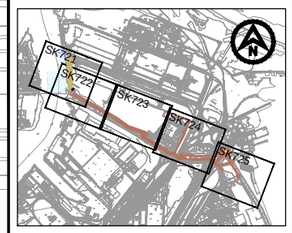

KEY PLAN

LEGEND

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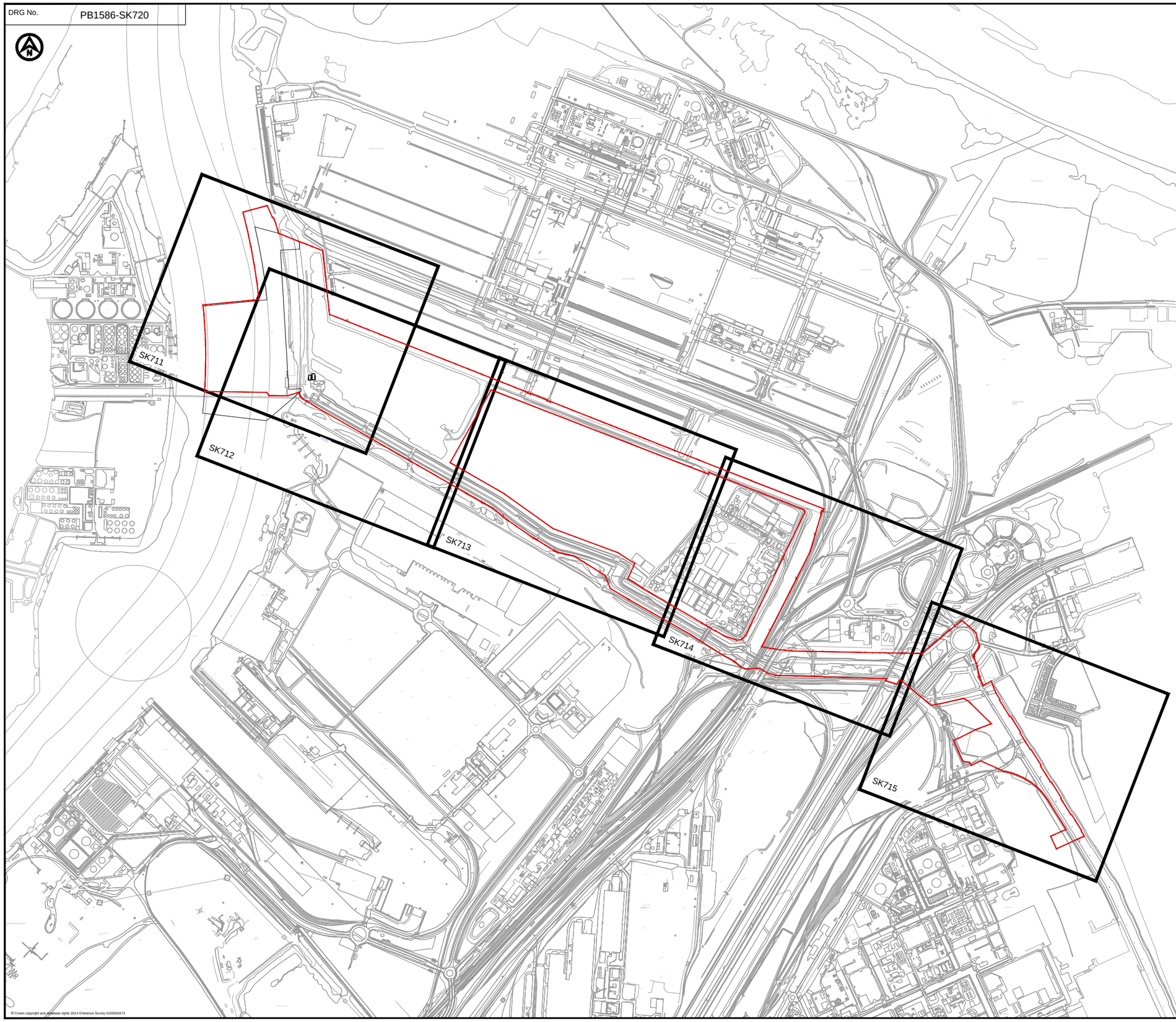

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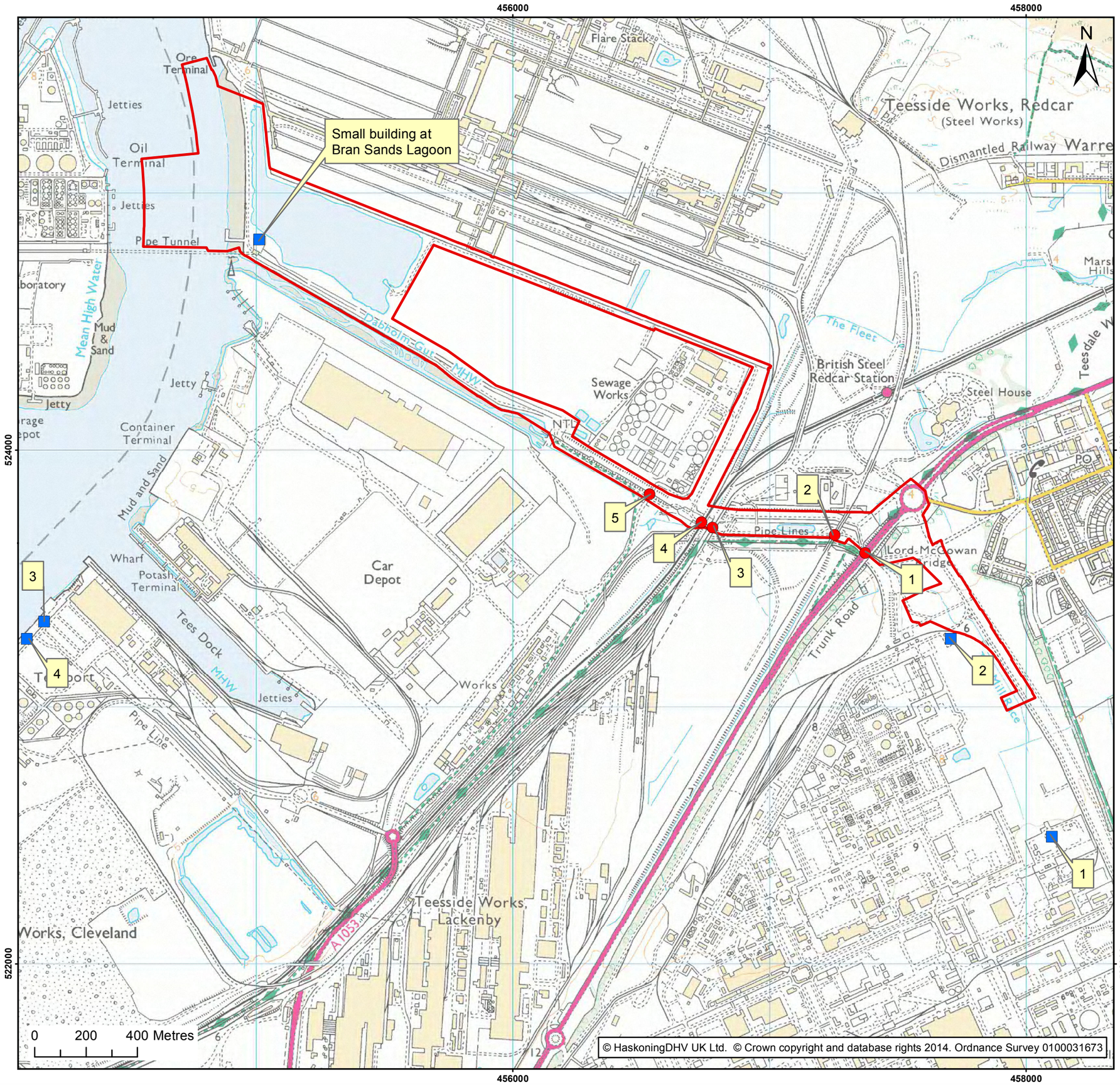
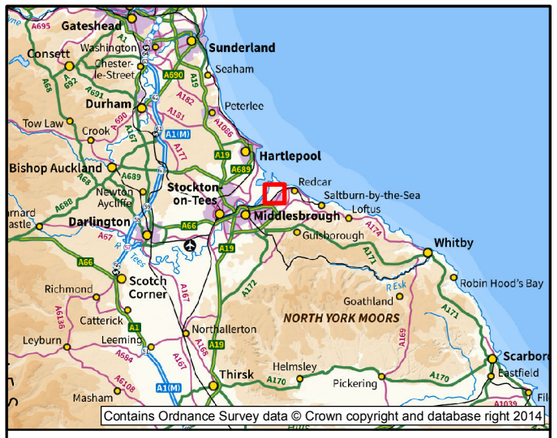
REVISION B

10 ANNEX D – BAT ROOSTING LOCATIONS





Legend:

DCO Order Limits

Potential Bat Roosting Sites

- Buildings
- Bridges

DCO Order Limits as of 24/02/15

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

Title:

Environmental Statement: Potential Bat Roosting Habitat Near Harbour Facilities

Part:	Figure:	Drawing No:
HF	10.1	9Y0989-HF-10-001

Rev:	Date:	Drawn:	Checked:	Size:	Scale:
1	06/03/2015	JE	CS	A3	1:15,000
0	10/12/2014	JE	CS	A3	1:15,000

Co-ordinate system: British National Grid

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11 REFERENCE DOCUMENTATION

In preparing this Technical Lighting Report the following documents have been referenced:

- 143022-EIA-001 Rev 0 – Overall Site Layout For Planning
- 143022-EIA-002 Rev 0 – Overall Site Layout Sections
- 25900-KHI-E28-3440-0001, rev B - External Lighting Strategy
- Construction Schedule Description 15 08 2014, Rev 0

National Regulations and Guidelines:

- ILP:PLG04, 2013; Institution of Lighting Professionals (ILP, formerly ILE); Guidance on Undertaking Environmental Lighting Impact Assessments (Guide 04).
- HSE: Lighting at Work, 2002 - Lighting at Work.
- HSE: HSG 38, 1997 - Health and Safety Guide 38 – Lighting at Work.
- BS-EN 12464-2:2014; Lighting of work places - Outdoor work places.
- BS 5489:2003 Part 1; Code of Practice for the design of Road Lighting.
- BS-EN 13201:2003 Parts 1-4; Road Lighting.
- Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6:1992; Outdoor Environment.
- Institution of Lighting Professionals (ILP formerly ILE); Guidance Notes for the reduction of Light Pollution.
- UK Parliament, 1990; The Environmental Protection Act 1990 (as amended by the Clean Neighbourhoods and Environment Act 2005), (Section 79, Statutory Nuisance: Lighting).
- Bat Conservation Trust (Version 3, May 2009); ILE Bats and Lighting in the UK.