

Net Zero Teesside Project

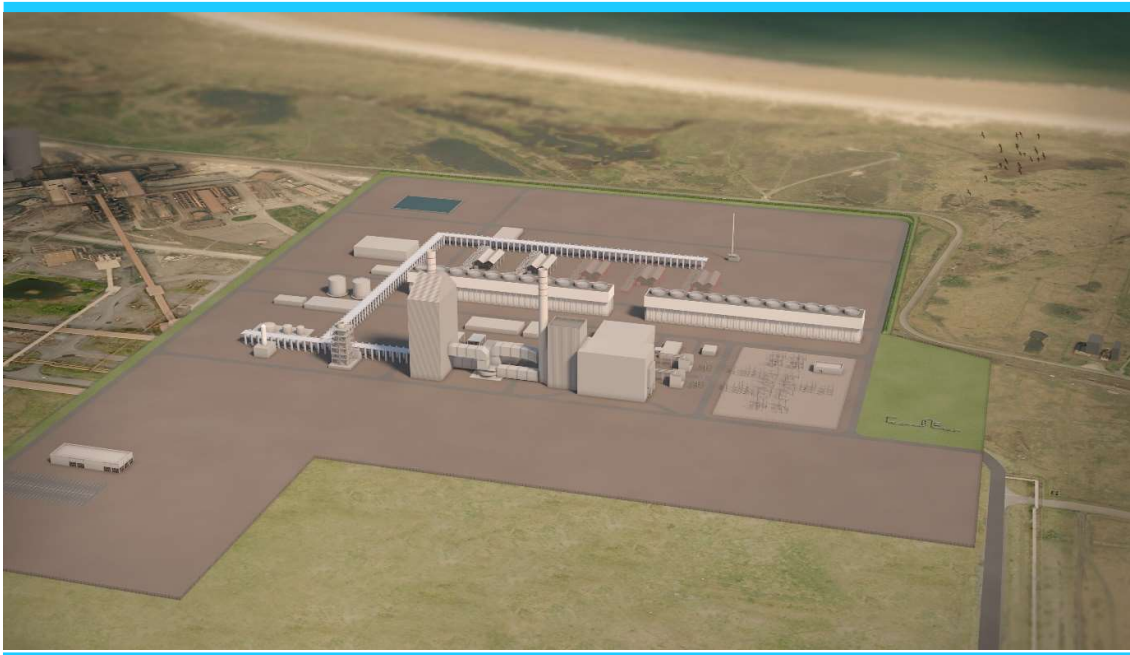
Planning Inspectorate Reference: EN010103

Land at and in the vicinity of the former Redcar Steel Works site, Redcar and in Stockton-on-Tees, Teesside

The Net Zero Teesside Order

Document Reference: 9.37 – Justification of Corridor Widths

Planning Act 2008



Applicants: Net Zero Teesside Power Limited (NZN Power Ltd) & Net Zero North Sea Storage Limited (NZNS Storage Ltd)

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GLOSSARY

Abbreviation	Description
AOD	Above ordnance datum
AS-	Additional Submissions
BAT	Best Available Techniques
BEIS	The Department for Business, Energy and Industrial Strategy
CCGT	Combined Cycle Gas Turbine
CCUS	Carbon Capture, Utilisation and Storage
CEMP	Construction and Environmental Management Plan
CTMP	Construction Traffic Management Plan
CO ₂	Carbon dioxide
CPO	Compulsory Purchase Order
dB	Decibels
DCO	Development Consent Order
dDCO	Draft Development Consent Order
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
ES	Environmental Statement
ETS	Emissions Trading Scheme
ExA	Examining Authority
FEED	Front end engineering and design
FRA	Flood Risk Assessment
Ha	Hectares
HDD	Horizontal Directional Drilling
HIA	Hydrogeological Impact Appraisal
HoT	Heads of Terms
kV	Kilovolts
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
Mt	Million tonnes

NATS	National Air Traffic Services
NSIP	Nationally Significant Infrastructure Project
NWL	Northumbria Water Lagoon
NZT	The Net Zero Teesside Project
NZT Power	Net Zero Teesside Power Limited
NZNS Storage	Net Zero North Sea Storage Limited
PA 2008	Planning Act 2008
PCC	Power Capture and Compressor Site
PDA-	Procedural Deadline A
PINS	Planning Inspectorate
RCBC	Redcar and Cleveland Borough Council
RR	Relevant Representation
SBC	Stockton Borough Council
SEL	Sound Exposure Level
SPA	Special Protection Areas
SoCG	Statement of Common Ground
SoS	Secretary of State
STDC	South Tees Development Corporation
SuDS	Sustainable urban drainage systems
UXO	Unexploded Ordnance
WFD	Water Framework Directive

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1.0 INTRODUCTION

1.1 Overview

- 1.1.1 This document, 'Justification of Corridor Widths' (Document Ref. 9.37) has been prepared on behalf of Net Zero Teesside Power Limited and Net Zero North Sea Storage Limited (the 'Applicants'). It relates to the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy ('BEIS'), under Section 37 of 'The Planning Act 2008' (the 'PA 2008') for the Net Zero Teesside Project (the 'Proposed Development').
- 1.1.2 The Application was submitted to the SoS on 19 July 2021 and was accepted for Examination on 16 August 2021. A change request made by the Applicants in respect of the Application was accepted into the Examination by the Examining Authority (the 'ExA') on 6 May 2022. A further change request was submitted to the ExA at Deadline 6 on 23 August 2022 and accepted on 6 September 2022.

1.2 Description of the Proposed Development

- 1.2.1 The Proposed Development will work by capturing CO₂ from a new the gas-fired power station in addition to a cluster of local industries on Teesside and transporting it via a CO₂ transport pipeline to the Endurance saline aquifer under the North Sea. The Proposed Development will initially capture and transport up to 4Mt of CO₂ per annum, although the CO₂ transport pipeline has the capacity to accommodate up to 10Mt of CO₂ per annum thereby allowing for future expansion.
- 1.2.2 The Proposed Development comprises the following elements:
- **Work Number ('Work No.') 1** – a Combined Cycle Gas Turbine electricity generating station with an electrical output of up to 860 megawatts and post-combustion carbon capture plant (the '**Low Carbon Electricity Generating Station**');
 - **Work No. 2** – a natural gas supply connection and Above Ground Installations ('AGIs') (the '**Gas Connection Corridor**');
 - **Work No. 3** – an electricity grid connection (the '**Electrical Connection**');
 - **Work No. 4** – water supply connections (the '**Water Supply Connection Corridor**');
 - **Work No. 5** – waste water disposal connections (the '**Water Discharge Connection Corridor**');
 - **Work No. 6** – a CO₂ gathering network (including connections under the tidal River Tees) to collect and transport the captured CO₂ from industrial emitters (the industrial emitters using the gathering network will be responsible for consenting their own carbon capture plant and connections to the gathering network) (the '**CO₂ Gathering Network Corridor**');

- **Work No. 7** – a high-pressure CO₂ compressor station to receive and compress the captured CO₂ from the Low Carbon Electricity Generating Station and the CO₂ Gathering Network before it is transported offshore (the ‘**HP Compressor Station**’);
- **Work No. 8** – a dense phase CO₂ export pipeline for the onward transport of the captured and compressed CO₂ to the Endurance saline aquifer under the North Sea (the ‘**CO₂ Export Pipeline**’);
- **Work No. 9** – temporary construction and laydown areas, including contractor compounds, construction staff welfare and vehicle parking for use during the construction phase of the Proposed Development (the ‘**Laydown Areas**’); and
- **Work No. 10** – access and highway improvement works (the ‘**Access and Highway Works**’).

1.2.3 The electricity generating station, its post-combustion carbon capture plant and the CO₂ compressor station will be located on part of the South Tees Development Corporation (STDC) Teesworks area (on part of the former Redcar Steel Works Site). The CO₂ export pipeline will also start in this location before heading offshore. The generating station connections and the CO₂ gathering network will require corridors of land within the administrative areas of both Redcar and Cleveland and Stockton-on-Tees Borough Councils, including crossings beneath the River Tees.

1.3 The Purpose and Structure of this document

1.3.1 The purpose of this document is to provide further justification for the extent of compulsory and temporary rights sought by the Applicants in relation to easements for Work Nos. 2A, 3A, 4, 5C, 6 and 8. The main content of this document was first submitted at Appendix 1 in the Applicants Written Summary of CAH2 [REP5-026]. Since that submission, the Applicants have submitted a change request and responded to comments by interested parties on the content. The Applicants have updated the content to reflect the revised Order Limits and provided further justification.

2.0 JUSTIFICATION OF CORRIDOR WIDTHS

2.1 Introduction

- 2.1.1 In response to Action 5 from CAH2 and previous representations by interested parties, the Applicants have developed this summary note to provide context and justification for the pipeline corridor widths of the Proposed Development.
- 2.1.2 The note below summarises the approach taken by the Applicants in developing the Order Limits and the area over which new rights are sought. Several cross sections along the pipeline corridor have been included to illustrate the existing land and infrastructure.

2.2 Sembcorp Pipeline Corridor

- 2.2.1 The pipeline corridor on the North Tees is limited to Work No. 6 only, which is proposed to be located within the existing Sembcorp pipeline corridor. In general, this existing corridor consists of an access track either side of a central pipe rack(s). The width of the pipe racks varies along the route and therefore so does the overall width of the corridor. The pipeline corridor has evolved over a number of decades, providing a common backbone for pipeline apparatus between Billingham and Wilton. At each section of the pipeline corridor pipelines enter and exit the corridor in order provide services to, or export services from adjacent facilities. This means that there is no consistent number of pipes or alignments from one end of the corridor to the other. New pipelines need to be installed in available space or on new structures and then often adjust their relative position within the corridor due to existing constraints.
- 2.2.2 Cross sections A-D further below in this section illustrate how the Sembcorp pipeline corridor changes as it passes from Billingham through to Wilton. Along the route, the existing infrastructure changes significantly, and the width, height and number of pipe racks is not consistent.
- 2.2.3 Given the early design phase of the project, the Applicants' approach to defining the extent of new rights sought within the Order Limits is illustrated in **Figure 1**. The new rights extend from 1m outside the edge of the existing northern access track to 1m outside the edge of the existing southern access track. The Applicants included a strip on the outside edge of each existing access track where required and appropriate. In the event the CO₂ Gathering Network pipeline is required to be installed on the 'outside' of the existing pipe racks, the Applicants recognise this may potentially reduce the access track width thereby impeding access for the pipeline corridor. To ensure the current access track width is maintained, the Applicants included a strip of land on the outside edge of each existing access track.

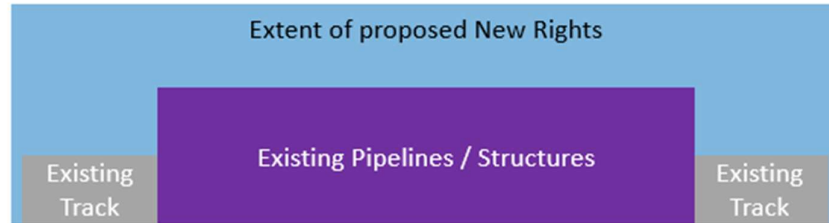


Figure 1 - Illustration of approach for CA - New Rights

- 2.2.4 The extent of the new rights provides the Applicants with sufficient access and clearance to design, construct, maintain and operate the CO₂ Gathering Network pipeline. However, for efficient construction of the new pipeline, additional land has been included solely for temporary possession. In general terms, this additional land is required to support with:
- Material staging and laydown,
 - Parking and operation of construction vehicles,
 - Welfare facilities, and
 - Provide temporary diversions along the pipeline corridor to maintain access for operators with existing apparatus.
- 2.2.5 The above approach will enable the Applicants to construct the pipeline safely and efficiently, while minimising impacts to ongoing operations of interested parties.
- 2.2.6 Given the early stage of engineering definition for the Proposed Development, the Applicants – in close coordination with appropriate interested parties - are continuing with site surveys and FEED in order to consider and then select the optimum routing for the CO₂ Gathering Network pipeline. The pipeline could need to be routed anywhere within the existing pipelines / structures and therefore the Applicants need to maintain the flexibility allowed by the potential acquisition of new rights within the areas shown on the Land Plans. This ensures the Applicants can design and then install the pipeline in the optimum position and will benefit from continued operational access along the northern or southern access tracks as required. As the design develops and the routing is finalised the actual area over which new rights are acquired can be refined.
- 2.2.7 The existing apparatus within the Sembcorp pipeline corridor have been installed over a number of decades. The routing of each pipeline installed within the corridor has been selected based on available space and existing access/inspection requirements. Work No. 6 is a pipeline of up to 550mm in diameter and therefore it is unlikely that a ‘simple’ routing option is available considering the existing apparatus. To ensure deliverability of Work No. 6 and the Proposed Development, the Applicants require new rights for the full width of the existing pipeline corridor and associated access tracks.
- 2.2.8 The flexibility with the rights sought enable the Applicants to select a route that accommodates existing physical apparatus and maintain operational rights of

existing users. Following pre-FEED site surveys and feedback from existing users as part of the initial design development, the Applicants expect the pipeline to cross between opposing pipe racks, e.g. the North and South pipe racks, and vice versa. There are existing pipelines in the corridor that are routed in this way. Without the inclusion of the full extent of the existing pipeline corridor, the Applicants would be restricted to selecting a route before adequate site assessment and engineering has been completed. Until engineering has reached an appropriate level of maturity there is an enduring risk that a proposed pipeline route has to be modified. The level of modification can vary, depending on the challenge that arises. For example, stress calculations during detailed design could cause a rerouting of a section of the pipeline route. Following the selection of a proposed pipeline route for Work No. 6, during detailed design the Applicants' engineering contractor will conduct calculations. These will determine whether the pipeline can be adequately supported, flex as it expands and contracts, and be fabricated. An outcome of this could require the Applicants to adjust a section of the proposed routing. The scope and scale of the modification is dependent on the risk, but a potential consequence could be the Applicants needing to adjust the route significantly, such as switching to the opposing pipe rack.

- 2.2.9 It is also possible that other works will take place within the corridor before the Applicants complete detailed design and construct the Proposed Development – whilst the Applicants are not aware of any significant new apparatus proposed in the corridor, changes in the infrastructure present remain a possibility and the flexibility sought will enable the Applicants to take account of these and adapt the detailed design as necessary.
- 2.2.10 It is therefore justified for the Applicants to seek rights which ensure the deliverability of the Proposed Development.
- 2.2.11 The following cross sections have been developed to illustrate the extent of the Order Limits for the Proposed Development and the existing infrastructure and constraints of the pipeline corridor.

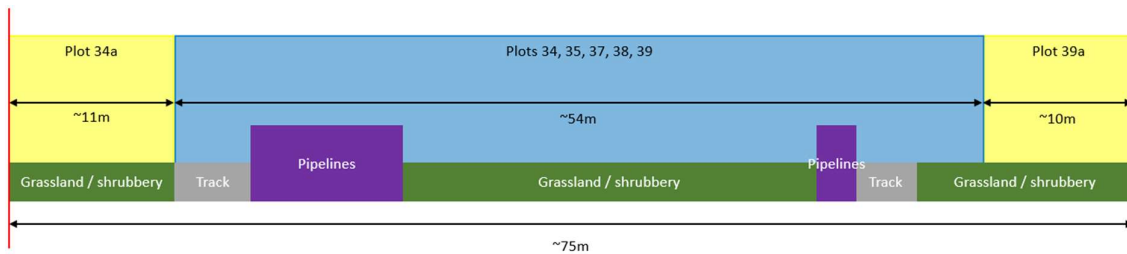
Key

 Order Limit	 Order Land – Temporary Possession	 Existing Pipelines / Structures	 Grassland / shrubbery
 Proposed Order Limit at Deadline 6	 Order Land – New Rights	 Existing Access Tracks	

Cross Section A (Work No. 6) – Sembcorp Corridor near Cowpen Bewley Rd (Looking NE)

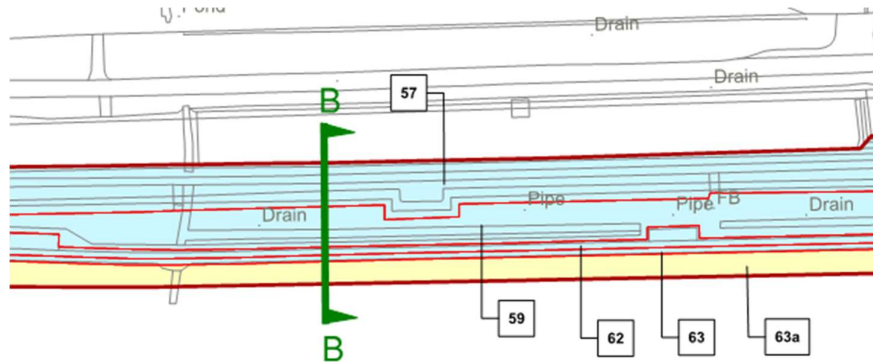


Extract of Land Plan (Document Ref 4.2) Sheet 1

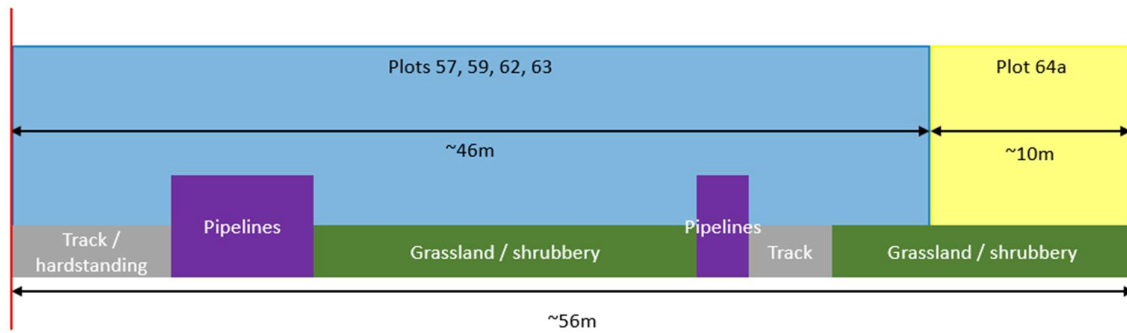


Cross Section of existing land and infrastructure

Cross Section B (Work No. 6) – Sembcorp Corridor parallel to A1185 (Looking E)



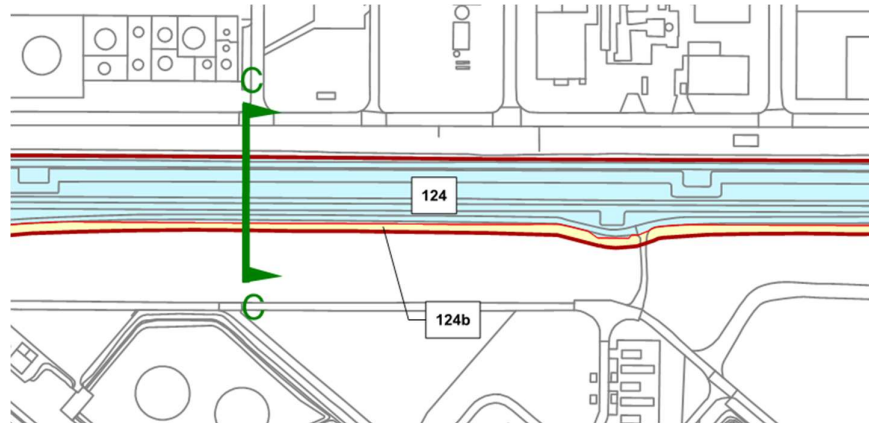
Extract of Land Plan (Document Ref 4.2) Sheet 2



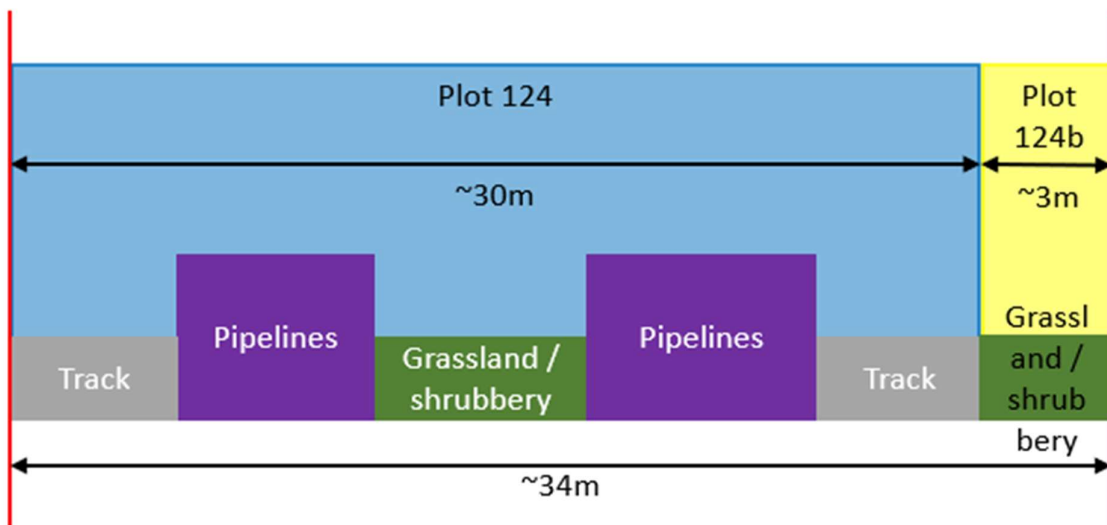
Cross Section of existing land and infrastructure

Cross Section C (Work No. 6) – Sembcorp Corridor in North Tees Limited (Looking E)

Updated following acceptance of Deadline 6 change request [PD-017]



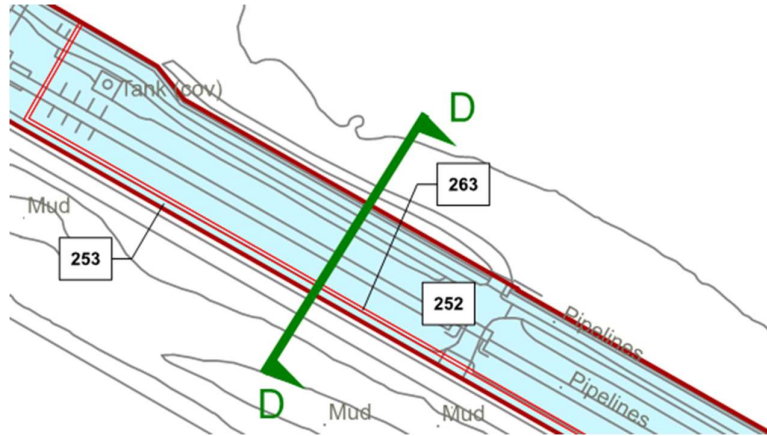
Extract of Land Plan (Document Ref 4.2) Sheet 4



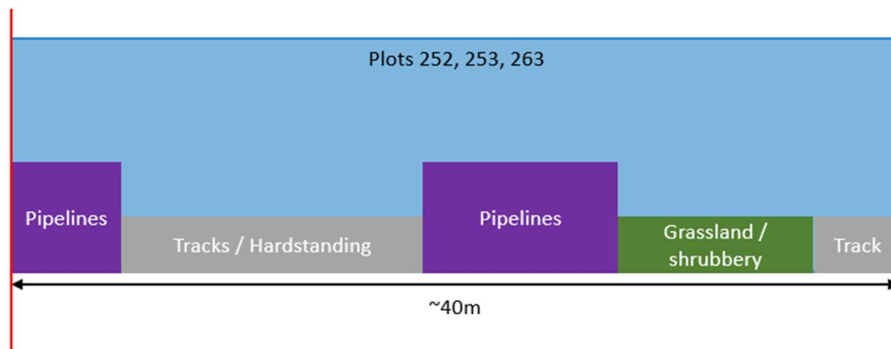
Cross Section of existing land and infrastructure

Cross Section D (Work No. 6) – Sembcorp Corridor parallel to Dabholm Gut (Looking SE)

Updated following acceptance of Deadline 6 change request [PD-017]



Extract of Land Plan (Document Ref 4.2) Sheet 5



Cross Section of existing land and infrastructure

2.3 Anglo American Corridor

2.3.1 The 'Anglo American corridor' is an area of land the freehold of which is held by Anglo American. It runs in a North – South direction parallel to the NWL Bran Sands WwTP. It consists of plots 332, 343, 345, 347 and 384

2.3.2 The Proposed Development requires the routing of up to four pipelines within the Anglo American corridor, these are Work Nos. 2A, 5C and 6. Work No. 2A will be a buried natural gas pipeline, as it will be transporting natural gas at pressure the associated easement will be significantly wider than just the pipeline to account for constructability, maintenance and process safety factors. The Applicants have based the easement, and therefore new rights, on the Institution of Gas Engineers & Managers (IGEM) standard:

- IGEM/TD/13 Edition 2 – Pressure regulating installations for natural gas, liquefied petroleum gas (LPG) and LPG/air
- Paragraph 4.2.1.3 Land rights and easements
 - The rights acquired should be such as to permit the satisfactory construction, use, maintenance and replacement of the pipeline and should last for at least the anticipated life of the pipeline/associated installation or the gas supply agreement.
 - Of special concern are the access rights of the pipeline easement, which should anticipate the needs of construction, remedial works to the land following construction and subsequent remedial works to, or replacement of, the pipeline, including consideration of storage and parking facilities on land contiguous to and neighbouring the pipeline.

2.3.3 The above guidelines have been considered when developing the proposed easement for Work No. 2A (as part of the works within the Anglo American corridor) and further engineering assessment is required, including a Quantitative Risk Assessment, to determine exclusion distances in the event of a rupture before a final easement width can be confirmed.

2.3.4 Work No. 2A requires a wider area of Order Land in comparison to installing an above ground pipeline within existing infrastructure. When establishing the route, associated easement and extent of rights sought, the Applicants have had to consider factors including the following, in order to ensure that the Proposed Development is deliverable:

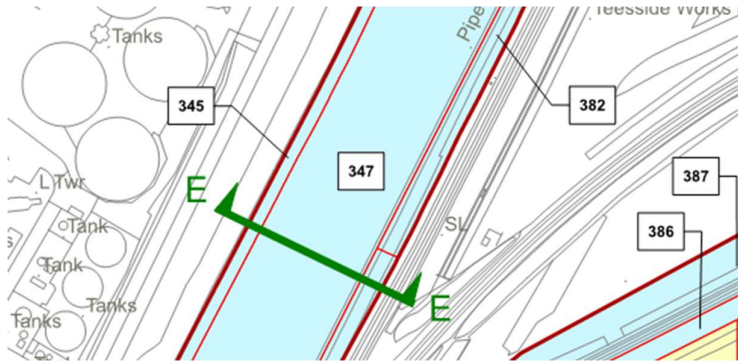
- Widths to safely excavate the open cut trench (for installation and any subsequent repairs and maintenance). In general, sloped shoring of open cut trenches are at 45 degrees. Therefore, a 2m deep, 3m wide trench would require 2m of shoring on either side, totalling 7m. This excludes the additional area that would be required for safe access to the trench and staging/lifting of pipe spools. Pending detailed design, these areas/widths could need to be anywhere within the STDC corridor.

- Construction clearances required at the entry and exit points to safely execute trenchless crossings,
 - Installation of supports for a dedicated aboveground pipeline corridor,
 - Separation distances between pipelines for external inspection,
 - Exclusion distances between the access routes/tracks and the underground high pressure gas pipeline (Work No. 2a). Process safety restrictions would prevent the Applicants from routing the main access track above or close to the buried pipeline in order to create segregation between operating personnel and the pipeline in the event it ruptures.
 - Ongoing access requirements for maintenance and operation. Due to the number of services to be installed in this corridor as part of the Proposed Development, the Applicants have considered the requirement for vehicle access on both sides of the corridor. This is required as a number of the services will be installed on aboveground supports and this would prevent vehicle access from one side to the other.
- 2.3.5 Work No. 2A will have to cross the CATS pipeline within this area and in order to optimise this crossing during the design process the Applicants require flexibility with key aspects of the Order Limits in order to safely deliver this Work No.
- 2.3.6 The width of the corridor is based on the existing access track to the West and the existing aboveground pipeline corridor to the East. The Applicants expect to route the aboveground pipelines (Work Nos. 5C & 6) adjacent to the existing pipeline corridor in order to minimise sterilisation of land in recognition of comments from interested parties. This defines the outer edge of the new rights sought.
- 2.3.7 In addition to the existing infrastructure and apparatus within this part of the Order Land, there is also Anglo American's DCO (York Potash Harbour Facilities Order 2016) which identifies this corridor as a route for a conveyor. The width of the new rights sought will provide the Applicants with the required flexibility so that the Proposed Development can be constructed, operated and co-exist with the development to be carried out pursuant to the York Potash Harbour Facilities Order.
- 2.3.8 Given the nature of this section of the Order Land, the Applicants expect to maintain and operate the pipelines similar to the operators with existing apparatus. There is no existing access track running parallel to the existing aboveground pipeline corridor, instead temporary access routes would be established for construction and then subsequently during intermittent activities during operation. Whilst those maintenance and access activities are temporary on each occasion, the rights to carry them out are required on an ongoing (permanent) basis.
- 2.3.9 The following cross section has been developed to illustrate the extent of the Order Limits for the Proposed Development and the existing infrastructure and constraints of the pipeline corridor. It does not identify the location of the proposed Anglo American conveyor (referenced above) which would be installed in addition to existing apparatus.

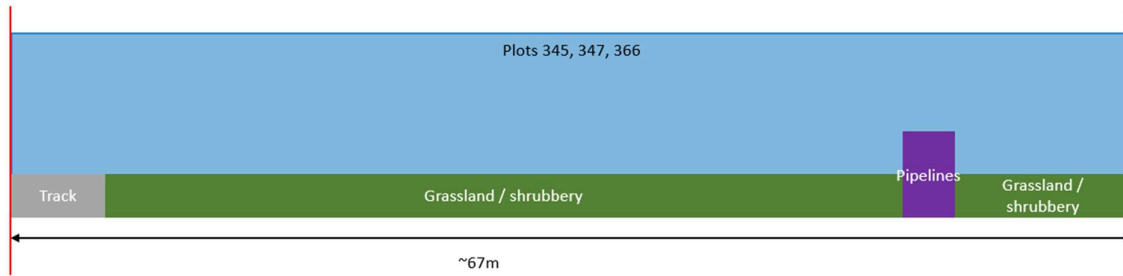
Key

 Order Limit	 Order Land – Temporary Possession	 Existing Pipelines / Structures	 Grassland / shrubbery
 Proposed Order Limit at Deadline 6	 Order Land – New Rights	 Existing Access Tracks	

Cross Section E (Work No. 6) – Anglo American Corridor (Looking NE)



Extract of Land Plan (Document Ref 4.2) Sheet 13



Cross Section of existing land and infrastructure

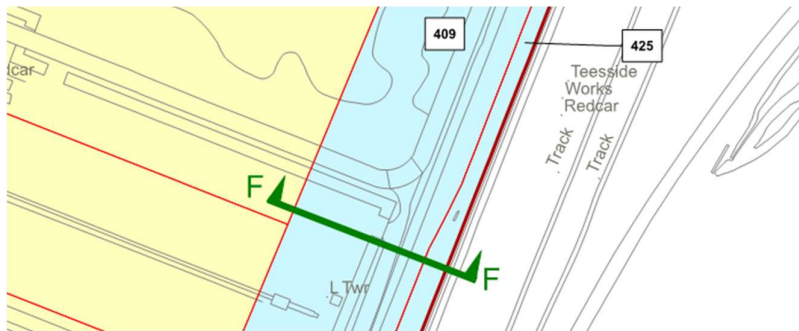
2.4 STDC Corridor

- 2.4.1 The STDC corridor is an area of land the freehold of which is controlled by STDC that connects the PCC site with the Anglo American corridor. It runs adjacent to the Eastern edge of Work No. 9A until it reaches the existing “Blue Main” Teesworks estate road and crosses existing private railway tracks. Broadly, the main corridor consists of plot 395, 401, 408 and 409.
- 2.4.2 The Proposed Development requires the routing of up to four pipelines within the STDC corridor (Work Nos. 2A, 5C, 6) and a cable (Work No. 3A). There is not an existing easement corridor along the proposed route within the Teesworks site. Therefore, in developing the Order Limits and outline design for the corridor the Applicants have had to consider construction and operational access requirements. From the PCC site (Works Nos. 1 and 7) to the existing Blue Main estate road, the Applicants will have a common utility corridor for all proposed services listed above.
- 2.4.3 As outlined in section 1.2 above, there are unique considerations for buried infrastructure. Within the STDC corridor, these will apply to Work No. 2a and Work No. 3a and are not repeated here.
- 2.4.4 The width of the new rights sought will provide the Applicants with the required flexibility so that the Proposed Development can be designed and constructed within the existing constraints of the Teesworks site. The Applicants require flexibility to enable optimisation during detailed design to adjust where challenges arise and potentially to adapt the detailed design or siting so as to reduce the sterilisation of land. The following cross section has been developed to illustrate the extent of the Order Limits for the Proposed Development and the existing infrastructure and constraints of the pipeline corridor.

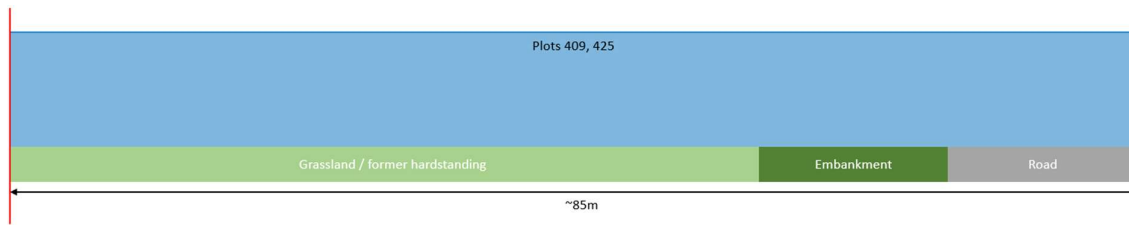
Key

 Order Limit	 Order Land – Temporary Possession	 Existing Pipelines / Structures	 Grassland / shrubbery
 Proposed Order Limit at Deadline 6	 Order Land – New Rights	 Existing Access Tracks	

Cross Section F (Work No. 6) – STDC Corridor (Looking N)



Extract of Land Plan (Document Ref 4.2) Sheet 8



Cross Section of existing land and infrastructure

2.5 Design Sequence and Timeline

- 2.5.1 The extent of rights sought by the Applicants are required to provide design and construction flexibility until the final routings are selected for all easements. While the extent of rights at this time are broader than will be required for the final easements, this is necessary to allow for the appropriate design flexibility noted above - the Applicants will only exercise powers to acquire rights after the point of final design, and at which point the lateral extent of rights sought will be limited to the specific pipeline or cable easement and the associated access rights for construction, maintenance, operation and decommissioning of the apparatus.
- 2.5.2 The Applicants' position is that the extent of rights sought within the draft DCO are justified in order to ensure the scheme is deliverable. At this stage of the Proposed Development, there is significant engineering uncertainty that prevents the Applicants from narrowing the Order Limits based on proposed easement routes. Below, the Applicants have set out the remaining steps in the design process that need to be completed to ensure a safe design, compliant with regulations before the easements can be fixed.
- 2.5.3 The Applicants are currently in FEED for the Proposed Development. In the context of pipeline and cable routings, during FEED, the Applicants will develop the routing based on pre-FEED information, site surveys and high-level engineering design.
- 2.5.4 During FEED, the Applicants will communicate preferred routings with affected parties to gather any comments on the proposed routings. This feedback will form an input into the interactive process of design. Following completion of FEED and sanction of the project at the Final Investment Decision, the Applicants will award EPC contracts for the full scope of the Proposed Development.
- 2.5.5 The EPC contractor(s) will develop the FEED design further through detailed design, including civil, structural, mechanical, electrical and instrumentation design, model reviews and constructability assessments. The design will need to reach 90% maturity before the routings are finalised and fixed. At this point the Applicants will be able to confirm the easements required.
- 2.5.6 The Applicants will liaise with affected land owners throughout the design process, providing information and seeking their input as appropriate. That will include informal liaison, as well as seeking approvals where required pursuant to protective provisions.

2.6 Easements & Rights

- 2.6.1 The final easements for Work Nos. 2A, 3A, 4, 5, 6 and 8 will be limited to the physical extent of the apparatus, and in some instances include protection strips either side of the apparatus.
- 2.6.2 Protection strips may be required for apparatus to secure physical separation between the Applicants' apparatus and any existing or future apparatus or activities. The protection strip will ensure the Applicants can control activity in close proximity to or which could affect their apparatus.
- 2.6.3 While the final easements will be limited in width, the Applicants will also require the necessary rights to construct, maintain, operate and decommission the apparatus. At a minimum the Applicants will require ongoing access rights to reach their apparatus by foot and vehicle. The size of vehicle will be dependent on the activity to be undertaken and vary for each of the Works. Access requirements will be specific for each of the Works and need to consider:
- Finalised routing,
 - Whether the apparatus will be installed above or below ground,
 - Construction methodology,
 - Existing access routes and obstructions, and any proposed works which are known about.
- 2.6.4 During the operation of the Proposed Development, the Applicants will undertake regular planned maintenance and unplanned maintenance of their apparatus. These activities will include routine visual inspections and non-intrusive inspections. This would require personnel to access by foot and/or car. If the apparatus is buried or elevated, then suitable construction vehicles and machinery would be required for access. In the event that repairs are required to apparatus then, this will require additional people and plant to facilitate material removal, laydown, testing and replacement. In some instances, the land over which rights are required for these activities may be similar to that required for access under paragraph 2.6.3. However, there will be numerous cases where this is not the case and therefore detailed and specific access rights will be required to ensure the continued safe operation of the Proposed Development.
- 2.6.5 The above factors limit the Applicants' ability to specify and/or narrow the required rights at this time and will be subject to design development as outlined in section 2.5 above.