VikingCCS

Viking CCS Pipeline

Environmental Statement Volume IV – Appendix 3-5 Decommissioning Strategy – Revision A (Clean)

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a Harbour Energy Company
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1 Outline Decommissioning Strategy

1.1.1 This document presents an initial Outline Decommissioning Strategy for the Viking CCS Pipeline. It has been revised to address comments within Natural England's Response to 'Applicant's Comments on Written Representations' and reflect the outcomes of a meeting with Natural England on 9 July 2024 in which Natural England's requirements were clarified and an approach agreed. The revisions provide further clarification the reinstatement of agricultural land at the three Block Valve Stations and at Theddlethorpe (Option 2) and are contained in sections 4.5 and 5.5, respectively.

1.1.2 The Viking CCS Pipeline consist of the following key components:

- Immingham Facility;
- Approximately 55.6 km buried 24 inch (") onshore steel pipeline (including cathodic protection);
- Three Block Valve Stations;
- Theddlethorpe Facility; and
- Replacement Dune isolation valve.

1.1.3 This document describes the outline decommissioning strategy for the listed key components and is based on the available information at the time of writing (August 2023). The Viking CCS Pipeline currently has a minimum design life of 25 years, which may be extended further. It is important to note therefore, that ahead of any actual on-site decommissioning works, a detailed decommissioning strategy and site restoration scheme will be developed and submitted and agreed with all relevant local planning authorities.

1.1.4 The location of the key components of the Viking CCS pipeline are shown on **Figure 1** below.

2 Final Process shutdown

2.1.1 At the end of the operational project life the final shutdown of the process will be carefully coordinated between Harbour Energy and the emitters that are connected into the pipeline.

2.1.2 A final intelligent pigging run may be conducted ahead of shutdown to give a record of the pipeline condition at the end of its life in case there is potential for it to be re-purposed.

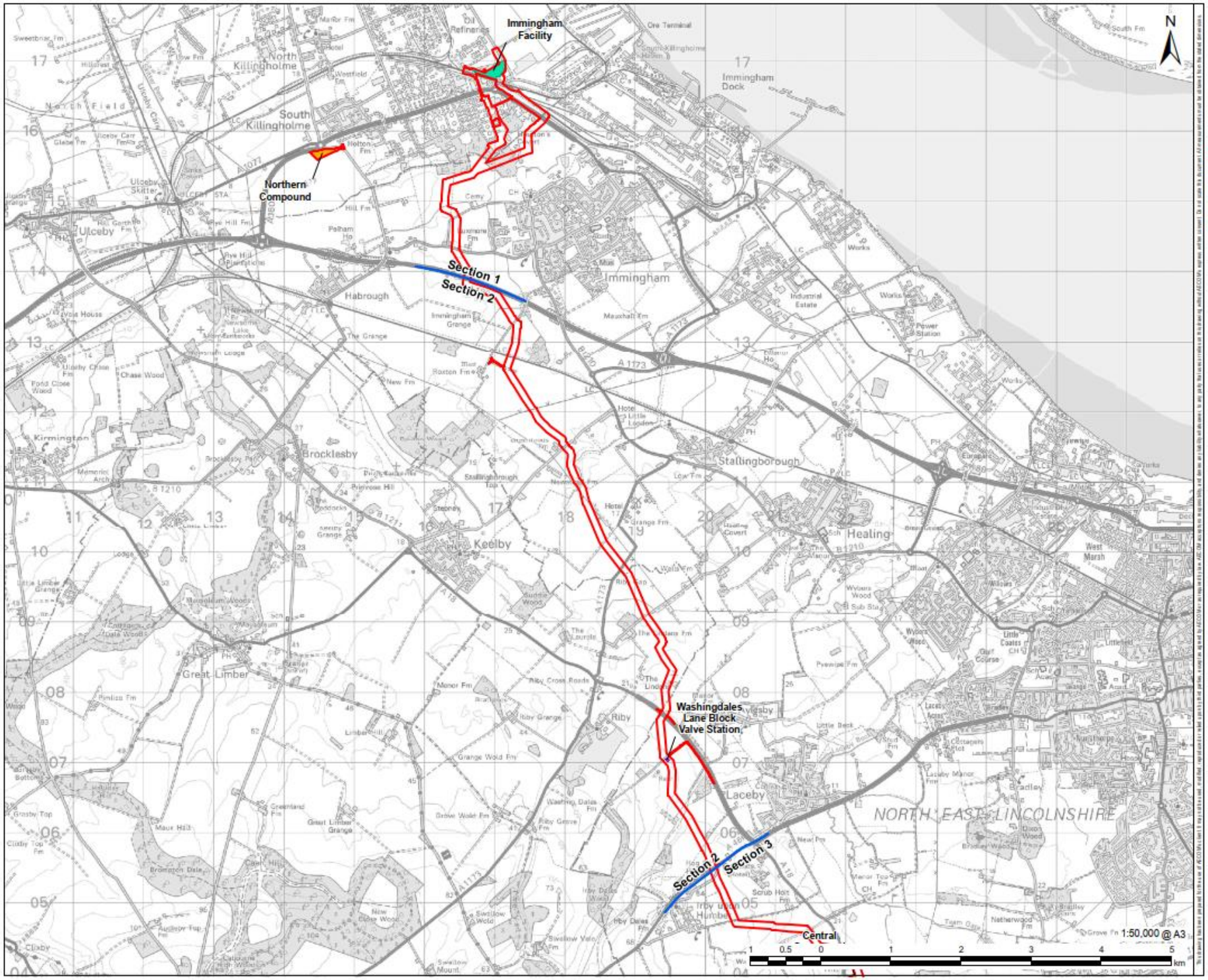
2.1.3 The flow into the pipeline from emitters will be stopped and all inlet valves will be closed.

2.1.4 The residual pipeline inventory of carbon dioxide will be carefully vented so as to ensure safe dispersion of material. As the rate of venting will be carefully controlled the final venting process could take around 4-6 weeks. The location of the venting will be determined nearer the time through an options appraisal process, but it will likely be via the 25m vent stack at either Immingham or Theddlethorpe although offshore venting will also be considered.

2.1.5 Once the pipeline pressure is verified as being at safe levels then the inlet connections to the pipeline will be removed in order to positively isolate the Immingham facilities from the emitters. The LOGGS offshore pipeline will also be positively isolated from the Theddlethorpe Facility which will allow the decommissioning programme to begin.

2.1.6 Removal of the infrastructure at Immingham and Theddlethorpe Facilities, plus the Block Valve Station removal could take between 6-12 months dependent on sequencing of the works.

Figure 1: Location of Key Components of Viking CCS Pipeline



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PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- Temporary Construction Compound
- Block Valve Station
- Reception Pipeline Facility

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FIGURE TITLE

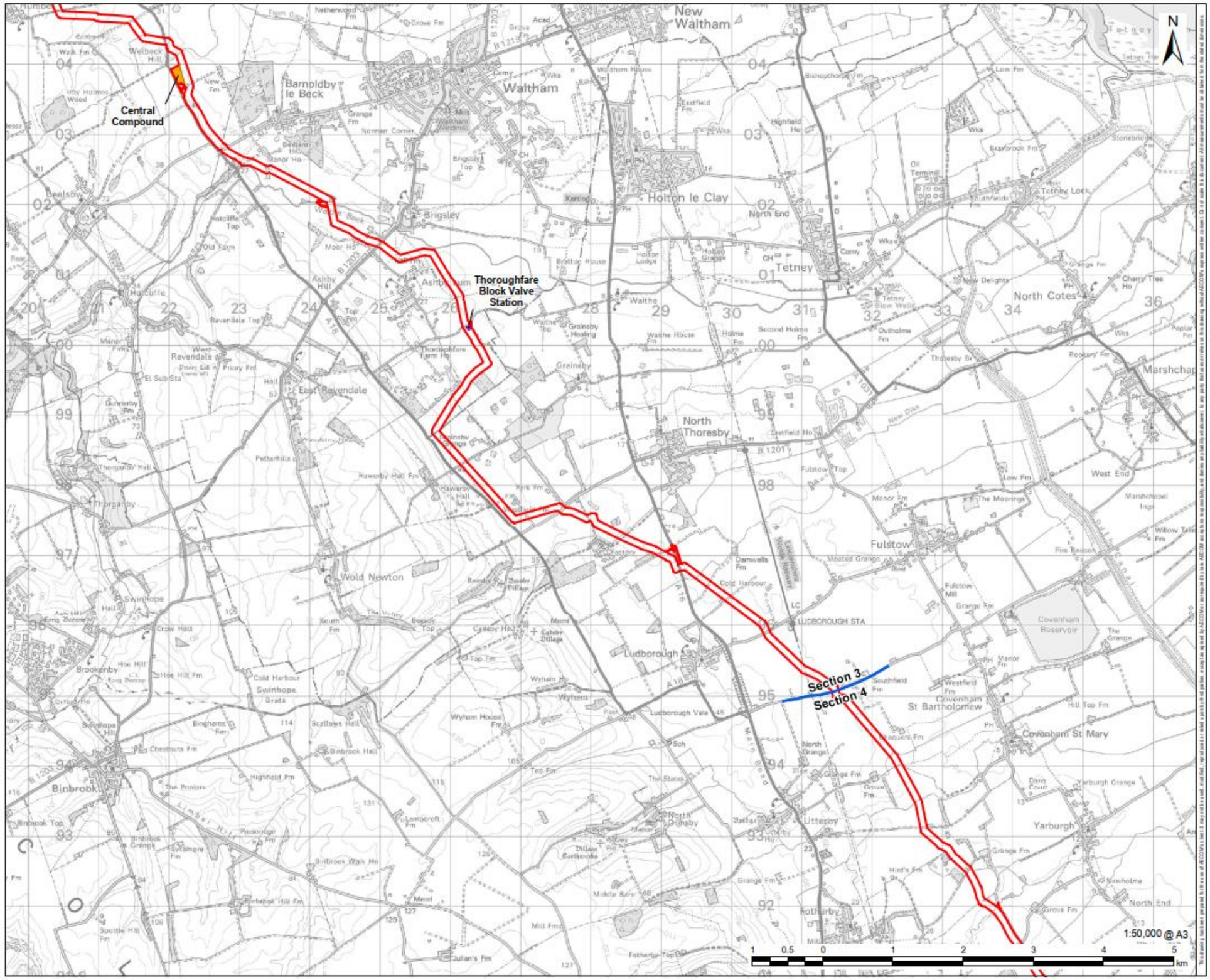
Figure 1-4 (1 of 3)
Key Components of the Proposed Development

ISSUE PURPOSE

ENVIRONMENTAL STATEMENT

PROJECT NUMBER / REFERENCE

60668955 / VCCS_230914_ES_1-4



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- Temporary Construction Compound
- Block Valve Station

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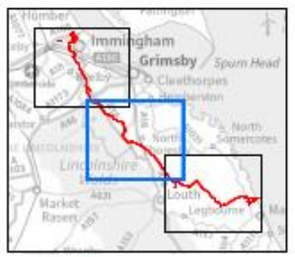

FIGURE TITLE

Figure 1-4 (2 of 3)
Key Components of the Proposed Development

ISSUE PURPOSE

ENVIRONMENTAL STATEMENT

PROJECT NUMBER / REFERENCE

60668955 / VCCS_230914_ES_1-4

Louth Road Block Valve Station

Section 4

Section 5

Theddlethorpe Facility Option 2

Theddlethorpe Facility Option 1

Isolation Valve

Southern Compound

N

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VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- Isolation Valve
- Existing Loggs Pipeline
- Temporary Construction Compound
- Block Valve Station
- Reception Pipeline Facility

FIGURE TITLE

Figure 1-4 (3 of 3)
Key Components of the Proposed Development

ISSUE PURPOSE

ENVIRONMENTAL STATEMENT

PROJECT NUMBER / REFERENCE

60668955 / VCCS_230914_ES_1-4

3 Immingham Facilities

3.1 Description of equipment

3.1.1 The Immingham Facilities receive conditioned carbon dioxide from emitters in the Immingham Industrial area.

3.1.2 The Immingham Facilities consist of the following key components:

- Inlet manifold with valve access platform;
- High-integrity pressure protection system (HIPPS);
- Permanent pig launcher to allow the onshore CO_2 pipeline to be cleaned and inspected during commissioning and operation and be suitable for intelligent pigging;
- Common pig handling area for the pig launcher;
- Emergency Shutdown Valve (ESDV) for each incoming pipeline from emitters;
- Venting system;
- Various instruments installed on the pipework, including temperature and pressure measurement and ultrasonic flowmeter;
- Local equipment room (LER); and
- Analyser house.

3.2 Proving safe

3.2.1 Although the pipeline will have already been de-pressured, all valves will be moved into the open position to ensure no trapped pressure.

3.2.2 Incoming electrical supplies will be isolated and subsequently disconnected from the main supply to remove the risk of electric shock.

3.2.3 Any other services to the site such as water supply, instrument air and nitrogen will also be isolated and disconnected.

3.3 Dismantling Equipment

3.3.1 Equipment will be dismantled in such a way as to maximise the segregation of different waste streams to ensure as much material as possible can be recycled.

3.3.2 Electrical systems, lighting and cables will be removed first from each item of equipment, and these will be segregated for offsite recycling.

3.3.3 Bolted connections are likely to require specialist bolt tensioning contractors to remove.

3.3.4 Cranes will be used to support sections of equipment and pipe as they are unbolted and will then be used to lower the sections to the floor for further processing.

3.3.5 Larger sections of pipe and equipment may be downsized on site by the appointed contractor in order to minimise the impact of traffic on the local road network.

3.3.6 This will likely be achieved through oxy-propane gas cutting methods as the volume of steel would not warrant mechanical shearing machines.

3.3.7 Any control cabinets and or containers on site will also be downsized on site.

3.3.8 Once all equipment is removed then concrete breakers will be used to break up the bases and plinths ready for crushing. A mobile crushing unit may be brought to the site so that the crushed material could be used for in-fill and site finishes.

3.3.9 The final element will be to remove any security fencing from the site.

3.4 Disposal of Waste

Table 1: Immingham Facility Waste Streams

Waste Stream	Disposal Option
Steel from pipes, valves, pig launchers and receivers, fencing	Sent to recycle once proven clean
Concrete from equipment plinths and bases	Broken out, crushed, and used or infill on site or final ground cover if required. If not required, this will be sent for recycle
Electrical equipment, control systems components, lighting, IT	Investigate sale option to 3rd party but if unavailable then recycle if possible and landfill as last resort
Batteries from UPS systems	Recycle

3.5 Reinstatement of Land

3.5.1 The final end state of the land will be determined through conversation with the landowner, but it is likely to remain as a brownfield site and will likely be covered with a hardcore subbase material (such as Ministry of Transport type 1) which may have to be sourced externally if there is not sufficient material recovered from the demolition process.

4 Block Valves

4.1 Description of Equipment

4.1.1 The block valves allow the pipeline to be remotely monitored from the main control centre, with local control monitoring/control capable when maintenance personnel are physically on site. The block valves also allow the pipeline to be isolated in sections in an emergency.

4.1.2 All 3 block valves for the project will be of the same design and as such the process below will apply to all locations.

4.1.3 The block valve would be buried with a valve actuator extended above ground (circa 1.5 metres), there will also be a number of bypass valves and associated pipework. The valves may be operated remotely for which the necessary equipment on site will be housed in a kiosk, which would be typically between 2-3m in height, subject to final design. The Block Valve Stations would include a local vent to ensure that bypass pipework maintenance activities can be performed safely, however it is not the intention for pipeline venting to be undertaken at these locations.

4.1.4 The Block Valve Stations would have security fencing, typically 3.2 high with double-leaf access gates for vehicles with access from the adjacent road network, access tracks or similar. Provision will be provided for maintenance operatives to safely park their vehicle(s) off the highway and open the gates. Refer to *ES Volume II Chapter 3: Description of the Proposed Development (Application Document 6.2.3)* for more details.

4.1.5 The Block Valve Stations would include associated landscaping such as planting or bunds to provide screening. Block Valve Stations would be unlit except during maintenance or potential breakdown/emergency requirements, when permanent task lighting columns (approximately 4m high) would be employed.

4.1.6 The Block Valve Stations would be connected to the local electrical distribution, with alternative sources of power as backup, should the permanent supply fail.

4.2 Proving Safe

4.2.1 Although the pipeline will have already been de-pressured all valves at the Block Valve Station will be moved into the open position to ensure no trapped pressure.

4.2.2 Incoming electrical supplies will be isolated and subsequently disconnected from the main supply to remove the risk of electric shock.

4.2.3 Electrical supplies will be made safe in conjunction with the local electricity supplier, this may involve removing cable back to the main connection point.

4.3 Dismantling Equipment

4.3.1 Equipment will be dismantled in such a way as to maximise the segregation of different waste streams to ensure as much material as possible can be recycled.

4.3.2 Electrical systems, lighting and cables will be removed first from each item of equipment, and these will be segregated for offsite recycling.

4.3.3 Any control cabinets and or containers on site will be removed from the site and transported to the Immingham site for down-sizing or may be sent directly for disposal.

4.3.4 There are two options for the removal of the buried valves at the block valve sites. The final decision will be made nearer the time. These comprise:

1. Unbolt the above ground elements (valve actuators) and leave the valve bodies in-situ. Puncture any concrete pit lining and back fill the valve pits; or
2. Unbolt the entire valve and remove, install blanking plates to the open ends of the pipeline Puncture any concrete pit lining and back fill the valve pits.

4.3.5 Any concrete and gravel used on the site will be removed and taken to Immingham or Theddlethorpe for recycling as site in-fill and finishing material on the respective sites unless otherwise agreed with the respective landowner.

4.3.6 The final element will be to remove any security fencing from the site.

4.4 Disposal of Waste

Table 2: Block Valves Waste Streams

Waste Stream	Disposal Option
Steel from valves and fencing	Sent to recycle once proven clean
Concrete from equipment plinths and bases	Broken out, crushed, and used or infill on site or final ground cover if required. If not required, this will be sent for recycle
Electrical equipment, control systems components, lighting, IT	Investigate sale option to 3rd party but if unavailable then recycle if possible and landfill as last resort
Batteries from UPS systems	Recycle

4.5 Reinstatement of Land

4.5.1 The final end state of the land will be determined through conversation with the landowner, but it is likely to be reinstated for agricultural use. The Applicant is committed to ensuring that the reinstated land is of the same agricultural quality as prior to development, i.e. that the restoration achieves the same Agricultural Land Classification (ALC) (noting that the ALC is the standardised methodology for assessing the quality of agricultural land in England and Wales).

4.5.2 The pre-development ALC grading will be recorded and mapped as part of the detailed ALC survey

4.5.3 During construction the soils within the Block Valve Stations will be either be stripped and stored in accordance with the Soil Management Plan (SMP) (an Outline SMP is presented in *ES Volume IV: Appendix 10.1 (Application Document 6.4.10.1))* or new topsoil will be imported for restoration that meets the requirement of British Standard BS3882. This will ensure that the structure, function and resilience of the soil resource is maintained, and that restored soils remain in a condition that enables them to support land of the same ALC grading as prior to construction.

4.5.4 At decommissioning, the reinstatement will be carried out in accordance with a location-specific Method Statement (or similar) which will detail appropriate good practice soil management measures based upon the current guidance at that time. Pre-construction soil and ALC surveys will be undertaken within each of the Block Valve Stations boundaries by a suitably experienced soils specialist following the standard methodology. The survey will record details of the pre-development soil profiles and characteristics. These data will be used to describe the proposed restoration profiles set out in each method statement.

4.5.5 Subsoil decompaction will be required prior to the placement of the topsoil, to restore the structure of the subsoil and to assist with future drainage. Topsoil will be reinstated at a suitable time of year. The topsoil would be levelled, cultivated and reseeded as agreed with the landowner/occupier.

4.5.6 The quality of the reinstatement will be verified a suitably qualified person and post-restoration soil surveys will be undertaken to record the 'after' statement of physical characteristics of the restored soils and determine whether the pre-construction target soil profile specifications have been met.

4.5.7 If the restored soil properties are found to differ from the 'before' characteristics to an extent that makes it impossible for the standard to be reached, a suitably experienced person will define any required remediation works and the remedial works will be undertaken. This process will be repeated until the 'before' characteristics are achieved.

4.5.8 The physical conditions on restored land may take several years to fully stabilise; therefore, ALC survey is not normally undertaken (the land is not normally graded) until five-years after soil replacement. However, despite the post-restoration surveys occurring soon after completion of the restoration works (well before the end of the five-year stabilisation period) calculation of ALC grading will be undertaken to compliment the post-restoration soil surveys and provide an initial assessment of post-restoration ALC grading. Any change in ALC grading during the five-year stabilisation period would be expected to be an improvement (i.e. and increase in grading).

4.5.9 Should comparison of the pre-construction and post-restoration survey data show the original ALC grading has not been achieved by the time this initial assessment is undertaken, the land will be subject to further monitoring after completion of any remediation work. Details of the monitoring programme would be confirmed after the results of the post-construction soil and ALC surveys were known.

5 Theddlethorpe Facilities

5.1 Description of Equipment

5.1.1 The Theddlethorpe Facility is required to enable the CO_2 to flow from the new 24" pipeline into the existing LOGGS (36") pipeline.

5.1.2 The Theddlethorpe Facility would comprise the following key components:

- LOGGS pipeline tie-in;
- Emergency Shutdown Valves;
- Pig receiver and launcher;
- High-integrity Pressure Protection System;
- Venting system;
- Local equipment room (LER); and
- Central Control Room.

5.1.3 The Theddlethorpe Facility would be secured by a prison type security fence 3.2m high.

5.2 Proving safe

5.2.1 Although the pipeline will have already been de-pressured all valves will be moved into the open position to ensure no trapped pressure.

5.2.2 Incoming electrical supplies will be isolated and subsequently disconnected from the main supply to remove the risk of electric shock.

5.2.3 Any other services to the site such as water supply, instrument air and nitrogen will also be isolated and disconnected.

5.3 Dismantling Equipment

5.3.1 Equipment will be dismantled in such a way as to maximise the segregation of different waste streams to ensure as much material as possible can be recycled.

5.3.2 Electrical systems, lighting and cables will be removed first from each item of equipment, and these will be segregated for offsite recycling.

5.3.3 Bolted connections are likely to require specialist bolt tensioning contractors to remove.

5.3.4 Cranes will be used to support sections of equipment and pipe as they are unbolted and will then be used to lower the sections to the floor for further processing.

5.3.5 Larger sections of pipe and equipment may be downsized on site in order to minimise the impact of traffic on the local road network.

5.3.6 This will likely be achieved through oxy-propane gas cutting methods as the volume of steel would not warrant mechanical shearing machines.

5.3.7 Any control cabinets and or containers on site will also be downsized on site.

5.3.8 Once all equipment is removed then concrete breakers will be used to break up the bases and plinths ready for crushing. A mobile crushing unit may be brought to the site so that the crushed material could be used for in-fill and site finishes.

5.3.9 The final element will be to remove any security fencing from the site.

5.4 Disposal of Waste

Table 3: Theddlethorpe Facility Waste Streams

Waste Stream	Disposal Option
Steel from valves and fencing	Sent to recycle once proven clean
Concrete from equipment plinths and bases	Broken out, crushed, and used or infill on site or final ground cover if required. If not required, this will be sent for recycle
Electrical equipment, control systems components, lighting, IT	Investigate sale option to 3rd party but if unavailable then recycle if possible and landfill as last resort
Batteries from UPS systems	Recycle

5.5 Reinstatement of Land

5.5.1 For Option 1 (Theddlethorpe Facility located on non-agricultural land within the former Theddlethorpe Gas Terminal) the final end state of the land will be determined through conversation with the landowner, but it is likely to remain as a brownfield site and will likely be covered with an MOT 1 type material which may have to be sourced externally if there is not sufficient material recovered from the demolition process.

6 Pipeline

6.1.1 In order to minimise impact of the decommissioning programme the majority of the pipeline will likely remain in-situ unless a specific reason appears in which to remove any particular section.

6.1.2 The base case therefore is that the project will leave the pipeline in place along its entire length. Special consideration will however be given to key locations such as road and railway crossings. At such locations agreed methodologies between relevant stakeholders will be employed to ensure the pipeline is left in a suitable condition; this may involve cutting out or grout filling sections of pipeline. Any open ends of pipeline will be capped and sealed.

6.1.3 As the pipeline will remain in-situ the marker posts and all necessary plans and maps will be updated to ensure they are accurate as to the as-left condition.

7 Dunes Isolation Valve

7.1 Description of Equipment

7.1.1 The Dunes Isolation valve is used just as an isolation valve and will typically be open for the operating life of the projects.

7.1.2 The dunes valve consists of the following key equipment:

- Isolation valve and associated control equipment;
- Access ladders and walkway;
- Lifting frame; and
- Security fencing.

7.2 Proving safe

7.2.1 Following the final venting the valve will be cycled open and closed several times to ensue no trapped pressure.

7.2.2 The valve will be closed and then the motive power source isolated.

7.2.3 Valve vent plugs will be removed.

7.3 Dismantling Equipment

7.3.1 The fencing will be removed from around the valve chamber to allow full access.

7.3.2 All ancillary items will be removed from the outside of the chamber which include the valve exhaust vent and the lifting frame.

7.3.3 The concrete lid to the chamber will be removed.

7.3.4 All control equipment access ladder and walkway will be removed from inside the chamber.

7.3.5 The valve is welded into the pipeline, so the most likely scenario is that the valve body remains in place and the valve works are unbolted and removed and the body cavity filled with grout.

7.3.6 The concrete chamber will also likely remain in-situ and just be backfilled with either concrete, grout, or soil.

8 Environmental Considerations

8.1 General Overview

8.1.1 All decommissioning work would be undertaken in accordance with applicable legislation that is in place at the time of the works. Protecting the environment and preventing pollution will form the fundamental approach to all decommissioning work undertaken.

8.1.2 Consequently, all works will be undertaken following standard best practice related to prevention of pollution and minimising any adverse impacts. Likely measures, will include, but not be limited to:

- Availability of appropriate equipment (e.g., spill kits) made available for all items of plant on site to deal with accidental spillages;
- A Pollution Prevention Plan is to be available with a full list of protocols and communication channels with the Environment Agency in the event of an accidental pollution incident;
- Pollution prevention training is to be provided, including a practical element, for site-based staff (including the practical use of spill kits and training on the consideration and selection of appropriate sediment mitigation installation); and
- All temporary works including construction of compounds will be undertaken in accordance with good practice guidance to prevent pollution of water features and / or physical impacts.

8.2 Ecology Surveys

8.2.1 Where necessary, ecology surveys will be commissioned ahead of any decommissioning works. These are likely to be required at each of the Block Valve locations and the Dune Isolation Valve. They may also be required at the Immingham Facility and Theddlethorpe Facility, the need would be determined via agreement with the Local Planning Authorities.

8.2.2 The ecology surveys would be undertaken by a suitably qualified ecologist and will be in line with any legislation or requirements in place at the time. The surveys would be undertaken no more than 12 months prior to the commencement of the onsite works.

8.2.3 Any required mitigation measures to avoid or minimise any significant impacts will be identified in the report.

8.3 Other Surveys

8.3.1 The requirement for any other environmental surveys such as landscape and visual, air quality or noise and vibration would be determined at the time, in line with applicable legislation.