



Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 1, Annex 3.3: Selection and Refinement
of the Onshore Infrastructure

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Glossary

Term	Meaning
the Applicant	The legal entity making the applications for consent; Morven Offshore Wind Limited (MvOWL).
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent
Environmental Impact Assessment (EIA)	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Landfall	The area in which the offshore export cables make landfall (come onshore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area between the trenchless technique exit pits and the transition joint bay inclusive of all construction works.
Marine Directorate Licensing Operations Team (MD-LOT)	The part of the Scottish Government's Marine Directorate responsible for assessing and administering applications for marine licences and Section 36 consent (offshore) in Scotland.
Marine Licence	A marine licence permits the undertaking of different activities in the marine environment, including construction, the deposition or removal of substances or objects from the seabed and dredging. The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities within the Scottish offshore region (12nm – 200nm) and in English offshore and inshore regions (noting that deemed marine licences will be included within the Development Consent Order application).
MHPGC Project Environmental Statement (ES)	The document presenting the results of the Environmental Impact Assessment process.
MHPGC Project Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach to, and information to support, the EIA and Habitats Regulations Assessment processes for certain topics.
MHPGC Project Marine Conservation Zone (MCZ) and Marine Protected Area (MPA) Assessment	The MPA and MCZ Assessment is a process used to evaluate whether a proposed activity could have a significant impact on designated nature conservation MPAs (in Scotland) or MCZs and HPMAAs (in England). It ensures that the development does not hinder the conservation objectives of the protected features of these sites, as required under the Marine (Scotland) Act 2010 (Scotland) and the Marine and Coastal Access Act 2009. The MPA/MCZ Assessment for the MHPGC Project will consider whether the activities subject to the relevant application (i.e. activities subject to a marine licence application and DCO consent) can hinder the conservation objectives of a protected feature in a nature conservation MPA, MCZ or HPMAA.
MHPGC Project PEIR Red Line Boundary	The area within which all components of the MHPGC Project will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).

Term	Meaning
MHPGC Project Preliminary Environmental Information Report (PEIR)	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
MHPGC Project Report to Inform Appropriate Assessment (RIAA)	A report prepared by the Applicant containing information that the Competent Authority needs to inform an Appropriate Assessment at Stage 2 of the HRA process. The MHPGC Project will consider whether the MHPGC Project could have adverse effects, either alone or in-combination with other plans or projects, on the integrity of the National Site Network for which the likely significant effects has been previously established.
MHPGC Project Scoping Opinions	Separate scoping opinions received from PINS (on behalf of the Secretary of State) and MD-LOT (on behalf of the Scottish Ministers) in response to the MHPGC Project Scoping Report. The MHPGC Project Scoping Opinions contain the range of issues that PINS, and MD-LOT in consultation with statutory stakeholders, have identified should be considered within the EIA process.
MHPGC Project Scoping Report	A Scoping Report for the MHPGC Project, scoping the likely significant effects of the project on the environment, was submitted and accepted by Planning Inspectorate (PINS) and submitted to the Scottish Ministers, via the Marine Directorate – Licencing Operations Team (MD-LOT) in February 2025.
High Voltage Alternating Current (HVAC)	A HVAC electric power transmission system uses alternating current for electric power transmission that periodically reverses direction at regular intervals.
High Voltage Direct Current (HVDC)	A HVDC electric power transmission system uses direct current for electric power transmission, in contrast to the more common alternating current systems. Most HVDC links use voltages between 100 kilovolts (kV) and 800kV.
Morven Branxton Area Grid Connection Project (hereafter 'MBAGC Project')	The Morven Branxton Area Grid Connection Project will be comprised of the offshore export cable in Scottish waters from the Morven North or the Morven South Offshore Substation Platforms, the onshore export cable and the onshore land substation in the vicinity of Branxton in East Lothian, Scotland.
Morven Hawthorn Pit Grid Connection Project ('MHPGC Project')	The MHPGC Project is comprised of the offshore export cables in Scottish and English waters from the Morven North or the Morven South offshore substation platform(s) (OSP), landfall, onshore export cables, the onshore land substation (LSS) and AC connection cables. Also referred to in this report as the MHPGC Project, for ease of reading.
Morven North Offshore Wind Array Project (hereafter 'Morven North')	The Morven North Offshore Wind Array Project which includes the wind turbines and foundations, Offshore Substation Platforms and foundations, inter-array and interconnector cables and associated infrastructure located within the Morven North Boundary.
Morven South Offshore Wind Array Project (Morven South)	The Morven South Offshore Wind Array Project, which includes the wind turbines and foundations, Offshore Substation Platforms and

Term	Meaning
	foundations, inter-array and interconnector cables and associated infrastructure located within the Morven South Boundary.
National Grid Hawthorn Pit Substation	The National Grid substation at Hawthorn Pit, County Durham, which the AC connection cables will connect into from the Onshore Land Substation.
Offshore export cables	HVDC cables which bring electricity from either the Morven North or Morven South offshore substation platform to the transition joint bay (TJB) at landfall.
Offshore substation platform (OSP)	OSP(s) comprise the support structure, topside and electrical components used for collecting the electricity generated by the wind turbine generators, in Scottish waters, for the passage or transmission to landfall. These OSP(s) can be divided into two types: • HVAC collector substations; • HVDC converter substations.
Offshore waters	The area seaward of 12nm, extending out to the UK's continental shelf.
Onshore export cables	HVDC cables which bring electricity from the TJB to the Onshore Land Substation.
Onshore Land Substation (LSS)	A purpose-built site comprising a compound containing the electrical components for converting the HVDC to HVAC power. The LSS site associated with the MHPGC Project adjusts the power quality and power factor to meet the requirements of power supply being fed to the National Grid Hawthorn Pit Substation.
Planning Inspectorate (PINS)	The PINS is an executive agency of the UK Government responsible for administering and examining DCO applications for NSIPs in England. PINS manages the application process, oversees consultation and examination, and makes a recommendation to the relevant Secretary of State on whether consent should be granted.
Transition Joint Bay (TJB)	An underground bay housing a joint which connects the offshore export cables to the onshore export cables. The TJB will be located in the vicinity of the onshore side of the landfall.

Acronyms

Unit	Meaning
AC	Alternating current
EIA	Environmental Impact Assessment
EnBW	Energie Baden-Württemberg AG
EPP	Evidence Plan Process
EWG	Expert Working Group
FUE	Follow-Up Exercise
HVAC	High Voltage Alternating Current

HND	Holistic Design Network
HVDC	High Voltage Direct Current
LSS	Land Substation
JNBP	JERA Nex bp Limited
MBAGC	Morven Branxton Area Grid Connection
MCAA 2009	Marine and Coastal Access Act 2009
MD-LOT	Marine Directorate – Licensing and Operations Team
MHPGC	Morven Hawthorn Pit Grid Connection
MMO	Marine Management Organisation
MvOWL	Morven Offshore Wind Limited
OSP	Offshore Substation Platform
OTNR	Offshore Transmission Network Review
RIAA	Report to Inform Appropriate Assessment
RLB	Red Line Boundary
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
SoS	Secretary of State
TJB	Transition Joint Bay

Units

Unit	Meaning
GW	Gigawatt

1 Selection and Refinement of the Onshore Infrastructure

1.1 Introduction

1.1.1 Overview

- 1.1.1.1 This document forms Annex 3.3: Selection and Refinement of the Onshore Infrastructure to Chapter 3: Site Section and Consideration of Alternatives of the Preliminary Environmental Information Report (PEIR) prepared for the Morven Hawthorn Pit Grid Connection Project (MHPGC Project) (referred to hereafter referred to as 'the MHPGC Project'). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process carried out to date for the MHPGC Project.
- 1.1.2.1 Morven Offshore Wind Limited (MvOWL), a joint venture between JERA Nex bp Limited (JNBP) and EnBW Energie Baden-Württemberg (EnBW) (hereafter 'the Applicant'), was awarded a seabed option under the 2021/22 ScotWind Leasing Round for the Morven Option Lease Agreement Site (hereafter Morven Site), located wholly within Plan Option Area E1, identified in the Scottish Government's Sectoral Marine Plan for Offshore Wind Energy (the SMP) (Scottish Government, 2020).
- 1.1.3.1 In the 2020 Progress Report to the Parliament on Reducing UK emissions, the Committee on Climate Change called for the UK Government to "develop a strategy to coordinate interconnectors and offshore networks for wind farms and their connections to the onshore network and bring forward any legislation necessary to enable coordination" (Committee on Climate Change, 2020). Following this, the UK Government announced the Offshore Transmission Network Review (OTNR) to identify near-term actions and opportunities for offshore windfarm projects to coordinate and thereby address the barriers of the then existing offshore transmission regime to the deployment of offshore wind; the intention being to develop an offshore transmission network that facilitates coordination between offshore wind developments.
- 1.1.4.1 The OTNR led to the publication of the Holistic Design Network (HND) (NGESO, 2022); which established an integrated approach to connecting new offshore wind generation to the electricity transmission network. Half of the generating capacity of the Morven Site was included within the HND assessment alongside other offshore wind developments in the East Coast Region. The remaining capacity was not included due to limitations on the total ScotWind generation considered within the HND.
- 1.1.5.1 The output of 2022 HND recommended that half of the generating capacity of the Morven Site, for up to 1.5 GW, is connected to the grid network at the Point of Interconnection (PoI) at the National Grid Hawthorn Pit Substation in County Durham, England.
- 1.1.6.1 The HND Follow Up Exercise (HND FUE) (Ofgem, 2024) was subsequently undertaken and considered the additional ScotWind projects and generating capacity that had not formed part of HND. This included the remaining half of the Morven Site generating capacity. The HND FUE recommended a second grid connection, for up to 1.5 GW, at a PoI within the Branxton area in East Lothian, Scotland.
- 1.1.7.1 The HND (and HND FUE) assessments both considered an interconnected offshore wind network, where a coordinated connection between other offshore assets was initially proposed.
- 1.1.8.1 Against this strategic grid connection context, in 2024 the Applicant decided to progress the Morven Site as two distinct projects: the Morven North Offshore Wind Array Project (hereafter 'Morven North') and the Morven South Offshore Wind Array Project (hereafter 'Morven South'). Both projects would be located off the coast of Aberdeenshire in the North Sea, within Scottish waters.
- 1.1.9.1 The Applicant also commenced the site selection process for the MHPGC Project, based on the recommended PoI at the National Grid Hawthorn Pit Substation identified through the 2022 HND. The alternatives considered for the MHPGC Project therefore relate to the feasible means of connecting Morven North or Morven South to the National Grid Hawthorn Pit Substation including the identification and assessment of offshore cable routes, landfall locations, onshore cable routes and associated onshore infrastructure.
- 1.1.10.1 In April 2025, NESO subsequently confirmed that the original proposal of a coordinated connection design was discounted and a radial connection for half of the generating capacity of the Morven Site

would be connected to the grid network at National Grid Hawthorn Pit Substation in County Durham. This decision is evidenced in the outcome of the HND North Cluster 2 Impact Assessment and Asset Classification (Ofgem, 2025).

- 1.1.11.1 In March 2024, following the recommendations of the HND FUE, NESO also confirmed that the remaining half of the Morven Site generating capacity would connect to the electricity transmission network within the Branxton area (Ofgem, 2025). In September 2025, NESO subsequently confirmed that the original proposal of a coordinated connection design was discounted and a radial connection for remaining half of the generating capacity of the Morven Site would be connected to the grid network at Branxton area. (NESO – Sep 2025, Ofgem - Nov 2025).
- 1.1.12.1 The transmission infrastructure associated with the Hawthorn Pit connection is planned as part of this application with the MHPGC Project seeking development consent and Marine Licence(s) for assets in Scottish and English waters and England. The transmission infrastructure associated with the Branxton connection is planned to be progressed separately through the Morven Branxton Area Grid Connection Project (hereafter referred to as 'MBAGC Project') and does not form part of the application for the MHPGC Project. Further the applications for the generation assets, Morven North and Morven South, are being progressed separately and the Section 36 (s36) applications were submitted to the Scottish Ministers in May 2026 and are undergoing a separate consultation process.
- 1.1.13.1 The MHPGC Project will connect the OSPs in either Morven North or Morven South to the Pol at Hawthorn Pit and will comprise the offshore export cables transiting through Scottish offshore waters, English offshore and inshore waters, to landfall in County Durham where the offshore export cables will connect to the onshore export cables in the transition joint bay (TJB), with onshore export cables connecting to the Onshore Land Substation (LSS) and National Grid substation.
- 1.1.14.1 This Annex summarises the onshore infrastructure site selection undertaken to date for the MHPGC Project only.

1.1.2 Purpose of this annex

- 1.2.1.1 This Annex sets out the stages of siting and design iterations that the MHPGC Project onshore infrastructure has been through from inception to PEIR.
- 1.2.2.1 The MHPGC Project PEIR Red Line Boundary (**Figure 1**) represents the area within which all components of the MHPGC Project will be located, including areas required temporarily for construction and areas where permanent infrastructure will be located. This annex focusses on the following components:
- Onshore export cable corridors – HVDC cables which bring electricity from the Transition Joint Bays (TJB) to the onshore Land Substation (LSS); where the permanent onshore export cables will be located, including temporary construction compounds, and temporary and permanent accesses;
 - Onshore LSS – A purpose-built site comprising a compound containing the electrical components for converting the HVDC to HVAC power; where the permanent onshore electrical substation infrastructure and connections to the onshore export cables are proposed to be located, including temporary and permanent accesses; and
 - Alternating Current (AC) connection cables – AC cables that will connect the proposed onshore LSS to the National Grid Hawthorn Pit Substation; including temporary construction compounds, and temporary and permanent accesses.
- 1.2.3.1 An important part of the MHPGC Project design process is the consideration, selection and refinement of potential siting options for landfall to communicate to consultees and stakeholders the rationale for how decisions have been reached and how potential adverse effects have been avoided, minimised and / or mitigated as far as practicable.
- 1.2.4.1 The site selection and refinement process followed an iterative approach to ensure the most appropriate and efficient solution was identified with consideration to environmental and engineering constraints. The site selection has been progressed through three stages, incorporating feedback received at each stage to further refine the siting and design of the onshore infrastructure in the next stage. These three stages are described in **Table 1** and shown in **Figure 1**.

Table 1: Site selection and refinement stages

Stage	Associated Document
Stage 1 – Identification of Point of Interconnection (Pol)	Volume 1, Chapter 3: Site Selection and Consideration of Alternatives
Stage 2 – Identification of areas of search • Stage 2a – identification of landfall areas of search • Stage 2b – identification of offshore infrastructure search area • Stage 2c – identification of LSSs search area • Stage 2d – identification of onshore cable route search area	Volume 1: Annex 3.1: Selection and Refinement of the Cable Landfall Volume 1: Annex 3.2: Selection and Refinement of the Offshore Infrastructure Volume 1: Annex 3.3: Selection and Refinement of the Onshore Infrastructure Volume 1: Annex 3.3: Selection and Refinement of the Onshore Infrastructure
Stage 3 – Refinement of the siting and design of the MHPGC Project for PEIR • Stage 3a – refinement of landfall for PEIR • Stage 3b – refinement of offshore infrastructure options for PEIR • Stage 3c – refinement of LSS search areas for PEIR • Stage 3d – refinement of onshore cable route options for PEIR	Volume 1: Annex 3.1: Selection and Refinement of the Cable Landfall Volume 1: Annex 3.2: Selection and Refinement of the Offshore Infrastructure Volume 1: Annex 3.3: Selection and Refinement of the Onshore Infrastructure Volume 1: Annex 3.3: Selection and Refinement of the Onshore Infrastructure

1.2.5.1 This annex focuses on the onshore elements landward of landfall undertaken as part of Stages 2c, 2d, 3c and 3d as detailed in **Table 1**.

1.2.6.1 In particular, this annex details the following for each stage:

- The approach taken to defining the spatial boundaries and constituent parts of the assets listed in **Section 1.1.2**;
- The siting decisions taken by the Applicant; and
- The reasonable alternatives considered for the MHPGC Project, including location and siting options.

1.2.7.1 For the purposes of this annex, each of the onshore elements is considered in turn; however, the alignment of the onshore cable route and the LSS evolved together during the site selection process.

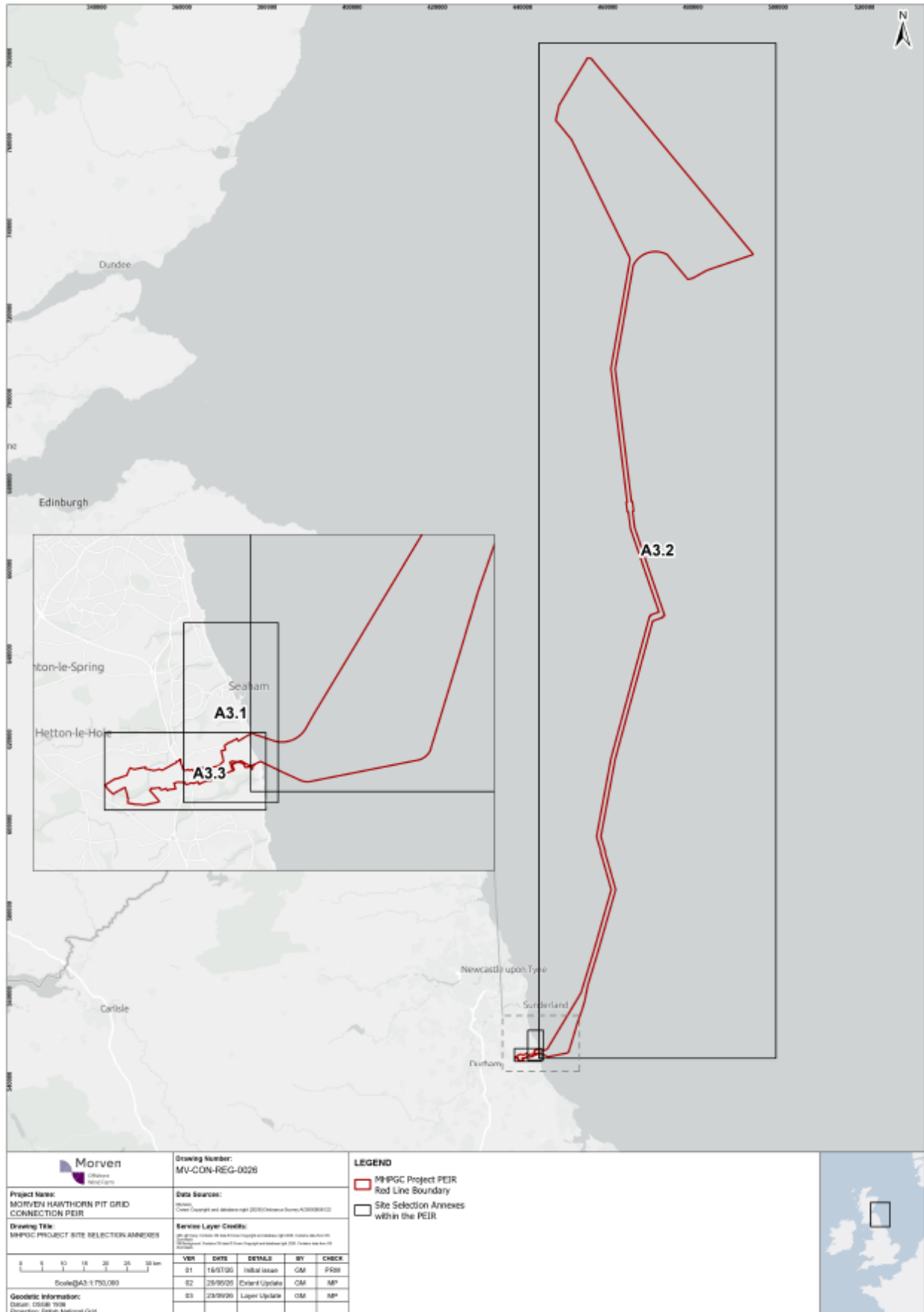


Figure 1: Site selection Annex Areas

1.1.3 Consultation and engagement

1.3.1.1 Stakeholder engagement and public consultation is recognised as vitally important for shaping the approach to development throughout each programme stage of development. **Table 2** provides a summary of consultation and engagement undertaken since the recommendation of the 2022 HND process was published to PEIR submission relevant to site selection for the MHPGC Project and **Figure 1** provides a summary of the site selection stages.

Table 2: Summary of consultation and engagement relevant to site selection for the MHPGC Project

Programme stage	Description of activities	Site selection stage
Consultation July – September 2024	Public consultation events to present: • Overview of the MHPGC Project and how a separate Development Consent Order (DCO) application is needed for the transmission assets and the generation assets • Explaining how the offshore windfarms are working to align infrastructure for the MHPGC Project	Stage 2c and 2d– identification of onshore infrastructure search area
EIA scoping February 2025	Submission of EIA Scoping Report for MHPGC Project covering: • Scoping boundary; • Landfall search area; • Offshore infrastructure search area; • Onshore infrastructure search area.	Stage 2c and 2d– progressing from the identification of an onshore infrastructure search area
Consultation October – November 2025	Public consultation events to present: • Preferred offshore export cable corridor; • Two landfall options; • Two indicative onshore export cable routes; • Three indicative LSS locations; • Request for feedback from stakeholders and communities; • Landowner liaison; • Evidence Process Plan (EPP) Steering Groups and Expert Working Groups (EWGs) on the scoping report and scoping boundary through to PEIR submission	Stage 3c and 3d – refinement of onshore infrastructure options for PEIR

Programme stage	Description of activities	Site selection stage
Community council meetings July – August 2026	Overview of project refinements since scoping covering: • Preferred offshore export cable corridor; • Selected landfall option; • Indicative onshore export cable route; • Two indicative LSS locations; • Request for feedback from stakeholders and communities; • Landowner liaison; • Evidence Process Plan (EPP) Steering Groups and Expert Working Groups (EWGs) on the scoping report and scoping boundary through to PEIR submission	

- 1.3.2.1 This document, and its selection and refinement process, supports the decision-making undertaken to inform the project refinements envelope. Those project refinements were presented at the July – August 2026 consultation EPP and EWGs and form the basis of the PEIR assessments.
- 1.3.3.1 From project inception up to publication of the PEIR, the Applicant has engaged with a range of stakeholders on the site selection and design of the MHPGC Project through the EPP. An EPP was developed for the MHPGC Project, seeking to ensure engagement with the relevant aspects of the EIA process throughout the pre-application phase. The development and monitoring of the Evidence Plan and its subsequent progress was undertaken by the EPP Steering Group. The Steering Group comprises the Planning Inspectorate, the Applicant, NatureScot, the Marine Management Organisation (MMO), Natural England, the Environment Agency and the Local Planning Authority as the key regulatory and bodies. Additionally, EWGs were set up to discuss and agree topic specific issues with the relevant stakeholders and to disseminate site and design refinements.
- 1.3.4.1 A summary of the key topics raised during consultation activities undertaken to date specific to the site selection and refinement of the landfall location is presented in Volume 1, Chapter 3: Site Selection and Consideration of Alternatives of the PEIR and Volume 1, Annex 3.1: Selection and Refinement of the Cable Landfall.

1.2 Guiding Principles for Site Selection of the Onshore Infrastructure

- 2.1.1.1 Alongside existing legislative, policy and guidance framework for the site selection process, as detailed in Volume 1, Chapter 3: Site Selection and Consideration of Alternatives, the following general principles guided the selection and refinement process of the onshore infrastructure, alongside Applicant-led considerations of cost of implementation and engineering constructability:
- Onshore cable routes should be as straight and direct as practicable;
 - LSSs should be sited in proximity to existing infrastructure to reduce proliferation of effects;
 - Directly avoid international, European and national designations, where practicable;
 - Avoid areas of woodland;
 - Avoid direct impact to residential properties, their curtilage and domestic gardens;
 - Minimise routing through challenging ground conditions (e.g. potentially contaminated land and marshlands); and
 - Minimise the number and length of complex crossings, where practicable (e.g. railways and pipelines) and cross the asset as close to 90 degrees as possible.
- 2.1.2.1 Each stage of the process (as described in **Table 1**) involved gathering desktop and survey data and feedback from stakeholders and the public to define and assess the onshore infrastructure options.

Internal workshops were then held to collate and review the data and feedback gathered to reach cross-discipline decisions about refining the onshore infrastructure options.

1.2.2 Horlock Rules

2.2.1.1 The relevance of planning and environmental considerations in the siting of LSSs was set out by the Central Electricity Generating Board and more recently reviewed and adopted by NGET in the 'Horlock Rules'. The Horlock Rules are a set of guidelines produced by NGET to assist those responsible for siting and designing substations to mitigate the environmental effects of such developments (National Grid, 2003). They are still referred to and used by National Grid (and endorsed in ministerial decisions and at public enquiry) when undertaking planning studies for new infrastructure although they now have to be considered alongside the relevant policy set out in National Policy Statements, Development Plan documents, local planning policies and other sources.

2.2.2.1 The principles embedded in the Horlock Rules are relevant to the MHPGC Project and are detailed below in **Table 3**.

Table 3: Onshore infrastructure application of the Horlock Rules

Horlock Rules overarching guidelines	Further detail on the MHPGC Project's consideration of the guidelines
Amenity, Cultural or Scientific Value of Sites The siting of new National Grid Company (NGC) substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections. [Horlock Rules – Section III paragraph 2] Areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable. [Horlock Rules – Section III paragraph 3]	The consideration of environmental constraints including internationally and nationally designated areas has been incorporated within the BRAG criteria for the site selection and refinement of the LSSs further details can be found in Section 1.4.4 and Section 1.4.5. All internationally and nationally designated sites have been avoided as part of the LSS site selection.
Local Context, Land Use and Site Planning The siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum. [Horlock Rules – Section III paragraph 4] The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum. [Horlock Rules – Section III paragraph 5] The land use effects of the proposal should be considered when planning the siting of substations or extensions. [Horlock Rules – Section III paragraph 6]	The stages to siting the LSS including the consideration of land use impacts is provided in Section 1.4.4 and Section 1.4.5. Screening around the LSSs will be detailed in the Environmental Statement that accompanies the application for development consent. Proposals to minimise visual and other environmental impacts, including the provision of screening will be provided within the Outline Landscape and Ecological Management Plan (CoT43) and Outline Design Principles (CoT62) to be submitted as part of the Application for development consent.

Horlock Rules overarching guidelines	Further detail on the MHPGC Project's consideration of the guidelines
Design In the design of new substations or line entries, early consideration should be given to the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum. [Horlock Rules – Section III paragraph 7] Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation. [Horlock Rules – Section III paragraph 8] The design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings. [Horlock Rules – Section III paragraph 9]	The consideration to the site selection and refinement of the LSS is detailed below in Section 1.4.4 and Section 1.4.5. The initial footprint of the LSS has been determined based on the Applicant's current substation designs. The design of the LSS may be subject to further refinement during the detailed design phase, post consent.
Line Entries In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance. The inter-relationship between towers and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.	The Applicant has not included overhead lines within the project design envelope. All cables will be buried underground, as per CoT27, (Volume 1, Annex 4.1: Draft Commitments Register, of the PEIR)

- 2.2.3.1 In the Horlock Rules, NGET states that it will encourage generators to adopt the guidelines when working with NGET on proposals for substations, sealing end compounds, or line entries. These guidelines also confirm that consideration must be given to environmental issues at the earliest stage in order to keep adverse effects to a reasonably practical minimum in the planning of new substations. The Horlock Rules are considered in detail in **Chapter 3: Site Selection and Consideration of Alternatives, of the PEIR**.

1.2.3 BRAG Assessment Methodology

- 2.3.1.1 A Black/ Red/ Amber/ Green (BRAG) Assessment was adopted to assess onshore infrastructure options during the site selection process (see **Section 1.4.5** and **Section 1.5.2** for assessment details and conclusions). This approach is considered appropriate to compare different LSS sites or onshore export cable corridors or routes, enabling a clear and direct comparison between options. Once constraints have been identified they are classified under four Appraisal Criteria, whereby the constraint is ranked as black, red, amber or green relative to a specific category criteria. **Table 4** presents a high-level summary of the BRAG Appraisal Criteria and **Table 7** and **Table 9** provide a detailed breakdown of constraint specific category criteria.

Table 4: BRAG definitions

Rating	Summary
Black	Constraints cannot be overcome and option is not feasible
Red	High potential to constrain development
Amber	Intermediate potential to constrain development
Green	Low potential to constrain development

2.3.2.1 Development considerations captured within the BRAG assessment include archaeology and cultural heritage, ecology, landscape, hydrology and hydrogeology, engineering, community, landscape and visual, property and planning. These were defined by a team of specialists comprising engineers, EIA consultants, and landscape, archaeology and ecological experts that have experience in undertaking site selection BRAG analysis. The BRAG analysis qualitatively assesses the influence of future developments, either using defined parameters, professional judgement, or assessing the issue relative to other potential options.

1.3 Measures adopted as part of the MHPGC Project (Commitments)

- 3.1.1.1 Throughout the design of the MHPGC Project, the principles of the mitigation hierarchy of avoid, mitigate, compensate have been applied; influencing the approach to the engineering and environmental design to align with National Planning Policy Framework, Section 15 (Ministry of House, Communities and Local Government, 2026) and National Policy Statement EN-1.
- 3.1.2.1 All measures to be adopted by the MHPGC Project are called 'Commitments' (CoTs). The CoTs will be used to inform the final design and details for construction, operation and maintenance, and decommissioning phases and will be secured substantively through the DCO by way of requirement.
- 3.1.3.1 All CoTs directly relevant to the selection and refinement of onshore infrastructure and design are outlined in **Table 5**. A draft version of the Commitments Register is provided with this PEIR in **Volume 1, Annex 4.1: Draft Commitments Register, of the PEIR**.

Table 5: Measures (commitments) adopted as part of the MHPGC Project relevant to onshore site selection

Commitment (CoT) number	Phase	Measure adopted	Commitment securing mechanism
CoT05	O&M	An Operational Noise Management Plan, detailing methods of reducing and managing operational noise to comply with the noise limits established by the assessment, will be prepared and submitted for approval prior to the commencement of operations. It will include limits on noise from operation of the Onshore Land Substation (LSS) associated with the MHPGC Project and an indication of the physical mitigation measures expected to be required and how compliance with these limits would be monitored.	Will be secured via DCO Schedule &/or Requirement.
CoT10	Construction	The Outline Highways Access Management Plan will be prepared and submitted with the application for development consent. It will include details regarding temporary access points from the public highway will be installed to facilitate vehicular access to the onshore export cable corridor, AC connection cable corridor and the Onshore Land Substation, during construction. A Detailed Highways Access Management Plan will be developed in accordance with the outline plan.	Will be secured via DCO Schedule &/or Requirement
CoT12	Design	The location of the permanent components of the MHPGC Project, notably Joint Bays, Monitoring and Link Boxes of the onshore export cables and the AC connection cables, will be designed as far as reasonably practicable to avoid severance of fields in agricultural production associated with farm holdings within the application boundary of the Development Consent Order.	Will be secured via DCO Schedule &/or Requirement.
CoT16	Decommissioning	An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable.	Will be secured via DCO Schedule &/or Requirement
CoT17	Design	Where practicable, the siting of the temporary and permanent footprint of the MHPGC Project will avoid sensitive historic, cultural, ecological and other environmental receptors, both statutory and non-statutory, during the site selection process for the MHPGC Project.	Will be secured via DCO Schedule &/or Requirement

Commitment (CoT) number	Phase	Measure adopted	Commitment securing mechanism
CoT22	O&M	An Outline Operational Drainage Management Plan (ODMP) for the onshore land substation will be prepared and submitted with the application for development consent. The Outline ODMP will detail measures to ensure that existing land drainage is reinstated and/or maintained, including limiting discharge rates and attenuate flows to maintain greenfield runoff rates at the LSS. A Detailed ODMP will be developed in accordance with the Outline ODMP and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority.	Will be secured via DCO Schedule &/or Requirement
CoT27	Design	The onshore export cables and the AC connection cables will be completely buried underground for the entire length. No overhead pylons will be installed as part of the MHPGC Project.	Will be secured via DCO Schedule &/or Requirement.
CoT42	Design	Vegetation, including trees, woodland and hedgerows, will be mapped through a Vegetation Retention Plan (or similar) to inform construction activities, with vegetation retained wherever practicable. All vegetation works will be undertaken in accordance with BS 5837:2012, including the implementation of appropriate root protection measures. These measures will be consolidated within an Arboricultural Management Plan that will form part of the Outline Landscape and Ecological Management Plan, which will be prepared and submitted with the application for development consent.	Will be secured via DCO Schedule &/or Requirement
CoT51	Construction	The following features will be crossed using trenchless techniques: • A, B and Classified unnumbered roads (known as C roads) (including the A19 and B1432); • all railway lines (including the section of railway line which runs between Seaham and Horden).	Will be secured via DCO Schedule &/or Requirement
CoT62	Design	Design Principles will be produced and submitted as part of the application for development consent. It will focus on design elements associated with the onshore LSS fulfilling the requirement for 'good design', as prescribed in the National Policy Statements EN-1, EN-3 and EN-5.	Will be secured via DCO Schedule &/or Requirement

1.4 LSS Site Selection

- 4.1.1.1 The purpose of the LSS is to transform the power supplied through the onshore export cables into an appropriate voltage and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
- 4.1.2.1 This section describes the site selection process for the LSS undertaken since the identification of the grid connection at the National Grid Substation at Hawthorn Pit. The process for identifying the grid connection at Hawthorn Pit is outlined in **Section 1.4.2** and described in detail in Volume 1, Chapter 3: Site Selection and Consideration of Alternatives of the PEIR. The identification and refinement of the LSS area is detailed in the following sections, culminating in the selection and refinement of the two LSS sites for PEIR publication.

1.4.2 National Grid connection offer

- 4.2.1.1 As detailed in **Section 3.7, Volume 1, Chapter 3: Site Selection and Consideration of Alternatives in the PEIR**, in July 2022 the UK Government published the Pathway to 2030 Holistic Network Design documents which set out the approach to connecting 50 GW of offshore wind to the UK electricity network (National Grid ESO, 2022). The output of this process concluded that the preferred connection option representing the most optimal design (economic, efficient and coordinated considering all criteria (i.e. technical, cost, environmental and deliverability)) was for the Morven Site, now the Morven North Offshore Wind Array Project and Morven South Offshore Wind Array Project, to connect to the existing National Grid substation at Hawthorn Pit in County Durham. The location of Hawthorn Pit therefore forms the starting point for the LSS site selection work.

1.4.3 LSS design principles

- 4.3.1.1 Prior to commencing site selection, key infrastructure parameters for the substation were established. This was defined as a maximum design parameter for the permanent footprint of the substation (m²), including landscape planting and drainage of approximately 60,000m².

1.4.4 Stage 2c: Identification of LSS search area

- 4.4.1.1 The selection of appropriate sites for electrical infrastructure requires a robust process that considers technical, environmental, commercial feasibility factors, and stakeholder feedback. The site selection process for the LSS sought to provide the optimal site, on balance, in consideration of each of these aspects.
- 4.4.2.1 To commence site selection (refer to **Table 1** for the site selection and refinement stages), an initial 2 km buffer was drawn around the Pol at the National Grid substation at Hawthorn Pit. This radius was used to minimise the length of the AC connection cables that would link the new LSS to the Pol, to minimise cable reactive power issues, mitigate transmission losses, and to minimise adverse effects on economic efficiency.
- 4.4.3.1 After establishing the initial area of search, a process of constraints mapping (**Figure 2**) and identification of environmental considerations (**Table 6**), in tandem with decision-making from the Applicant that considered technical, environmental and commercial aspects from a project implementation perspective, resulted in refinement of the search area with due consideration to the overarching guidelines outlined within the Horlock Rules (see **Section 1.2.2**) and to the design requirements set out in **Section 1.4.3**, which resulted in:
- The northern section of the initial area of search discounted to avoid the dense commercial and residential area of Murton and the 49.9MW solar farm (approved on appeal in May 2023);
 - The area to the south and south-west of the National Grid substation at Hawthorn Pit was removed to avoid the potential need to route a 400 kV grid connection cable around the built up and residential area of South Hetton;
 - The area to the north-west and west of the National Grid substation at Hawthorn Pit was removed due to development around Easington Lane, the built up and residential area of Easington Lane, the Groundwork North East Community Forest and Eppleton Grassland SSSI

north of the B1285, and the potential need for the onshore cable route to double-back on itself; and

- The area south of the A182 was removed due to the need for the onshore cable route to cross the A182 more than once.

4.4.4.1 The removal of these areas resulted in the LSS search area that was presented at Scoping as shown in **Figure 3**.



Figure 2: LSS search area (with constraints)

Table 6: Environmental considerations for the initial LSS area of search

Environmental Consideration	Description
Biological	There are a number of statutory designations within the LSS area of search. These are typically smaller scale which provides opportunities for underground cable routes to avoid them without significantly increasing overall route length. Key designations which influence LSS site selection include: • Hesledon Moor West SSSI designated for the fen, carr and heathland habitats which are present. This occupies an area of approximately 7.5ha and is located approximately 325m directly south of the National Grid Substation at Hawthorn Pit. • Hesledon Moor East SSSI designated for the grassland habitats which are present. The site occupies two discrete areas totalling approximately 5ha. The nearest part of the SSSI is located approximately 1km to the east of the National Grid Substation at Hawthorn Pit. • Eppleton Grassland SSSI located approximately 2km to the north west of the National Grid Substation at Hawthorn Pit. It designated for the mosaic of semi-natural habitats present including unimproved neutral and acid grasslands, fen-meadows and rush-pastures. • Hawthorn Quarry SSSI located close to the coastline approximately 5km to the east of the National Grid Substation at Hawthorn Pit. The site is designated for geological interests. • Hawthorn Dene SSSI located close to the coastline approximately 3.6km to the east of the National Grid Substation at Hawthorn Pit. The site occupies a significant area of woodland greater than 60ha. It is designated for the woodland, grassland and fen habitats which are present. • Stony Cut, Cold Hesledon SSSI located approximately 3.5 km to the east of the National Grid Substation at Hawthorn Pit north of the A182. The site is designated for geological interests. There are various Local Wildlife Sites (LWS) designated through the Durham County Council or Sunderland District Council Local Plans as well as priority habitats scattered throughout the LSS search area. The most notable sites are in the vicinity of the National Grid at Hawthorn Pit include Hesledon Moor East LWS, and Coophouse Wood LWS to the south of Hawthorn Pit Substation. Priority habitats include significant areas of deciduous woodland as well as some small areas of lowland heathland to the east of Hetton-le-Hole and lowland fens closer to Hawthorn Pit.
Physical	The underlying bedrock geology within the LSS search area is mostly underlain by Dolomitised Limestone and Dolomite. Superficial geological deposits are more variable. These are largely comprised of till with some pockets of sand and gravel or clay present.
Historic	The majority of designated historic environment features are located within or associated with settlements. There is a single scheduled monument present, Dalden Tower: a medieval fortified manor house and related earthworks, which is located on the west of Seaham. There are a number of listed buildings present, however, these are generally located within settlements including within Seaham, Hawthorn, Murton and Easington, as well as individual listed buildings spread across the landscape. Historic Environment Records (HER) identify features of local or regional interest. The HER identifies a wide range of features or assets in the LSS search area ranging from find spots where items of archaeological interests have been found to larger, more recent features such as the South Hetton Railway which was routed through Seaham and parallel to the A182 and Jade Business Park Access.
Landscape	Durham County Council's Adopted Local Plan identifies Areas of High Landscape Value. None of these sites are located within the immediate vicinity of the National Grid Substation at Hawthorn Pit where the permanent above ground components of the MHPGC Project (i.e. the LSS) could be located, however, Areas of High Landscape Value are present at the coast and extending inland.
Socio-economic	The main settlements in the LSS search area are Seaham which extends along the coast and inland, Murton and South Hetton to the north and south of the National Grid Substation at Hawthorn Pit respectively as well as Easington Lane and Hetton-le-Hole to the west and north-west respectively. In

Environmental Consideration	Description
	addition to existing settlement there is an approved planning application for a 1,500 unit housing development on land to the south of Seaham, south of the A182. Land use comprises a mix of agricultural use outside of settlement boundaries with some light commercial, industrial and other business uses on the margins of settlements. Agricultural Land Use Classification identifies the majority of the LSS search area outside of urban areas as being Grade 3 good to moderate quality agricultural land. This is described as land with moderate limitations that affect the choice of crops, timing and type of cultivation, harvesting or the level of yield.
Other infrastructure	There are four notable planning consents for infrastructure projects identified in the vicinity of Hawthorn Pit Substation: • On land to the north of Hawthorn Pit Substation there is a planning consent for a 49.9MW solar farm. • On land to the east of Hawthorn Pit Substation there is an approved planning application to extend the Jade Business Park. This is a mixed-use development comprising of B2 (general industrial) and B8 (storage and distribution) units. • On land to the south of Hawthorn Pit Substation there is a planning consent for Scotland to England Green Link 1 (SEGL1) – this project is currently under construction. • On land immediately south of Hawthorn Pit Substation there is permitted development for the extension of the National Grid substation – this project is currently under construction.

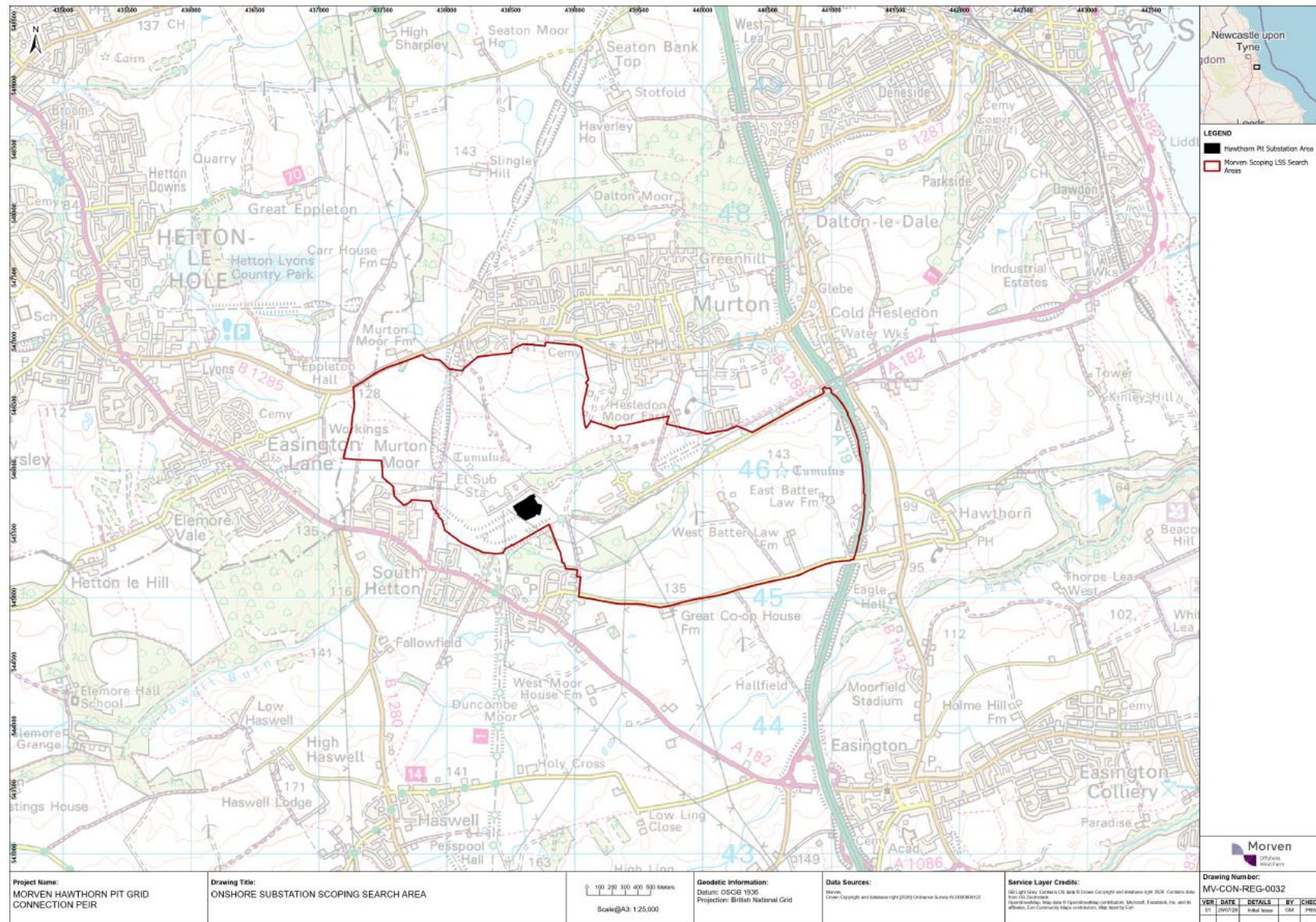


Figure 3: LSS search area within the MHPGC Project scoping boundary

1.4.5 Stage 3c: refinement of LSS sites for PEIR

4.5.1.1 After establishing the LSS search area, a further constraints-based mapping exercise was undertaken. The exercise utilised environmental datasets to highlight and overlay key constraints within the search area to identify indicative sites for the LSS.

4.5.2.1 The following constraints were used for the mapping exercise:

- Ground conditions e.g. topography;
- Other developments e.g. planning applications;
- Traffic and transport – access;
- Ecology and biodiversity;
- Utilities – cables and pipelines;
- Water resources – flood risk, Main Rivers and surface water features, Source Protection Zones; and
- Best and most versatile agricultural land (Grade 1, 2 and 3a ALC land).

Creation of LSS indicative sites

4.5.3.1 The next stage in the process was to refine the LSS search area into sites. Key constraints were initially used to refine the LSS search area into LSS indicative sites including those listed in the mapping exercise in **Section 1.4.5**.

4.5.4.1 Subsequently, eight indicative LSS sites were identified as shown in **Figure 4**, as follows:

- LSS-A: located south of LSS-E on agricultural land to west of the National Grid Substation at Hawthorn Pit;
- LSS-B: northwest of the National Grid Substation at Hawthorn Pit on agricultural land;
- LSS-C: the site of a proposed solar farm which has been granted planning permission by Durham County Council immediately northeast of the National Grid Substation at Hawthorn Pit;
- LSS-D: agricultural land to the east of the National Grid Substation at Hawthorn Pit, immediately west of Hesledon Moor East SSSI;
- LSS-E: agricultural land which forms the north and north eastern slopes of Batter Law Hill, adjacent to the western edge of the A19;
- LSS-F: agricultural land to the east of the A19;
- LSS-G: located within Jade Business Park; and
- LSS-H: agricultural land southeast of Coop House Wood.

4.5.5.1 The extent of the sites was determined by reference to existing geographic features such as field boundaries, residential properties, roads, watercourse, or other existing highway infrastructure whilst ensuring the sites met the requirements of the design envelope as outlined in **Section 1.4.5** (i.e. approximately 60,000m² for the permanent footprint and landscape planting and drainage).

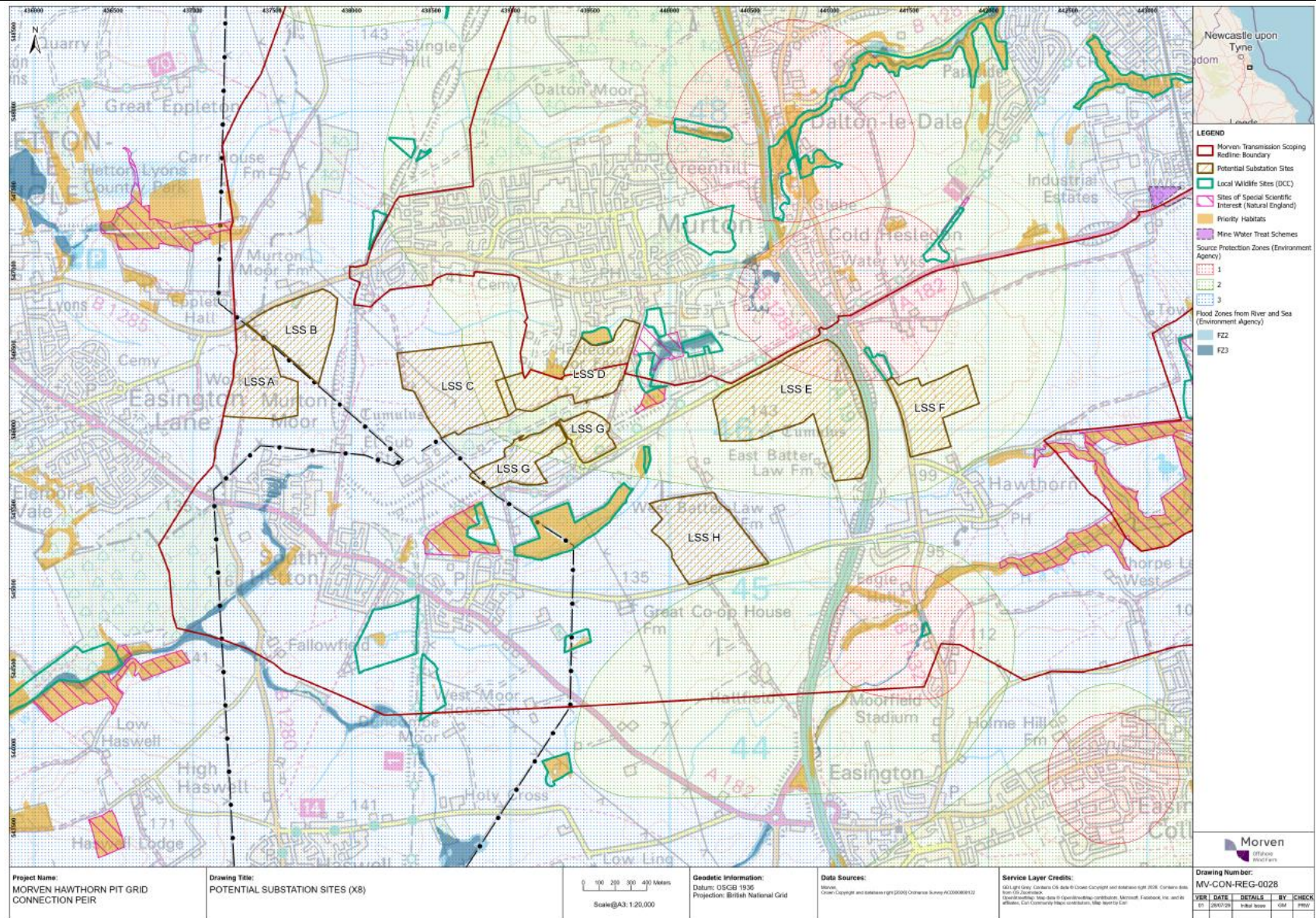


Figure 4: Indicative LSSs sites with Constraints

LSS-A

- 4.5.6.1 LSS-A is located agricultural land to west of the National Grid Substation at Hawthorn Pit. The western boundary is adjacent to an existing quarry which appears to also handle some waste materials. The site occupies an area of approximately 15ha so would comfortably accommodate a LSS site with land also available for mitigation.
- 4.5.7.1 The site is predominantly flat sitting at 130mAOD so limited earthworks would be required to establish a LSS platform.
- 4.5.8.1 There are no existing accesses to the site, however the B1285 is located to the north. A new access could be established from this to the site. Subject to where it originates from construction traffic would need to be routed along the B1285 through Murton (from the east) or Hetton-le-Hole (from the west).
- 4.5.9.1 There are moderate sized settlements to the northeast (Murton), west (Easington Lane) and south (South Hetton). There could be views of the LSS from all of these locations, however, these would likely vary. While the site provides the opportunity for landscape mitigation, the size of a LSS is such that it could not be completely screened in views from settlements.
- 4.5.10.1 Land within and adjacent to the site is not subject to any environmental designation.

LSS-B

- 4.5.11.1 LSS-B lies to the northwest of the National Grid Substation at Hawthorn Pit on agricultural land. Land within and adjacent to the site is not subject to any designation. The site footprint is approximately 11ha which is sufficient for a LSS. The site's regular shape is well suited for a LSS. An existing 400kV overhead line is routed to the south of the site and forms its southern boundary.
- 4.5.12.1 Landform within the site is generally flat, the majority of the site is located at 130mAOD. Surrounding land does tend to be lower meaning a LSS in this location could potentially be prominent within the landscape. This is an important consideration noting the distribution of settlements to the northeast (Murton), south (South Hetton) and west (Easington Lane and Hetton-le-Hole).
- 4.5.13.1 While some earthworks would be required to establish an LSS platform these are unlikely to be significant. The B1285 runs along the northern boundary of the site and would provide access to it. Subject to where it originates from construction traffic is likely to be routed along the B1285 through Murton (from the east) or Hetton-le-Hole (from the west).
- 4.5.14.1 There are moderate sized settlements to the northeast (Murton), west (Easington Lane) and south (South Hetton). There would be views of the LSS from all of these locations, however, these would likely vary. The site has limited opportunity for landscape mitigation, to screen views from settlements.
- 4.5.15.1 Land within and adjacent to the site is not subject to any statutory environmental designation. LSS-C
- 4.5.16.1 LSS-C largely overlies the site of a proposed 49.9MW solar farm. The site occupies 30ha and is currently agricultural land. If the solar farm were not to proceed then given its size the site can easily accommodate a LSS within it and provide opportunities for mitigation as required. The site slopes west to east so this would need to be taken into account with it being preferable to develop the LSS in the southeast corner of the site.
- 4.5.17.1 With landform within the site gently sloping, the majority of the site is located between 110 and 130mAOD. Some earthworks would be required to establish a substation platform on this site.
- 4.5.18.1 There are no existing accesses to the site, however, a new access could be established from the private road providing access to Hawthorn Pit Substation which is located to the south or from the B1285 to the north. Both accesses could require routing of construction traffic through settlement including Hetton-le-Hole or Murton. The site is considered to be more constrained relative to other options.
- 4.5.19.1 The settlement of Murton lies approximately 500m to the north of the site. The site has limited opportunity for landscape mitigation, to screen views from settlements.

- 4.5.20.1 The site is located in open countryside which is not subject to allocation in County Durham Local Plan. As noted above it overlaps entirely with land which is subject to a planning appeal for a solar farm while land to the south is where the SEGL1 LSS and new substation as well as associated underground cables are located. Jade Business Park is also located to the south / southeast and allocated as employment land.

LSS-D

- 4.5.21.1 LSS-D is located on agricultural land to the east of the National Grid Substation at Hawthorn Pit. While the site is approximately 14ha in size it is an irregular shape which constrains options for flexibility in electrical layout of the LSS. The site is broadly flat rising from 100 to 120mAOD from east to west. The eastern part of the site has the most potential to accommodate a LSS, however, there would be limited scope for landscape planting or other mitigation. Similar applies to the western part of the site, its irregular shape has some potential to accommodate a LSS but there is limited scope for mitigation. Compared to other sites the shape of this site means it is more constrained than others in terms of accommodating a LSS.
- 4.5.22.1 Access to the site is limited to an unnamed road which runs along the eastern and southern boundary of the site. This road is gated part way along and appears to provide permanent access to the National Grid Substation at Hawthorn Pit. There is a spur to a track at the point at which it is gated; this track connects to the Jade Business Park access road via another gated junction. .
- 4.5.23.1 The site is within 300m of the settlement of Murton to the north. While the built-up nature of the settlement is likely to partially screen or obscure views of the site, some views, particularly from the north of Murton, could be unavoidable given the height of the LSS. A funeral service business is located to the east of the site just to the north of the gate on the private road.
- 4.5.24.1 Land within and adjacent to the site is not subject to any designation, however, there are designated sites to the east and north including Heseldon Moor SSSI and associated Local Wildlife Site. The site is located on vacant land which is not subject to any planning designation or allocation in County Durham Local Plan. Jade Business Park is also located to the south and allocated as employment land.

LSS-E

- 4.5.25.1 LSS-E lies on agricultural land which forms the north and northeastern slopes of Batter Law Hill. Land within and adjacent to the site is not subject to any designation, however, there are designated sites in the wider area including Heseldon Moor SSSI and a number of associated Local Wildlife Sites (LWS). Given the site is approximately 30ha in size it can easily accommodate a LSS within it and provide opportunities for mitigation as required, for example landscape planting.
- 4.5.26.1 Land generally is gently sloping rising from around 100mAOD at the north of the site to 130mAOD to the south of site, however, towards the west of the site it is more steeply sloping. Some earthworks would be required to establish a platform on which the LSS would be located, however, it is likely that a cut-fill balance could be achieved. A key objective would be to establish a platform level which helps to reduce the prominence of the LSS in the landscape.
- 4.5.27.1 LSS-E is immediately south of the Jade Business Park access road providing opportunities to establish short, direct access into the LSS site. This can be access via the A182 or the A19 both of which are likely to be suitable for construction traffic flows including potential abnormal loads.
- 4.5.28.1 There are individual properties to the south and west of the site comprising farmhouses while a housing estate on the outskirts of South Hetton is located to the northwest. The nature of the landform is such that clear views of the LSS should be not possible from these locations, however, subject to the final height of the LSS it is likely that there would be some views of the upper parts of the larger buildings which house conversion equipment.
- 4.5.29.1 As noted above the site is located in open countryside which is not subject to any planning designation or allocation in County Durham Local Plan. Land to the west towards Hawthorn Pit Substation where Jade Business Park is located and allocated as employment land. From a review of the Durham County Council planning portal the site is not part of any planning application for another development.

LSS-F

- 4.5.30.1 LSS-F is located on agricultural land to the east of the National Grid Substation at Hawthorn Pit, of all the potential LSS sites it is most distant from the connection point so requires the longest HVAC cable connection, subject to routeing in the order of 2-3km. The site footprint is approximately 10ha which is sufficient for a LSS. The site's regular shape is also well suited for a LSS. Within the northern part of the site there is an existing overhead line, likely to be low voltage, that would need to be diverted subject to micro-siting within the overall site.
- 4.5.31.1 Landform within the site generally flat, the majority of the site is located between 100 and 110mAOD. While some earthworks would be required to establish a LSS platform these are unlikely to be significant.
- 4.5.32.1 The B1432 runs along the western boundary of the site and would provide access to it, however, it should be noted that the A19 and A182 run above the B1432. The B1432 is likely to be more sensitive to construction traffic impacts so as a result access to the site is considered to be more constrained relative to other options.
- 4.5.33.1 There are some scattered individual properties to the north of the site as well as an approved application for Seaham Garden Village approximately 350m to the northeast. The village of Hawthorn lies to the south of the site. Given the landform and distance, a LSS on LSS-F would be a prominent feature in the landscape from these locations giving rise to potential visual impacts.
- 4.5.34.1 LSS-F is on the margin of an Area of High Landscape Value as identified through the County Durham Local Plan. While the potential site is outside of this its proximity to it indicates it is more sensitive in landscape terms. Land within and adjacent to the site is not subject to any ecological or archaeological designation, however, SSSIs and LWSs as well as listed buildings are present in the wider area.

LSS-G

- 4.5.35.1 LSS-G is located on employment / development land to the east of the National Grid Substation at Hawthorn Pit. The land is designated as a development zone with land allocated for business, general industrial and storage & distribution. The eastern half of the site is allocated for approved planning application to extend the Jade Business Park. This is a mixed-use development comprising of B2 (general industrial) and B8 (storage and distribution) units. However, the consent for this extension has not been triggered as development to extend Jade Business Park has not commenced since the grant of that consent. The western half of the site is identified as vacant land. The site directly abuts woodland to the south which is part of an application to re-use spoil from the business park to raise land and create a visual screen.
- 4.5.36.1 The site is approximately 7ha in size and it is an irregular shape due to the surrounding uses which constraints the optionality for an LSS. The site is broadly flat. The western part of the site has the most potential to accommodate a LSS, with scope for landscape planting or other mitigation working within the constrained nature of the site.
- 4.5.37.1 Land within and adjacent to the site is not subject to any designation, however, there are designated sites to the east and north including Heseldon Moor SSSI and associated Local Wildlife Site. The site is a brownfield site (former Hawthorn Mine) which presents potential ground-related challenges including obstructions, contamination, ground gas and soil. There is also evidence of remedial activities having taken place on site.
- 4.5.38.1 Access to the site is via the Jade Business Park access road and an unnamed road which runs along the eastern and northern boundary of the site. This road is gated part way along and appears to provide permanent access to Hawthorn Pit Substation. There is a spur to a track at the point at which it is gated; this track connects to the Jade Business Park access road via another gated junction. It is noted that the National Grid substation extension at Hawthorn Pit will make use of this existing road to facilitate construction.
- 4.5.39.1 The site is within 500m of the settlement of Murton to the north. While the built-up nature of the settlement is likely to partially screen or obscure views of the site some views, particularly from the north of Murton, most of the site is screened by the enclosed nature of Jade Business Park and the

surrounding planting. The proposed application to re-use spoil from the business park to raise land and create a visual screen would benefit this site.

LSS-H

- 4.5.40.1 LSS-H lies on agricultural land which forms the south and southeastern slopes of Batter Law Hill. Land within and adjacent to the site is not subject to any designation, however, there are designated sites within 200m including a number of Local Wildlife Sites (LWS). Heseldon Moor SSSI is approximately 500m north of the site, on the other side of the Jade Business Park access road. Despite the site being approximately 11ha in size, the topography adds complexity and requires additional space requirements due to the need for significant cut and fill to provide a level platform. This reduces the flexibility and options for siting within the site.
- 4.5.41.1 Land is undulating with significant topographical variation and sloping ground across the site as a whole. Extensive cut and fill earthworks would be required to provide a level platform regardless of where the LSS is located within the site. Siting of an accompanying laydown and compound area is unlikely to be adjacent, due to the topographical challenges of the site. A key challenge would be to establish a platform level that helps to reduce the prominence of the LSS in the landscape, as the undulating terrain creates a visible splay from West Lane to the south.
- 4.5.42.1 LSS-H is immediately north of West Lane which provides a direct link between South Hetton and Hawthorn. Construction traffic would be required to travel from the A182, through South Hetton and its associated residential properties, and along West Lane to gain access to the site; unless an alternative access to the north could be established Jade Business Park. However, this would require traversing Batter Law Hill and the undulating topography.
- 4.5.43.1 There are individual properties to the north and east of the site comprising farmhouses while a housing estate on the outskirts of South Hetton is located to the west. The nature of the landform is such that clear views of the LSS are possible from this location and it is likely that there would be views of the buildings which house conversion equipment within the LSS.
- 4.5.44.1 As noted above the site is located in open countryside which is also subject to a designated Rural Area within the County Durham Local Plan. Land to the west towards Hawthorn Pit Substation where Jade Business Park is located and allocated as employment land.

BRAG Appraisal of Sites

- 4.5.45.1 The eight sites were then analysed for their suitability for siting the LSS through an initial Black, Red, Amber, Green (BRAG) appraisal.
- 4.5.46.1 The constraints considered within the BRAG appraisal included:
- Ground conditions e.g. topography;
 - Other developments e.g. planning applications;
 - Traffic and transport – access;
 - Ecology and biodiversity;
 - Utilities – cables and pipelines;
 - Water resources – flood risk, Main Rivers and surface water features, Source Protection Zones; and
 - Best and most versatile agricultural land (Grade 1, 2 and 3a ALC land).
- 4.5.47.1 There was no differentiation between the zones with respect to national landscape character areas, and this criterion was not considered further.
- 4.5.48.1 In addition to the above considerations, a consultation event held between July and September 2024 sought feedback on the LSS area of search (**Figure 3**).
- 4.5.49.1 The key themes that emerged from the consultation feedback included but were not limited to proximity to neighbouring communities; visual impact of the substation; impact on agricultural land; flood risk; and potential impacts on landowners and tenants. The feedback received from the consultation was considered alongside the environmental constraints already identified.

4.5.50.1 The BRAG criteria for the LSS sites is provided within **Table 7** with the BRAG analysis provided in **Table 8**. Although not explicitly described within the categories, a BRAG scoring of **Black** indicates a constraint that the project cannot overcome. Further explanation of **Black** scores is included within **Table 8** within the BRAG appraisal for the LSS.

Table 7: LSS BRAG criteria summary

Category	Red	Amber	Green
Ground conditions (geology and mining)	Unsuitable ground conditions with limited potential for mitigation	Unsuitable ground conditions with large potential for mitigation	Suitable ground conditions
Transport and access	High sensitivity of the highway network in the vicinity of the zone and long access route length from highway network to the proposed site	Medium sensitivity of the highway network in the vicinity of the zone and average access route length from highway network to the proposed site	Low sensitivity of the highway network in the vicinity of the zone and short access route length from highway network to the proposed site
Presence of utilities – existing services	High pressure gas pipeline and overhead powerlines running through zone leaving a severed site	No high-pressure gas pipeline. Overhead powerlines running through zone but site of suitable size available with appropriate buffer	No high-pressure gas pipelines or overhead powerlines within site
Planning policy and future development potential	Located within Green Belt and / or Area of Separation and existing planning applications	Located within Green Belt and / or Area of Separation and proposals for further development	Not located within Green Belt and / or Area of Separation and no proposals for further development or existing planning applications
Ecology	Located within proximity to Nationally designated sites and larger presence of protected and/or notable species linked to the designated sites	Located within Woodland pasture and BAP Priority Habitat, locally designated sites (e.g. Biological Heritage Sites), and/or limited presence of protected and/or notable species linked to the designated sites	Not located within designated sites and minimal presence of protected and/or notable species linked to the designated sites
Flood risk	Large areas of Flood Zone 3	Large areas of Flood Zones 2 with presence of discrete areas of Flood Zone 3	Large areas of Flood Zone 1 with presence of discrete areas of Flood Zone 2
Best and Most Versatile (BMV) Agricultural Land Classification (ALC)	Grade 1 (excellent) and high likelihood to be classified as BMV agricultural land	Grade 2 (very good) and 3 (good to moderate) and moderate to high likelihood to be classified as BMV agricultural land	Grade 4 (poor) and 5 (very poor), and not a BMV agricultural land

Category	Red	Amber	Green
Settlements / residential / amenity	<250m distance to nearest residential properties / settlement PRoW(s) / bridleways intersect or cross the LSS site	250m – 500m distance to nearest residential properties / settlement PRoW(s) within 250m of the LSS site	>500m distance to nearest residential properties / settlement No PRoWs in proximity to the LSS site
Engineering and design	Significant constraints in relation to size and space to effect LSS layout, access and topography	Some constraints in relation to size and space to effect LSS layout, access and topography	Few constraints in relation to size and space to effect LSS layout, access and topography

Table 8: Summary of BRAG appraisal of LSS sites

Constraint	LSS-A	LSS-B	LSS-C	LSS-D	LSS-E	LSS-F	LSS-G	LSS-H
Ground conditions	- Generally favourable site due to flat terrain and limited previous historical development - Ground conditions and terrain are favourable - No evidence of contamination 1 small Mineral Safeguarding Area within the site. Potentially avoidable depending on preferred LSS footprint	- Generally favourable site due to flat terrain and limited previous historical development - Ground conditions and terrain are favourable - No evidence of contamination 1 small Mineral Safeguarding Area within the site. Potentially avoidable depending on preferred LSS footprint	- Generally favourable site due to flat terrain, will require some earthworks to establish level platform - Ground conditions and terrain are favourable - Site is located on a Mine Water Treatment Scheme so has high potential for contamination	- Generally favourable site due to flat terrain, will require some earthworks to establish level platform - Ground conditions and terrain are favourable	- Site with sloping terrain increasing potential for various geotechnical challenges during development - Bedrock at site is anticipated to be fractured due to faulting and may contain anhydrite - No evidence of contamination 5 Mineral Safeguarding Areas within the northern and western areas of site, including within the preferred flatter area which has been identified	- Site with sloping terrain increasing potential for various geotechnical challenges during development - Bedrock at site is anticipated to be fractured due to faulting and may contain anhydrite - No evidence of contamination 5 Mineral Safeguarding Areas within the northern and western areas of site, including within the preferred flatter area which has been identified	- Brownfield site (former Hawthorn Mine) which presents potential ground-related challenges including obstructions, contamination, ground gas and soil - Evidence of remedial activities having taken place on site. Assumption made that remediated to acceptable levels for development of LSS site and assume contamination risks are low 1 Mineral Safeguarding Area within the site. Not avoidable with proposed LSS footprint	- Site with sloping terrain will require significant earthworks to develop – potential geotechnical challenges - No evidence of contamination - No Mineral Safeguarding Areas
Transport and access	Single option for access from the main B1285 road to the north. Short access road may need to be constructed depending on where on site. No issues expected establishing junction onto B1285	Single option for access from the main B1285 road to the north. Short access road may need to be constructed depending on where on site. No issues expected establishing junction onto B1285	- Single option access from the private road providing access to Hawthorn Pit Substation - Access requires routing construction traffic through settlements including Hetton-le-Hole or Murton	- Single option access from the private road providing access to Hawthorn Pit Substation - Access requires routing construction traffic through settlements including Hetton-le-Hole or Murton	Road to north is considered preferable for access into site. Short access road is not significant concern	Road to north (A182) is considered preferable for access into site. Short access road is not significant concern	Access is established from existing main access route (from Spring Road to the south)	Access via West Lane, to south of site. Short access route of approximately 100m would need to be constructed into site. West lane is a minor road and can only be accessed by passing through local villages. Junction modifications may be needed in relation to abnormal road load deliveries to LSS
Presence of utilities – existing services	OHL through site anticipated to be <33kV	No HV OHL on-site. 400kV OHL on western boundary of site, and 66kV OHL approximately 20m from northeast boundary of site	- No HV OHL on-site. 400kV OHL on southern boundary of site - OHL through site anticipated to be <33kV	No OHL within site	OHL through site anticipated to be <33kV	No OHL within site	- No OHL within site - Assume suitable connections in close proximity due to adjacent industrial developments	No OHL within site. 66kV OHL approximately 35m west of site

Constraint	LSS-A	LSS-B	LSS-C	LSS-D	LSS-E	LSS-F	LSS-G	LSS-H
Planning policy and future development potential	- Site is within a designated Rural Area. No relevant Local Development Plan reserved areas within site. Area of Higher Landscape Value – Durham 600m to the south - No relevant planning applications within site - No green belt in proximity to the site	- No relevant Local Development Plan reserved areas within site - No relevant planning applications within site - No green belt in proximity to the site	- Not subject to any planning designation or allocation in County Durham Local Plan - Aura Power Solar Farm identified on site11 - No green belt in proximity to the site	- Not subject to any planning designation or allocation in County Durham Local Plan - Immediately adjacent to granted consent for Aura Power Solar Farm - No green belt in proximity to the site	- Site is within a designated Rural Area. No other relevant LDP reserved areas within site. Employment land 250m north and Area of High Landscape Value – Durham 900m north - No relevant planning applications within site - No green belt in proximity to the site	- Site is within a designated Rural Area. No other relevant LDP reserved areas within site. Employment land 250m north and Area of High Landscape Value – Durham 900m north - No relevant planning applications within site - No green belt in proximity to the site	- Employment land – Jade Park, land allocated for business, general industrial and storage & distribution - Site G is owned by Durham County Council and is designated as a development zone - No green belt in proximity to the site	- Site is within a designated Rural Area, however this is not considered a constraint for this site - No relevant planning applications within site - No green belt in proximity to the site
Ecology	- No designated sites within 500m of site - No Ancient Woodland within 500m of site	- Local wildlife designation for Murton Grassland approximately 350m north of site - No Ancient Woodland within 500m of site - Woodland in north central area of site potentially restricting developable area into south of site. Reduces options for access road into site	- Local wildlife designation and SSSI: Hesledon Moor East approximately 300m east of site - No Ancient Woodland within 500m of site - Immature woodland / thickets on site perimeter to the south	- Immediately adjacent to SSSI: Hesledon Moor East, Local Wildlife Sites and priority habitats - No Ancient Woodland within 500m of site - Immature woodland / thickets on site perimeter to the south	- No designated sites within 500m of site - No Ancient Woodland within 500m of site	- Immediately adjacent to Local wildlife designation. - No Ancient Woodland within 500m of site	- Local wildlife designation and SSSI: Hesledon Moor East approximately 150m east of site - No Ancient Woodland within 500m of site - Immature woodland / thickets on site perimeter in several directions	- No designations within 500m of site - No Ancient Woodland within 500m of site - Trees to north of site are subject to Tree Protection Order
Flood risk and water resources	- Flood Zone 1 <5m southwest a small surface watercourse is present - Site on SPZ3	- Flood Zone 1 - No watercourses within 400m, but some evidence of standing water within agricultural fields - Site on SPZ3	- Flood Zone 1 - Off-site surface watercourse approximately 200m north - Majority of site within an SPZ3	- Flood Zone 1 - Off-site surface watercourse approximately 500m north - Majority of site within an SPZ2	- Flood Zone 1 - Off-site surface watercourse approximately 120m north - Majority of site within an SPZ2. South of site lies within SPZ3	- Flood Zone 1 - Site on SPZ2	- Flood Zone 1 - Site on SPZ3	- Flood Zone 1 - Dalton Beck approximately 15m north of site - Eastern half of site within SPZ2. Western half of site within an SPZ3
Best and Most Versatile (BMV) agricultural land	Site is wholly within ALC Grade 3	Site is wholly within ALC Grade 3	Site is wholly within ALC Grade 3	Site is wholly within ALC Grade 3	Site is wholly within ALC Grade 3	Site is wholly within ALC Grade 3	Nearly all is ALC Grade 4 (poor) agricultural land, with a small zone in the southeast of ALC Grade 3 land	Site is wholly within ALC Grade 3
Settlements / residential / amenity	Public footpaths (0880000010 and 0880000012) intersect and cross the site and would be severed by the	No public rights of way within site or adjacent to site, except for the public footpath (0880000010) on	A public footpath (0880000013) runs immediately adjacent all the way around the south, east and west of the site.	A public footpath (0880000026) crosses the site and would be severed by the development of LSS. An	A short public footpath (0880000027) is present in the north of the site – but could potentially be	A public footpath (0540000009) crosses the site and would be severed by the development of LSS. An	A public bridleway (0880000029) crosses along the southern extent of the site and would be severed	A public footpath (0540000011) runs immediately adjacent to the east of the site

Constraint	LSS-A	LSS-B	LSS-C	LSS-D	LSS-E	LSS-F	LSS-G	LSS-H
	development of LSS. Alternative paths would be required. <500m from South Hetton (approximately 340m)	field boundaries to the south and east (offset approximately 100m from site boundary) Less than 250m from Murton (approximately 170m)	<500m from Murton (approximately 500m)	alternative path would be required <500m from Murton (approximately 300m) - Commercial property immediately east of site (funeral service)	avoided by the preferred / developable area identified <500m from Murton (greater than initially assessed as LSS is likely to be located in the eastern area of site due to topography of the site)	alternative path would be required Immediately adjacent to residential properties in Hawthorn (less than 100m), one of which is a Grade II listed building.	by the development of LSS. An alternative path would be required <500m from Murton (approximately 480m)	>500m from South Hetton (approximately 550m), however views across the topography would have high visibility from residential properties in South Hetton
Engineering and design	- Site has moderate topographical variation relating to a slope in the west of site. Southeastern area of site is more level with potential to construct platform - Sufficient space available for laydown and construction adjacent within boundary - No road access anticipated between laydown and LSS - Large site. 33kV OHL does not reduce developable area therefore sufficient space for multiple layout options	- Moderate topographic variation across site but generally level. Some cut / fill earthworks expected but not extensive. Parts of site are sloping however potential to construct platform in centre of site with minimal level variations - Sufficient space available for laydown and construction adjacent within boundary - No road access anticipated between laydown and LSS 18ha site with level topography – multiple layout options	- Site has moderate topographical variation relating to a slope in the west of site. Southeastern area of site is more level with potential to construct platform and would benefit from screening to reduce visuals from adjacent settlements - Sufficient space available for laydown and construction adjacent within boundary - No road access anticipated between laydown and LSS - Large site (30ha) with multiple layout options	- Site is relatively flat but irregular shape of site means scope for mitigation is limited - Constrained for layout options - Sufficient space available for laydown and construction adjacent within boundary provided flexibility in arrangement is acceptable - No road access anticipated between laydown and LSS 14ha site with level topography but shape of site constrains optionality	- Western part of site has significant slope around Batter Law Hill - Due to extensive sloping ground within the site, there are limited areas for laydown adjacent to potential LSS sites. Laydown may need to be remote from LSS site and material / equipment brought via main road 47ha site however topography may significantly limit flexibility and add complexity	- Moderate topographic variation across site but generally level. Some cut / fill earthworks expected but not extensive. Parts of site are sloping however potential to construct platform in centre of site with minimal level variations - Sufficient space available for laydown and construction adjacent within boundary - Access required to pass adjacent to Local Wildlife Site via A182. - Large site. Sufficient space for multiple layout options	- Site has been remediated and landscaped to a level development platform. Terrain does not reduce the developable area - Consent has been granted for another development opposite site – space may not be available for laydown - Small 7ha site. Layout options limited by size of site	- Significant topographical variation and sloping ground across site as a whole. Extensive cut / fill earthworks expected regardless of where the LSS is located within the site - Due to extensive sloping ground within the site, laydown and compound area is likely to be outwith the LSS-H boundary. Field opposite may be suitable - Access between LSS and laydown area could avoid using main roads 11ha site. Limited options for flexibility. Topography adds complexity and requires additional space for laydown area

Outcome of appraisal

- 4.5.51.1 An appraisal of each LSS site was made based on the number of black, red, amber or green ratings given in the BRAG appraisal.
- LSS-C was discounted following the grant of planning permission on appeal for the Aura Power Solar Farm, as there would be insufficient space for the LSS to be sited in this area due to the proposed footprint of the solar panels.
 - LSS-D was discounted due to the site's immediate proximity to settlements and residential properties in Murton that would likely give rise to significant effects to residents associated with the construction (such as noise, air quality and visual amenity) and operation (noise and visual amenity) of the LSS. It also suffered from access constraints and irregular field boundaries indicating that site arrangement would be challenging.
 - LSS-F is in close proximity to settlements and residential properties in Hawthorn, and specifically a Grade II listed building (The Rectory). This could likely give rise to significant effects to residents associated with the construction (such as noise, air quality and visual amenity) and operation (noise and visual amenity) of the LSS. The proximity of a listed building could also indicate a likely significant effect associated with the setting of the heritage asset.
 - LSS-B was discounted due to its direct comparison to LSS-A. LSS-B is closer to residential properties and has an area of trees / hedgerows in the northern section of the site. Given the co-location of LSS-A and LSS-B, a decision was taken to focus on LSS-A due to its larger area of flat developable land.
 - LSS-H was discounted due to its undulating steep topography and potential for the LSS to be visible from visual receptors within South Hetton. The access requirements for the LSS would also require construction traffic to pass through South Hetton, or an alternative access taken from the Jade Business Park access road which would require crossing Batter Law Hill.
- 4.5.52.1 Therefore, it was concluded that LSS-A, LSS-E and LSS-G were to be taken forward for further assessment as the LSS options to be considered against the onshore cable route optioneering (see **Figure 5**) within Stage 3d (see **Section 1.5.2**). The other five sites were discounted from further consideration for the reasons outlined in **Table 8** and summarised above.
- 4.5.53.1 Following the review of the onshore cable route options within Stage 3d (see **Section 1.5.2**), LSS-A was discounted due to the engineering challenges for the MHPGC Project to route a 400 kV cable route from the west of Hawthorn Pit National Grid substation, primarily due to the required interaction with the consent of the Aura Power Solar Farm and the SEGL1 cable corridor. It was concluded that LSS-A would be removed from further consideration.
- 4.5.54.1 The second consultation between October and November 2025 was aimed at seeking feedback on the identified LSS sites and to obtain more local knowledge on those specific sites. Due to the removal of LSS-A from further consideration, the Applicant re-introduced LSS-H for the purposes of the statutory consultation so that the next- feasible LSS option closest to Hawthorn Pit could be considered as an alternative. The following colour-coding was used during the 2025 consultation to differentiate between sites:
- LSS-E = Blue
 - LSS-G = Green
 - LSS-H = Pink
- 4.5.55.1 The key themes which emerged from the 2025 consultation included, but were not limited to, support for the Green onshore LSS option (LSS-G/ Jade Business Park), with concern for the alternatives displayed (Blue/LSS-E/adjacent to the A19 and Pink/LSS-H/south of Batter Law Hill) due to potential for landscape and visual impacts, potential for impacts on residential receptors and potential impacts on farming landowners. In addition, concern was raised specifically in regard to LSS-H relating to impacts arising from the extent of new roadway that would be required to service the site from the public highway
- 4.5.56.1 In line with the feedback received, the site selection process for the onshore LSS option LSS-H (Pink/south of Batter Law Hill) considered the undulating topography and potential for the LSS to be visible from visual receptors within South Hetton. The Applicant also considered the landform around LSS-H that could reduce the possibility for landscape and visual impacts and potential

impacts to residential receptors via landscape or planting. Due to the topography and land requirements necessary to reduce potential impacts, the Applicant made the decision that it was not feasible to implement a landscaping scheme that could deliver sufficient mitigation to the visibility of the LSS from South Hetton. This has resulted in the discounting of LSS-H from further consideration.

- 4.5.57.1 The Applicants also made the decision to retain LSS-E / Blue / adjacent to the A19 due to the potential for challenging ground conditions (e.g. contaminated land) at LSS-G / Green / Jade Business Park and the need to retain a potential alternative if this option became infeasible following further site investigation.
- 4.5.58.1 Therefore, it was concluded that LSS-E (named Blue for the purposes of consultation – see **Section 3.10.2 of Volume 1, Chapter 3: Site Selection and Consideration of Alternatives of the PEIR**) and LSS-G (named Green for the purposes of consultation – see **Section 3.10.2 of Volume 1, Chapter 3: Site Selection and Consideration of Alternatives of the PEIR**) were to be taken forward for further assessment as the LSS options within PEIR.
- 4.5.59.1 A series of landowner meetings were also held between the 2025 consultation and the presentation of the LSS sites for the PEIR to obtain feedback on the selected sites in order to allow the MHPGC Project to incorporate feedback into the site selection process early, wherever possible. Key changes were made to the definition of the LSS site boundaries as a result of defining key infrastructure parameters and feedback from the 2025 consultation and landowner feedback. These include:
- Removal of the western extension of LSS-E along the base of Batter Law Hill due to challenging topography and extension of the boundary to the south into more favourable topography; and
 - Alignment of the LSS-E site boundary along field margins to reduce potential severance to landowners.
- 4.5.60.1 The indicative LSS site boundaries for LSS-E and LSS-G are incorporated into the draft Works Plans and illustrated in detail in **Figure 8**.

LSS site selection next steps

- 4.5.61.1 The LSS locations will continue to be refined subject to further consultation and stakeholder engagement; and informed by the assessment of potential environmental effects and the results of baseline surveys. The two potential options identified for the LSS at Jade Business Park and adjacent to the A19 are assessed within Volume 3 and Volume 4 of this PEIR to aid in the determination of the preferred LSS to connect to the National Grid substation at Hawthorn Pit. Consultation feedback received during subsequent consultation will also be considered and feed into the site selection process.



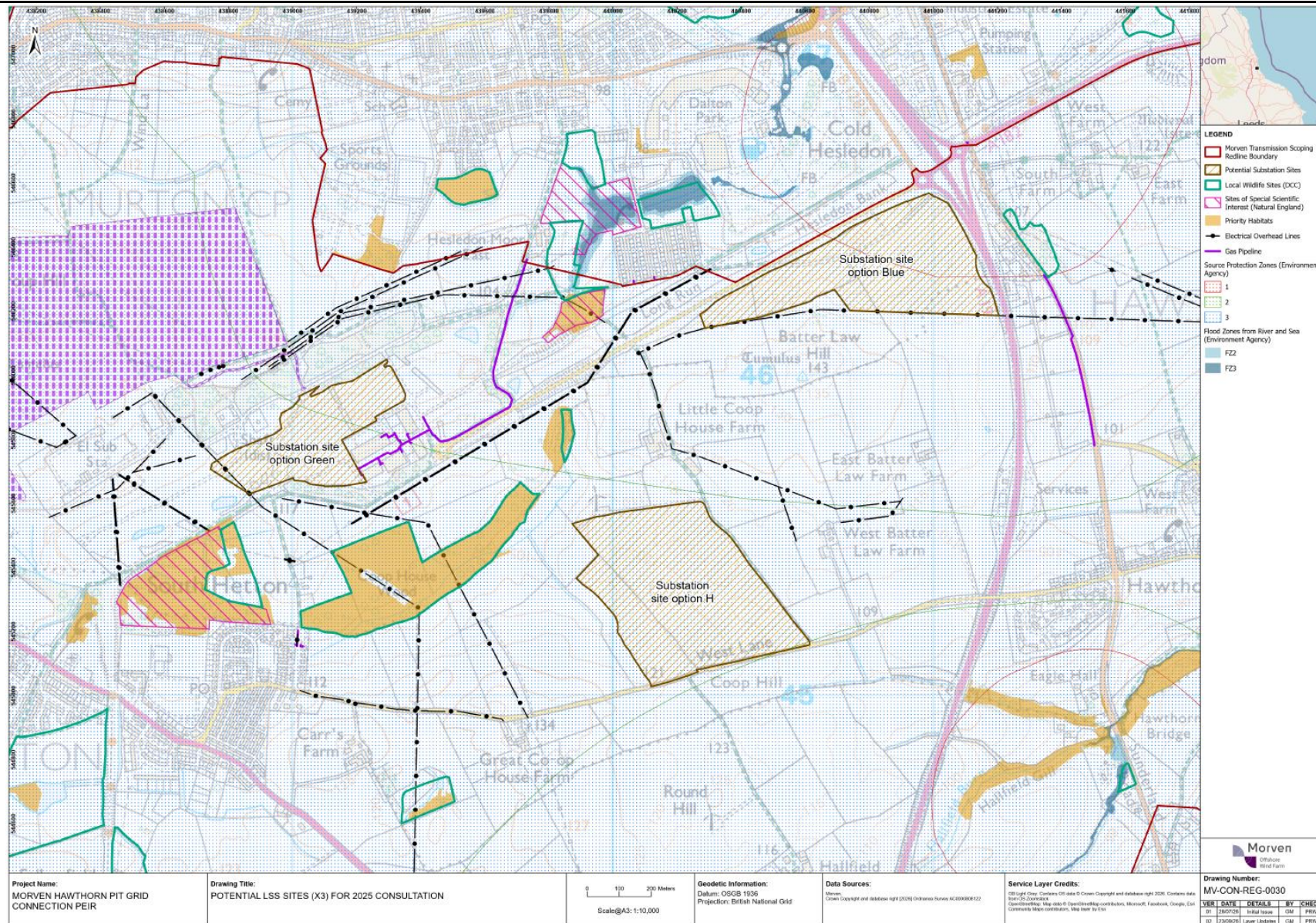


Figure 6: Selected LSS sites for 2025 consultation



1.5 Onshore Cable Route Site Selection

1.5.1 Stage 2d: Identification of onshore cable route search area

- 5.1.1.1 The location of the initial onshore cable route search area was driven by the location of the prospective landfall search area between Ryhope and Easington Colliery (see Volume 1, Annex 3.1) and the Point of Interconnection (PoI) at National Grid substation at Hawthorn Pit.
- 5.1.2.1 The onshore cable route search area was created between the eastern point of landfall and the most western point of the PoI. The extent of the boundary was also determined by reference to existing geographic features such as field boundaries and roads or other existing highway infrastructure. For example, residential areas of Ryhope, Seaham and Easington Lane were used to create the northern and western extents and Easington Colliery, Dawdon and Easington Lane were used to create the southern extent.
- 5.1.3.1 Once the search area was defined, this became the Scoping boundary (**Figure 8**) encompassing a broad area to accommodate subsequent refinement of the onshore cable route. To ensure early engagement with communities, the Applicant carried out a first phase of consultation between July and September 2024.

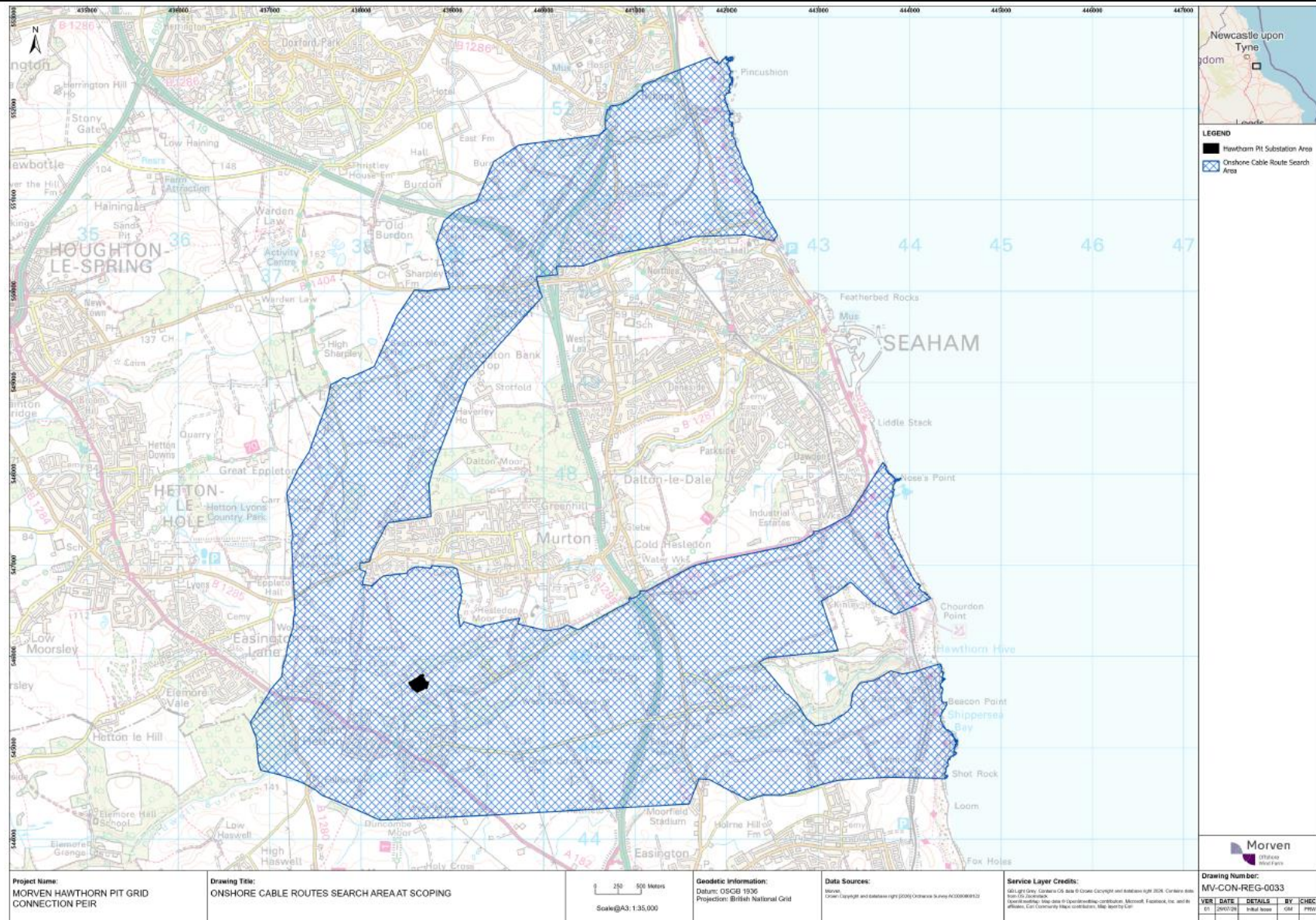


Figure 8: Onshore cable route search area at Scoping

1.5.2 Stage 3d: Refinement of the onshore cable route options for PEIR

5.2.1.1 In preparation for the consultation on the PEIR, the Applicant undertook further refinements to the search area that had previously identified three distinct landfall options (Northern Landfall (north of Seaham), Central Landfall (Nose Point) and Southern Landfall (Beacon Hill)) to identify distinct onshore export cable route options. This was driven by:

- Defining key infrastructure parameters; and
- Review of known constraints.

Defining key infrastructure parameters and guiding principles

5.2.2.1 Key infrastructure parameters associated with the onshore cable route that informed the Stage 3d site selection exercise were that the corridor was to be sufficiently wide to accommodate the design envelope and followed a series of guiding principles for the 'line of best fit' route options.

5.2.3.1 In order to establish onshore cable routes the following criteria were used when developing the route options:

- Onshore cable routes should be as straight and direct as practicable;
- Directly avoid international, European and national designations, where practicable;
- Avoid areas of woodland;
- Avoid direct impact to residential properties, their curtilage and domestic gardens;
- Minimise routing through challenging ground conditions (e.g. potentially contaminated land and marshlands); and
- Minimise the number and length of complex crossings, where practicable (e.g. railways and pipelines) and cross the asset as close to 90 degrees as possible.

5.2.4.1 The design parameters and guiding principles were applied to the Scoping Boundary (area of search) to find the most suitable routing (described in **Section 1.4.4**). The constraints are shown on **Figure 9** with the outputs of the initial routing from the three landfalls to the LSS search area illustrated in **Figure 10**.

5.2.5.1 Three onshore cable routes were identified (see **Figure 10**):

- Northern corridor: from north of Seaham, navigating west of Seaham, crossing the A1018 and A19, and heading south into Hawthorn Pit between Murton and Easington Lane;
- Central corridor: from Nose Point, heading due west crossing the A19 and into Hawthorn Pit south of Murton; and
- Southern corridor: from Beacon Hill, heading west immediately south of Hawthorn Dene, crossing the A19 and into Hawthorn Pit south of Murton.

5.2.6.1 The BRAG criteria for the onshore cable is provided in **Table 9**. Although not explicitly described within the categories, a BRAG scoring of **Black** indicates a constraint that the project cannot overcome. Further explanation of **Black** scores is included within **Table 10** of the BRAG appraisal for the onshore cable.

Table 9: Onshore export cable BRAG criteria summary

Category	Red	Amber	Green
Engineering - geotechnical	Challenging ground conditions – high likelihood for hazard(s) to affect proposed development	Moderate challenging ground conditions – medium likelihood for hazard(s) to affect proposed development	ground conditions – Low likelihood for hazard(s) to affect proposed development

Category	Red	Amber	Green
Engineering - crossings	Presence of major crossings (>66kV overhead lines, underground sensitive utilities, major roads (primary and secondary), railways and major watercourses)	Presence of few major crossings and majority minor crossings (<66kV, minor roads, private roads and tracks, minor watercourses)	No major or minor crossings within cable corridor
Engineering – terrain & topography	Cable corridor section contains steep slopes including unavoidable areas with steep slopes	Cable corridor sections undulating / rolling. Contains some areas with steep slopes but these may be avoidable during construction	Cable corridor section generally flat. No significant areas of sloping grounds
Engineering - flooding	N/A	Potentially significant areas of standings water OR Zones of surface water flood risk (Flood Zone 2 or 3) OR Flood zones (Zone 2 or 3) around a trenchless river crossings	No medium or high risk surface water flood zones within cable corridor section (Flood Zone 1)
Environmental designations (SSSI, SAC, LWS)	<100m from route centreline	None within 100m of route centreline	None within 250m of route centreline
Woodlands – Ancient & non-Ancient	<100m from route centreline OR Tree felling anticipated as part of works	None within 100m of route centreline OR Woodland <50m from likely construction works	None within 500m of route centreline OR No woodland within 50m of construction works
Cultural heritage	Unavoidable impact on heritage feature - Listed Buildings - Scheduled Monuments boundaries - Registered parks and gardens - Registered battlefields - Conservation areas	Heritage feature on site but impacts can be avoided by route design - Listed Buildings - Scheduled Monuments boundaries - Registered parks and gardens - Registered battlefields - Conservation areas	None on route centreline - Listed Buildings - Scheduled Monuments boundaries - Registered parks and gardens - Registered battlefields - Conservation areas
Groundwater abstractions	Site within an inner SPZ (SPZ1)	Site within an out SPZ (SPZ2)	Site within SPZ3

Category	Red	Amber	Green
Mineral Safeguarding	MSA or quarry within route centreline, unavoidable impact	MSA or quarry within route centreline but route design could avoid sterilisation of resource, or would only affect small area	No MSA or active quarries within route centreline
Planning applications	Potentially significant conflicting planning application which could prevent surface construction of cable route OR Potentially significant conflicting planning application which the cable route would need installation beneath	Potentially significant conflicting planning application (unavoidable) OR Conflicting planning application only occupies minor part of the section	No recent or relevant planning applications anticipated to impede construction
Public Rights of Way (PRoWs)	N/A	Public right of way will likely be severed during construction, but temporary impact	No public rights of way within site or adjacent to site
Agricultural Land Classification	Grade 1 or 2 ALC within cable corridor route	Grade 3a ALC within cable corridor route	Cable corridor section comprises Grade 3b or lower, urban / non-agricultural land, or Grade 3b agricultural land if not currently

5.2.7.1 An onshore cable corridor BRAG appraisal was undertaken on the onshore cable route options and included a characterisation and qualitative BRAG rating against a list of individual criteria within engineering, environment and land use / planning constraints. For the purposes of the constraints review and BRAG appraisal, the onshore cable route options were each split into smaller sections, so that a thorough review and characterisation exercise could be completed. The summary of the BRAG appraisal of the onshore cable route options is detailed in **Table 10**.



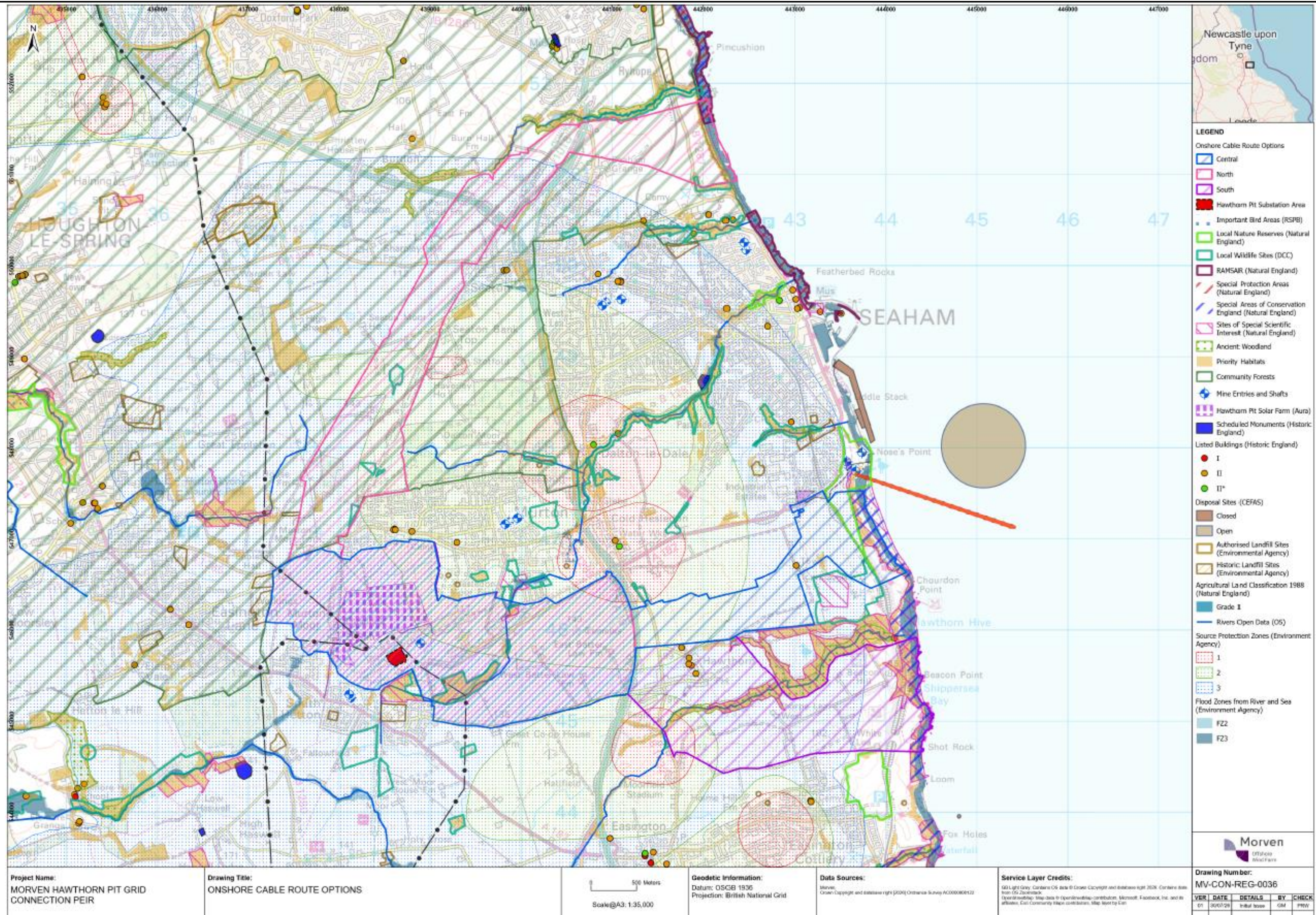


Figure 10: Onshore export cable route BRAG mapping at Stage 3d

Table 10: Onshore export cable route BRAG for Stage 3d

Category	Northern Corridor	Central Corridor	Southern Corridor
Engineering - geotechnical	Main risks relate to buried obstructions and potential for unexploded ordnance.	Main risks relate to buried obstructions and potential for unexploded ordnance.. Comparatively slightly higher potential for contaminated land than Northern Corridor.	Main risks relate to buried obstructions and potential for unexploded ordnance.. Comparatively slightly higher potential for contaminated land than Northern Corridor
Engineering - crossings	Unnamed private access road to Hawthorn Pit will be crossed. This appears to be the only access route to Hawthorn Pit, therefore emergency access may be needed along this route 24/7, which could necessitate a trenchless crossing	Crossing of Spring Road (which may necessitate an open-cut crossing), three unclassified roads to farms and the access road to Hawthorn Pit will be crossed. This appears to be the only access route to Hawthorn Pit, therefore emergency access may be needed along this route 24/7, which could necessitate a trenchless crossing	Crossing of Spring Road (which may necessitate an open-cut crossing), three unclassified roads to farms and the access road to Hawthorn Pit will be crossed. This appears to be the only access route to Hawthorn Pit, therefore emergency access may be needed along this route 24/7, which could necessitate a trenchless crossing
Engineering – terrain & topography	Route crosses a gully associated with Pittington Beck with localised slopes over 10 degrees Majority of site is level except for some small earthworks slopes in vicinity of roads	Cable route passes through sloping ground are Batter Law Hill but majority of route is level with very little elevation with small earthworks slopes in vicinity of roads	Southern Landfall (Beacon Hill) identifying unfavourable and challenging topography associated with engineering feasibility for installation of trenchless techniques due to need for significant levelling works to establish level platform for drilling activities and TJB. Cable route is required to pass through significant gully associated with Hawthorn Dene with slopes over 10 degrees requiring commitment to trenchless technique and significant depth to traverse steep valley
Engineering - flooding	No Flood Zone 2 or 3 present along route.	Flood Zone 2 and 3 present	Flood Zone 2 present

Environmental designations (SSSI, SAC, LWS)	LWS: Slingley Pond in centre of corridor SSSI: Hesledon Moor West <30m south.		SSSI and LWS: Hesledon Moor East and Hesledon Moor West <30m south.		SSSI: Hawthorn Dene SSSI. LNR: Easington LNR <50m south.	
Woodlands – Ancient & non-Ancient	Designated Ancient Woodland: 10m north. Woodland present parallel to historic railway onsite along length of corridor		Ancient Woodland on southern boundary associated with Hawthorn Dene Minor areas of woodland and scattered areas of trees and woodland across the route		Ancient Woodland would need to be crossed by the cable corridor associated with Hawthorne Dene requiring a commitment to trenchless technique to avoid significant impacts on designated site Minor areas of woodland and scattered areas of trees and woodland across the route	
Cultural heritage	HER: Croup Hill Barrow, former archaeological excavation with historic cremation .		1 Grade II listed building (Kinley Hill Tower), and HER of Batter Law Hill tumulus present Hawthorn Village conservation area immediately adjacent to the south of corridor Durham Heritage Coast follows the coastline but the onshore cable route is offset from the designation by approximately 100m.		5 x Grade II listed buildings (The Rectory, Church Hall, West Farmhouse, Hawthorn War Memorial and Garden House) can be avoided by route selection but creates pinch points around the Hawthorn Village conservation area	
Groundwater abstractions	Route does not lie within any SPZ designation for the majority		Majority of cable route lies within a SPZ2		Majority of cable route lies within a SPZ3	
Mineral Safeguarding	Many MSA areas adjacent to the route centreline.		Corridor is part of an MCA for magnesian limestone “Hawthorn / Beacon Hill”. Part of the eastern section is within the mineral and waste site safeguarding zone for the Hawthorn Quarry adjacent to the cable route		Corridor is part of an MCA for magnesian limestone “Hawthorn / Beacon Hill”, glacial sand and gravel and river sand and gravel.	
Planning applications	SEGL, Windsor Drive Housing Development and Aura Solar Farm restrict route options including		SEGL, Windsor Drive Housing Development, Jade Business Park, Aura Solar Farm and Hawthorn Pit battery		SEGL, Windsor Drive Housing Development, Jade Business Park, Aura Solar Farm and Hawthorn Pit battery	

	complete obstruction of corridor section at the Hawthorn Pit end		facility restrict route options unless long trenchless technique is used		facility restrict route options unless long trenchless technique is used	
Public Rights of Way (PRoWs)	National Cycle Route 1, public bridleways, and public footpaths perpendicular to and along the cycle route are unavoidable		Public footpaths and bridleways across and adjacent to sections of the corridor are unavoidable		Public footpaths and bridleways across and adjacent to sections of the corridor are unavoidable	
Agricultural Land Classification	Cable corridor comprises Grade 3 land (assumed Grade 3a for conservative approach to scoring)		Cable corridor comprises Grade 3 land (assumed Grade 3a for conservative approach to scoring)		Cable corridor comprises Grade 3 land (assumed Grade 3a for conservative approach to scoring)	

Outcome of appraisal

- 5.2.8.1 An appraisal of each onshore cable route option was made based on the number of black, red, amber or green ratings given in the BRAG appraisal.
- 5.2.9.1 The Southern Corridor was primarily discounted due to the Southern Landfall (Beacon Hill) identifying unfavourable and challenging topography associated with engineering feasibility for installation of trenchless techniques (see Volume 1, Annex 3.1: Selection and Refinement of the Cable Landfall). In addition, the selection of the Southern Landfall (Beacon Hill) would also create the requirement to route through Hawthorn Dene SSSI. However, the topography of Hawthorn Dene is a steep valley with a sensitive watercourse at its base. This would be challenging from an engineering feasibility perspective.
- 5.2.10.1 As part of the consultation undertaken between October and November 2025, two indicative onshore export cable corridors (north and central) were presented (along with indicative onshore LSS sites). Landowner meetings were also held between January and March 2026 to obtain feedback on the route options in order to allow the MHPGC Project to incorporate feedback into the site selection process early, wherever possible. The feedback received (see **Section 3.2 of Volume 1, Chapter 3: Site Selection and Consideration of Alternatives, of the PEIR**) has subsequently been considered alongside a broad range of environmental and engineering constraints to further refine the site selection process.
- 5.2.11.1 Based on the results of the constraints mapping, engineering feasibility and consultation, the Northern Corridor was subsequently discounted due to a combination of the grant of planning permission on appeal for the Aura Power Solar Farm and the identified route of the SEGL1 cable route and its associated construction timelines, as there would be insufficient space for the AC connection cable route to route to the north and to the west of Hawthorn Pit. In addition, the Northern Corridor included, pinch points created by another consented solar farm and highway infrastructure in the northern extent of the Northern Corridor, multiple major crossings that would require complex trenchless techniques to traverse the A19, A1018 (and associated embankments) and a high pressure gas main, and direct interaction with Walk Wheel Cycle Trust (formerly Sustrans) path that is located in this corridor.
- Note that the discounting of the Northern Corridor also means that all LSS options to the west and north of Hawthorn Pit cannot be connected via the AC connection cables and therefore the potential for these options is also removed. This relates primarily to LSS-A (which was shortlisted as per Section 1.4.5), but also LSS-B (which was discounted due to the preference toward LSS-A).
 - Remaining LSS options are therefore only LSS-E, LSS-G and LSS H2.
- 5.2.12.1 Therefore, it was concluded that the Central Corridor was to be taken forward for further assessment as the onshore cable route search area within PEIR (see **Figure 11**). The other two routes were discounted from further consideration for the reasons outlined in **Table 10** and summarised above.
- 5.2.13.1 A series of landowner meetings were held between the second phase of consultation in October – November 2025 and the presentation of the onshore cable route search area for the PEIR to obtain feedback on the route in order to allow the MHPGC Project to incorporate feedback into the site selection process early, wherever possible.
- 5.2.14.1 Key changes were made to the onshore cable route search area to refine it down to a PEIR Red Line Boundary: Onshore as a result of defining key infrastructure parameters and feedback from consultation and landowner feedback. These include:
- refinement of any potential interaction with residential developments adjacent to the A182, such as refinement around the boundary of Seaham Garden Village following clarity based on its start of construction;
 - alignment of the PEIR Red Line Boundary: Onshore along field margins to reduce severance to landowners; and
 - addition of access that runs to the Hawthorn Quarry to include an alternative access (to the A182 option) to the proposed landfall location.

5.2.15.1 **Figure 11** illustrates the historic ongoing refinement of the indicative PEIR Red Line Boundary: Onshore from the feedback received at the consultations (2024 and 2025) combined with the MHPGC Project internal technical workstreams to support the decision-making, as described in this annex.

Identification of potential temporary construction compounds

5.2.16.1 Construction activities will need to be supported by a series of temporary construction compounds along the onshore cable route close to the cable corridor. Further development of the onshore cable corridor area of search allowed for the identification of several potential locations. These areas are incorporated into the draft Works Plans and indicatively illustrated in **Volume 1, Chapter 2: Project Description**.

Onshore cable route selection next steps

5.2.17.1 The onshore cable route will continue to be refined subject to further assessment of potential environmental effects and the results of ongoing surveys.

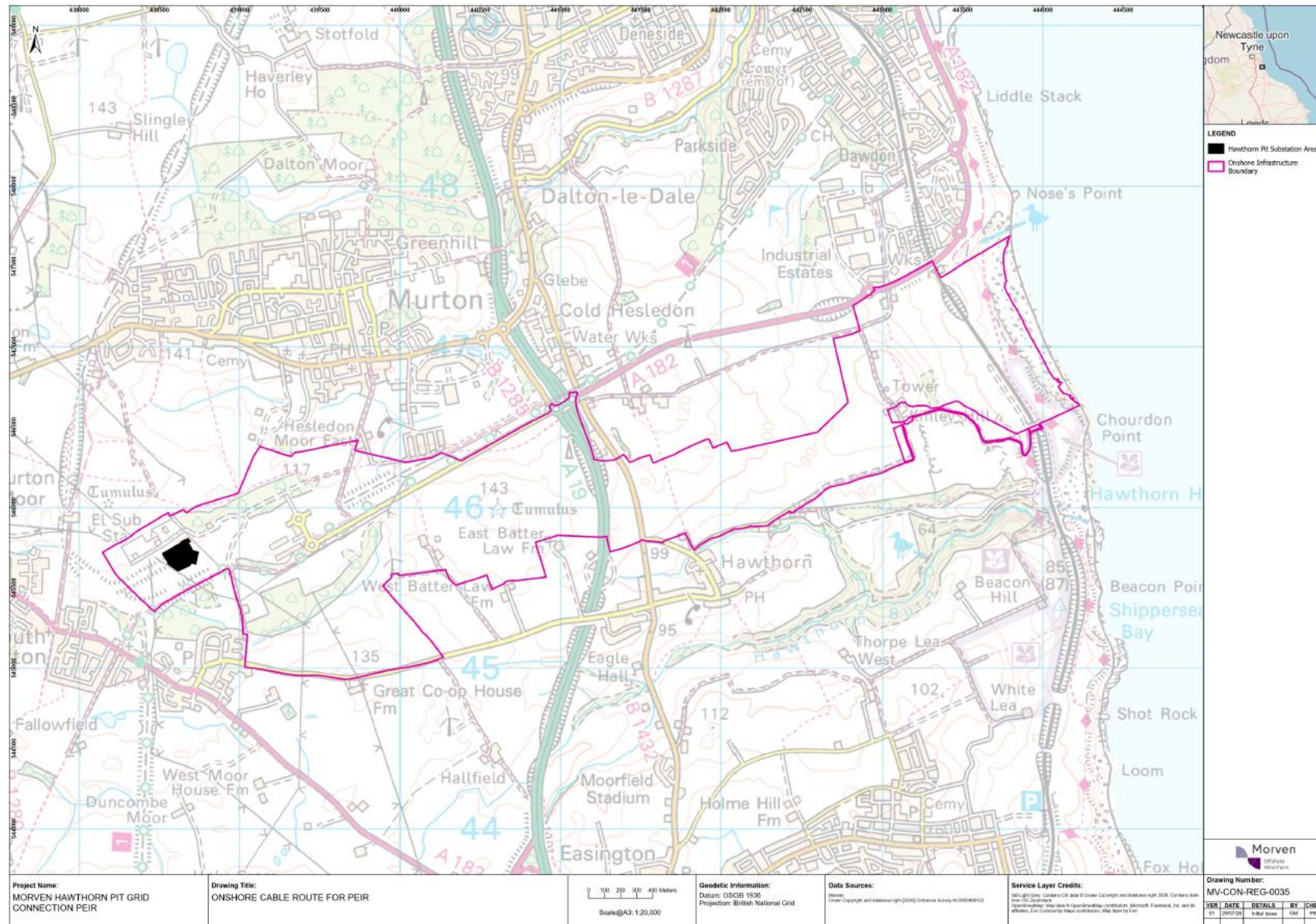


Figure 11: Onshore cable route search area for PEIR assessment

1.6 Biodiversity benefit and environmental mitigation

- 6.1.1.1 From 2nd November 2026, mandatory Biodiversity Net Gain (BNG) requirements will apply to the MHPGC Project. The legislative basis for this lies in the Environment Act 2021, which amends the Planning Act 2008 through Schedule 15 to introduce biodiversity gain requirements for projects requiring development consent. These provisions will require the Secretary of State to be satisfied that the biodiversity gain objective is met before granting a Development Consent Order. For a development to meet the biodiversity gain objective, the biodiversity unit value attributable to a development (which may include on-site units, off-site units and statutory biodiversity credits) must exceed the pre-development biodiversity value of the on-site habitat by at least 10%.
- 6.1.2.1 An area of search for habitat management including environmental mitigation and biodiversity gain has been identified within the MHPGC Project PEIR Red Line Boundary. This area is incorporated into the draft Works Plans (Work Plan Area 12) and illustrated in detail in **Volume 1, Chapter 2: Project Description, of the PEIR**.
- 6.1.3.1 The area of search, located in close proximity to the Green LSS Option Area and Blue LSS Option Area, was identified through positive discussions with the landowner. The location benefits from its proximity to and connectivity with Coop House Wood Local Wildlife Site and provides suitable habitat for exploring potential on-site BNG gain options. This area will be refined and further detail provided on proposed BNG options and environmental mitigation, as required in the ES at DCO application.

1.7 Summary

- 7.1.1.1 The MHPGC Project site selection work (as informed through stakeholder engagement, landowner discussions and technical studies) has enabled the refinement of the MHPGC Project to the point of PEIR assessment.
- 7.1.2.1 Based upon the results of the constraints mapping, engineering feasibility and consultation (including landowner feedback) the onshore export cable corridor was refined running west from landfall towards the Hawthorn Pit National Grid substation following the alignment of the Central Corridor option. This results in two LSSs being considered for PEIR assessment – LSS-E and LSS-G – due to the inability for the MHPGC Project to route an AC connection cable route from the west of Hawthorn Pit, thereby automatically discounting LSS-A.
- 7.1.3.1 The following aspects of the project have been identified and refined:
- A refined landfall search area south of Nose's Point;
 - A single preferred onshore cable route search area ; and
 - Two feasible onshore HVDC substations sites (to be refined down to one for DCO application).
- 7.1.4.1 The Applicant considers that these options and refinements are sufficiently justified and narrowed down to enable stakeholders (through the consultation process) to provide meaningfully comment on the potential scheme and its potential effects on the receiving environment.

1.8 Next steps

- 8.1.1.1 The Applicant will continue to develop and refine the project design as it progresses towards the final application for Development Consent and beyond this as it moves towards construction. The MHPGC Project is currently at Stage 3 in the design process. Up to this point, the Applicant has engaged with a range of stakeholders in refining the project and identifying suitable options amongst the alternatives considered.
- 8.1.2.1 As the MHPGC Project progresses past the consultation stage at PEIR, the Applicant will continue engagement with stakeholders via the EWGs and other consultation as necessary. The Applicant will continue to keep stakeholders informed about the project design as it continues to evolve, and the selection process for preferred options where they remain in consideration.

2 References

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