#### **18 DECEMBER 2024**

#### THE INFRASTRUCTURE PLANNING (EXAMINATIONS PROCEDURE) RULES 2010

THE H2 TEESSIDE PROJECT

#### WRITTEN SUBMISSION AT DEADLINE 5 ON BEHALF OF NATIONAL GRID ELECTRICITY TRANSMISSION PLC

&

#### **REQUEST TO ATTEND COMPULSORY ACQUISITION HEARING 2 (CAH2)**

&

RESPONSE TO THE EXAMINING AUTHORITY'S SECOND WRITTEN QUESTIONS & REQUESTS FOR INFORMATION [PD-015]

REF: TWHI/2026502.572



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#### 1 INTRODUCTION

- 1.1 National Grid Electricity Transmission Plc ("**NGET**") made a Relevant Representation in this matter on 1 July 2024 [**RR-024**] and a Written Representation on 3 October 2024 [**REP2-068**] (together the "**Existing Representations**").
- 1.2 As stated in its Existing Representations, NGET wishes to reemphasise that it does not object in principle to the development proposed by H2 Teesside Limited (the "**Applicant**") and as defined as the "**Authorised Development**" in the draft Development Consent Order (the "**Draft Order**") [**REP4-004**]. Indeed, NGET is committed to supporting and enabling the United Kingdom's energy transition in line with the UK Government's commitment to reach net zero emissions by 2050.
- 1.3 NGET does, however, continue to **strongly object** to:
  - (a) the carrying out in its current form of those elements of the Authorised Development, including but not limited to Work Nos. 6A.1 and 6B.1, 9 and 10A.1 as defined in the Draft Order, the overall effect of which will be likely to render impossible the delivery by NGET of a planned expansion of Saltholme 275kV and 132kV Substation (the "Saltholme Expansion");
  - (b) the Applicant's intended reliance on powers of temporary possession and compulsory acquisition (as set out in the Draft Order) in order to temporarily use and to permanently acquire a significant extent of land and rights currently held for the purposes of NGET's statutory undertaking and, further, to override or otherwise interfere with easements or rights which would adversely affect NGET's right to access and maintain its apparatus; and
  - (c) the Authorised Development being carried out in close proximity to NGET's existing apparatus within the Order limits, unless and until suitable protective provisions and related agreements have been secured to NGET's satisfaction.
- 1.4 Considered individually and in totality, NGET contends that each of the points of objection referred to in Paragraph 1.3 will, if not promptly and satisfactorily addressed by the Applicant, give rise to serious detriment in the context of NGET's statutory undertaking and the discharge of its regulatory duties.
- 1.5 This Written Submission, which is provided at Deadline 5 (18 December 2024), is comprised of the following elements:

- (a) A request made on behalf of NGET to attend Compulsory Acquisition Hearing 2 ("**CAH2**") which is scheduled to take place virtually on 13 January 2025;
- (b) A written submission, supported by an Engineering Constraints Report and a Constraints Assessment, which together further articulate NGET's specific concerns regarding the interface between the Authorised Development and the Saltholme Expansion; and
- (c) A response to the Examining Authority's ("**ExA**") Second Written Questions and Requests for Information [**PD-015**].
- 1.6 NGET would be pleased to provide the ExA with clarification on any of the matters contained within this Written Submission.

#### 2 **REQUEST TO ATTEND CAH2**

- 2.1 With reference to Annex B of the ExA's "*Notice of variation to the Examination Timetable following acceptance of change request for examination, including notification of Hearings"* issued on 9 December 2024 [PD-017], NGET wishes to confirm its attendance at CAH2 which is scheduled to take place virtually on 13 January 2025.
- 2.2 With reference to the Preliminary Agenda for CAH2 included at Annex C of [PD-017], NGET would anticipate making oral submissions on the following agenda items:
  - (a) Item 4(i): an update in respect of NGET's objection to the Authorised Development (with reference to matters as set out in this Written Submission);
  - (b) **Item 5(ii):** statutory undertakers' land (and, in particular, in relation to Plots 3/18 to 3/25 (inclusive)); and
  - (c) **Item 6:** any other business (to the extent that NGET is invited to do so by the ExA).
- 2.3 It is anticipated that NGET will be represented at CAH2 by:
  - (a) Daisy Noble (Counsel, Francis Taylor Building);
  - (b) Tariq Ajumal (Regional Connections Manager, NGET) or Matt Doherty (Lead Connections Engineer, NGET);
  - (c) Aileen Smith (Head of Central Consents, NGET);
  - (d) Julian Barnett (Onshore Interface Manager, NGET) and
  - (e) Tom White (Senior Associate, Bryan Cave Leighton Paisner LLP).

#### 3 WRITTEN SUBMISSION REGARDING THE INTERFACE BETWEEN THE AUTHORISED DEVELOPMENT AND THE SALTHOLME EXPANSION

#### Overview

3.1 Given the nature of the points at issue, as articulated in its Existing Representations and through direct correspondence with the Applicant, NGET is surprised and

disappointed at the absence of meaningful and substantive engagement from the Applicant during the course of the Examination.

- 3.2 NGET has no in principle objection to the Authorised Development and, indeed, is committed to supporting and enabling the United Kingdom's energy transition in line with the UK Government's commitment to reach net zero emissions by 2050.
- 3.3 However, NGET is also bound by its own statutory obligations and regulatory duties, including those pursuant to Section 9(2)(a) of the Electricity Act 1989 which requires all electricity transmission licence holders to *"to develop and maintain an efficient, co-ordinated and economical system of electricity transmission."*
- 3.4 In this respect, and as the Engineering Constraints Report (Appendix 1) and Constraints Assessment (Appendix 2) together make clear:
  - (a) the uncontrolled and unmitigated exercise by the Applicant of temporary use and compulsory acquisition powers over an extensive swathe of land and rights owned and held by NGET, including adjacent to the Saltholme 275kV and 132kV Substation; and
  - (b) the construction, maintenance and use of those elements of the Authorised Development, including but not limited to Work Nos. 6A.1 and 6B.1, 9 and 10A.1 as defined in the Draft Order,

will likely render impossible the delivery by NGET of the Saltholme Expansion and further prevent NGET from being able to maintain, repair, refurbish, replace or renew its existing apparatus in accordance with its statutory obligations and regulatory duties.

- 3.5 It is acknowledged that certain of those impacts related to NGET's 'business as usual' operations are capable of being addressed and mitigated through Protective Provisions and, where necessary, further contractual obligations agreed to by the Applicant. To date, there has been no serious attempt made by the Applicant to engage with NGET on these matters. Nonetheless, NGET remains willing to work with the Applicant in order to reach an outcome which is operationally acceptable to both parties.
- 3.6 However, based on the documentation currently before the Examining Authority, it is NGET's position that there is no possibility that those parts of the Authorised Development which will interact with the Saltholme Expansion can be undertaken in a manner which will avoid giving rise to serious detriment in the context of NGET's statutory undertaking and the discharge of its regulatory duties. The two proposals are fundamentally incompatible.
- 3.7 NGET is aware from the Pipelines Statement submitted as part of the Applicant's DCO application [**APP-035**] that two options (Options A and B) were previously considered by the Applicant for what was termed in that Statement (and in the accompanying Indicative Hydrogen Production Facility and Above Ground Installations Plans [**APP-012**]) as the 'Transmission and Distribution Infrastructure Connection'. It is not clear to NGET why the Applicant has subsequently chosen to proceed with Option A and, given the nature of NGET's concerns (including also as to the absence of a detailed consideration by the Applicant of reasonable alternatives), why the Applicant has not sought to reconsider that decision. It is also unclear why the westerly extent of the 'South Tees Development Corporation (STDC) and Seal Sands' section of the pipeline route must include an end-of-line AGI in its current location, as opposed to another location outside of NGET's freehold boundary.

3.8 NGET would, at the very least, expect the Applicant to provide further justification on these matters as part of the Examination and, in any event, would suggest that Option B must now be reconsidered in light of the serious detriment to NGET's undertaking which would arise from a combination of Option A and an end-of-line AGI in its current location.

#### **Engineering Constraints Report and Constraints Assessment**

- 3.9 The accompanying Engineering Constraints Report (Appendix 1) and Constraints Assessment (Appendix 2) have been produced by NGET for the purposes of Deadline 5 and CAH2 in order to further demonstrate to the Examining Authority the particular nature of NGET's concerns with the Authorised Development.
- 3.10 Taking each of these documents in turn:

#### (a) Engineering Constraints Report:

(i) Part A explains why the Saltholme Expansion is required to be delivered by NGET, how that Expansion could best be accommodated and delivered from a technical engineering perspective within the boundaries of NGET's existing freehold ownership and how any such Expansion would interact with the relevant elements of the Authorised Development.

> It concludes that the presence within NGET's freehold land of a hydrogen pipeline (including AGI) would render all three available options unviable and, hence, would prevent NGET from discharging its statutory duties and from fulfilling its transmission licence obligations as set out by OFGEM. This would be in addition to impacts during construction associated with the extensive temporary use powers sought by the Applicant.

(ii) Part B identifies NGET's concerns with the Authorised Development from a 'business as usual' perspective (i.e. in the context of the discharge of NGET's existing statutory undertaking and absent the Saltholme Expansion).

It is NGET's view that those impacts related to its 'business as usual' operations are largely capable of being addressed and mitigated through Protective Provisions and, where necessary, further contractual obligations agreed to by the Applicant.

#### (b) **Constraints Assessment:**

- (i) The Constraints Assessment explains how NGET would ordinarily undertake the development of major infrastructure projects, such as the Saltholme Expansion. It identifies the constraints which would need to be taken into account as part of the consenting of any such Expansion, including on land outside of NGET's existing freehold ownership.
- (ii) It concludes that the wider area around Saltholme Substation is already significantly constrained, both in terms of policy and environmental designations and in terms of other existing or proposed infrastructure. As a consequence, the development of the Saltholme Expansion on land owned by National Grid at the existing

Saltholme substation site presents the least constrained option, and would likely have the least overall environmental impact.

- (iii) The Constraints Assessment also concludes that it is highly unlikely that NGET would obtain consent for an expanded substation on other land within the search area, that search area being dictated by the complex configuration of the existing transmission network. (No assessment has been made in this context as to whether any such land would even be available for acquisition by NGET).
- 3.11 Both documents have been produced by NGET with reference to available desktop sources (including information submitted by the Applicant as part of the Examination) and by discipline experts with extensive working knowledge of delivering other major projects associated with NGET's transmission network infrastructure.
- 3.12 It is NGET's intention to refer to each of these documents during CAH2 and it is hoped that prior submission of the same will be of benefit to the Examining Authority, the Applicant and other Interested Parties.

#### 4 **RESPONSE TO THE EXAMINING AUTHORITY'S SECOND WRITTEN** QUESTIONS & REQUESTS FOR INFORMATION [PD-015]

4.1 NGET's responses to ExQ2 Q2.6.5 and Q2.6.6 are set out in the following table:

ExQ2	Question To:	Question:	Response:
Q2.6.5	National Grid	In its DL2 Written Representation (WR) [ <b>REP2-068</b> ] NGET stated in paragraph 2.5 that it is "unable to release, for third party development, any land immediately adjacent to its existing operational assets, including substations, on the basis that the land in question must remain safeguarded to allow for the development of those assets" Please provide details of the safeguarding requirements in relation to the Proposed Development and advise the ExA if suitable PPs will ensure this safeguarding will be managed, or if the zones in question are absolute.	<ul> <li>Presumption against release of land:</li> <li>As summarised in NGET's Written Representation [REP2-068], in the context of enabling the United Kingdom's energy transition and net zero ambitions, there is now a starting presumption that NGET cannot release any operational or non-operational land for third party development.</li> <li>This presumption is aligned with Standard Condition B7 (Availability of Resources) of NGET's Transmission Licence which stipulates that NGET "shall at all times act in a manner calculated to secure that it has available to it such resources, including (without limitation)fixed and moveable assets, rights, licences, consents and facilities, on such terms and with all such rights, as shall ensure that it is at all times able:</li> <li>(a) to properly and efficiently carry on the transmission business; and</li> <li>(b) to comply in all respects with its obligations under this licence and such obligations under the Act as apply to the transmission business including, without limitation, its duty to develop and maintain an efficient, co-ordinated and economical system of electricity transmission."</li> <li>Standard Condition B7 is itself consistent with NGET's statutory duties pursuant to Section 9(2)(a) of the Electricity Act 1989 which requires all electricity transmission licence holders to "to develop and maintain an efficient, co-ordinated and economical system of electricity transmission."</li> <li>Proposed Protective Provisions and Impact on NGET's Statutory Undertaking:</li> </ul>

ExQ2	ExQ2 Question To: Question: Response:		Response:	
			The "Acquisition of Land" provisions incorporated within NGET's standard form of Protective Provisions (Paragraph 29 in the version of those Protective Provisions as appended to NGET's Relevant Representation [ <b>RR-024</b> ]) are reflective of NGET's statutory duties and regulatory obligations.	
			It is noted that Paragraph 36(2) of the same version of those Protective Provisions provides that whenever NGET's consent, agreement or approval is required for the taking of any action by the Applicant, such consent, agreement or approval must not be unreasonably withheld or delayed. This represents a proportionate safeguard mechanism in relation to the practical operation of the usual "Acquisition of Land" provisions.	
			Consideration of particular circumstances:	
			Notwithstanding the presumption outlined above, and as contemplated by the Protective Provisions, NGET will always consider all reasonable requests for land rights made by third party developers on a case by case basis.	
			Where a request is considered to be compatible with NGET's statutory duties and transmission licence obligations, it may be capable of being granted. However, this will depend upon the nature of the request and the likely impact of the disposal on NGET's statutory undertaking.	
			It should be noted that the prior consent of Ofgem is likely to be required where the disposal by NGET would be of a 'relevant asset', in accordance with Standard Condition B3 (Disposal of relevant assets and restrictions on charges over receivables) of NGET's Transmission Licence. It is noted that a 'disposal' is defined broadly for the purposes of Standard Condition B3.	

ExQ2	Question To:	Question:	Response:
			Application to the H2 Teesside Project: For the reasons which are articulated in the Engineering Constraints Report and the Constraints Assessment, each of which forms part of NGET's Written Submission at Deadline 5, NGET does not consider there to be any conceivable scenario whereby the disposal of, or grant of rights over, land within its control in order to facilitate those elements of the Authorised Development which are proposed to be undertaken in the immediate vicinity of Saltholme Substation, including but not limited to Work Nos. 6A.1 and 6B.1, 9 and 10A.1 (as defined in the Draft Order), will be compatible with its statutory duties and transmission licence obligations. Without prejudice to NGET's primary position, in the event that a disposal could be contemplated, it is likely that Ofgem's prior consent would likely be required in respect of at least <i>part</i> of the land in question.
			As a consequence, and based on the proposals put forward to date by the Applicant, NGET's position remains that the safeguarded areas adjacent to Saltholme Substation are absolute in nature, and that an absolute prohibition on the disposal or release of that land on the terms sought by the Applicant must be maintained in order to avoid serious detriment to the carrying on of NGET's statutory undertaking.
Q2.6.6	National Grid	Please update the ExA regarding engagement with the Applicant as highlighted in the NGET DL2 WR [ <b>REP2-068</b> ] paragraphs 6.3 to 6.19 and also regarding the land in the environs of Saltholme Substation.	<b>Protective Provisions:</b> There has been very limited further engagement with the Applicant on outstanding matters related to the Protective Provisions. The Applicant's position, as set out in writing on 12 November, is that NGET's required restrictions on the exercise of compulsory

ExQ2	xQ2 Question To: Question: Response:		Response:
			acquisition and temporary possession powers cannot be accepted unless and until all necessary voluntary land agreements have been completed.
			For the reasons articulated in response to ExQ2 Q2.6.5, there is no realistic prospect of any voluntary land agreements being progressed whilst the Applicant's proposals remain in their current form.
			Consideration of Alternatives:
			So far as NGET is aware, and with reference to Paragraph 6.18 of NGET's Written Representation [ <b>REP2-068</b> ], the Applicant has continued to proffer very little evidence in order to demonstrate the absence of suitable alternative locations for constructing the relevant aspects of those parts of the Authorised Development comprising Work Nos. 6A.1 and 6B.1, 9 and 10A.1 (as defined in the Draft Order).
			It is noted that Chapter 6 (Alternatives and Design Evolution) of the Applicant's Environmental Statement [ <b>APP-058</b> ] presents the Applicant's consideration of alternatives in respect of the 'Hydrogen Pipeline Corridor' (at Paragraph 6.7.2 onwards) in generally vague terms as follows:
			"A number of options were considered for the routeing of the Hydrogen Pipeline Corridor (Work No. 6) to potential offtakers. After the preparation of the EIA Scoping Report (presented within Appendix 1A: Scoping Report (ES Volume III, EN070009/APP/6.4)), the route options were refined, informed by engineering feasibility work, the outcome of environmental studies and consultation with statutory consultees such as Natural England and the Environment Agency (EA). This included the removal of a number of routeing option to the western extent of the Proposed Development Site, and

ExQ2	Question To:	Question:	Response:	
			alternate options for the crossing of Greatham Creek and the River Tees."	
			From NGET's perspective, the continued absence of a developed consideration of reasonable alternatives (alongside the notable omission of a compelling justification in favour of proceeding with the current alignment of Work Nos. 6A.1 and 6B.1, 9 and 10A.1) constitutes a significant deficiency in the adequacy of the Applicant's environmental impact assessment (pursuant to Paragraph 2 of Schedule 4 to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017).	
			Survey Access:	
			The Applicant has recently requested access to NGET's land at Saltholme to undertake non-intrusive topographical and ground penetrating radar surveys to help inform design for its proposals in this location.	
			Notwithstanding NGET's objection as articulated in its Written Submission at Deadline 5, NGET is prepared in principle to allow access for surveys, subject to appropriate safeguards.	
			This has been communicated to the Applicant and NGET will continue to work with the Applicant where possible to resolve matters.	

**Bryan Cave Leighton Paisner LLP** 

For and on behalf of National Grid Electricity Transmission Plc

18 December 2024

#### Appendix 1

**Engineering Constraints Report** 

**Deadline Five Submission** 

# H2Teesside Saltholme Substation

# Engineering Constraints Report

December 2024

nationalgrid

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Appendix A Plans and drawings



# New substation Expansion

# 1. Introduction

- 1.1 The way the UK generates electricity is changing rapidly as there is a transition to cheaper, cleaner, and more secure forms of energy. There is a shift towards renewable energy sources, meaning there is a greater demand on the existing electricity transmission and distribution networks to connect new sources of electricity and customers.
- 1.2 National Grid Electricity Transmission (NGET) needs to make changes to the transmission network of overhead lines (OHLs), pylons, cables, and other infrastructure that transport electricity around the country so that everyone has access to the clean electricity from these new renewable sources.
- 1.3 In the Teesside area, several organisations have requested new transmission connections from NGET and, as a regulated business, NGET has a legal obligation to meet these requests economically and efficiently. A customer receives a connection agreement from NGET to connect to the transmission network after their application is deemed technically competent and engineering studies have been concluded.
- 1.4 In the Northeast, especially around Saltholme, is an area of the transmission network seeing significant increases in power requirements as traditional industry moves away from fossil fuels and towards net zero technologies. These include hydrogen production, electric arc steel furnaces and data centres. These technologies contribute to governmental targets on levelling-up so it is therefore crucial that NGET can respond to these requirements effectively and in a timely manner.
- 1.5 Given the existing and anticipated demand from customers wishing to connect into Saltholme, a new substation is required. It is anticipated that any substation development at Saltholme will utilise land within NGET's existing land ownership boundaries and seek to avoid, where reasonably practicable, the use of land beyond this boundary (noting, in particular, the various environmental and policy constraints on land in the immediate vicinity of Saltholme as set out in the accompanying High Level Constraints Assessment).

# 2. New substation requirements at Saltholme

## 2.1 New Substation Drivers

2.1.1 There has been rapid growth in the volume of customers seeking to connect to the transmission network resulting in over 700GW of contracted connections for NGET across England and Wales. A similar challenge is being felt by the Distribution Network Operators (DNO's), triggering further reinforcements between their networks and the transmission network to facilitate embedded generation and demand connections.

#### 2.2 The key drivers for a new substation at Saltholme are:

- 2.2.1 450MW of transmission connected Battery Energy Storage Systems (BESS) connections at the substation (reference at section 2.1.2 below for further information);
- 2.2.2 An additional three Super Grid Transformers (SGTs) on top of the existing two SGTs are also required by Northern Power Grid (NPG), the DNO, to facilitate connections of both embedded generation and demand projects through the distribution network (reference at section 2.1.3 below for further information); and
- 2.2.3 Future strategy to uprate the existing 275kV OHLs to 400kV OHLs (to increase the transmission capacity on existing circuits).

#### 2.3 **Transmission Customers**

- Saltholme BESS 200MW connection for October 2035
- Bewley BESS 250MW connection for October 2035

## 2.4 **Distribution Customers**<sup>1</sup>

- 105.3MW Demand, 99.90MW Embedded Generation
- 75MW Demand, 75MW Embedded Generation
- 189.9.89MW Embedded Generation
- Total: 180.3MW Demand, 364.79MW Embedded Generation

#### National Grid | | H2Teesside

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<sup>&</sup>lt;sup>1</sup> Nb all Distribution Customers are connecting in 2035 with specific customer information being held by NPg.

# 2.5 **OHL uprating**

2.5.1 The area of the network around Saltholme is not only experiencing increased power demand but it is also constrained by the fact that existing OHLs are operating at 275kV. This limits the amount of power that can be transferred along the OHLs. Due to large strategic customers in the region, there is an increasing requirement to uprate the OHLs to 400kV to facilitate their connections. The technical solution for Saltholme would include 400kV switchgear which would help to facilitate the transition to the uprated voltage.

#### 2.6 **New Substation Timescales**

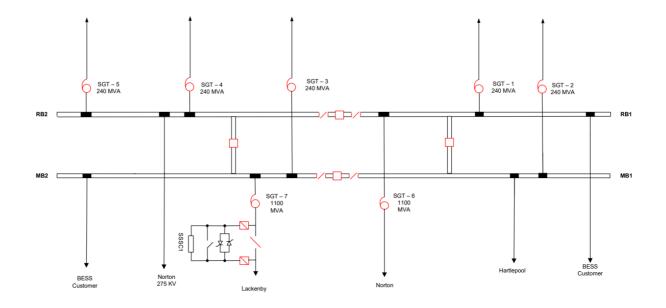
- 2.6.1 NGET is required to provide a connection to the transmission customers and the DNO on the contracted date of 30th October 2035. This is the date by which customers will be 'switched on' supplying or consuming electricity from the NGET transmission system.
- 2.6.2 To meet this date, a construction period of approximately three years will be required to construct the proposed new substation and adequately modify the existing OHLs to connect into the new substation. This construction period would be lengthened significantly if a new substation would be required to be built on land not currently within NGET's ownership and control and where, consequently, more complex modifications to the existing OHLs would be required. Prior to construction of the new substation there will also be a period for design, consenting and development which would ordinarily have commenced in or around 2029.
- 2.6.3 However, in response to the Development Consent Order (DCO) submission made by H2 Teesside Limited, some preliminary optioneering work has been undertaken to produce a range of possible solutions relating to the location of the new substation on existing NGET land and, in doing so, demonstrate that the proposals put forward by H2 Teesside Limited are fundamentally incompatible with the delivery of a new substation at Saltholme.
- 2.6.4 Whilst they are informed by the underlying need case and have been based on established design and electrical engineering principles, the preliminary optioneering solutions outlined in this Engineering Constraints Report are indicative options only and have been prepared solely for the purpose of supporting NGET's written and oral submissions made as part of the Examination for the H2 Teesside Project DCO. Further detailed design development, environmental impact assessments and consultations will be required to be undertaken by NGET as the expansion proposals progress.

## 2.7 **Technical Solution**

- 2.7.1 Prior to considering the options for the siting and design of a new substation, NGET evaluated possible alternatives to building a new substation to ensure that the chosen solution would be most beneficial for its consumers.
- 2.7.2 The options considered were:

- A. Do nothing this was rejected due to potential non-compliance with NGET's regulatory obligations which require a suitable connection point to be provided to customers
- B. Market-based or DNO alternative solutions this was rejected due to insufficient connection capacity for additional customers to be connected efficiently through the DNO network, driving the need for transmission network investment
- C. Utilising the existing substations this was rejected due to lack of available capacity and the limited possibilities to extend the existing Saltholme substation (see reference at section 2.4 for further information)
- D. Develop a new substation on a new site (progressed)
- 2.7.3 The solution required to meet the key drivers is a 20-bay double bus bar substation consisting of:
  - Two Feeder Bays (OHL connections)
  - One 275/400kV 1100MVA interbus transformer
  - Five 275/132kV 240MVA Super Grid Transformers (SGT's)
  - Six spare bays (to future proof the substation, in line with NGET's transmission licence obligations)
  - Two transmission customer bays (contracted customers)
  - Two bus couplers
  - One Section breaker
  - Workshop, protection room, telecoms room, control room, Low Voltage Alternating Current (LVAC) room and battery room

2.7.4 These requirements drive the physical size of the substation along with the consideration of factors such as electrical safety clearances, constructability and maintainability.



Saltholme 275kV



## 2.8 Feasibility of an extension of the existing substation

- 2.8.1 The existing Saltholme Substation is a 'mesh' type substation a configuration of substation popular in the past due to the lower costs associated with its design. The trade-off with this design is that it cannot be extended to the size and capacity required to satisfy the current customer key drivers at the substation.
- 2.8.2 The existing substation is also surrounded in the following ways on all four sides which would inhibit extension in any direction:
  - To the north is the existing control building with a centralised relay room, telecommunications equipment, battery systems and Static Synchronous Series Compensator (SSSC) controls. This building will ultimately be removed following the new substation build, but any construction strategy will dictate that this is left until the last circuits and systems are transferred to the new substation.
  - To the east there are smart valves which are key transmission assets and cannot be removed
  - To the south there is an existing '*service corridor*' which is used by several above ground pipelines. H2 Teesside Limited are also proposing to use the same for their proposed new hydrogen pipeline.
  - To the west is the existing DNO substation which will remain in situ.

2.8.3 For these reasons, an extension to the existing substation is not feasible and a new substation located on the same site utilising existing land owned by NGET is the optimum solution.

## 2.9 **Substation siting constraints**

- 2.9.1 To determine a suitable location for a new substation the following criteria were considered:
  - To provide sufficient land to futureproof the substation;
  - To be within close proximity to major roads for access, existing OHL (1.6km) and connecting customers (20km);
  - To avoid proximity to residential properties as far as is practicable; and
  - To avoid designated assets and identified land, environmental and ecological constraints.
- 2.9.2 NGET will always prioritise using land within its existing ownership if it conforms with the requirements listed above.
- 2.9.3 As set out in detail in the accompanying High Level Constraints Assessment, the existing Saltholme substation benefits from good access from the A1185. This is an important consideration during construction and operation phases, particularly where the delivery of large items of equipment, such as transformers or cable drums, is required.

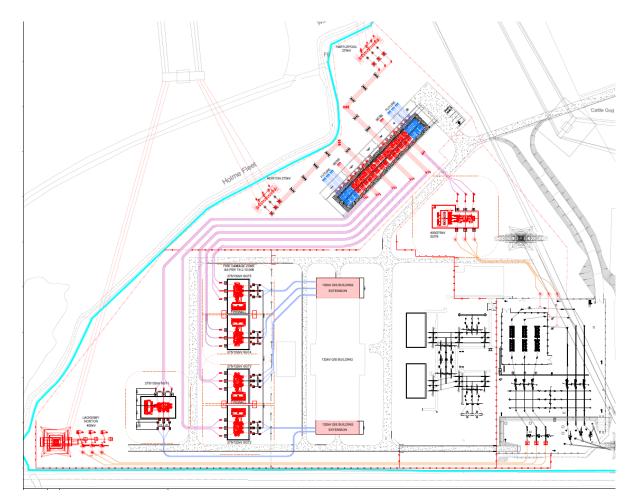
# 3. Options



Figure 1. 3D Visualisation of the future of Saltholme substation developments

- 3.1.1 Several options have been developed which utilise existing NGET land at Saltholme to hold a new substation. These options are preliminary designs which consider the feasibility of the locations. Further development work would need to be completed to better inform the site selection process as part of the development work for the new substation which is currently anticipated to be completed towards the end of the decade.
- 3.1.2 Any of the options would require careful staging of the build to ensure continued supply to Saltholme and the surrounding areas. They would also all require OHL modifications which could raise a need for temporary towers and OHL diversions resulting in further land requirements.
- 3.1.3 Additional land would also be required for temporary laydown areas needed for the construction villages, material storage, off road parking etc. These areas are not shown on the layout drawings but will likely require a similar area to the new substation.
- 3.1.4 Due to the size constraints of the available land, NGET would anticipate using Gas Insulated Switchgear (GIS) which minimises the land take required. This utilises gas as the insulating material instead of air considerably reducing the distance required between assets to avoid unwanted electrical transfer between them, otherwise known as arcing or short circuiting.

- 3.1.5 The main part of the substation would be housed in a building similar to the existing DNO substation in the west of the existing Saltholme, SGTs would be located outside. A secondary benefit to this is the enhanced corrosion protection offered by the building which increases the asset life in the saline environment of Saltholme which is detailed in NGET Policy PS(T)023[PH1][le2].
- 3.1.6 All of the new substation designs account for the customer led drivers and are futureproofed for further connections by way of the addition of spare bays. They are also able to accommodate future OHL uprating by using 400KV equipment which will be used at the lower 275kV voltage.
- 3.1.7 Design options were created using existing records of buried services. Further surveys will be required during development to confirm the locations of these.



# 3.2 **Option 1a**

Figure 2 Option 1a New substation to the north of the site with tower replacement

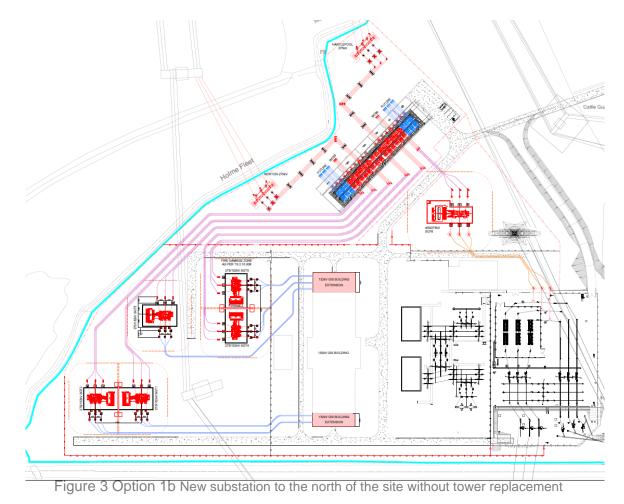
#### **Substation**

- 3.2.1 The 275kV GIS substation building is in the northern section of NGET's land parcel and runs parallel to a re-outed access road. The building consists of a switchgear room, workshop, protection room, telecommunications room, control room, LVAC room and battery room. The bays highlighted in blue signify the six required to future proof the substation. It is connected to the existing 400kV substation via an underground cable shown in pink and an orange through an interbus transformer which is situated to the southeast of the new 275kV substation.
- 3.2.2 The existing DNO 132kV substation will be extended as shown by the pink hashed rectangles to connect the five SGTs. The SGT's are located to the west of the 132kV substation. There are two pairs of two SGTs linearly positioned and separated by a fire wall to reduce the land requirements with the fifth SGT positioned perpendicularly behind them. These are connected to both the 275kV and 132kV substation via underground cables shown in pink and blue respectively.
- 3.2.3 The new substation, along with the SGTs are surrounded by security fencing. Within this fence line will be all access roads required to construct and maintain the SGTs and access to the individual substations.

#### **OHL works**

- 3.2.4 Each of the Hartlepool and Norton 275kV circuits are connected into the northern side of the substation via a gantry which connects to short run of Gas Insulated Busbar (GIB). The location of the 275kV substation allows for the simple OHL connections due to its proximity with existing towers on the northern side of the land parcel. There is also sufficient clearance to allow for the maintenance of the gantries and GIB.
- 3.2.5 The Lackenby Norton 400kV OHL is required to be rerouted from its existing position to allow for the SGTs to be sited linearly as shown in Figure 2. This requires the existing tower 'YYJ037' to be removed and replaced with a tower and Cable Sealing End (CSE) which would be installed in the southwest corner of the site. The 400kV circuit would then be cabled along the southern border of the site into the existing 400kV substation. The tower and CSE will be accessed through the new substation.

# 3.3 Option 1b



#### **Substation**

- 3.3.1 The 275kV GIS substation building is in the northern section of NGET's land parcel and runs parallel to a re-outed access road. The building consists of a switchgear room, workshop, protection room, telecommunications room, control room, LVAC room and battery room. The bays highlighted in blue signify the six required to future proof the substation. It is connected to the existing 400kV substation via an underground cable shown in pink and an orange through an interbus transformer which is situated to the southeast of the new 275kV substation.
- 3.3.2 The existing DNO 132kV substation will be extended as shown by the pink hashed rectangles to connect the five SGTs. The SGT's are located to the west of the 132kV substation. There are two pairs of two SGTs position perpendicularly and separated by a fire wall to reduce the land requirements with the fifth SGT positioned in between the pairs. This arrangement of the SGTs is to fit around the existing OHL and ensure there is no conflict between the tower or oversailing conductors when in operation. These are connected to both the 275kV and 132kV substation via underground cables shown in pink and blue respectively.
- **3.3.3** The new substation, along with the SGTs are surrounded by security fencing. Within this fence line will be all access roads required to construct and maintain the SGTs and access to the individual substations.

#### **OHL works**

3.3.4 The Hartlepool and Norton 275kV circuits are connected into the northern side of the substation via a gantry which connects to two short runs of GIB. The location of the 275kV substation allows for the simple OHL connections due to its proximity with existing towers which are on the northern side of the land parcel. There is also sufficient clearance to allow for the maintenance of the gantries and GIB. The Lackenby – Norton OHL remains in its original place but outages will likely be required to ensure safe working underneath the circuit whilst the substation is being constructed.

# 3.4 **Option 2**

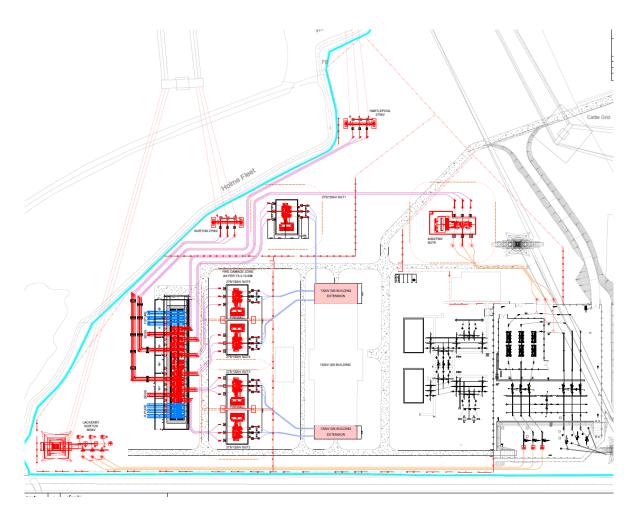


Figure 4 Option 2 substation to the west of the site

#### **Substation**

- 3.4.1 The 275kV GIS substation is in the western section of NGET's. This consists of a switchgear room, workshop, protection room, telecommunications room, control room, LVAC room and battery room. The bays highlighted in blue signify the six required to future proof the substation. It is connected to the existing 400kV substation via a long underground cable shown in pink and an orange through an interbus transformer which is situated to the north of the existing 275kV substation.
- 3.4.2 The existing DNO 132kV substation will be extended as shown by the pink hashed rectangles which will be utilised to connect the five SGTs. The SGTs are mostly located between the new 275kV substation and the existing 132kV substation. There are two pairs of two SGTs linearly positioned and separated by a fire wall to reduce the land requirements with the fifth SGT positioned to the north. These are connected to both the 275kV and 132kV substation via underground cables shown in pink and blue respectively.
- 3.4.3 The new substation, along with the SGTs are surrounded by security fencing. Within this fence line will be all access roads required to construct and maintain the SGTs and access to the individual substations.

#### **OHL works**

- 3.4.4 Each of the Hartlepool and Norton 275kV circuits are connected into the western side of the substation via a gantry which connects to long underground cables and GIB runs. The location of the 275kV substation require more complex OHL connections due to it's distance from existing towers which are on the northern side of the land parcel. Whilst the gantry to the north is free of constraints the proximity of the more southern gantry could make maintenance more difficult.
- 3.4.5 The Lackenby Norton 400kV OHL is required to be rerouted from it's existing position to allow for the SGT's to be sited linearly as shown in Figure 4. This requires the existing tower 'YYJ037' to be removed and replaced with a tower and CSE which would be installed in the southwest corner of the site. The 400kV circuit would then be cabled along the southern border of the site into the existing 400kV substation. The tower and CSE will be accessed through the new substation.

## 3.5 **Comparison of Options**

- 3.5.1 All three options presented above are technically feasible.
- 3.5.2 At this stage of the optioneering process, Option 1a is considered to have clear benefits in terms of both the substation location and the OHL works compared to Option 2 and 1b.

# 3.6 **Substation Location**

- **3.6.1** The 275kV substation location of Option 1a has several clear benefits over the location proposed in option 2:
  - The substation is in a less constrained position regarding the amount of space around it. This aids the constructability of the substation by allowing more room for plant movement and deliveries which improves safety and reduces build time.
  - The length of cable/GIB required to connect the existing 275kV OHL into the substation is greatly reduced. These cable/GIB runs will be required to transfer significant amounts of power which makes long routes technically challenging, reducing these where possible is desired.
  - The length of cable required to connect the substation to the interbus transformer is greatly reduced. As above, these cable runs will be required to transfer significant amounts of power and a shorter length is preferable.
  - The separation of the OHL and interbus transformer cables is greater with this substation location. High power cables in close proximity present cable design challenges which are diminished in this option.
  - The SGT cables have much shallower bending radius and greater separation again eases cable design challenges. They are longer however these cables will be comparably low power so the length is not such a pertinent issue.
  - There are more options for customer cables routes into the substation due to its distance from other assets.

# 3.7 OHL Design

- 3.7.1 The differentiating factor between Option 1a and 1b is the removal of the existing tower 'YYJ037' which would be replaced with a tower and CSE installed in the southwest corner of the site. This is present in Option 1a and presents a preferable option due to the impact that a live, oversailing OHL has on construction and the significant challenges this brings. It has serious safety implications which drive increases in both the programme and costs to protect the individuals working on site and is therefore avoided.
- 3.7.2 Because of electrical clearance requirements and risks around Impressed Voltages, construction activities under OHL are extremely restricted. Any activities which require high level equipment such as piling, using cranes or Mobile Elevated Working Platforms, and even the delivery of SGT's is not possible. This means that the Lackenby Norton OHL would need to be on outage (not transmitting power) for the duration of the construction period in the southwest corner. As the transmission system becomes busier in the 2030's the likelihood of this outage reduces, in addition circuits can only be on outage during March to October.
- 3.7.3 Only a short outage would be required to remove and replace tower 'YYJ037'. Once complete, construction work could continue unrestricted, reducing cost and programme on the project but most importantly reducing the risk of serious injury or even death.

# 4. Conflicts with H2Teesside proposal

- 4.1.1 The substation options considered in the previous section highlight the difficulty in developing a substation if any of NGET's land is acquired or used for other purposes.
- 4.1.2 The layout drawings for each of the substation options presented have been overlaid onto H2 Teesside Limited's proposal to clearly show the incompatibilities.
- 4.1.3 The following paragraphs outline the anticipated conflicts with relevant elements of the H2 Teesside proposal (including Work Nos. 6A.1 and 6B.1, 9 and 10A.1).

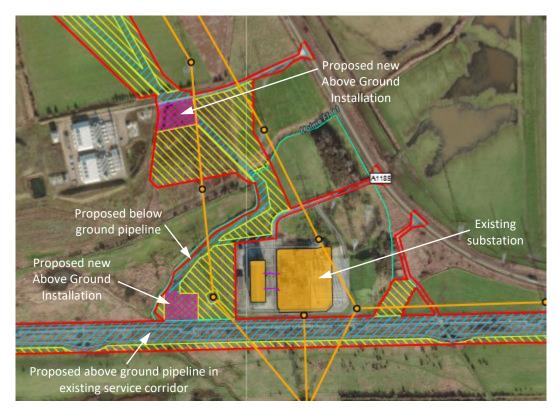


Figure 5 Overview of H2 Teesside Limited's proposal

# 4.2 **Option 1a Conflicts**



Figure 6 Layout 1a and H2 Teesside Proposal Overlay

#### **Pipeline interaction**

- 4.2.1 There are several interactions between the pipeline and substation proposals shown in Figure 6 which would restrict the installation of a number of NGET assets:
  - The Norton 275kV OHL Gantry would be located on top of the proposed pipeline. The gantry would require substantial foundations to manage the forces exerted on it but the weight of the conductors. This would not be feasible with the pipeline in the proposed location. The Hartlepool 275kV gantry would also be challenging to construct due to the proximity to the pipeline.
  - Both the Norton 275kV and Hartlepool 275kV GIB would be required to run on top of the pipeline to allow for construction and maintenance clearances. Again, foundations would be required which could not be installed with the pipeline in situ.
  - The SGT1, 2, 3 and 4 cables, would be required to run on top off, or very close to the pipeline to ensure sufficient clearance from the next SGT cable. To install the cable on top of the pipeline would be impossible and even if the cable was only nearby, there would be constructability issues surrounding excavation near high pressure pipelines.

### **AGI Interactions**

- 4.2.2 There are two interactions between the AGI and substation proposals shown in Figure 6 which would restrict the installation of those assets:
  - The new tower and CSE required would be in direct conflict with the positioning of the AGI. The position and orientation of the tower is such to ensure electrical clearances from the proposed substation development and would be required to be situation there to ensure the substation could be built and maintained safely.
  - SGT 1 would also need to be installed in the same location of the AGI to ensure sufficient clearances from the SGT 2 cables and ensure the fire damage zone is clear of both the CSE and substation road.

#### **Access Road interactions**

4.2.3 The proposed access road for the AGI would sit entirely in the high security fence line at Saltholme. Notwithstanding NGET's concerns as regard the extent of access rights sought for the purposes of the H2 Teesside Project (explained further in Part B), it is noted that any routine maintenance activities would require an NGET member of staff to open gates and to potentially escort staff. This would not be acceptable to NGET, including from a site security perspective.

# 4.4 **Option 1b Conflicts**



Figure 7 Layout 1b and H2 Teesside Proposal Overlay

#### **Pipeline interaction**

- 4.4.1 There are several interactions between the pipeline and substation proposals shown in Figure 7 which would restrict the installation of several NGET assets:
  - The Norton 275kV OHL Gantry would be located on top of the proposed pipeline. The gantry would require substantial foundations to manage the forces exerted on it but the weight of the conductors. This would not be feasible with the pipeline in the proposed location. The Hartlepool 275kV gantry would also be challenging to construct due to the proximity to the pipeline.
  - Both the Norton 275kV and Hartlepool 275kV GIB would be required to run on top of the pipeline to allow for construction and maintenance clearances. Again, foundations would be required which could not be installed with the pipeline in situ.
  - The SGT1, 2, 3 and 4 cables, would be required to run on top off, or very close to the pipeline to ensure sufficient clearance from the next SGT cable. To install the cable on top of the pipeline would be impossible and even if the cable was only nearby, there would be constructability issues surrounding excavation near high pressure pipelines.

#### **AGI Interactions**

4.4.2 There is one main interaction with the AGI in option 1b which is the position of SGT 1 and 2. This would be in direct conflict with the positioning of the AGI. The SGT's would require large foundations owing to the weight of the transformers. Furthermore, there is a fire radius which is associated with transformers which would further envelop the AGI and restricts the proximity in which you can install and SGT to other assets. There are no other options to site the SGTs in the southwestern corner of the site if the OHL remains in situ.

#### **Access Road interactions**

4.4.3 The proposed access road for the AGI would sit entirely in the high security fence line at Saltholme. Notwithstanding NGET's concerns as regard the extent of access rights sought for the purposes of the H2 Teesside Project (explained further in Part B), it is noted that any routine maintenance activities would require an NGET member of staff to open gates and to potentially escort staff. This would not be acceptable to NGET, including from a site security perspective.

# 4.5 **Option 2 Conflicts**



Figure 8 Layout 2 and H2 Teesside Proposal Overlay

#### **Pipeline Interactions**

- 4.5.1 There are several interactions between the pipeline and substation proposals shown in Figure 8 which would restrict the installation of several NGET assets:
  - Both the Norton 275kV and Hartlepool 275kV OHL Gantry would be located on top of or the proposed pipeline. The gantry would require substantial foundations to manage the forces exerted on it but the weight of the conductors. These would not be feasible with the pipeline in situ
  - Both the Norton 275kV and Hartlepool 275kV cable/GIB would be required to run on top off the pipeline to ensure sufficient clearance from the next OHL and interbus transformer cable respectively
  - The interbus transformer cable would be required to run on top off the pipeline to ensure sufficient clearance from the next SGT cable. To install the cable on top of the pipeline would be impossible
  - The North western corner of the GIS building would be situated very close to the pipeline which would create constructability issues especially around foundations

• SGT 1 would be installed on top off or very close to the pipeline The SGT would require large foundations owing to it's weight. Furthermore, there is a fire radius which is associated with transformers which would further envelop the pipeline and restricts the proximity in which you can install and SGT to other assets. There are no other options to site the SGTs due to the cable runs required.

#### **AGI Interactions**

- 4.5.2 There are two interactions between the AGI and substation proposals shown in Figure 8 which would restrict the installation of those assets:
  - The new tower and CSE required would be in direct conflict with the positioning of the AGI. The position and orientation of the tower is such to ensure electrical clearances from the proposed substation development and would be required to be situation there to ensure the substation could be built and maintained safely.
  - The AGI and substation proposals would directly abut one another making construction of the substation challenging. Furthermore, customer cable routes into the most southerly bays would not be achievable effectively sterilising those bays.

#### **Access Road interaction**

- 4.5.3 There are several interactions between the access and substation proposals shown in Figure 8 which would restrict the installation of several NGET assets:
  - The proposed access road for the AGI would sit entirely in the high security fence line at Saltholme. Notwithstanding NGET's concerns as regard the extent of access rights sought for the purposes of the H2 Teesside Project (explained further in Part B), it is noted that any routine maintenance activities would require an NGET member of staff to open gates and to potentially escort staff. This would not be acceptable to NGET, including from a site security perspective.
  - SGT 1 would be required to be installed on the proposed access road to ensure adequate fire radii are met.
  - The GIB runs for the OHL connection would be required to cross over the proposed access road, these would typically installed at the height of around 1m.
  - The northwestern edge of the substation compound would be required to be installed over the access road to allow for access into the GIS building an provide hardstanding for large deliveries.

## 5. Conclusion

- 5.1 The land owned by NGET at Saltholme substation is already constrained due to the size, shape and fixed boundaries of the site. This restricts the options for new substation placement and although all three of the proposed options in this report are technically feasible, there are no other options that could be explored.
- 5.2 The introduction of the proposed H2 Teesside Limited's pipeline (including AGI) would render all three options unviable through the extra constraints applied via both by the pipeline and the AGI. This would force NGET and NPG to look elsewhere in the vicinity for other land parcels which have been shown, through constraints mapping and other tools, to be limited in nature in the area around Saltholme.
- 5.3 The introduction of the proposed pipeline onto NGET's land will prevent the development of a new substation. This will in turn stop NGET from discharging its statutory duties and from fulfilling its transmission licence obligations as set out by OFGEM.



# **Existing Assets**

# 6. Introduction

#### 6.1 Scope

- 6.1.1 This section identifies the potential interactions and conflicts between the H2 Teesside Proposal and NGET's existing infrastructure, particularly at the Saltholme substation site. This includes the activities that NGET is required to carry out in respect of regular maintenance of its infrastructure.
- 6.1.2 It addresses the following particular matters in turn:
  - Safety venting of hydrogen
  - Operational aspects
  - Electrical interference
  - OHL maintenance activities
  - OHL interaction and pipelines
  - Pipeline construction activities
  - Possible interaction between parallel pipelines
  - Existing underground services
  - Fires and firefighting
  - Access road
  - Security

#### Information from the NGET Technical Guidance Note 287

#### 6.2 Electricity transmission infrastructure

#### **Overhead lines**

- 6.2.1 OHLs consist of two main parts pylons (also called towers) and conductors (or wires). Pylons are typically steel lattice structures mounted on concrete foundations. A pylon's design can vary due to factors such as voltage, conductor type and the strength of structure required.
- 6.2.2 Conductors, which are the 'live' part of the OHL, hang from the pylons on insulators. Conductors come in several different designs depending on the amount of power that is transmitted on the circuit.
- 6.2.3 In addition to the two main components, some OHL routes carry a Fibre Optic cable between the towers with a final underground connection to the substations.

#### **Substations**

6.2.4 Substations are found at points on the network where circuits come together or where a rise or fall in voltage is required. Transmission substations tend to be large high voltage facilities containing equipment such as power transformers, circuit breakers, reactors and capacitors. In addition, diesel generators and compressed air systems can be located there.

# 6.3 Statutory requirements for working near high-voltage electricity

6.3.1 The legal framework that regulates electrical safety in the UK is The Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002. This also details the minimum electrical safety clearances, which are used as a basis for the Energy Networks Association (ENA) TS 43-8. These standards have been agreed by CENELEC (European Committee for Electrotechnical Standardisation) and form part of the British Standard BS EN 50341-1:2012 titled 'Overhead electrical lines exceeding AC 1kV'. All electricity companies are bound by these rules, standards and technical specifications. They are required to uphold them by their operator's licence.

#### **Electrical safety clearances**

6.3.2 It is essential that a safe distance is kept between the exposed conductors and people and objects when working near NGET's electrical assets. A person does not have to touch an exposed conductor to get a life-threatening electric shock. At the voltages NGET operates at, it is possible for electricity to jump up to several metres from an exposed conductor and kill or cause serious injury to anyone who is nearby. For this reason, there are several legal requirements and safety standards that must be met. 6.3.3 Any breach of legal safety clearances will be enforced in the courts. This can and has resulted in the removal of an infringement, which is normally at the cost of the developer or whoever caused it to be there. Breaching safety clearances, even temporarily, risks a serious incident that could cause serious injury or death.

#### 6.4 **Responsibilities - OHLs**

- 6.4.1 Work which takes place near OHLs carries a significant risk of coming into proximity with the conductors. If any person, object or material gets too close to the wires, electricity could 'flashover' and be conducted to earth, causing death or serious injury. You do not need to touch the wires for this to happen. The law requires that work is carried out in close proximity to live OHLs only when there is no alternative, and only when the risks are acceptable and can be properly controlled. Statutory clearances exist which must be maintained, as prescribed by the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002.
- 6.4.2 Under the Health and Safety at Work etc. Act (HSWA) 1974 and Management of Health and Safety at Work Regulations 1999, people working in the close vicinity of electrical assets are responsible for preparing a suitable and sufficient risk assessment and safe systems of work, to ensure that risks are managed properly and the safety of the workforce and others is maintained. The risk assessment must consider and manage all the significant risks and put in place suitable precautions/controls in order to manage the work safely. The people working in the close vicinity of electrical assets are also responsible for ensuring that the precautions identified are properly implemented and stay in place throughout the work.
- 6.4.3 Work near OHLs must always be conducted in accordance with the Health and Safety Executive (HSE) Guidance Note GS6, titled 'Avoiding danger from overhead power lines', and any legislation which is relevant to the work being completed.

# 7. Constraints and conflicts with existing infrastructure

#### 7.1 Safety

#### Venting of hydrogen

- 7.1.1 During normal operation of a pipeline, there will be times when sections of pipeline, pipework and equipment will have to be depressurised by venting volumes of hydrogen into the atmosphere to facilitate maintenance, inspection or remedial work activities. The venting of hydrogen may also be required during the commissioning stage of the proposed pipeline system.
- 7.1.2 NGET is concerned about the proposed location of the AGI relative to the OHLs and existing substations given that the electrical assets provide high probability ignition sources and are keen to minimise the likelihood of a hazardous event escalating as well as being concerned that the proposals deviate from normal best industry practice.
- 7.1.3 There is very limited information on the AGI site options considered as part of the project in Chapter 6 of the Environmental Statement (ES) titled 'Needs, Alternatives and Design Evolution' and the proposed operations and maintenance philosophy in document 5.5 titled 'Pipelines Statement'. No information could be found in the H2 Teesside Limited's submission regarding any dispersion analysis conducted covering all normal and abnormal pipeline operational scenarios to demonstrate that the separation distances used are acceptable and any risks posed are As Low As Reasonably Practicable (ALARP) as required by the Pipelines Safety Regulations (PSR) 1996.
- 7.1.4 Noting that:
  - A release of hydrogen into the atmosphere has the potential to generate a flammable fuel/air mixture which could result in a fire or explosion if it comes into contact with an ignition source, and will therefore generate thermal radiation and overpressure.
  - As 'Employer's', NGET and H2 Teesside Limited have to comply with all the Employer's duties in HSWA with respect to safeguarding the health, safety and welfare of its employees and ensuring that anyone else affected by its activities are not exposed to risks to their health or safety.
  - Under the framework set by *HSWA*, a number of sets of regulations which apply to specific activities and assets. In relation to pipelines, the specific regulations which apply include the *Pipelines Safety Regulations (PSR) 1996*. PSR covers all pipelines and require that the integrity of pipelines is ensured by their safe design, construction, installation, operation, maintenance and abandonment. Clause 31 in the HSE document L82, titled '*A guide to the Pipelines Safety Regulations 1996*. *Guidance on Regulations*' states:

'<u>The design and location of the pipeline should take account of the hazard</u> <u>potential of the fluid being conveyed</u>. Consideration should be given to routes which will minimise the possibility of external damage. Extra protection may be required to prevent damage from other conditions such as road and river crossings, long self-supported spans and structural movements.'

 Chapter 20 in H2 Teesside Limited's ES titled 'Major accidents and disasters' states:

'The Hydrogen Pipelines are being designed to IGEM/TD/1 Ed.6, including Supplement 2. ASME B31.12, which are the two most prominent Hydrogen Pipeline design codes.'

• With reference to American Society of Mechanical Engineers (ASME) B31.12 titled '*Hydrogen piping and pipelines*'. Clause GR-5.2.4 is headed '*Prevention of Accidental Ignition*' and states:

<sup>6</sup>Smoking, open flames, and <u>spark-producing devices shall be prohibited in</u> <u>and around structures or areas</u> that are under the control of the operating company and contain hydrogen facilities (such as compressor stations, meter and regulator stations, and <u>other hydrogen-handling equipment</u>) where possible leakage of hydrogen constitutes a hazard of fire or explosion.<sup>2</sup>

• The European Industrial Gases Association (EIGA) document 121/14 titled *'Hydrogen pipeline systems'* states in clause 4.7:

Siting of hydrogen systems must be carefully studied, especially at points where venting to atmosphere may occur, for example valve stations, vents, drains, safety valves, etc.

The location of potential vent sites should be chosen with care and, in so far as is practical, to avoid the immediate proximity of vulnerable areas and equipment <u>such as electrical equipment</u>, flammable product storage tanks, public roads, public buildings, car parks and transfer stations.'

• The British Standard for onshore pipelines, PD 8010:Part 1:2015, titled '*Pipeline* systems. Steel pipelines on land. Code of practice' provides some useful guidance on the siting of AGIs in clause 7.1 titled 'Selection of location' and states:

'In selecting the locations for stations and terminals on land, account should be taken of factors including, but not limited to:

. . . .

*h)* hazards from other activities and adjacent property;

. . . .

j) anticipated developments.'

• Clause 13.3.6.3 in PD 8010:Part 1:2015 covers 'Venting and flaring' and states:

'Hazards and constraints that should be taken into account when planning to vent or flare include:

. . . .

*b)* ignition of gases <u>by stray currents, static electricity or other potential</u> <u>ignition sources;</u>

....,

#### 7.2 **Operational Aspects**

- 7.2.1 Hydrogen pipelines and HV electrical systems have significant inherent dangers and the interactions between the two systems will need to be fully understood to enable them to be operated in close proximity. Any distances or mitigation required to enable safe operation of plant regarding impressed voltages and earthing etc. will need to be determined and understood before any designs can be developed for both networks.
- 7.2.2 Saltholme is a National Electricity Transmission System (NETS) substation with significant importance to the electricity distribution to the wider area of North Teesside. The introduction of a significant hazard which could catastrophically impact the substation needs to be carefully considered and fully understood.

#### 7.3 Electrical interference

Impressed voltage (Information taken from NGET guidance note: TGN287)

7.3.1 Any conducting materials installed near HV equipment could be raised to an elevated voltage compared to the local earth, even when there is no direct contact with the HV equipment. These impressed voltages are caused by inductive or capacitive coupling between the HV equipment and nearby conducting materials and can occur at distances several metres away from the equipment. Impressed voltages may damage equipment and could potentially injure people and animals, depending on their severity. Third parties should take impressed voltages into account during the early stages and initial design of any development, ensuring that all structures and equipment are adequately earthed at all times.

#### 7.4 OHL maintenance activities

#### Maintenance access (Information taken from NGET guidance note: TGN287)

- 7.4.1 NGET needs to have safe unobstructed access for vehicles around its assets at all times and work that restricts this will not be allowed.
- 7.4.2 In terms of OHLs, excavations or permanent structures built in close vicinity off OHLs that might affect the foundations of the pylons are prohibited. The size of the foundations around a pylon base depends on the type of pylon. NGET should be contacted prior to any works being undertaken within 30m of a pylon for more information. NGET has to maintain access routes to pylon bases with landowners. For that reason, a route wide enough for a Heavy Goods Vehicle (HGV) must be permanently available. NGET may need to access our sites, pylons, conductors and underground cables at short notice.
- 7.4.3 Figures 9 and 10 show the work areas required around the OHLs.

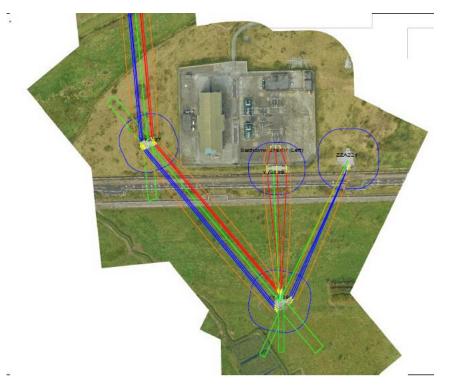


Figure 9 OHL work requirements

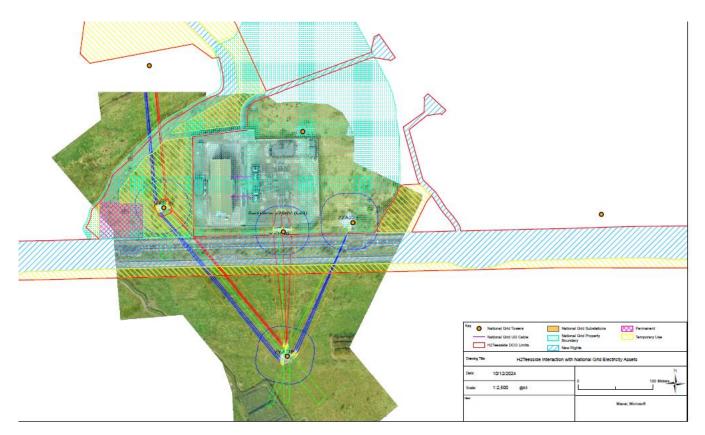


Figure 10 OHL work requirements

#### **Electrical clearance from OHLs**

- 7.4.4 The clearance distances referred to in this section are specific to 400kV OHLs. NGET can advise on the distances required around different voltages, i.e. 132kV and 275kV.
- 7.4.5 ENA TS 43-8 details the legal clearances to OHLs. The minimum clearance between the conductors of an OHL and the ground is 7.3m at maximum 'sag'. The 'sag' is the vertical distance between the conductor's highest and lowest point. Certain conditions, such as power flow, wind speed and air temperature can cause conductors to move and allowances should be made for this.

#### 7.5 **OHL interaction and pipelines**

- 7.5.1 Pipelines running parallel to OHLs can experience possible interactions particularly with the pipeline corrosion protection arrangements. Pipeline standards include rigorous mandatory requirements to avoid this, which can impact the level of corrosion experienced on the pipeline and in the worst case scenario lead to a release of hydrogen from the pipeline system with associated impacts on the OHLs.
- 7.5.2 Another aspect of this, is the possibility of any issues between the earthing systems on the substations or associated with the OHLs which could affect the pipeline corrosion protection system.
- 7.5.3 Section 10 in the Institution of Gas Engineers and Managers (IGEM) standard IGEM/TD/1:Edition 6, titled 'Steel pipelines for high pressure gas transmission' covers 'Protection against corrosion'. In the sub section titled 'Special situations', clause 10.2.1 is headed 'Avoidance of know corrosion hazards' and states:

<sup>•</sup><u>At the route planning stage</u>, consideration shall be given to the avoidance of the more obvious corrosion hazards, for example by routing to avoid:

. . . .

paralleling of high voltage AC/DC overhead or buried power lines

electricity towers (pylons)

.....'

Clause 10.4.3 in IGEM/TD/1:Edition 6 is titled '*AC corrosion*' and states:

'When pipelines are routed parallel to overhead high voltage power lines, voltages and current can be induced into the buried pipeline. Long parallelisms with overhead power lines of 132 kV or greater should be avoided or at least minimized.'

 BS PD 8010:Part 1:2015 provides guidance on corrosion management in section 9 and clause 9.4.1 covers some general aspects of corrosion and states:

'Pipelines should be designed and routed to take account of the possible corrosive effects of contaminated or industrial waste ground, naturally aggressive ground, parallelism with a.c. power lines or cables, pylons and stray d.c. earth currents.'

#### 7.6 **Pipeline construction activities**

7.6.1 Some kind of lifting arrangements are typically used during pipeline construction activities to either unload sections of pipe or equipment, locate equipment in sections of pipework as part of assembly operations, lowering pipe into a below ground trench, to lift pipe onto suitable supports if installed above ground etc. This is confirmed from clause 5.3.37 in Chapter 5 of H2 Teesside Limited's ES titled 'Construction Programme and Management' which states:

'Existing pipework and other infrastructure will limit the available working space at various locations on the pipeline route. It is difficult to define an exact working area and methodology at all locations due to these restrictions, but generally <u>it is anticipated that cranes will be used to lift sections of new pipeline into position</u> with temporary crash decks used to protect existing pipelines during these operations.'

7.6.2 NGET are concerned about lifting activities in close proximity to the existing OHLs and the risk that a crane could either damage an OHL when working underneath/nearby or a crane could touch an OHL and cause an injury to the construction staff below. All lifting operations will need to be planned in detail and supervised by the H2 Teesside Limited's construction team. NGET are keen to understand the construction philosophy proposed around the OHLs and what mitigation measures are being planned to ensure no damage is caused by the construction activities.

#### 7.7 **Possible interaction between parallel pipelines**

7.7.1 H2 Teesside Limited's document 5.5 titled 'Pipelines Statement' makes several references to the use of an existing 'Linkline corridor' which runs to the south of the existing Saltholme substation. This is confirmed in Chapter 5 of the ES titled 'Construction Programme and Management' and clause 5.3.36 states:

'It is anticipated that new pipelines will be installed in parallel and working to one side of the existing pipelines.'

- 7.7.2 There is potential interaction between the above ground pipelines located in the 'Linkline corridor' and running in parallel if a failure scenario is experienced which could contribute to escalating the situation into a major emergency (i.e. 'domino effect') with an impact on the substations and associated OHLs.
- 7.7.3 Clause 6.11.1 in IGEM/TD/1:Edition 6 is titled 'Pipelines running parallel to other major pipelines' and states:

'Where practical, <u>new pipelines should be routed to avoid close proximity when</u> <u>running parallel with existing major accident hazard pipelines</u> (see clause 4.1.2). Where this is impractical, construction of a new pipeline in parallel with an existing one is acceptable where a sufficient separation distance between the two pipelines can be maintained to limit the possibility of interaction and escalation in the event of a failure.' 7.7.4 The increasing number of parallel pipelines located in the 'Linkline corridor' creates additional risks to NGET (and NPG) staff in attendance at the substation and impact on the NETS from the security of supply perspective. NGET were unable to locate any information regarding the level of risk from the parallel pipelines and how these risks would be managed and mitigated, noting that a Quantified Risk Assessment (QRA) is required to evaluate the risk and ensure it is ALARP.

#### 7.8 Existing underground services

7.8.1 The power station located to the north west of Saltholme substation has a 132kV buried cable connection to the existing substation that crosses the proposed hydrogen pipeline route. Records will need to be consulted and below ground scanning completed as part of further development in this area to accurately locate the route. Historical mapping indicates the cable route disturbance in the field can be identified and is shown in Figure 11 below.



Figure 11 Route of power station buried cable

**7.8.2** Site drainage at Saltholme substation is very complex (Reference Figure 12 below). There is potential interaction with the drainage system with the proposed hydrogen pipeline route to the north west.

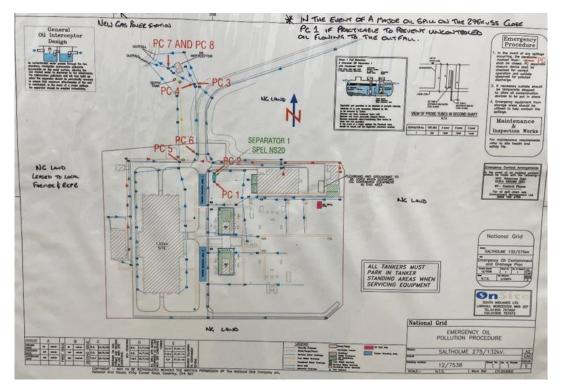


Figure 12 Substation site drainage details

#### 7.9 **Fires and firefighting**

- 7.9.1 (Information taken from NGET guidance note: TGN287) NGET does not recommend that any type of flammable material is stored under OHLs. Developers should be aware that in certain cases the local fire authority will not use water hoses to put out a fire if there are live, HV conductors within 30m of the seat of the fire (as outlined in ENA TS 43-8).
- 7.9.2 In these situations, NGET would have to be notified and reconfigure the system to allow staff to switch out the OHL affected before any firefighting could take place. This could take several hours and potentially impacts the electrical supply to customers in the area.

#### 7.10 Access Road

- 7.10.1 Currently there is no access road from our main substation access gate heading west to the proposed AGI and proposed pipeline route. A new road would need to be constructed to enable proposed access. The proposed access road would lead to extensive land sterilisation for future expansion. If new access roads were required, responsibilities for construction and future management would need to be resolved. Any future Occupier Duties responsibilities would need to be determined for any proposed access roads.
- 7.10.2 Irrespective of any expansion of Saltholme substation, NGET is concerned as to the highway improvement works proposed to be undertaken pursuant to Work No. 10A.1 and the permanent rights sought to be acquired by the Applicant in relation to the same ("....the right to create, maintain or improve accesses and a right for the undertaker and all persons authorised on its behalf to enter, pass and re-pass, on foot, with or without vehicles, plant, machinery and equipment, at all times and for all purposes in connection with the laying, installation, use and maintenance of the authorised development, along with the right to prevent any works on or uses of the land which may interfere with or obstruct access from and to the authorised development....").
- 7.10.3 The access road to which Work No. 10A.1 relates is also the primary access route into the Saltholme substation and, therefore, is in frequent use.
- 7.10.4 Not only would the nature of rights sought by the Applicant lead to a greater frequency of competing use of that access road in connection with the Project (and potential disturbance in terms of NGET's own access), but the acquisition of those rights could also be said to create a ransom position insofar as the Applicant would assume sole control over the functioning of the access road and would in effect be entitled to conclude, potentially without justification, that NGET's use amounted to an interference with its own use of the road. There can be no good reason why NGET should be exposed to such a risk.
- **7.10.5** There is also currently no indication as to how access to the substation would be maintained for a temporary period whilst works to improve the existing access are undertaken by the Applicant.

#### 7.11 Security

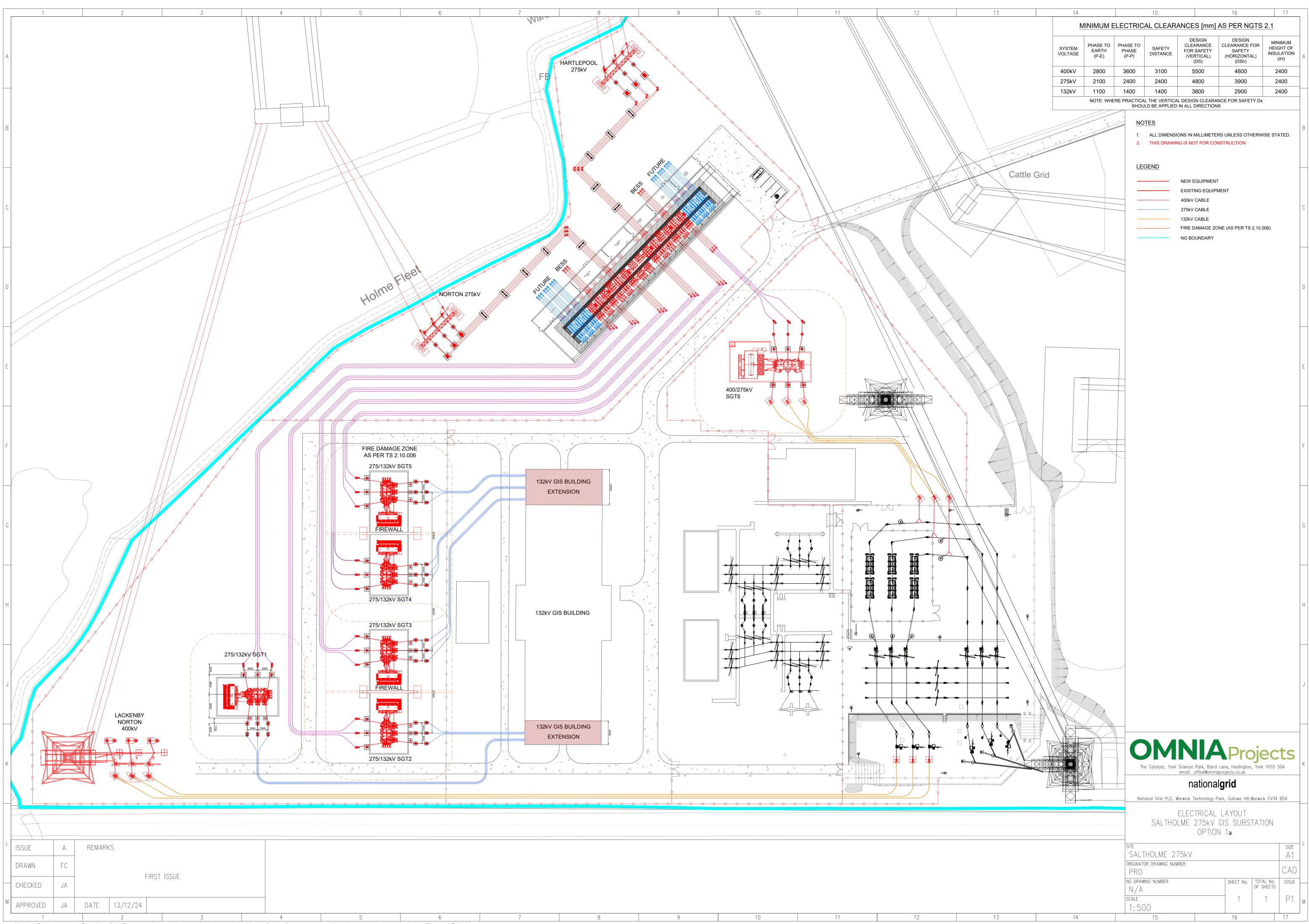
7.11.1 The proposed access road proximity to the substation and the extension needs to ensure there are not likely to be any security issues and that due consideration has been given to vehicles inadvertently leaving the proposed access road and driving into the substation and causing damage to the security fencing etc.

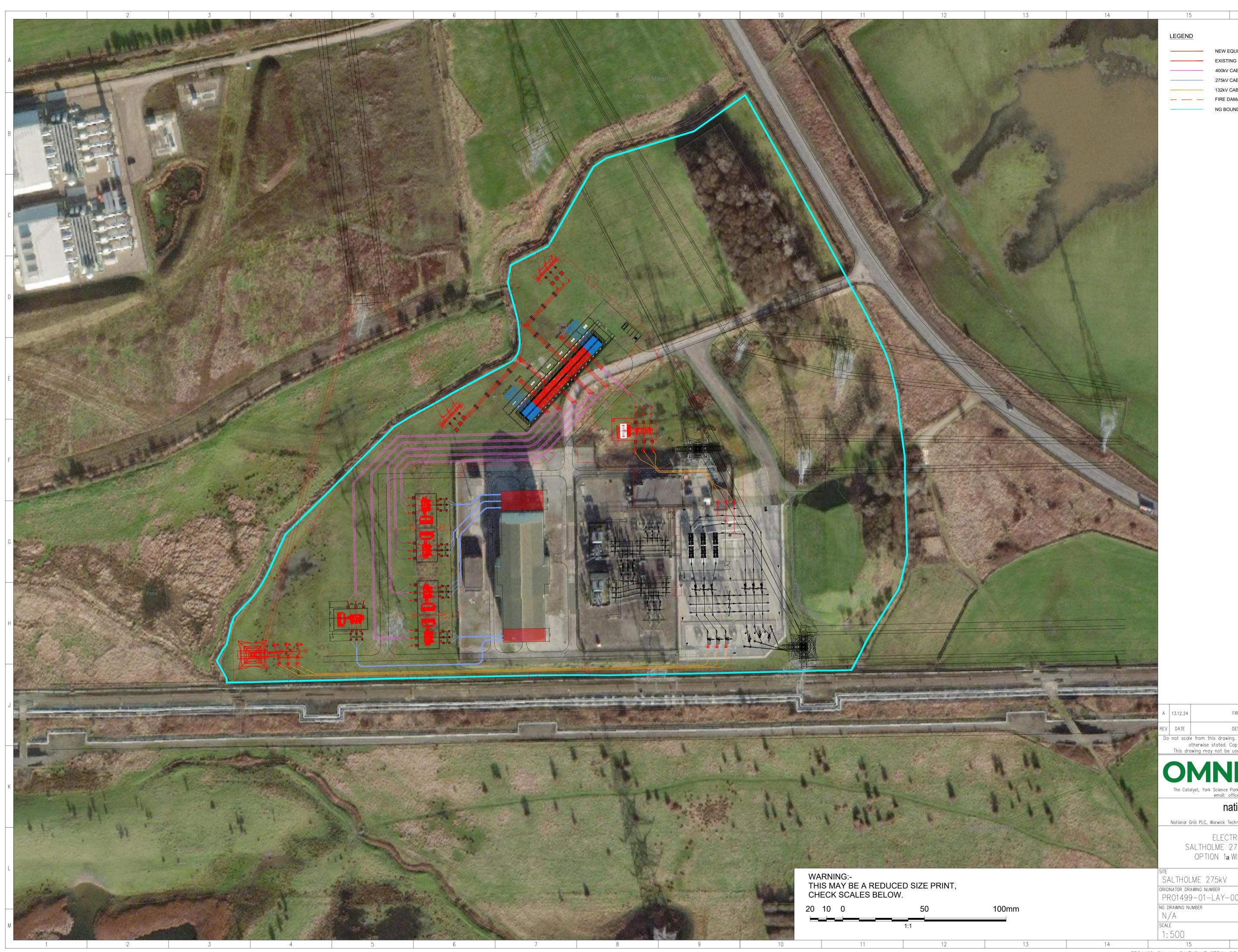
## 8. Conclusion

- 8.1 Whilst extensive, NGET considers that the concerns outlined in Part B of this Engineering Constraints Report remain capable of being largely addressed and mitigated through Protective Provisions and, where necessary, further contractual obligations agreed to by the Applicant.
- 8.2 However, NGET contends that it is essential that the current deficiencies in the Protective Provisions are addressed to its satisfaction to ensure adequate protection for NGET's existing apparatus and land rights.
- 8.3 NGET would welcome further prompt and substantive engagement from the Applicant on these matters.

### Appendix A Plans and drawings

Plans and drawings - Option 1a





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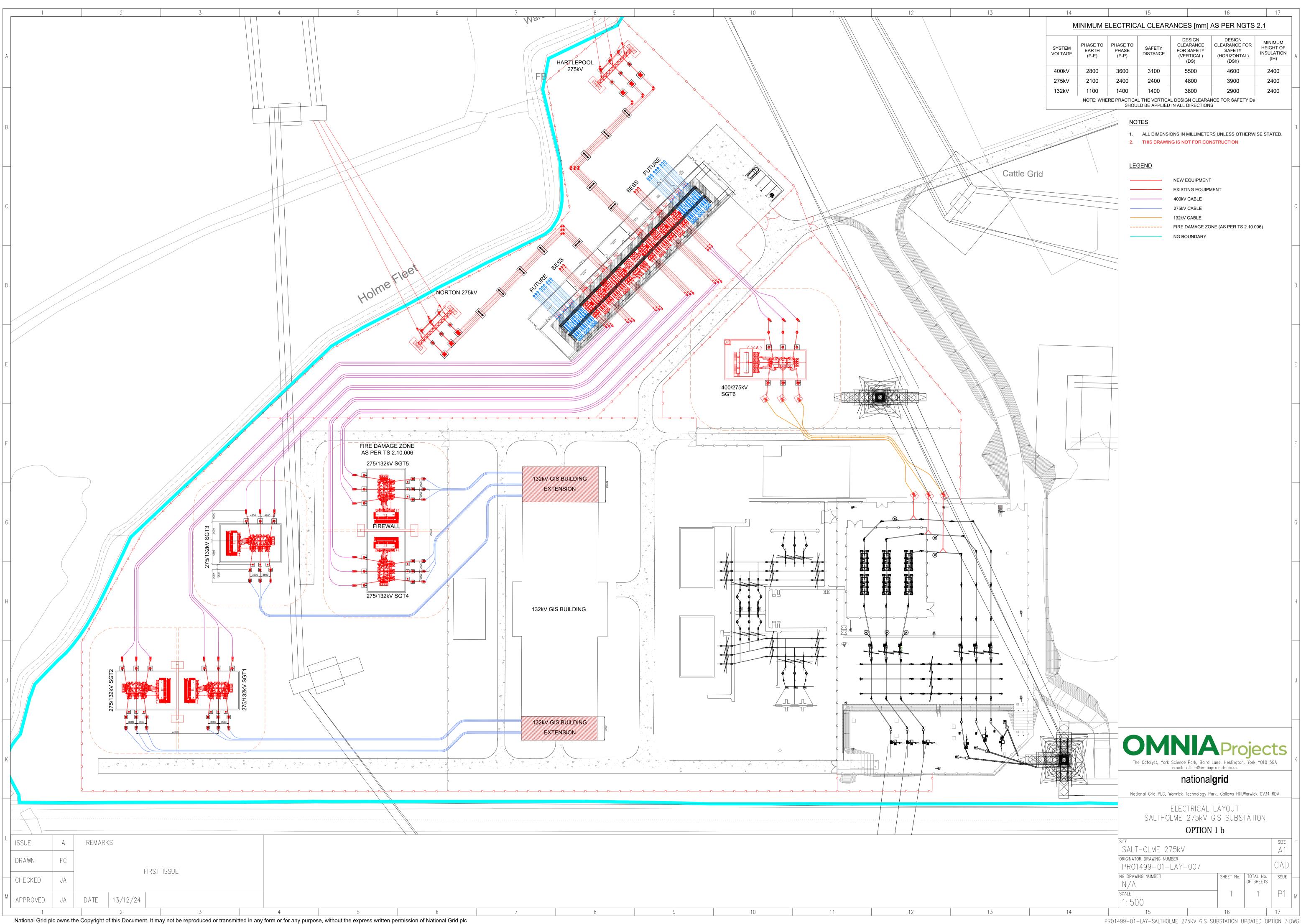


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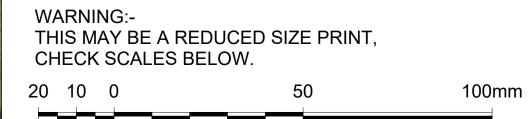
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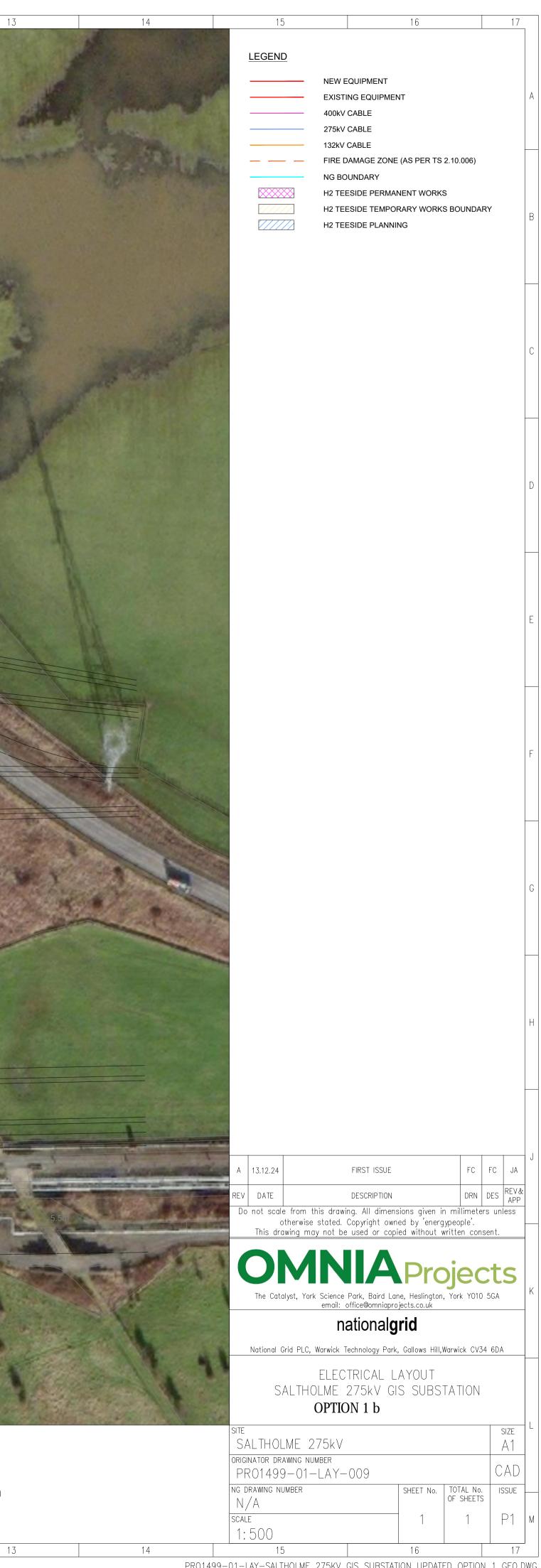
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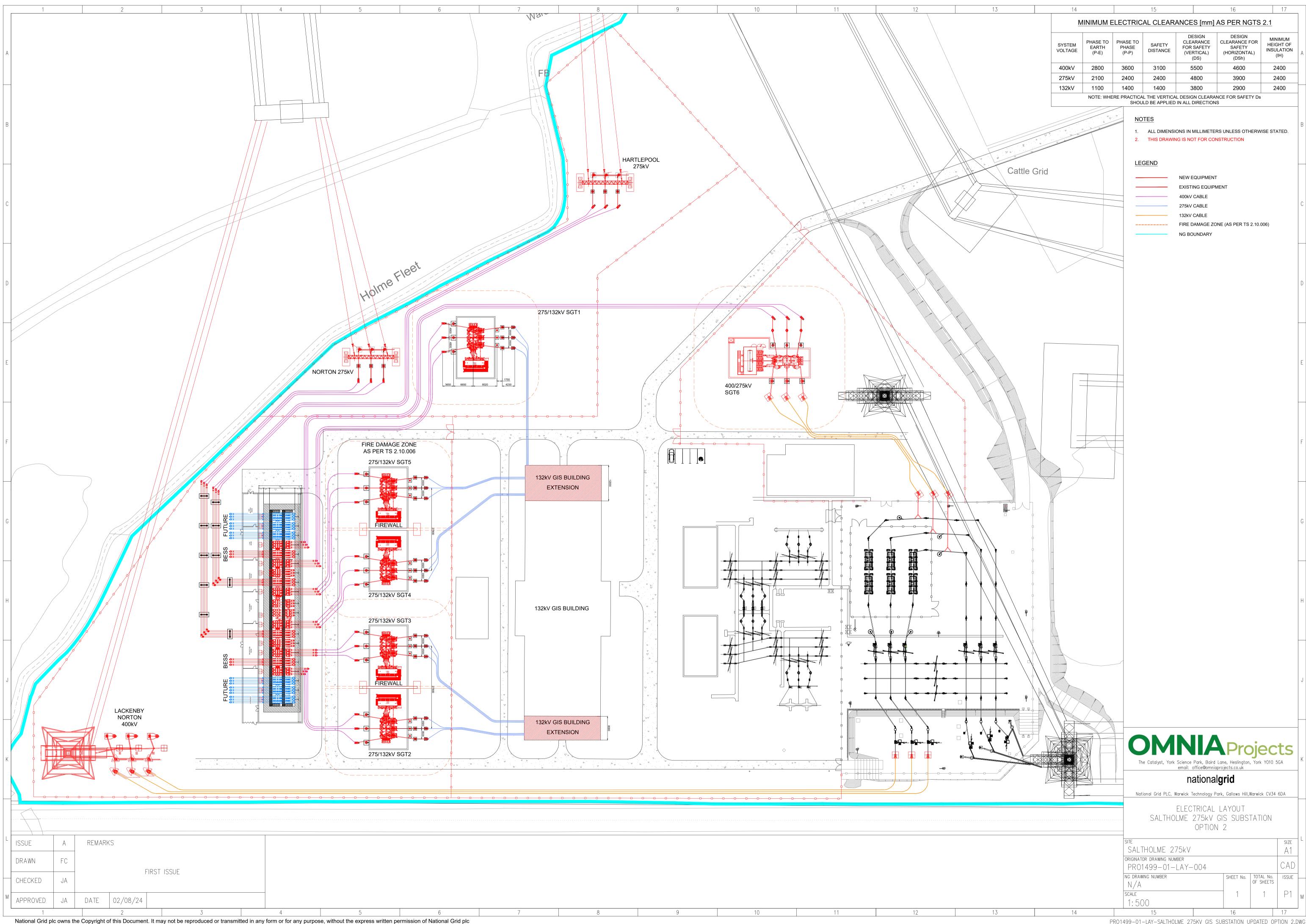
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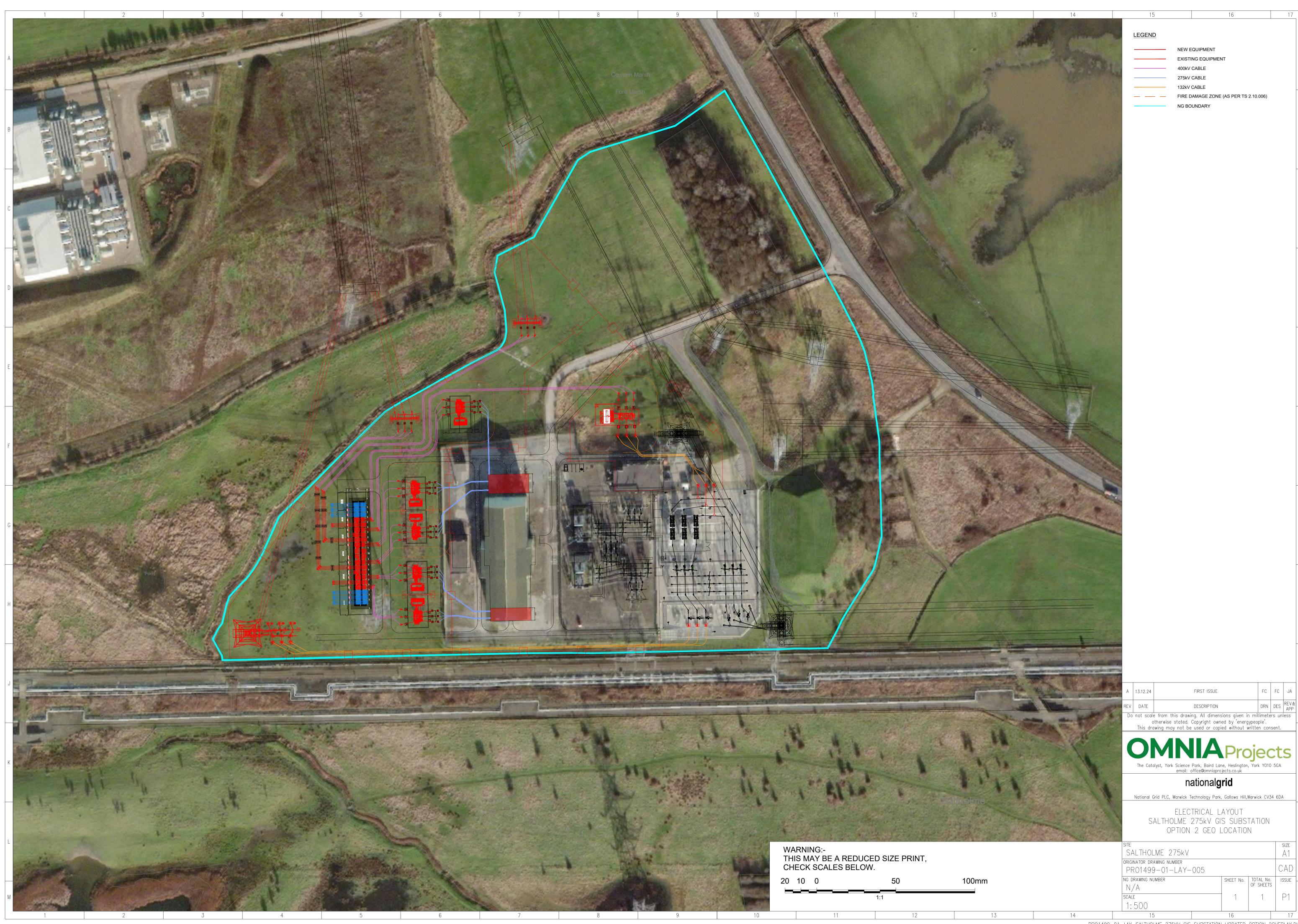


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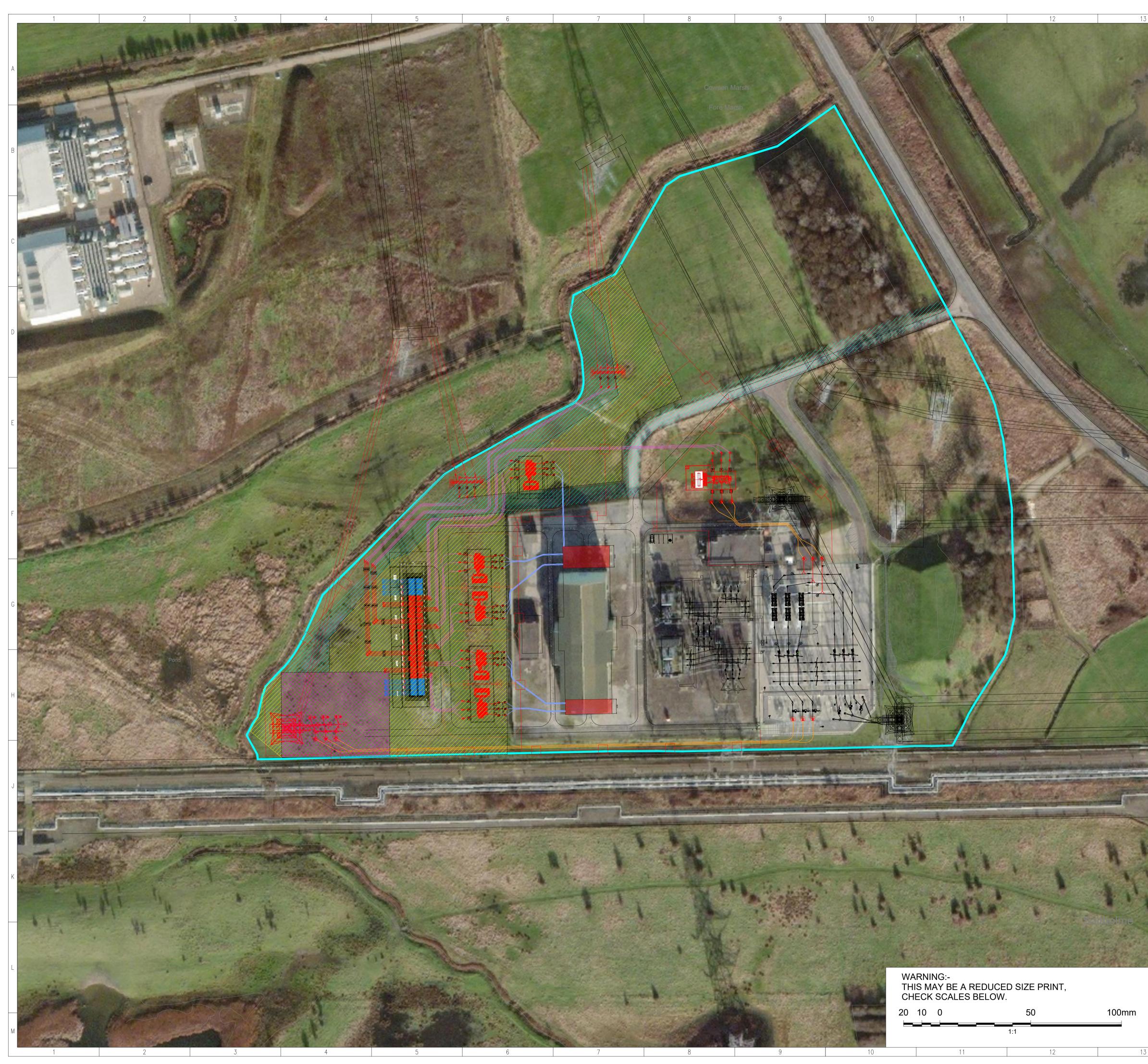


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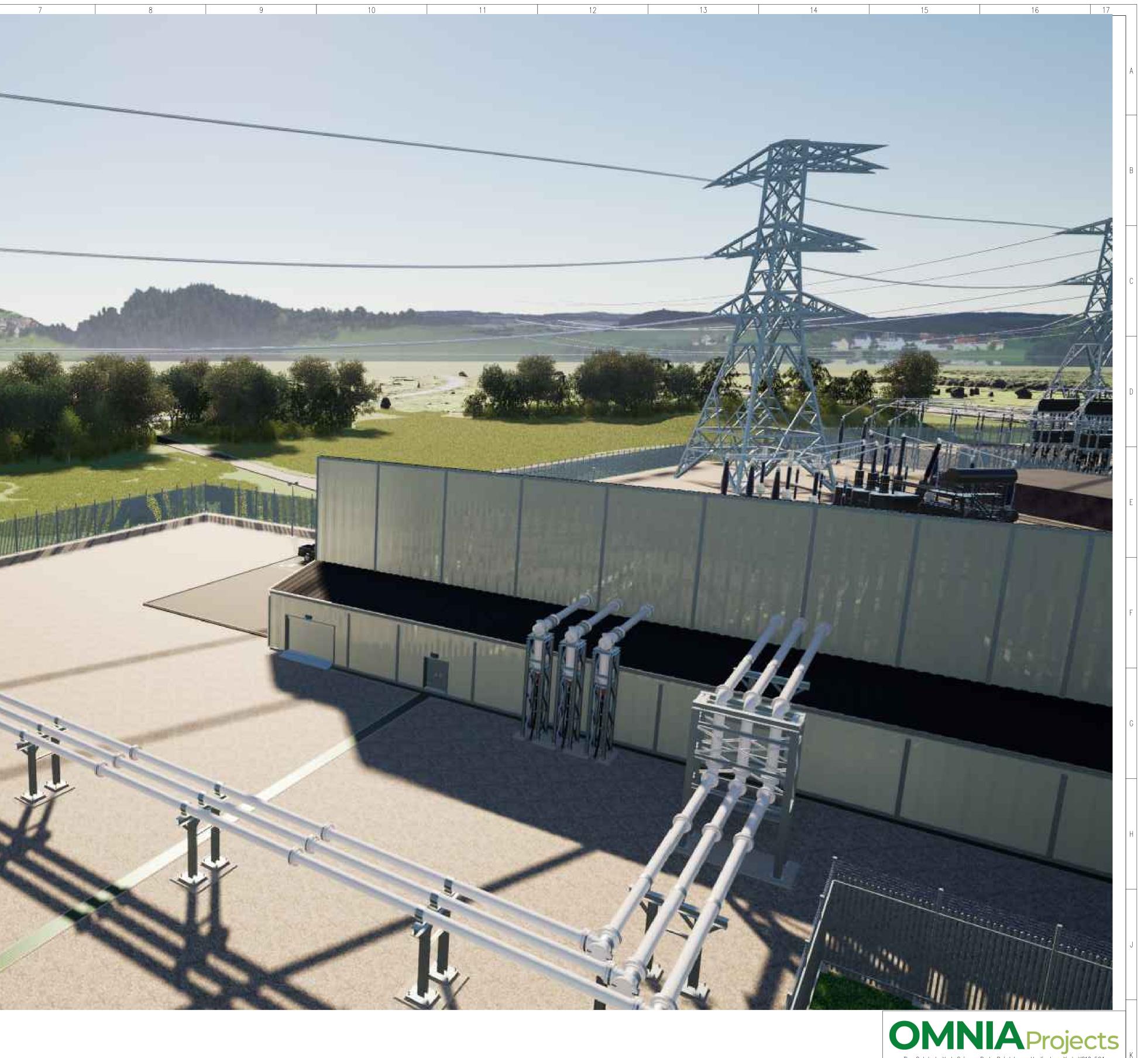
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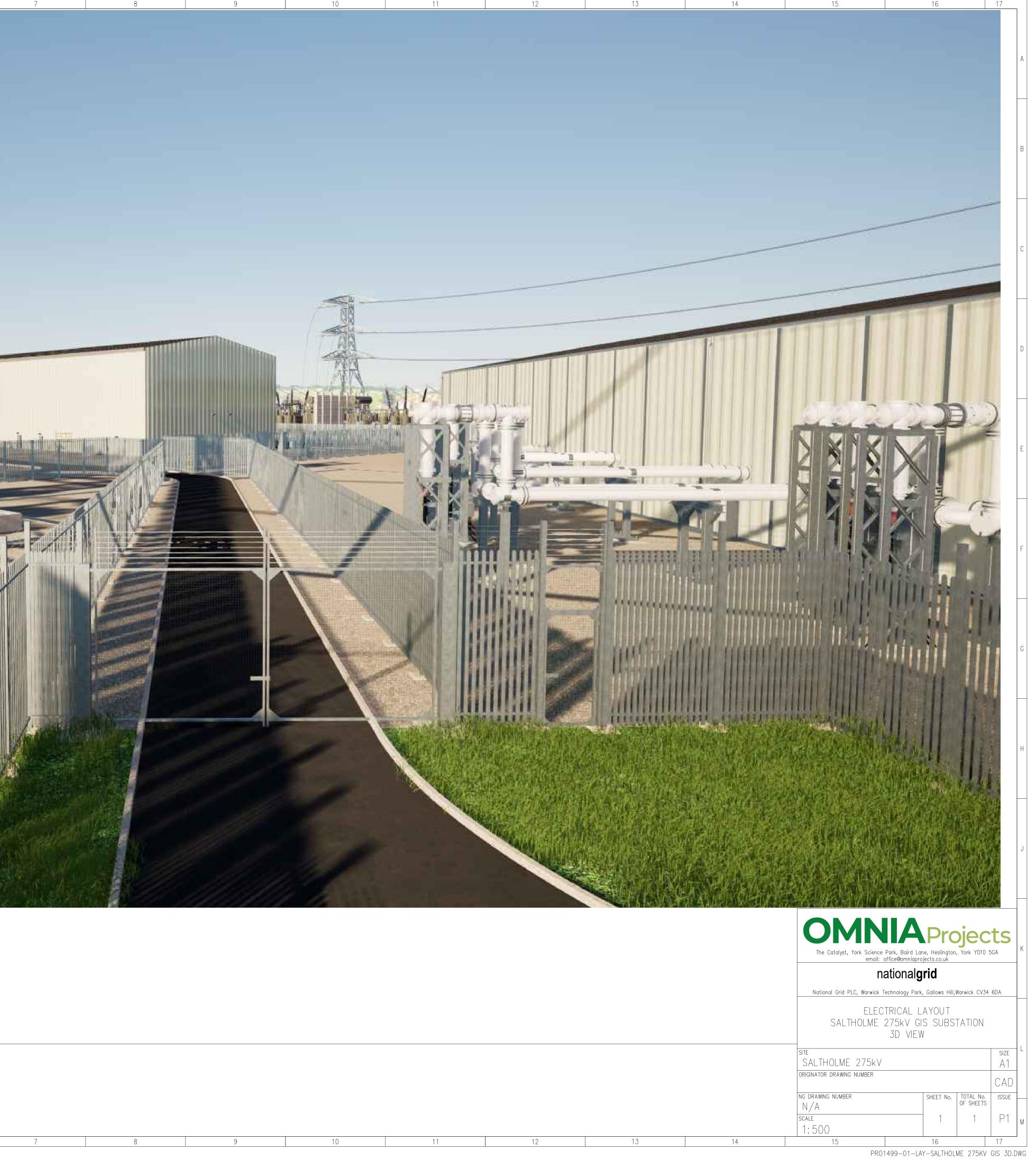
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#### Appendix 2

#### **Constraints Assessment**

# Saltholme Substation High level Constraints Assessment

December 2024

# national**grid**

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Figure 2.1 – Aerial image of the constraints search area within a 1km (green circle buffer) and 1km either side of the OHL within 2km (orange buffer) 5

Figure 2.2 – Location Plan of the existing Saltholme 275kV substation

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# 1. Introduction

The purpose of this note is to provide a high-level analysis (based on a desktop study using public domain information) of the options to develop additional substation capacity at National Grid's Saltholme substation.

### **1.1 Background to the Development of Substation Projects**

- **1.1.1** National Grid Electricity Transmission's (NGET's) Approach to Consenting outlines the project development process for major infrastructure projects including substations, from initial inception to consent and construction. Its aim is to allow NGET to fulfil its statutory duties and to support the UK Government's goal to achieve net zero carbon by 2050. It encourages the development of NGET projects in the most efficient, sustainable and cost-effective way to achieve consent, whilst at the same time maintaining the highest standards of design, stakeholder engagement and environmental protection.
- **1.1.2** In developing proposals for substation developments, NGET follows a sequential approach to ensure that the works are economic and efficient and in compliance with our Schedule 9 duties to have regard to the preservation of Amenity. How we comply with schedule 9 duties is set out in our "*Our stakeholder, community and amenity policy*" https://www.nationalgrid.com/electricity-transmission/document/81026/download.
- **1.1.3** NGET also develops new infrastructure projects having regard to established guidance on the "*Holford Rules*" for Over Head Lines (OHLs) and the "*Horlock Rules*" for substations which are recognised in the National Policy Statement NPS EN-5 with regards to electricity Infrastructure.

### 1.2 **Options Appraisal**

- **1.2.1** Options Appraisal is used by NGET to consider the implications of the selection of certain options in developing their infrastructure projects.
- **1.2.2** Options Appraisal includes assessment of the following considerations:
  - Environmental: Landscape and Visual Amenity; Ecology; Historic Environment; Local Air Quality; Noise and Vibration; Soils and Geology; Water
  - Socio-economic: Economic Activity; Traffic and Transport; Aviation and Defence
  - Technical: Technical Complexity; Construction/Project delivery (including resource use and waste); Suitability of Technology; Network Capacity; Network efficiency/benefits (which includes energy efficiency)
  - Cost: Capital cost; and Lifetime cost
- **1.2.3** Our first starting point is therefore to identify the:
  - need for development system, asset replacement or customer need

- the size and scale of development
- the timescale for development
- **1.2.4** The location for the development is the next question addressed:
  - 1. Is there space to build within an existing substation compound if not:
  - 2. Has NGET got land around an existing substation to extend the compound or build a new substation if not:
  - 3. Conduct a substation siting study for a new greenfield substation site.
- **1.2.5** Where Option 3 is taken forward a robust siting study process has to be followed to support a planning submission and the Compulsory Acquisition of land where this is required. In the majority of new substation projects it is necessary to progress with a Compulsory Purchase Order (CPO) to ensure that land can be in place to meet the required substation construction dates.
- **1.2.6** Developing at an existing substation site is National Grid's preference wherever possible for the following reasons:

#### Land

- Land already owned by NGET is available
- Third party land acquisition, and cost to buy land (cost to consumer), is not required
- A CPO to acquire additional land is not required

#### Planning

- Developing at a site with an established "electricity" use
- Aggregating "*electricity*" development together to minimise introducing new infrastructure into new areas
- Overall developable area likely to be smaller as existing site, access, facilities and utilities are available

#### Engineering

- Development can link into existing site utilities (drainage, earthing systems, power supplies)
- Existing highways access for large loads (Abnormal Indivisible Loads (AILs)) available
- Connection to existing transmission network available reducing need for additional pylons and OHLs

#### **Cost and Efficiency**

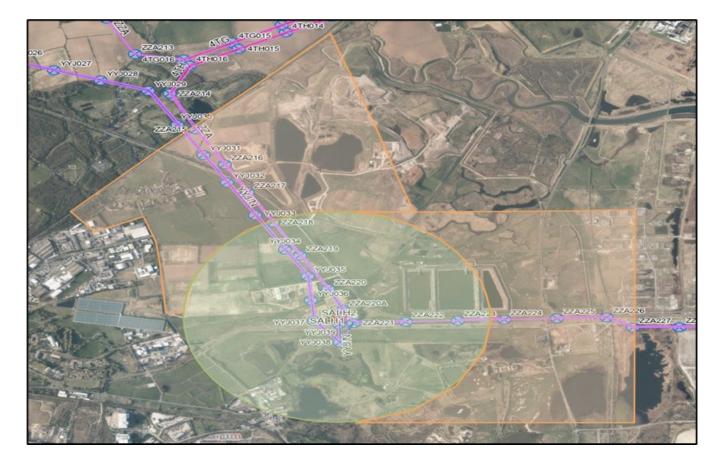
- No land acquisition costs
- Quicker to consent as a CPO will not be required
- Use of existing access existing site, access, facilities and utilities less civil costs
- More certainty over delivery because not reliant on third party land acquisition

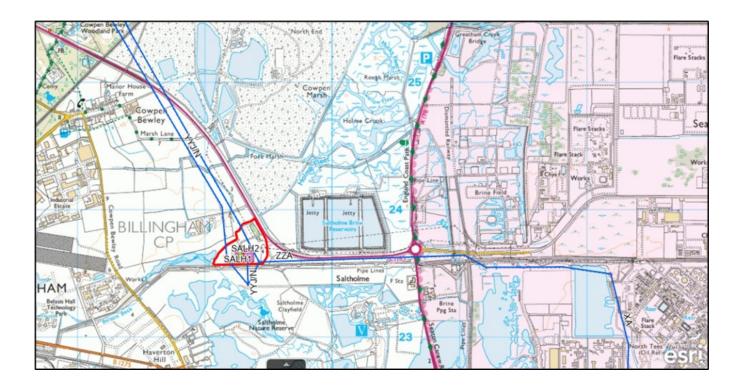
# 2. Saltholme Substation.

## 2.1 Constraints

- 2.1.1 A desktop constraints mapping exercise has been undertaken to identify the availability of potential alternative sites to provide for the expansion of substation capacity near to the existing site if land owned by NGET were to be constrained by the proposed H2Teesside project with the planned hydrogen pipeline system and associated Above Ground Installation (AGI).
- 2.1.2 A study area of 2km to the north and east of the existing substation location along the connecting OHLs and 1km from existing OHLs was used, this is shown in Figure 1 below. The extent of the study area is by necessity limited due to the requirements for any new substation site to connect into the existing NGET OHLs, and the existing Northern Power Grid (NPG) distribution substation at Saltholme.

# Figure 2.1 – Aerial image of the constraints search area within a 1km (green circle buffer) and 1km either side of the OHL within 2km (orange buffer)





#### Figure 2.2 – Location Plan of the existing Saltholme 275kV substation

### 2.2 Environmental Constraints

**2.2.1** National and local environmental constraints information was identified by review of the Stockton-on-Tees Adopted Local Plan and proposals map together with public domain Geographic Information System (GIS) sources such as magic.gov.uk.

### 2.3 Ecological Constraints

- 2.3.1 In site selection NGET seek to avoid internationally and nationally designated sites and nature conservation areas. Siting of a substation near to these areas would require further environmental survey works to determine potential impacts and whether these could be mitigated.
- 2.3.2 Land immediately to the south, west and north west of the existing site has both International (Ramsar and Special Protection Area (SPA)) and National designations (Sites of Special Scientific Interest (SSSI)) such that developing a new substation adjacent to NGET's land would not be possible. Land within NGET's landholding does not have these designations.
- **2.3.3** Outside of the designated sites and close to the existing substation the land is identified as high priority habitat which would represent a considerable consenting risk due to the unlikeliness of achieving consent within or near to these areas. It would also impact the requirement for Biodiversity Net Gain (BNG) and make the value of any compensation considerably higher.

- **2.3.4** Land to the south, north and west of the existing Saltholme substation site are managed for nature conservation purposes and form part of land and Nature Reserves at Royal Society for the Protection of Birds (RSPB) Salholme.
- **2.3.5** Developing on NGET's own land at Saltholme substation would have the least ecological impact.
- **2.3.6** Any development in this area is likely to require a Habitat Regulations Assessment (HRA) to consider the impact of the proposals on European sites and this would include the consideration of alternatives.

The table below show locations of ecological designations identified in the locality.

Saltholme Substation in all the below figures is edged red for reference.



#### Table 2.1 – Ecological designations identified in the locality

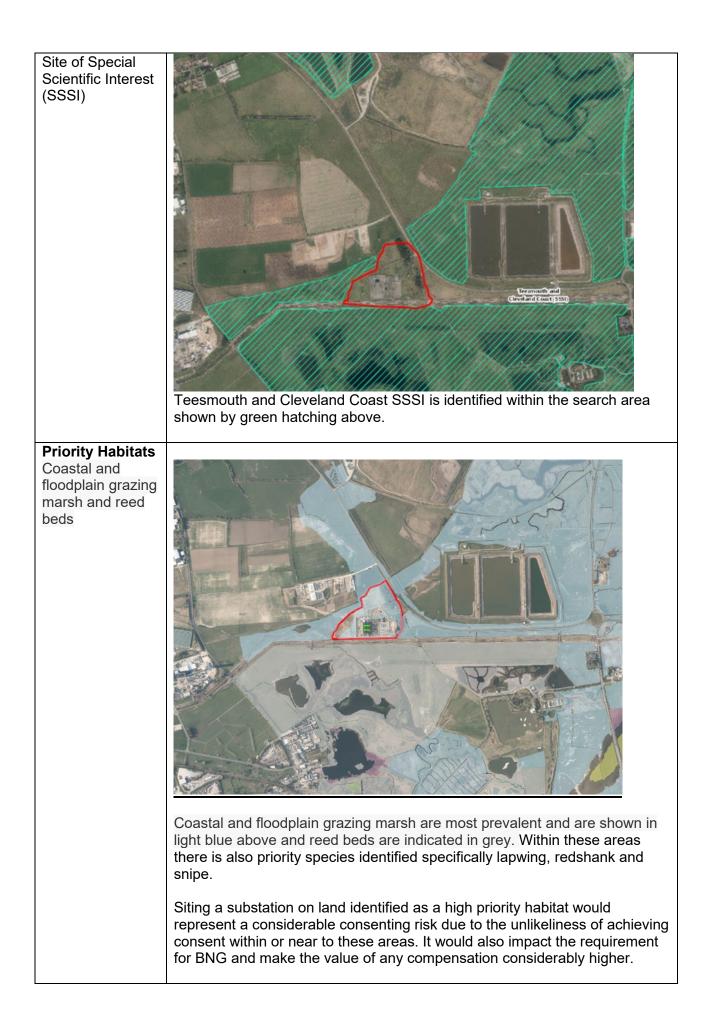
Ramsar and Proposed Ramsar Site

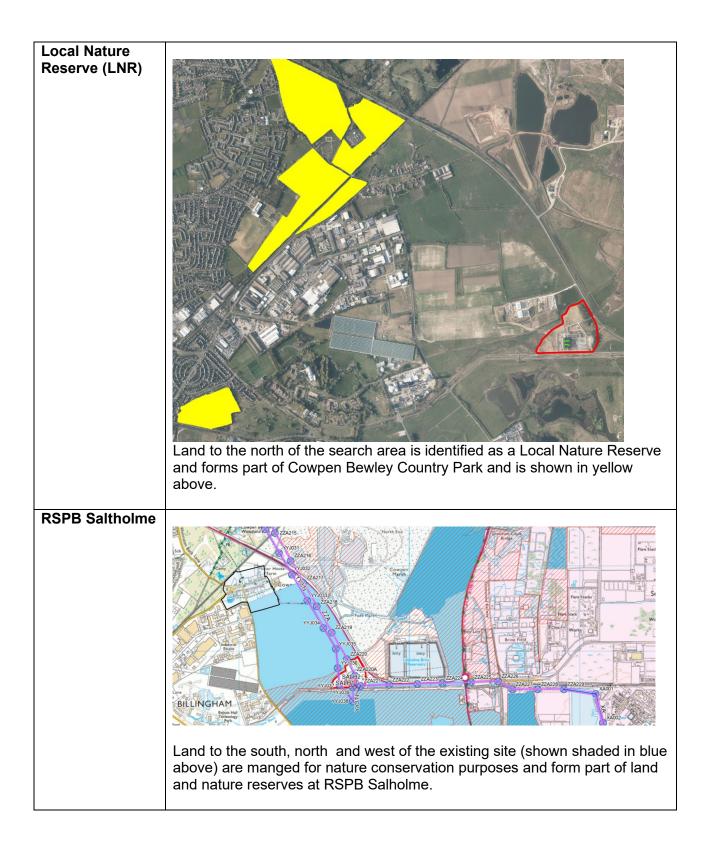


designated as '*Ramsar*' sites which are shown as green above. *The Convention on Wetlands of International Importance* (RAMSAR sites) are protected under Habitat 1971 (the *Ramsar Convention*) and are commonly inhabited by birds. Assessment of the implications of plans and projects is effected through Part 6 of the *Conservation of Habitats and Species Regulations 2017 (as amended)*, in particular Regulations 61 – 69.

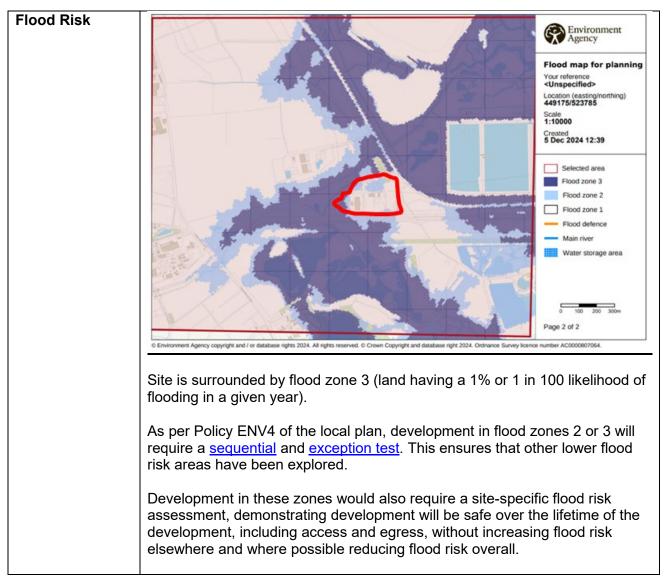
A Natural England report (2019) looked at amending the boundary and extend the existing Ramsar Site from 1,253.76 ha, consisting of wetland and coastal habitats, to include an additional 840.24 ha of wetland areas (shown below as a hatched area).





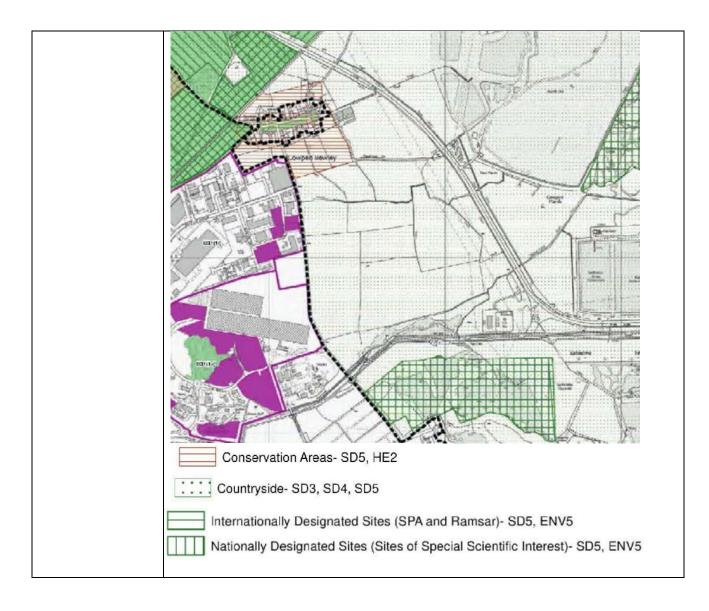


#### Table 2.2 – Flood Risk



#### Table 2.3 – Local Plan

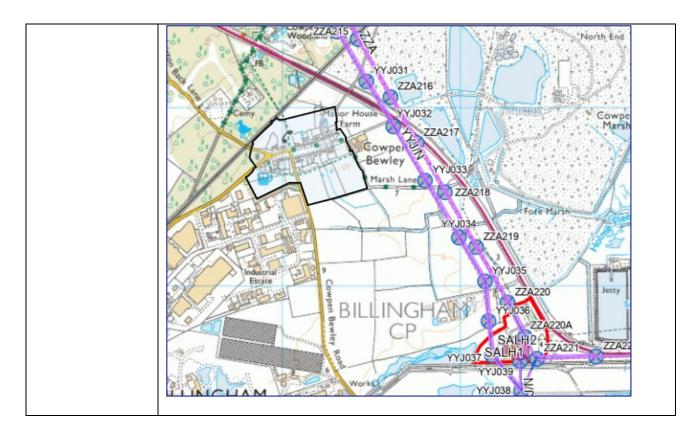
Stockton-on-Tees	The current Stockton-on-Tees District Council's Local plan policies map
local plan policies	shows the substation to be in close proximity to both Internationally
map	Designated Sites (SPA and RAMSAR) and Nationally Designated Sites
<u>Stockton-on-Tees</u>	(SSSI) for which SD5 and ENV5 policies apply. These areas must be
Borough Council	avoided.
Local Plan adopted 30 <sup>th</sup> January 2019	<ul> <li>Policy SD5 - Natural, Built and Historic Environment: To ensure the conservation and enhancement of the environment alongside meeting the challenge of climate change</li> <li>Policy ENV5 - Preserve, Protect and Enhance Ecological Networks, Biodiversity and Geodiversity</li> <li>Policy SD3, SD4 and SD5 - Countryside related</li> </ul> Reference graphic below.



## 2.4 Historic Environment

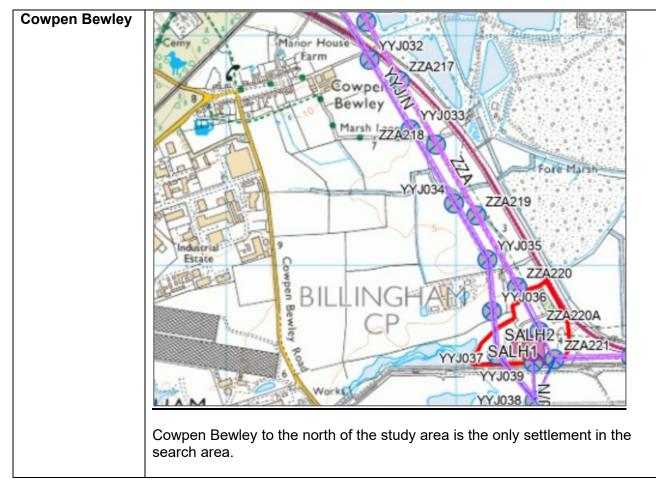
#### Table 2.4 – Conservation Area

Conservation Area	The conservation area at Cowpen Bewley village to the north of the search area is the only significant historic designation. There are also records of local heritage assets in the area (identified in the H2Teesside project's Environmental Statement (ES)).
	Reference area with the black outline in the graphic below.



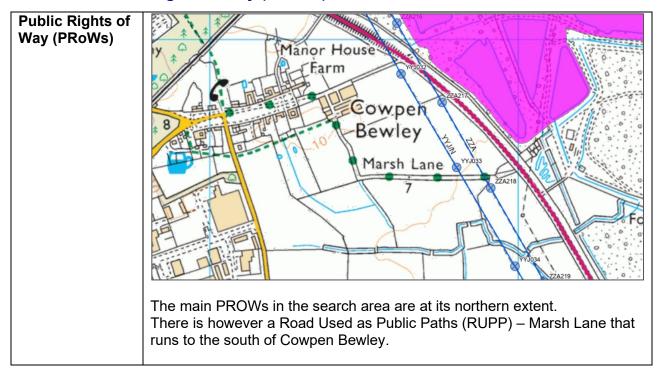
### 2.5 **Residential Properties**

#### Table 2.5 – Residential Properties

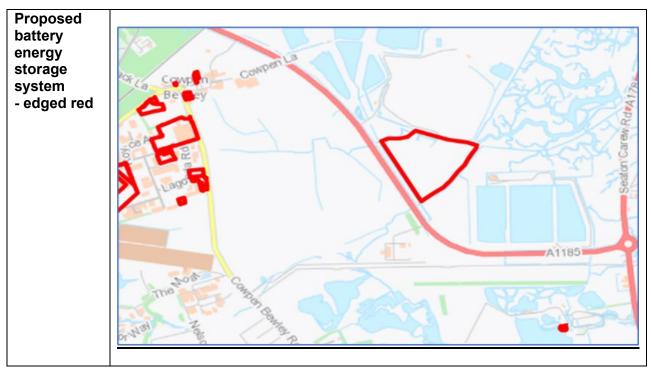


# 2.6 Public Rights of Way (PRoWs)

Table 2.6 – Public Rights of Way (PRoWs)



# 2.7 Development Proposals in Locality



#### Table 2.7 – Development proposals in locality

	The only recent planning application within the search area was a screening opinion (dated September 2024) for a proposed battery energy storage system to the north of the substation (area indicated in red above).
H2Teesside pipeline	The proposed hydrogen pipeline route to the north of existing substation would prohibit development of a new substation adjacent to the existing OHLs.

# 3. Conclusion & analysis of constraints

- **3.1.1** Finding an unconstrained location for a new substation within the area of search is difficult because of ecological constraints and existing development.
- **3.1.2** Developing on land owned by NGET at the existing Saltholme substation presents the least constrained option that would have the least overall environmental impact and highest prospect of obtaining consent.
- **3.1.3** The reasons for this are:
  - The existing substation site is connected to the transmission network. Any new site would require that the two OHL routes currently connected to Saltholme substation are diverted into the new substation with additional pylons. Any new OHLs over 2km would trigger a Development Consent Order (DCO).
  - If a site is not available close to the existing DNO 132kV substation at Saltholme, it
    would not be economically viable to cable a large distance from NGET's new 275kV
    substation to their existing 132kV substation. Therefore a new 132kV substation
    would be required at a cost to the DNO which will impact their wider network with
    additional connections, cabling and OHL requirements.
  - As shown within the high-level constraints table above, the search area contains a number of significant constraints which make the siting of a new Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) substation challenging. The search area includes large designations of European Protected Sites such as the Teesmouth and Cleveland Coast SSSI, Ramsar's and SPA's. Expansion into these areas would be unviable from a consents perspective.
  - Outside of the designated sites the area to the north west of the existing substation site contains priority habitats of coastal and floodplain grazing marsh as well as being identified as part of land managed by RSPB Saltholme for nature conservation purposes.
  - Residential development to the north at Cowpen Bewley.
  - Existing ditches and watercourses would have to be diverted or culverted.
  - Surrounding the site there is a prevalence of land designated as flood zone 3 (land which has a 1 in 100 or 1% greater chance of flooding in a given year).
  - Land parcels to the north west of the site, although outside of the nationally designated areas, are within an area identified as "*Countryside*" in the local plan. A case for development within this area would need to demonstrate why a site on an already developed site is not available. Land at NGET's existing site could be considered as "*previously developed*" due to the historic landfill at the site.
  - Development in this area is likely to require a HRA, due to the proximity to European sites and the likelihood that habitat north of the site is used by species linked to a SPA. Any required OHL changes will also need careful consideration as additional OHLs will have to be planned to mitigate any potential for "*bird strikes*".

• Development to the north west adjacent to the existing OHL will be constrained by the route of the proposed H2Teesside project hydrogen pipeline and an existing natural gas pipeline.

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