The Great Grid Upgrade

Sea Link

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Volume 9: Examination Submissions

Document 9.32: Minster Converter Station Ground Conditions and Water Management – Technical Note

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1. Introduction

1.1.1 This report fulfils a commitment made during the second Issue Specific Hearing (ISH2) (see Table 13.1 within **Application Document 9.89 Applicant's Written Summaries of Oral Submissions at Issue Specific Hearing 2 [REP4-085]**), to submit a technical note addressing points raised by local councilors and other parties regarding the proposed ground improvement works associated with the construction of the Minster Converter Station and Substation in Kent and the related water management processes and procedures**.**

1.1.2 During examination, comments have been raised by stakeholders in regard to drainage, water management and pollution control associated with the construction of the Minster Converter Station and Substation in Kent. The flood risk associated with the site and the feasibility of Sustainable Drainage Systems (SuDS) has also been raised. This report aims to provide clarification over and above what has already been provided in previous submissions, sets out the comments raised in Section 2 and provides a combined response to these in Section 3.

2. Comments Raised by Stakeholders

2.1.1 Over the course of the examination, various stakeholders have commented on the required drainage, water management and pollution control associated with the construction of the Minster Converter Station and Substation site in Kent. The flood risk associated with the site and the feasibility of SuDS has also been raised. The Applicant has provided detailed responses to the majority of these comments throughout the examination within their various submissions, including within **Application Document 9.34.3 (B) Applicant's Response to Relevant Representations from Affected Landowners [REP2-018]**, **Application Document 9.79 Applicant's Comments on Written Representations [REP2-034]** and **Application Document 9.134 Applicant's Comments on Other Submissions Received at Deadline 4 and Deadline 5** submitted at Deadline 6. The additional specific comments which this Technical Note seeks to address are presented in Table 2.1 below.

Table 2.1 Stakeholder Comments and Previous Applicant Reponses

Stakeholder Comment	Applicant Response
Save Minster Marshes in their comments on any further information/submissions received by Deadline 1 and Deadline 1A raised the following at Deadline 2 [REP2-103]: *"Flooding (Response to Ref 2.9.13, paras. 54 and 55, p. 285) NG states: "All hardstanding areas created by the Project (temporary and permanent) will be served by Sustainable Drainage features". Further, in their Flood Risk Assessment (FRA, APP-292 and AS-099) NG asserts "no net flood risk increase" via raised foundations, SuDS, and zero dewatering, passing the sequential test for Flood Zone 3b at Minster Marshes converter station. Rebuttal: This is a dangerous misrepresentation: Minster Marshes is a low-lying floodplain. NG ignores Minster Marshes designation as a groundwater flood zone. NG claims "zero dewatering" and SuDS prevent exacerbation, with <25 mm settlement via piling. This overlooks clay compaction reducing permeability, displacing an estimated 500,000 m³ of groundwater annually. (APP-171) ground survey states SuDS is not feasible due to the slow draining nature of the clay which will be required for temporary drainage ponds for tracks in multiple arable fields and will need to be reconsidered. (APP-292) ignores exceptionally high groundwater despite surveys confirming 0.5 - 1 meter depth. The collection of water in tanks on proposed converter*	See section 3 of this report for details of the methodology for constructing the raised platform and foundations and the associated drainage at the Minster Converter Station and Substation site. In addition, the Applicant has provided responses to the points raised linked to flooding in **Application Document 9.99 Groundwater Flood Risk at the Minster Converter Station Site [REP5-122]** and reiterates that the proposed site for the Minster Converter Station and Substation is not within Flood Zone 3b, with reference to Environment Agency mapping provided for the River Stour, which is presented in **Application Document 9.101 (A) Kent Onshore Scheme - Fluvial Flooding from the River Stour [REP4-096]**. Infiltration based SuDS are not feasible in this location, however there are a variety of other SuDS techniques available, that the Proposed Project would utilise to manage surface water runoff.

Stakeholder Comment	Applicant Response
site for the proposed no-drain SuDS alternative will require more load bearing than surveyed and additional piling techniques to support the deep heavy weight water attenuation storage. There is not a high tech system for allowing large quantities of floodwater to be released into the Minster Stream, and will ultimately lead to flooding downstream areas which include waterworks, BESS, the methane gas plant and NG's own Nemo Link converter which will all be put at risk from the outfall from being connected to the Minster Stream. If the tidal River Stour is also at high levels during this event, water will be backed up throughout the system. Calculations for such an event are required, not hearsay as suggested to be satisfactory in (AS-099). This document also uses an out of date council map. It would be prudent at this point to use the freely available Environment Agency flood map for up to date information on flood zones which shows Minster Stream flooding downstream in the current situation. *Bearing capacity of the top 8–14 m is 15–30 kPa. A fully loaded 40-tonne articulated lorry already exceeds this. Crawler cranes (300–600 t) for the 28 m-high valve halls would sink over 2m instantly.* *NG's impermeable concrete platform (1 km², raised 2 m on piles in soft alluvial clay) and HDD works will displace water, compact soils, and exacerbate groundwater breakout. The risks are not modeled in 1:100-year climate scenarios, breaching NPS EN-1 para 4.2.15 (sequential test) and NPPF para 163 (flood risk vulnerability).* *Groundwater is 0.5 - 1.0m below the surface. Any excavation >1 m fills with water immediately. Continuous dewatering of 90,000m² would lower the water table across the entire Minster Marshes SSSI causing uncalculated ecological and agricultural damage.* *In Flevoland, Netherlands, the largest energy structure ever built on clay is the 380 kV Lelystad substation which is 1/10th the footprint and 1/20th the weight of Sea Link. Even that required: ● 18 months pre-loading with 1 m sand ● 1,400 piles ● permanent ring-canal pumping stations running 24/7 forever.*	

Stakeholder Comment	Applicant Response
NG's current ES assumes a simple 2 m stone platform and "standard piling". This is a complete fantasy on this soil."	
Save Minster Marshes requested detail on the method of construction on the Minster Converter Station site at Deadline 4 [REP4-144] stating they are *"waiting for evidence of how the Applicant will proceed to drain the marsh in readiness for building".*	This is being responded to at Deadline 6 within **Application Document 9.134 Applicant's Comments on Other Submissions Received at Deadline 4 and Deadline 5**. In addition, see Section 3 of this report for details.
Save Minster Marshes in their submission at Deadline 5 [REP5-167] have raised a number of points in relation to the hydrogeology and Water Framework Directive (WFD) at the site of the proposed Minster Converter Station and Substation.	This is being responded to at Deadline 6 within **Application Document 9.134 Applicant's Comments on Other Submissions Received at Deadline 4 and Deadline 5**. In addition, see also Section 3 of this report for details.
Councillor Becky Wing raised the following queries during the ISH2: • Waterlogging and displacement: It was highlighted that the area is underwater or waterlogged for a "vast length of the year" and has a very high water table. It was questioned where water would be displaced for the Minster Converter Station and Substation site. • Contamination: Concern was raised regarding the potential contamination of water used by local farmers and the leaching of impurities into the watercourse. • Inappropriateness of SuDS regarding the high water table at the site, leading to direct discharge into the River Stour or Minster Stream.	See Section 3 of this report for details.

3. Response

3.1 Construction

3.1.1 Details regarding the construction of the proposed Minster Converter Station and Substation are included within **Application Document 6.2.1.4 (D) Part 1 Introduction Chapter 4 Description of the Proposed Project [REP1A-003]**. The sections below set out in further detail the proposed construction method at this location which is in line with **Application Document 9.17.2 (B) Kent Drainage Strategy [REP5-085]**.

Formation and purpose of the raised platform

3.1.2 A raised platform is required at the site of the proposed Minster Converter Station and Substation due to the high groundwater table within the area. Raising the platform would provide sufficient gradients for drainage to be achieved and will allow cable troughs to be raised above the groundwater level. The appointed contractor has proposed that the structures and the raised platform associated with the Minster Converter Station and Substation will be piled using modular columns, in conjunction with the installation of Prefabricated Vertical Drains (PVDs) and proposed surcharging and some probable de-watering (associated with minor groundwater seepages and rainwater) of excavations for foundations and drainage.

3.1.3 Regarding the role of PVDs in constructing the platform at the Minster Converter Station and Substation, the contractor will employ the following methodology:

- Lay out a membrane across the whole site.
- Establish a formal drainage system at the outer edge of the membrane. The preferred option is to then outfall surface water into the neighbouring watercourse (the irrigated channels that run in amongst the fields which then get pumped out into the River Stour), but other options are available if required as noted below under the section on water quality management and pollution control.
- The membrane gets perforated by vertical drains approximately 8.5 m in depth. The use of the PVDs is to provide a conduit for porewater pressures to dissipate that will develop from loading the ground, and to facilitate settlement. The impacts of the PVDs are localised and intended only to facilitate porewater pressure dissipation and settlement beneath the proposed footprints of the Minster Converter Station and Substation (**it does not amount to dewatering to actively lower the groundwater**).
- A layer of rock/stone is laid out on top. This will consolidate the ground below with water pushed out to the surface where it will be channelled away by the membrane eventually finding its way into the nearby watercourse in accordance with the contractor's position statement presented in **Appendix A** (see section on Water Management and Pollution Control below).
- The water runs through the stone acting as a filter for any sediment. This takes about three months.

- A final layer of stone is added on top and the process continues for another three months.
- Once the settlement has stopped the contractor will then start the piling.

3.1.4 The above detailed ground improvement methodology is deliverable within and consistent with the parameters and assumptions presented and assessed throughout the Environmental Statement.

Water quality management and pollution control

3.1.5 The contractor's position statement in terms of dewatering and the protection of watercourses and water quality across the Proposed Project is provided in **Appendix A** to this report. This will be applied to the Proposed Project and demonstrates how they will manage water, control any required dewatering, prevent pollution and protect water quality during construction in line with standard best practice.

3.1.6 The methodology described above for the formation of the platform at Minster Converter Station and Substation would facilitate soil porewater pressure dissipation, encouraging porewater to be expelled via the stone layer. These flows would pass through the stone layer, receiving some treatment, before being collected into a formal drainage system. The waters would be subject to testing and would receive treatment on site, tailored in accordance with its characteristics. Once treated and attenuated, the waters would outfall to the wider watercourse network. The slow, incremental drainage over a long period using the methodology described would therefore provide for both treatment and attenuation prior to the discharge of flows into the local water environment. Maximum flow and volume limits on discharges would be governed by an Environment Agency (EA) Bespoke Discharge Permit.

3.1.7 In response to comments on the potential impacts on water quality of groundwater polluting surface water receptors, including potential agricultural abstractions, in the eventuality that water brought to the surface by the PVDs is subsequently discharged to surface water features, it is considered that the existing assumptions and commitments made in the Development Consent Order (DCO), together with the range of available water management controls that will be utilised by the contractor as set out in **Appendix A**, as required, provide sufficient environmental control. Commitments GG15, W05 and GH07 in **Application Document 7.5.3 (D) Outline Onshore Construction Environmental Management Plan (CEMP)** submitted at Deadline 6 comprise controls relating to site discharge. **Appendix A** includes the core principles and standard water protection measures that will be developed in the Proposed Project's Environmental Management Plan, which will align with **Application Document 7.5.3 (D) Outline Onshore Construction Environmental Management Plan** submitted at Deadline 6.

3.1.8 Monitoring would be undertaken to ensure full compliance with permit conditions, including routine onsite testing and laboratory analysis of discharge water for key permit parameters such as pH, suspended solids, oils, contaminants and site-specific parameters, which would be defined based on the results of the Proposed Project's Ground Investigation works. Monitoring would be adaptive, for example increasing in frequency during heavy rainfall events. Where water contains high concentrations of any parameter, treatment would be provided to achieve consentable limits as agreed with the EA.

3.1.9 As noted in **Appendix A**, an option of tankering the water offsite to be recovered at a local water treatment facility would only be considered as a last resort in the scenarios provided in **Appendix A** to maintain full regulatory compliance.

3.2 Operation

3.2.1 The Applicant submitted **Application Document 9.99 Groundwater Flood Risk at the Minster Converter Station Site [REP5-122]** into the examination at Deadline 5. This provides information on the geology and hydrogeology of the Minster Converter Station and Substation site, corroborating the assessment of groundwater flood risk within **Application Document 6.8 (B) Flood Risk Assessment** submitted at Deadline 6. It sets out that there is limited potential for groundwater from the Chalk bedrock to rise above ground level at the site given the setting and the overlying low permeability material confining the groundwater in the lower strata.

3.2.2 All new areas of impermeable land cover as a result of the Proposed Project would be served by drainage infrastructure, including the creation of large, shallow basins. The basins would hold both direct rainfall and accommodate rainfall runoff from the permanent above ground infrastructure. Sufficient capacity would be provided to allow discharges back to the surrounding network of watercourses at pre-development (greenfield) rates. The current function of the land in providing temporary storage for rainfall would therefore be formalised within the basins, compared to the existing ad-hoc ponding that is currently experienced across the site.

3.2.3 Operational drainage discharges would be treated as described in **Application Document 9.17.2 (B) Kent Drainage Strategy [REP5-085]**.

Appendix A Contractor's Water Management Position Statement

Contractor's Position Statement on Dewatering, Protection of Watercourses and Water Quality

1. Introduction

Sea Link is a nationally significant electricity transmission development designed to enhance the UK's high-voltage network, improve resilience and increase capability for low-carbon energy integration. The Proposed Project will deliver a new High Voltage Direct Current (HVDC) connection between Saxmundham (Suffolk) and Minster (Kent).

The supporting onshore infrastructure includes:

- A new Onshore Converter Station at Saxmundham;
- A new 400 kV substation at Friston;
- A new Onshore Converter Station at Minster; and
- A new 400 kV substation at Minster.

Construction of these facilities involves significant earthworks, drainage installations, sustainable drainage systems (SuDS) formation, foundation works and utility routing, all of which interact with watercourses, groundwater systems, farmland and drainage districts.

This Position Statement has been developed to demonstrate how Siemens Energy (the Contractor) will manage water, control dewatering, prevent pollution, and protect water quality, in compliance with:

- The Development Consent Order (DCO) (if granted);
- The Environment Agency Bespoke Discharge Permit and Abstraction Regulations;
- Internal Drainage Board (IDB) consents;
- Siemens Energy's EC02 Water Management Procedure; and
- Industry best practice for pollution prevention and hydrological protection.

2. Core Principles

Siemens Energy will implement a consistent water-management framework across all sites for the Proposed Project ensuring:

- No pollution or degradation of surface watercourses or groundwater resources;
- All discharges and abstractions comply fully with regulatory permits, position statements and exemptions;
- Dewatering is controlled, monitored and environmentally safe;
- Runoff and sediment are contained at source;
- Water quality monitoring informs real-time decision-making; and

- All contractors follow prescribed environmental controls outlined in the Proposed Project Environmental Management Plan.

This Position Statement should be read in conjunction with commitments in the DCO within **Application Document 9.84 Register of Environmental Commitments (REAC)** and **Application Document 7.5.3 Outline Onshore Construction Environmental Management Plan**.

3. Standard Water Protection Measures

- Daily inspection of watercourses, increasing during rainfall or active dewatering;
- No refuelling, concrete washout operations or storage of materials within 10 m of drainage channels;
- Spill kits, booms and "grab packs" deployed wherever plant works near waterbodies;
- Plant inspected for leaks before use; and
- All wash-down water collected in controlled bunded areas and removed off-site.

4. Water Quality Monitoring

Water quality monitoring will be undertaken to ensure full compliance with the Environment Agency Bespoke Discharge Permit (upon approval) and Siemens Energy's EC02 Water Management Procedure. This will take account of commitment W26 within **Application Document 9.84 Register of Environmental Commitments (REAC).**

Core requirements include:

- Daily visual inspections of watercourses, drainage, SuDS and discharge points for clarity, sediment, oil sheen and erosion;
- Routine on-site testing of permit parameters such as pH and turbidity and total suspended solids (TSS) using calibrated equipment operated by trained personnel;
- Laboratory analysis of discharge water for key permit parameters (e.g., TSS, pH, iron), with increased frequency if results approach limits;
- Hourly checks during operation of treatment systems (e.g., Siltbuster) to confirm correct dosing and performance;
- Permit-driven compliance recording, with all monitoring results logged, stored and available for inspection;
- Immediate escalation and cessation of discharge if non-compliance or pollution indicators are detected; and

- Adaptive monitoring, increasing during rainfall, dewatering, or elevated risk conditions.

Any requirements arising from baseline water quality data, including iron concentrations or other parameters identified through ongoing Ground Investigation (GI) works, will be incorporated into the Proposed Project specific environmental management plans as those results become available.

5. Discharge and Abstraction Permits

5.1 Bespoke Discharge Permit

All discharges to surface water or ground water resources will be regulated under the Environment Agency Bespoke Discharge Permit, which defines:

- Maximum flow and volume limits;
- Treatment standards for pH, suspended solids, oils, contaminants and site-specific conditions;
- Monitoring frequency and sampling requirements; and
- Authorised discharge locations.

5.2 Chemical Treatment under the Bespoke Discharge Permit

Where water contains high sediment loading or requires pH correction:

- Chemical dosing systems (e.g., flocculants and coagulants) and settlement units (e.g., Siltbuster) will be deployed only under permit authorisation;
- All treated water must meet discharge limits before release; and
- Discharge points remain closed until laboratory or field analysis confirms compliance.

6. Permit to Pump System

The Siemens Energy Permit to Pump (P2P) system governs *all* dewatering operations across the Proposed Project. No water may be moved, pumped or discharged without an active P2P.

P2P requirements include:

- Assessment of water quality (clarity, contamination, pH);
- Confirmation of operational treatment systems (settlement, filtration, chemical dosing);
- Identification of authorised discharge locations;
- Defined monitoring and emergency procedures; and
- Maximum validity of 7 days and reissue if conditions change.

6.1 Tankering Protocol

Tankering is employed only when:

- Water cannot be treated to meet discharge limits;
- Treatment systems are offline or unavailable;
- Unexpected contamination renders water unsuitable for discharge; and
- Emergency scenarios arise (e.g., spill, chemical contamination).

Tankering is therefore a last resort measure to maintain full regulatory compliance and would be recovered at a local water treatment facility.

7. Construction Phase Runoff and Sediment Controls

7.1 Physical and Mechanical Controls

The following controls are adaptable during construction and will be installed as per design and changing conditions on site:

- Silt fencing around exposed soil and drainage pathways;
- Check dams (stone or sandbags) within ditches and channels;
- Silt socks at the point of dewatering operations;
- Sediment traps and settlement basins at runoff low points;
- Geotextiles, erosion blankets, geocells and surface stabilisation measures;
- Diversion channels routing clean water away from excavation areas; and
- Wheel wash infrastructure and regular road sweeping.

7.2 Chemical Treatment as an Escalated Measure

Where physical and mechanical controls alone cannot reduce sediment sufficiently:

- Chemical treatment (e.g., flocculant dosing, coagulation) may be used under the EA permit; and
- Treated water must pass compliance sampling before any discharge.

8. Working in or Near Waterbodies

- No concrete washout or refuelling within 10 m of watercourses;
- Concrete mixing prohibited within 10 m of any ditch or drainage line;

- Biodegradable hydraulic oils and biofuels used for instream plant where required for construction of culvert and crossing installations;
- Absorbent booms installed downstream of culvert works; and
- Abiding with all parameters set out in Ordinary Watercourse Consents provided by the Local Lead Flood Authority or Land Drainage Consent from the Internal Drainage Board.

9. Spill Prevention and Drainage Protection

- Emergency spill response plan to be in place and briefed to all personnel for dewatering, concreting and refuelling activities on site;
- Oil separators installed at high risk drainage nodes;
- Drainage system safeguarded through bunding, good housekeeping and preventive maintenance;
- 24/7 emergency response provider implemented in the event of major spill or leak; and
- Spill kits and ''grab packs'' to be available in all work zones and active plant/machinery utilised on site.

10. Conclusion

The Proposed Project adopts a comprehensive, multilayered water management strategy incorporating best practice dewatering, pollutant control and construction water governance across the Minster Converter Station, Saxmundham Converter Station and the Minster and Friston 400 kV substations. This is through:

- Early deployment of SuDS;
- Strong runoff and sediment controls;
- Strict governance under the Permit to Pump system;
- Undertaking of water discharges and treatment under the EA Bespoke Discharge Permit;
- Tankering only when treatment cannot achieve compliance or under emergency scenarios; and
- Continuous monitoring, inspection and adaptive mitigation.

The Proposed Project will ensure that all watercourses, drainage ditches and groundwater bodies remain protected throughout construction, in full alignment with the DCO, EA permitting, IDB conditions and Siemens Energy environmental procedures.

This Position Statement is formally submitted to demonstrate the Proposed Project's commitment to robust, compliant and environmentally responsible water management through standard measures adopted for projects requiring dewatering or where water will arise through ground improvement works. As such, the above commitments provide certainty that there will be no significant effects on the water environment as a result of construction works.

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