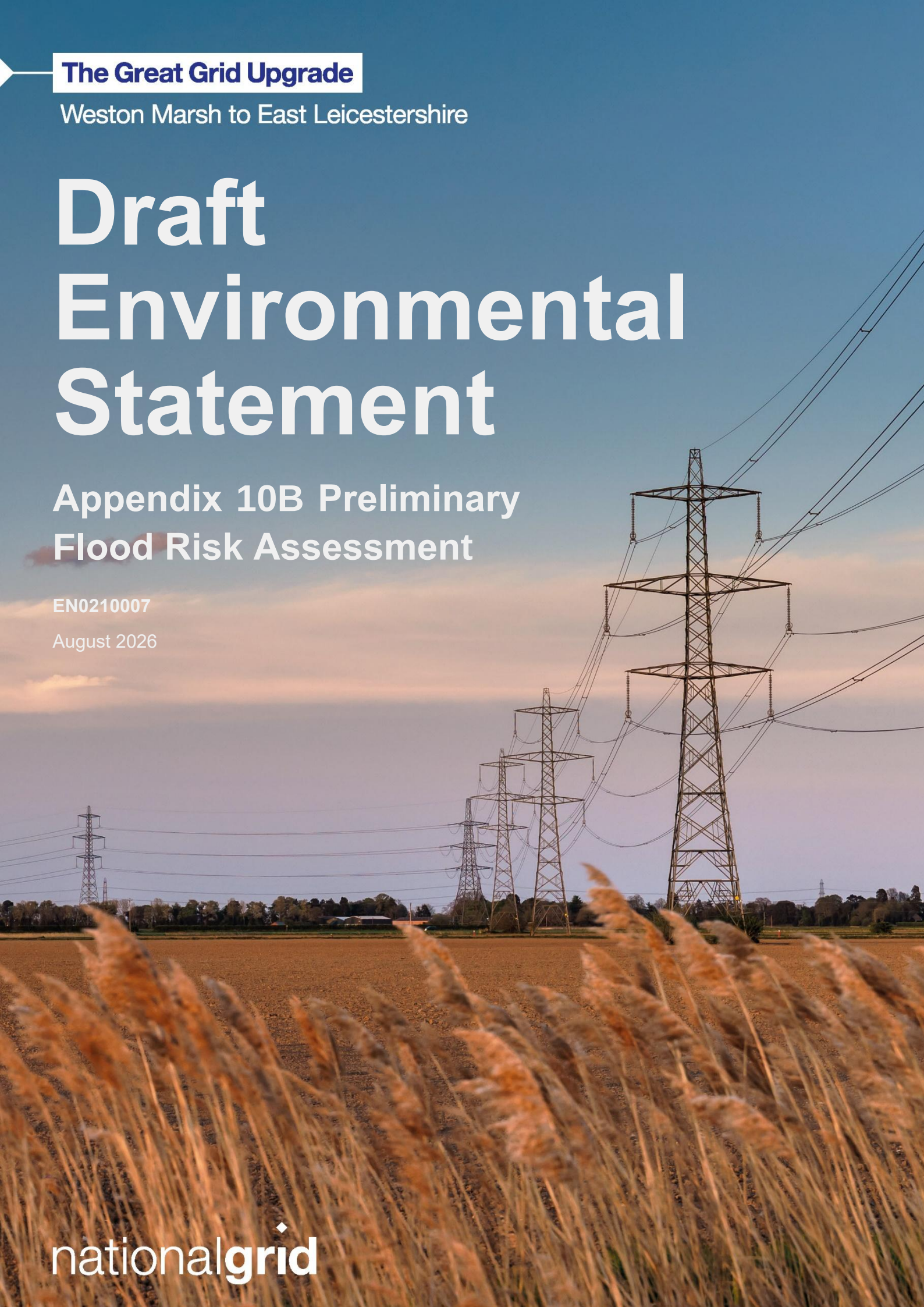




The Great Grid Upgrade

Weston Marsh to East Leicestershire

Draft Environmental Statement

Appendix 10B Preliminary Flood Risk Assessment

EN0210007

August 2026

nationalgrid

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10B. Preliminary Flood Risk Assessment

10B. Preliminary Flood Risk Assessment

10B.1 Introduction

Overview

- 10B.1.1 National Grid Electricity Transmission plc ('National Grid') owns and maintains the national high voltage electricity transmission network throughout England and Wales.
- 10B.1.2 National Grid has developed plans for Weston Marsh to East Leicestershire (the 'Project'). The Project would support the UK's net zero target through the connection of new low carbon energy generation in the East Midlands and by reinforcing the transmission network.
- 10B.1.3 This assessment is a technical appendix that supports **Chapter 10 Water Environment** of the non-statutory Draft Environmental Statement (DES) (referred to in this document as "DES" and non-statutory DES") prepared to support consultation regarding the Project. Full details of the Project are provided in **Chapter 4 Description of the Project** and shown on **Figure 4.1 Proposed Project Design** of the DES.

Purpose of This Report

- 10B.1.4 This Preliminary Flood Risk Assessment (pFRA) details relevant legislation, policy and guidance; provides an overview of the development description; includes a summary of flood risk from all relevant sources to the Project; and presents an initial assessment of the predicted impact of the Project on flood risk elsewhere.
- 10B.1.5 This pFRA also describes how the risk of flooding would be managed and outlines the standard mitigation measures that are proposed to reduce any potential residual impacts associated with the Project. The standard mitigation measures are documented within **Appendix 4A Draft Outline Code of Construction Practice (CoCP)** and have been given a code, e.g. GG01, to allow the measures to be easily cross referenced. The codes relevant to the pFRA are summarised in **Table 10B.1**. Mitigation measures for permanent works and the operation phase are detailed throughout Section 10B.4.

Table 10B.1 Standard mitigation measures relevant to the pFRA taken from **Appendix 4A Draft Outline CoCP**

Ref	Summary of Standard Mitigation Measure	Relevance to pFRA
W01	All works in, under or over Main Rivers or ordinary watercourses will be in accordance with a method approved under environmental permits or land drainage consents (as relevant).	Working in accordance with the conditions of relevant consents and permits would safeguard the integrity of watercourses and their flow conveyance qualities and capacities, reducing flood risk on- or off-site.
W02	For any open cut watercourse crossings and installation of vehicle crossing points, good practice measures will be implemented.	The Project crosses numerous land drains, ordinary watercourses and Main Rivers, so these measures would reduce flood risk during construction.
W03	Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Where appropriate, natural substrate will be provided through temporary watercourse crossings.	This would help to minimise impacts on the existing land drainage regime.
W04	Appropriate measures will be employed where watercourses are to be crossed by construction traffic.	This would help to minimise impacts on the existing land drainage regime and reduce the risk of flooding during the construction phase.
W06	The Project will incorporate appropriate surface water drainage measures into its final design for the haul roads, access tracks, works compounds and laydown areas so that they do not lead to a significant increase in flood risk.	This would reduce the risk of flooding during the construction phase.
W07	The contractor(s) will subscribe to the Environment Agency's Floodline service, and will implement a suitable flood risk action plan.	This would ensure safety of construction workers if a flood event occurs during the construction period.
W10	Severance of existing land drainage routes, including agricultural field drainage systems would be managed during construction through provision of temporary alternative drainage routes, and these drainage systems would be permanently reinstated to ensure their existing function is maintained.	This would help to minimise impacts on the existing land drainage regime.

Ref	Summary of Standard Mitigation Measure	Relevance to pFRA
W11	Appropriate control of runoff from working areas will be achieved through implementation of a Drainage Management Plan (DrMP) for the construction phase.	This would reduce the risk of surface water flows being impacted by above ground features.
GG17	Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding.	This would reduce the risk of surface water flooding during construction. This would support construction planning in terms of temporary works and activities to limit the impact of any severe events, both in terms of disruption to construction and potential environmental impact.
GH02	Construction methods such as appropriate piling techniques will be required to minimise the risk of mixing of aquifer bodies through the creation of new pathways. This includes the provision of a Foundation Works Risk Assessment (FWRA).	The FWRA would inform proposals relating to piled foundations. This is relevant to the assessment of groundwater flood risk.
AS01	Soil management measures will be set out in the SMP.	Appropriate soil management would help to minimise impacts on the existing land drainage regime.
AS05	Consultation with affected landowners will be carried out to investigate the current extent of land drainage.	This would help to minimise impacts on the existing land drainage regime and reduce the risk of flooding during the construction phase.
AS09	Temporary work pads of suitable materials (stone, wooden bog mats or similar) will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used.	Reducing ground disturbance would help to minimise impacts on the existing land drainage regime.

Consultation and Engagement

- 10B.1.6 The design has developed as a result of ongoing engineering design, landowner discussions, environmental assessment and consultation and engagement responses received during Stage 1 Consultation and meetings with relevant stakeholders. The design also reflects responses to the statutory scoping consultation undertaken by the Planning Inspectorate, as provided in **Appendix 5B Scoping Opinion**.
- 10B.1.7 This pFRA has been informed by consultation and engagement with the relevant flood risk management authorities (i.e. the Environment Agency and Lead Local Flood Authorities (LLFAs) (Leicestershire County Council, Lincolnshire County Council, West Northamptonshire Council and North Northamptonshire Council)) and the Water Management Alliance Internal Drainage Boards (IDBs), as well as Anglian Water.
- 10B.1.8 A full summary of issues raised in the Scoping Opinion and responses are provided in **Appendix 5C Preliminary Scoping Opinion Response**. A key point raised in the Scoping Opinion was related to identifying flood risk from ordinary watercourses which do not have Flood Zones on the Environment Agency's Flood Map for Planning (Ref 10B.1). To address this comment, the pFRA has included a review of the Environment Agency's Flood Map for Planning Surface Water mapping to understand the risk of flooding from ordinary watercourses. The requirement for hydraulic modelling will be determined once the design is developed further in consultation with the Environment Agency and LLFAs. Another key point raised in the Scoping Opinion was regarding the proposed watercourse crossing methodology. Watercourses will be crossed via clear span bridges or culverts. At this stage, the type of crossing for each individual watercourse is unknown; however, crossings will be appropriately sized and the approach will be agreed with the Environment Agency, LLFAs and IDBs. A full crossing schedule detailing what type of crossing will be applied where will be prepared for the final FRA to be submitted alongside the Environmental Statement (ES) and the development consent order (DCO) application.
- 10B.1.9 A Technical Working Group (TWG) meeting took place on 31 March 2026 including representatives from the Environment Agency, Leicestershire County Council, Lincolnshire County Council, Canal and River Trust, Anglian Water, Severn Trent Water, Natural England, and Witham and Humber IDB. As part of this meeting the Environment Agency agreed that using existing models and the Environment Agency's Flood Map for Planning Surface Water datasets is reasonable to inform the pFRA. These TWG meetings will occur quarterly to enable regular engagement with relevant stakeholders.

10B.2 Legislation, Policy and Guidance

Introduction

- 10B.2.1 Legislation and policy have been considered at a national and local level. The following legislation and policy have been considered when producing this pFRA:
- Flood and Water Management Act 2010 (Ref 10B.2);
 - Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 10B.3);
 - NPS for Electricity Networks Infrastructure (EN-5) (Ref 10B.4);

- National Planning Policy Framework (NPPF) (Ref 10B.5);
- Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Ref 10B.6);
- Flood Risk Assessments: Climate Change Allowances (Ref 10B.7);
- South East Lincolnshire Local Plan 2011-2036 (Ref 10B.8);
- South Kesteven District Council Local Plan (Ref 10B.9);
- Melton Local Plan (Ref 10B.10);
- Harborough Local Plan (Ref 10B.11);
- North Northamptonshire Local Plan (Ref 10B.12); and
- West Northamptonshire Local Plan (Ref 10B.13).

National Policy and Guidance

Overarching National Policy Statement for Energy (EN-1) (Ref 10B.3)

- 10B.2.2 The Overarching NPS for Energy (EN-1) (Ref 10B.3) provides specific guidance on the development of energy infrastructure in relation to flood risk for the lifetime of a project. The sections of EN-1 of relevance to this pFRA are:
- Section 4.10, which discusses climate change adaption; and
 - Section 5.8, which discusses flood risk, setting out the minimum requirements of a FRA, as well as information on the application of the Sequential and Exception Tests.
- 10B.2.3 EN-1 confirms that an FRA is required to assess flood risk from all sources for the lifetime of the Project. It states that the FRA needs to identify, among other aspects, flood risk reduction and management measures. Residual risks would also require assessment to consider their acceptability.
- 10B.2.4 EN-1 states that the scope of the FRA must be proportionate to the risk and appropriate to the scale of the development that is proposed. EN-1 also states that the FRA must consider different sources of flooding and their effects, as well as the impacts of climate change.
- 10B.2.5 EN-1 also includes several additional requirements that are specific to energy infrastructure.
- 10B.2.6 **Table 10B.2** summarises the requirements for FRAs set out in NPS EN-1 and lists where they are addressed in this FRA.

Table 10B.2 NPS EN-1 (Ref 10B.3) requirements relating to flood risk to the Project and where they are addressed in this pFRA

Topic	EN-1 Minimum Requirement	Where Addressed in This pFRA
Policy	The development proposal should be in line with any relevant national and local flood risk management strategies (paragraph 5.8.36).	Section 10B.2

Topic	EN-1 Minimum Requirement	Where Addressed in This pFRA
Flood risk	Where necessary, the development should be appropriately flood resilient and resistant, and it should be demonstrated that any residual risk can be safely managed over the lifetime of the development (paragraph 5.8.7).	Sections 10B.4 and 10B.5
Operation of the site	The development should be designed to remain operational when floods occur (paragraph 5.8.7).	Sections 10B.4 and 10B.5
Functional floodplain	The development should not result in a net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site (paragraphs 5.8.12 and 5.8.41).	Section 10B.4
Flood Warning and Evacuation Plan	The receipt of and response to warnings of floods is an essential element in the management of the residual risk of flooding. Flood Warning and Evacuation Plans should be in place for those areas at an identified risk of flooding (paragraph 5.8.33).	Section 10B.4
Climate change	The impacts of climate change should be considered when planning the location, design, build, operation and, where appropriate, decommissioning of the Project (paragraph 4.10.8).	Section 10B.4
Climate change	The Secretary of State should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projections available at the time the ES was prepared to ensure they have identified appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new infrastructure, including any decommissioning period (paragraph 4.10.13).	Paragraph 10B.2.21
Climate change	Where energy infrastructure has safety critical elements, the applicant should apply a credible maximum climate change scenario. It is appropriate to take a risk-averse approach with elements of infrastructure which are critical to the safety of its operation (paragraph 4.10.12).	Paragraph 10B.2.27 and Section 10B.4
Climate change	Applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario (paragraph 4.10.11).	Paragraph 10B.2.27 and Section 10B.4

Topic	EN-1 Minimum Requirement	Where Addressed in This pFRA
Adaptation	Any adaptation measures should be based on the latest set of UK Climate Projections, the government's latest UK Climate Change Risk Assessment, when available and in consultation with the Environment Agency's climate change allowances for FRAs (paragraph 4.10.17). Adaptation measures should be required to be implemented at the time of construction where necessary and appropriate to do so (paragraph 4.10.19).	Paragraph 10B.2.21 and Section 10B.4
Drainage and Sustainable Drainage Systems (SuDS)	SuDS should be used unless there is clear evidence that their use would be inappropriate (paragraph 5.8.36).	Table 10B.1 and Section 10B.4
Drainage and SuDS	The DCO, or any associated planning obligations, would need to make provision for appropriate operation and maintenance of any SuDS throughout the Project's lifetime. Where this is secured through the adoption of any SuDS features, any necessary access rights to property would need to be granted (paragraph 5.8.38).	Table 10B.1
Drainage and SuDS	Site layout and surface water drainage systems should be designed to cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without any adverse impacts (paragraph 5.8.26).	Table 10B.1 , paragraph 10B.2.19 and Section 10B.4
Drainage and SuDS	The volumes and peak flow rates of surface water leaving the site should be no greater than the rates prior to the proposed Project, unless specific off-site arrangements are made and result in the same net effect. The predicted impacts of climate change should be accounted for (paragraph 5.8.27).	Table 10B.1 , paragraph 10B.2.19 and Section 10B.4
Drainage and SuDS	The FRA should consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the Project may affect drainage systems (paragraph 5.8.15).	Table 10B.1 , Section 10B.4
Sequential Test	The Sequential Test and sequential approach should be applied (paragraphs 5.8.9, 5.8.21 to 5.8.23).	Section 10B.5
Exception Test	The Exception Test, where necessary, should be applied (paragraphs 5.8.10, 5.8.11).	Section 10B.5
Vulnerability and safe access	The FRA should consider the vulnerability of those using the site, including arrangements for safe access and escape (paragraph 5.8.15).	Table 10B.1 , Sections 10B.4 and 10B.5

Topic	EN-1 Minimum Requirement	Where Addressed in This pFRA
Reducing flooding overall and natural flood management	Identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management (paragraph 5.8.15).	Table 10B.1 and Section 10B.4

10B.2.7 In addition to the requirements described above, EN-1 also details the following:

'Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the Secretary of State may grant consent if they are satisfied that the increase in present and future flood risk can be mitigated to an acceptable and safe level and taking account of the benefits of, including the need for, nationally significant energy infrastructure' (paragraph 5.8.42).

NPS for Electricity Networks Infrastructure (EN-5)

10B.2.8 EN-5 (Ref 10B.4) is the NPS specific to electricity infrastructure and with regard to flood risk reiterates the requirements set out in EN-1, detailed above. Paragraph 2.3.3 of EN-5 (Ref 10B.4) states that the Project's resilience to climate change should be assessed and the policy states that an FRA should be prepared. **Chapter 10 Water Environment** assesses the Project's resilience to climate change.

National Planning Policy Framework and guidance

10B.2.9 The NPPF (Ref 10B.5) sets out the government's planning policies for England to ensure that flood risk is considered at all stages of the planning and development process, to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk of flooding. To achieve this, the NPPF advocates application of a Sequential Test whereby development in the low risk flood zone (e.g. Flood Zone 1) is preferentially supported. Where there are no reasonably available sites in Flood Zone 1, for example, reasonably available sites in Flood Zone 2 should be considered. Only when there are no reasonably available sites for development in Flood Zones 1 and 2, should the suitability of sites in Flood Zone 3 be considered.

10B.2.10 The sequential approach should be used in areas known to be at risk now or in the future. The Flood Risk and Coastal Change PPG (Ref 10B.6) requires other sources of flooding to be considered consistently with risks from rivers and the sea so that the sequential approach can be applied with respect to all sources of flooding as required in paragraphs 173 and 174 of the NPPF (Ref 10B.5).

10B.2.11 In addition, the NPPF states that development should be made safe for its lifetime without increasing flood risk elsewhere and also states that for a development to be considered acceptable with regard to flood risk, the Sequential Test requirements must be satisfied, along with demonstrating that (paragraph 181):

- *'within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*

- *the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- *it incorporates SuDS, unless there is clear evidence that this would be inappropriate;*
- *any residual risk can be safely managed; and*
- *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'*

10B.2.12 Further details of the requirements for sequential testing and sustainable drainage are provided in the paragraphs that follow.

Sequential testing

10B.2.13 The Sequential Test should be applied to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed.

10B.2.14 The PPG on Flood Risk and Coastal Change supports the NPPF with additional guidance on flood risk vulnerability classifications and managing residual risks. The PPG provides further description of Flood Zones (**Table 10B.3**) and a vulnerability and incompatibility matrix (**Table 10B.4**) in order to assess the suitability of a specific site for a certain type of development.

Table 10B.3 Flood Zone definitions

Flood Zone	Probability of Flooding	Definition
1	Low	Land having a less than 0.1% annual probability of river or sea flooding.
2	Medium	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
3a	High	Land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea flooding.
3b	High – Functional Floodplain	Land where water has to flow or be stored in times of flood, identified by Local Planning Authorities (LPAs) in Strategic Flood Risk Assessments (SFRAs). Identification of functional floodplain should take account of local circumstances and not be solely defined on rigid probability parameters. Functional floodplain normally comprises: • land having >3.3% annual probability of flooding (with any existing flood risk management infrastructure operating effectively); or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

Table 10B.4 Flood risk vulnerability and Flood Zone ‘incompatibility’

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
1	✓	✓	✓	✓	✓
2	✓	✓	Exception Test required	✓	✓
3a	Exception+ Test required	✓	X	Exception Test required	✓
3b	Exception* Test required	✓	X	X	X

Key:
✓ Development is appropriate
X Development should not be permitted

+ In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

*In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage; and
- not impede water flows and not increase flood risk elsewhere.

10B.2.15 Following application of the Sequential Test, if it is not possible (consistent with wider sustainability objectives) for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied, if appropriate.

10B.2.16 For the Exception Test to be passed it must be demonstrated that based on a site-specific flood risk assessment:

- the development provides wider sustainability benefits to the community, that outweigh flood risk; and
- the development would be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk overall.

10B.2.17 Where the Exception Test is applied, both elements of the Exception Test would have to be passed for development to be permitted, as detailed in Section 10B.5.

Sustainable drainage

10B.2.18 The PPG on Flood Risk and Coastal Change (Ref 10B.6) supports the NPPF with additional guidance on managing flood risk. It states that new development presents opportunities to reduce the causes and impacts of flooding through the use of natural flood management techniques, including a comprehensive sustainable drainage approach.

- 10B.2.19 In order to manage surface water on the site, it is necessary to consider the appropriateness of various SuDS measures, using the SuDS hierarchy set out in the PPG and also reiterated in the National Standards for SuDS (Ref 10B.14). Where surface water cannot be reused by the Project, the aim should be to discharge surface runoff according to the following drainage options, listed with the most favourable option first and least preferable last:
- 1) into the ground (shallow infiltration in areas of low contamination risk)¹;
 - 2) to a surface water body;
 - 3) to a surface water sewer, highway drain, or another drainage system; and
 - 4) to a combined sewer.
- 10B.2.20 Surface water runoff can be managed through SuDS. **Appendix 4A Draft Outline CoCP** describes the standard mitigation measures including SuDS for managing surface water runoff that would be adopted during construction. A Drainage Strategy will be prepared during the ES stage to manage surface water runoff from operational above ground infrastructure in accordance with the requirements and standards of the relevant LLFA using suitable SuDS that are maintained for the Project's lifetime.

Flood Risk Assessments: climate change allowances

- 10B.2.21 The UK Climate Projections are a set of climate change projections that are interpreted by the Environment Agency to develop a set of allowances to be applied to assess the predicted impact of climate change on a range of parameters.
- 10B.2.22 The Environment Agency's (2022) online advice note Flood Risk Assessments: Climate Change Allowances (Ref 10B.7) was published in February 2016 and most recently amended in May 2022 to take account of an update to recommended climate change allowances for rainfall intensity.
- 10B.2.23 The allowances applicable to this pFRA are for fluvial (peak river flow), sea level rise, and peak rainfall intensities. The fluvial climate change allowances are summarised in **Table 10B.5** for the different management catchments the Project would be located within. The higher central (2080s) river flow allowance is shown in **Table 10B.5** because the climate change allowance guidance states this should be used for essential infrastructure, which the Project is classified as.

Table 10B.5 Environment Agency fluvial climate change allowances applicable to the Project

Management Catchment	Peak River Flow Allowance (Higher Central, 2080s)
Welland	28%
Witham	32%
Soar	37%
Nene	13%

¹ The designs of infiltration drainage features would be based on infiltration tests that have been undertaken in accordance with BRE 365 testing procedures. Infiltration deeper than 2 m or in areas of land affected by contamination is likely to be lower in the hierarchy.

10B.2.24 The sea level rise climate change allowances are summarised in **Table 10B.6** for the river basin districts the Project would be located within. The Environment Agency advice note states that both the higher central and upper allowances should be assessed within FRAs.

Table 10B.6 Sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline)

River Basin District	Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative Rise 2000 to 2125 (metres)
Anglian	Higher central	5.8	8.7	11.6	13	1.20
	Upper end	7.0	11.3	15.8	18.1	1.60
Humber	Higher central	5.5	8.4	11.1	12.4	1.15
	Upper end	6.7	11	15.3	17.6	1.55

10B.2.25 As indicated in **Table 10B.5**, the Project is located within four management catchments. For these, the Environment Agency climate change allowances suggest peak rainfall intensity is anticipated to increase between 20% and 40% in the design lifetime of the Project (80 years).

10B.2.26 The effects of climate change on rainfall intensity will be included for in the operational drainage design in accordance with the upper end allowances for the 2070s epoch for each management catchment. The allowance to be applied within the surface water drainage design, is for a 40% uplift.

10B.2.27 In line with the climate change allowances guidance, Nationally Significant Infrastructure Projects such as power stations and power lines, flood risk should also be assessed for a credible maximum climate change scenario. The credible maximum scenario includes:

- the H++ climate change allowances for sea level rise;
- the upper end allowance for peak river flow (53% for Welland for 2080s epoch, 57% for Witham for 2080s, 60% for Soar for 2080s epoch, 36% for Nene for 2080s epoch);
- the sensitivity test allowances for offshore wind speed and extreme wave height; and
- an additional 2 mm for each year on top of sea level rise allowances from 2017 for storm surge.

10B.2.28 The credible maximum scenario will be assessed at the ES stage when all flood risk datasets have been reviewed and the final layout is confirmed.

National Grid Policy

- 10B.2.29 National Grid requires that substations considered to be critical infrastructure, should be resilient to flooding from rivers and the sea up to the 0.1% Annual Exceedance Probability (AEP) flood event; proposed new WMEL-A and WMEL-B Substations are located in Flood Zone 1 and meet the requirements of the policy.

Local Planning Policy and Guidance

- 10B.2.30 This section refers to local planning policy, guidance documents and flood-risk-related reporting that have informed this pFRA. Whilst these do not form the final basis for determining the application for development consent for the Project, paragraph 4.1.12 of EN-1 states that the Secretary of State will consider Development Plan documents or other documents in the Local Development Framework relevant to its decision making.
- 10B.2.31 In addition to the national and local planning policy, there are various flood risk management-related documents related to the Project, prepared by either the LPA or the LLFA for the area. The SFRAs, published Preliminary Flood Risk Assessments (PFRAs) and Local Flood Risk Management Strategies (LFRMSs) are addressed in Section 10B.4 of this FRA.
- 10B.2.32 The remainder of this section lists the relevant Local Plans for the Project and provides an overview of their content relevant to the pFRA.

South Holland District Council

South East Lincolnshire Local Plan 2011-2036

- 10B.2.33 The South East Lincolnshire Local Plan (Ref 10B.8), which includes the South Holland District Council area, was adopted in 2019 to guide development in South East Lincolnshire. The Plan includes Policy 4 relating to flood risk which is outlined below:
- Development in Flood Zones 2 and 3 will only be permitted where no safer alternative sites are available and where they meet the requirements of the Sequential and Exception Tests.
 - FRAs should be produced to support developments located in Flood Zones 2 and 3 which should identify the relevant predicted flood risk level, and mitigation measures to demonstrate how the development will be made safe. The FRA should demonstrate that the proposal will not increase risk elsewhere.
 - Development sites should incorporate the use of SuDS (unless it is demonstrated that this is not technically feasible).

South Kesteven District Council

South Kesteven District Council Local Plan 2011-2036

- 10B.2.34 The South Kesteven District Council Local Plan (Ref 10B.9) was adopted in 2020 to encourage sustainable growth and investment in South Kesteven. The Plan includes Policy EN5 relating to flood risk which is outlined below:
- Development should be located in the lowest areas of flood risk, in accordance with the South Kesteven SFRA. Where this is not possible the sequential

approach to development should be applied. Where the requirements of the Sequential Test are met, the Exception Test should be applied, where necessary.

- An FRA will be required for all development in Flood Zones 2 and 3 and for sites greater than 1 hectare in Flood Zone 1, and where a development site is located in an area known to have experienced flood problems from any flood source, including critical drainage.
- All development must avoid increasing flood risk elsewhere.
- Surface water should be managed efficiently on-site through the use of SuDS unless it is demonstrated to be technically unfeasible.

Melton Borough Council

Melton Local Plan 2011-2036

10B.2.35 The Melton Local Plan (Ref 10B.10) was adopted in 2018 and sets out the Council's policies for the use and development of land across the Borough. The Plan includes Policy EN11 relating to flood risk which is outlined below:

- Ensure development proposals do not increase flood risk and seek to reduce flood risk to others.
- Apply the Sequential and Exception Tests to new developments.
- Planning applications should be accompanied by an FRA where development is in Flood Zones 2 or 3, or exceed 1 hectare. This should be informed by the Melton SFRA.
- Surface water management should be undertaken, wherever practicable through the utilisation of appropriate SuDS techniques which mimic natural drainage patterns.

Harborough District Council

Harborough Local Plan 2011-2031

10B.2.36 The Harborough Local Plan (Ref 10B.11) was adopted in 2019 and sets out the vision, objectives, spatial strategy and planning policies for the District. The Plan includes Policy CC3 relating to flood risk which is outlined below:

- New development should take place in the areas of lowest risk of flooding, including the potential future risk due to climate change. The Sequential Test, and, where necessary, the Exception Test should be used to assess the suitability of proposed development. Site-specific FRAs of all sources of flood risk on the site and downstream of the site will be required as appropriate.
- Development proposals subject to a site-specific FRA will only be permitted where the mitigation, flood management, flood resilience measures, and design requirements identified are satisfactorily addressed; and design incorporates flood resilience measures to allow for increased risk due to climate change.
- All major developments must incorporate SuDS.

North Northamptonshire Council

North Northamptonshire Local Plan

10B.2.37 The North Northamptonshire Local Plan (Ref 10B.12) was adopted in 2016 and guides development and growth in the North Northamptonshire area. The Plan includes Policy 5 relating to flood risk which is outlined below:

- Development should contribute towards reducing the risk of flooding and to the protection and improvement of the quality of the water environment.
- Development should, wherever possible, be avoided in high and medium flood risk areas through the application of a sequential approach considering all forms of flooding for the identification of sites and also the layout of development within site boundaries.
- Development should be designed from the outset to incorporate SuDS wherever practicable, to reduce flood risk, improve water quality and promote environmental benefits.

West Northamptonshire Council

West Northamptonshire Local Plan

10B.2.38 The West Northamptonshire Local Plan (Ref 10B.13) was adopted in 2014 and sets out the long-term vision and objectives for the West Northamptonshire area. The Plan includes Policy BN7 relating to flood risk which is outlined below:

- Development proposals will comply with the flood risk assessment and management requirements set out in the NPPF and PPG and the West Northamptonshire SFRA to address current and future flood risks with appropriate climate change allowances.
- A sequential approach will be applied to all proposals for development in order to direct development to areas at the lowest probability of flooding unless it has met the requirements of the Sequential Test and Exception Test.
- All proposals for developments of 1 hectare or above in Flood Zone 1 and for development in Flood Zone 2, 3a or 3b must be accompanied by an FRA that sets out the mitigation measures for the site and agreed with the relevant authority.

10B.3 Project Description

Project Description

10B.3.1 The Project is a proposal by National Grid to build the following principal components:

- approximately 60 km of new 400 kV overhead transmission line.
- a new 400 kV substation to be built in the vicinity of the existing 4VK (Cottam – Wymondley) 400 kV overhead line near Corby Glen, South Kesteven (to be referred to as WMEL-A).

- a new 400 kV substation to be built in the vicinity of the existing ZA (Cottam – Sundon) 400 kV overhead line near Ab Kettleby, Melton (to be referred to as WMEL-B).
- reconductoring of approximately 66 km of the existing ZA 400 kV overhead line from WMEL-B to the existing Grendon substation.
- replacement of short sections of existing 400 kV overhead line and local changes to the distribution networks to facilitate the construction of the new overhead line and substations.

- 10B.3.2 The Project would include other required works, for example, temporary and permanent diversions for works on existing overhead line routes, temporary access haul roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation (if required) and enhancement of the environment including Biodiversity Net Gain.
- 10B.3.3 This pFRA focuses on assessing the flood risk impacts to and from the proposed new infrastructure (new overhead transmission line, WMEL-A and WMEL-B substations). Reconductoring involves the replacement of old conductors with new ones, with no new additional infrastructure. Therefore, the reconductoring element of the Project is not anticipated to impact on or increase flood risk. During construction, any flood risk would be suitably managed in accordance with **Appendix 4A Draft Outline CoCP**.
- 10B.3.4 The Project would be designed, constructed and operated in accordance with applicable health and safety legislation. The Project will comply with design safety standards including the Security and Quality of Supply Standard, which sets out the criteria and methodology for planning and operating the National Electricity Transmission System. National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, maintaining, and operating assets such as those proposed on the Project, will be adhered to.
- 10B.3.5 Currently no new 400 kV underground cables are proposed as part of the Project. The requirement for, and location of, any undergrounding of existing lines will be confirmed following ground investigations, and appropriate assessment included in the ES.

Draft Order Limits and Project Sections

- 10B.3.6 The draft Order Limits are defined as the maximum extent of land within which the Project, as defined within the DES, may be carried out, and includes both permanent and temporary land required to build and operate (and maintain) the Project.
- 10B.3.7 The Project has also been sub-divided into five geographical sections for reader accessibility, based on Local Planning Authority boundaries:
- Section 1 – South Holland;
 - Section 2 – South Kesteven;
 - Section 3 – Melton;
 - Section 4 – Harborough; and
 - Section 5 – Northamptonshire (including both North Northamptonshire and West Northamptonshire).

Design Measures

Proposed new overhead line

- 10B.3.8 Principal routeing and siting for the Project has sought to avoid designated sites and sensitive receptors as far as possible. The new overhead transmission line is essential infrastructure that is appropriate in Flood Zone 2, and Flood Zone 3 subject to the Exception Test being satisfied. As the Project progresses, further work will be done to identify and evaluate water environment receptors to avoid and minimise adverse impacts through design.
- 10B.3.9 In addition to the above, the following general design assumptions are being applied with regards to the overhead line. It may not be possible keep to all of these assumptions in all tower locations and where there are exemptions these will be identified.
- As far as practicable lakes, reservoirs and large ponds have been avoided and disruption to watercourses and ditches minimised.
 - Where possible rivers and their floodplains are crossed at a narrow location.
 - The horizontal clearance of any towers from watercourses and other water features is at least 15 m measured from the top of the bank, batter, edge of a culvert or landward toe of any existing flood defence to avoid hydromorphological impacts, where practicable. Any exceptions will require agreement with the Environment Agency and IDBs, together with consideration of any mitigation that may be required.
 - Overflight of watercourses by the overhead line is as perpendicular as practicable.
 - Vertical clearance of the overhead line above the bank or flood bank crest level is at a minimum height above the watercourse in line with National Grid standards and guidance.

Substations

- 10B.3.10 As a result of the Corridor Preliminary Routeing and Siting Study (Ref 10B.15), the substations are to be positioned in the lowest flood risk area as possible. The proposed WMEL-A and WMEL-B substations are located in Flood Zone 1. As the Project progresses further design measures will be developed in collaboration with the engineering design team, other environmental disciplines and in consultation with relevant stakeholders; this will include:
- Where possible, a minimum set back distance between new substation infrastructure and watercourse (e.g. minimum 10 m from the top of the bank, batter or landward toe of any existing defence).
 - Appropriate drainage design for substations to ensure no increase in flood or pollution risk arising from site runoff.
 - Where practicable, a SuDS approach will be implemented, although where necessary this may be augmented with proprietary measures (e.g. electrical equipment such as supercharged transformers contain oil and although self-bunded, surface water runoff from certain areas will be captured and passed through an oil separator). A reinforced concrete bund forming the perimeter to the substations will also act as a secondary spillage containment. Details will be set out in a Drainage

Strategy submitted with the ES, including how it will be maintained in perpetuity for the life-time of the development.

- In keeping with the current National Standards for SuDS Guidance (Ref 10B.14), if possible, engineered outfalls to watercourses will be avoided in favour of more natural ditch connections. The design of the final connection of these ditches to the receiving watercourse will be done after development consent is granted, subject to agreement of a suitable securing mechanism.
- The proposed substations will generally be unmanned and operated remotely. At the time of writing, it is not known whether there would be a need for a permanent foul drainage solution from either of the two proposed new substations. If required, options may include connecting to the nearest available public sewer or a self-contained independent non-mains domestic storage and/or treatment system.

Construction Assumptions

- 10B.3.11 Should consent be granted in 2029, it is anticipated that construction of the Project would commence in mid 2030, likely starting with enabling works including site clearance activities, the installation of temporary construction compounds and access roads. It is expected the main construction works would continue through to 2035 (five years). Therefore the baseline year considered in this pFRA is 2030.

Land Use and Topography

- 10B.3.12 Ordnance Survey Mapping (Ref 10B.16) indicates that the topography in the north east of the draft Order Limits, near Spalding is < 50 m Above Ordnance Datum (m AOD). Travelling west along the draft Order Limits topography increases to approximately 100 m AOD just north of Melton Mowbray. Topography within Sections 4 and 5 remains at approximately 100 m AOD, with slight undulations between 90 to 145 m AOD. The highest points are to the east of Leicester at approximately 190 m AOD, near Skeffington.
- 10B.3.13 The general land use is typical for lowland areas in England, consisting predominantly of arable farmland, pockets of pastureland, some urban areas, and clusters of small woodlands. Main towns and villages either within or near the draft Order Limits include Pinchbeck, Melton Mowbray, Market Harborough, Wellingborough, Earls Barton, Asfordby, and South Witham.

Soils, Geology and Hydrogeology

Soils

- 10B.3.14 Predominant soil types within the draft Order Limits are loamy and clayey soils with impeded drainage, and slowly permeable seasonally wet loamy and clayey soils (Ref 10B.17). At the eastern extent of the draft Order Limits in Section 1, soils comprise loam and clay with naturally high groundwater. There are some areas with freely draining loamy soils primarily through Sections 3, 4 and 5.
- 10B.3.15 The soils characterised by slow permeability or impeded drainage would be less suitable for infiltration SuDS. Freely draining soils would likely be more suitable for infiltration.
- 10B.3.16 A more in-depth analysis of soils can be found in **Chapter 12 Agriculture and Soils**.

Geology

- 10B.3.17 The bedrock geology and superficial geology are shown on **Figure 11.2 Superficial Geology** and **Figure 11.3 Bedrock Geology**.
- 10B.3.18 Superficial deposits for the draft Order Limits are summarised as follows (Ref 10B.18):
- Section 1: Tidal flat deposits (clay and silt).
 - Section 2: Some parts of this section have no superficial deposits recorded. Where present, they consist of Tidal flat deposits, River Terrace Deposits, Glaciofluvial deposits (sand and gravel), Alluvium (clay, silt, sand and gravel) and Till.
 - Section 3: Some parts of this section have no superficial deposits recorded. Where present, they consist of Bytham Sand and Gravel Formation, Thrussington Member, Oadby Member glacial till, Birstall Member, Till, Glaciofluvial deposits, Head, Alluvium, Colluvium and River Terrace Deposits.
 - Section 4: Some parts of this section have no superficial deposits recorded. Where present, they consist of Till, Oadby Member, Glaciofluvial deposits (sand and gravel), Alluvium, Colluvium, Head, River Terrace Deposits and Alluvial Fan Deposits.
 - Section 5: Some parts of this section have no superficial deposits recorded. Where present, they consist of Bozeat Till, Oadby Member, Till, Glaciofluvial deposits, River Terrace Deposits, Grendon and Ecton Members (sand and gravel), Alluvial Fan deposits and Alluvium.
- 10B.3.19 Bedrock underlying the draft Order Limits and superficial deposits (where present) are summarised as follows (Ref 10B.18):
- Section 1: Oxford Clay Formation (mudstone);
 - Section 2: Whitby Mudstone Formation, Northampton Sand Formation (ironstone), Grantham Formation (sandstone, siltstone and mudstone), Lower and Upper Lincolnshire Limestone Members, Rutland Formation (sandstone and limestone), Blisworth Limestone Formation, Cornbrash Formation (limestone), Kellaways Sand Member (sandstone and siltstone), Oxford Clay Formation (mudstone) and Kellaways Clay Member (mudstone);
 - Section 3: Charmouth Mudstone Formation, Dyrham Formation (silt and sand with imperersistent beds of limestone and sandstone), Whitby Formation (mudstone), Scunthorpe Mudstone Formation, Marlstone Rock Formation (limestone), Northampton Sand Formation (ironstone), Grantham Formation (sandstone, siltstone and mudstone), Lower Lincolnshire Limestone Member and Blue Lias Formation (mudstone);
 - Section 4: Blue Lias Formation (mudstone), Charmouth Mudstone Formation, Dyrham Formation (siltstone and mudstone), Marlstone Rock Formation (limestone) and Whitby Mudstone Formation; and
 - Section 5: Whitby Mudstone Formation, Northampton Sand Formation (ironstone), Grantham Formation (sandstone, siltstone and mudstone), Stamford Member (sandstone and siltstone), Rutland Formation (mudstone), Lower Lincolnshire Limestone Member, Wellingborough Member (limestone), Blisworth Member (limestone), Charmouth Mudstone Formation and Dyrham Formation.

10B.3.20 **Chapter 11 Geology and Hydrogeology** provides full details of the geology context for the draft Order Limits.

Hydrogeology

10B.3.21 A review of the aquifer designations (Ref 10B.19) indicates that the superficial deposits across the draft Order Limits are classified as follows:

- Secondary A: Glaciofluvial deposits, Alluvium, Alluvial Fan Deposits, River Terrace Deposits, Bytham Sand and Gravel Formation and Birstall Member;
- Secondary B: Colluvium;
- Secondary Undifferentiated: Till, River Terrace Deposits, Head, Oadby Member Glacial Till, Bozeat Till, Glaciofluvial deposit and Thrussington Member; and
- Unproductive: Tidal flat deposits.

10B.3.22 A review of the aquifer designations (Ref 10B.19) indicates that the bedrock geology across the draft Order Limits is classified as follows:

- Principal: Lower and Upper Lincolnshire Limestone Members, and Blisworth Limestone Formation;
- Secondary A: Northampton Sand Formation, Cornbrash Formation, Kellaways Sand Member, Rutland Formation (limestone), Dyrham Formation (sandstone), Marlstone Rock Formation (limestone), Stamford Member and Wellingborough Member;
- Secondary B: Rutland Formation (sandstone and limestone);
- Secondary Undifferentiated: Grantham Formation, Blue Lias Formation, Charmouth Mudstone Formation and Dyrham Formation (siltstone and mudstone); and
- Unproductive: Oxford Clay Formation, Kellaways Clay Member, Whitby Mudstone Formation and Scunthorpe Mudstone Formation.

10B.3.23 Each type of aquifer is defined as follows:

- Principal aquifers: aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.
- Secondary A Aquifers: aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.
- Secondary B Aquifers: are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.
- Secondary Undifferentiated Aquifers: are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.
- Unproductive: negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial deposits with low permeability that naturally offer protection to any aquifers that may be present beneath.

10B.3.24 The information included here provides context for Section 10B.4 of this pFRA which focuses on flooding from groundwater. **Chapter 11 Geology and Hydrogeology** provides full details of the hydrogeological context for the draft Order Limits.

Watercourses and Flood Defences

10B.3.25 Schedules of watercourse crossings will be provided in a watercourse crossing register at ES stage once design has been developed further.

10B.3.26 The Project crosses the following Main Rivers and their associated floodplains:

- Section 1: River Welland and River Glen;
- Section 2: South Forty Foot Drain, Car Dyke, East Glen River, West Glen River and River Witham;
- Section 3: River Wreake and Gaddesby Brook;
- Section 4: Langton Brook, Stonton Brook and River Welland; and
- Section 5: River Welland, River Jordan, River Isle, Swanspool Brook, River Nene and a tributary of River Nene.

10B.3.27 There are also numerous tributaries of these rivers, classified as ordinary watercourses and Board Drains, that the Project crosses. It is noted that some of the watercourses are classified as ordinary watercourses where they are crossed by the Project but are classified as Main Rivers further downstream.

10B.3.28 WMEL-A Substation would be within the catchment of the West Glen River. WMEL-B Substation would be within the catchment of the River Wreake.

10B.3.29 There are multiple places where the Project crosses flood defences. The locations where the Project crosses the flood defences shown in the Environment Agency spatial flood defences database (Ref 10B.20) are summarised below alongside the watercourse they are associated with:

- Section 1: Embankment (River Welland and River Glen);
- Section 2: Embankment (South Forty Foot Drain), natural high ground (Car Dyke, East Glen River, River Witham);
- Section 3: Engineered high ground (River Wreake);
- Section 4: Engineered high ground (Langton Brook); and
- Section 5: Natural high ground (River Jordan).

10B.4 Flood Risk

Flood Risk Data

10B.4.1 There are readily available reports providing a context for flood risk, and specifically flood history, that are relevant to the Project and its draft Order Limits. These reports draw together a range of information and are prepared by relevant LPAs in their role as LLFA.

10B.4.2 The following sections of this report provide a summary of flood risk/history data from relevant SFRAs, PFRAs, LFRMSs, Section 19 Flood Investigation Reports and

stakeholder consultation, before focusing on the sources of flooding scoped into the pFRA.

- 10B.4.3 Flood risk data has also been obtained from online Environment Agency mapping (Ref 10B.1) and flood model outputs provided by the Environment Agency (October 2025).
- 10B.4.4 It is noted that the data summarised below are only for reported events. It is possible some flood events, such as groundwater flooding in remote areas, may have occurred without being reported.

Strategic Flood Risk Assessments

- 10B.4.5 There are several recent SFRAs covering the draft Order Limits. There are listed below in **Table 10B.7**, along with a brief summary of the information within the documents which is relevant to the Project.

Table 10B.7 Summary of the SFRAs relevant to the draft Order Limits

Document title	Year	Project Section	Information Relevant to the Project
South East Lincolnshire SFRA (Ref 10B.21)	2017	1	The low lying nature of the South East Lincolnshire area makes it vulnerable to flooding from rivers and the sea. The area is protected from flooding by an extensive network of raised engineered defences.
South Kesteven District Council SFRA (Ref 10B.22)	2017	2	There have been numerous accounts of historical flooding associated with the River Witham, River Welland, East Glen River and West Glen River. There have also been numerous accounts of surface water flooding across the area.
Melton SFRA (Ref 10B.23)	2015	3	The main source of flooding across the area is from rivers with numerous historical flood events recorded. The primary fluvial flood risk source is associated with the River Wreake and its tributaries. Melton Mowbray has also had records of groundwater flooding and flooding from canals.
Leicestershire and Leicester City SFRA (Ref 10B.24)	2017	3/4	The predominant flood sources across the area are from rivers, surface water, sewer and flood incidents associated with water infrastructure issues such as culvert blockages.
Harborough District SFRA (Ref 10B.25)	2009	4	The main source of flooding across the area is from rivers and surface water with numerous historical flood events recorded. The primary fluvial flood risk source is from the River Welland and River Soar tributaries.
Kettering SFRA (Ref 10B.26)	2010	5	The main source of flooding across the area is from rivers, primarily associated with the Slade Brook. The area is also susceptible to surface water flooding.

Document title	Year	Project Section	Information Relevant to the Project
Wellingborough SFRA (Ref 10B.27)	2017	5	Historically, fluvial flooding has been the dominant source of flood risk across the area associated with the River Nene, Swanspool Brook and River Isle. Surface water flooding has also affected the area.
West Northamptonshire SFRA (Ref 10B.28)	2019	5	The dominant source of flood risk across the area is from rivers with numerous historical flood incidents recorded, primarily from the River Nene. There have also been historical incidents of surface water flooding following intense rainfall events.

Preliminary Flood Risk Assessments

- 10B.4.6 There are several LLFAs with PFRAs applicable to the Project. They are Lincolnshire County Council, Leicestershire County Council, and North Northamptonshire and West Northamptonshire Unitary Authorities (previously Northamptonshire County Council when the PFRA was produced).
- 10B.4.7 The PFRAs are high-level overviews of flood risk attributable to surface water, groundwater, ordinary watercourses, sewers, and canals. They draw together a wide range of readily available information as a means to inform the strategic overview of flood risk across the counties from these sources. It should be noted that the PFRAs were produced in 2011 and therefore information described in this section is using flood risk information correct as of 2011.
- 10B.4.8 Note that whilst the focus of the PFRAs is on those sources listed above, some PFRAs also provide a broader flood risk context from Main Rivers.

Lincolnshire County Council 2011

- The Lincolnshire PFRA (Ref 10B.29) includes the South Kesteven and South Holland LPAs.
- There are no reported historical local flood events located within the draft Order Limits in the South Kesteven LPA. There is one reported historical flood incident within the draft Order Limits in the South Holland LPA where the draft Order Limits cross the A16 near Spalding.
- The majority of the draft Order Limits is in an area with <25% susceptibility to groundwater flooding.
- Due to the steep valleys of the Lincolnshire Wolds which connect to the low lying coastal fringes, many areas are at potential risk of surface water flooding.
- Local flooding is likely to be mainly from heavy rainfall causing surface water runoff, overflowing ordinary watercourses and overflowing sewers.
- Flooding from canals and reservoirs is not considered to be a significant risk.

Leicestershire County Council 2011

- The Leicestershire PFRA (Ref 10B.30) includes the Melton and Harborough LPAs.

- Surface water flooding has historically been and continues to be a significant problem in Leicestershire. Surface water flood events have been recorded in Harborough although no surface water flood events have been identified within the draft Order Limits.
- Ordinary watercourse flooding poses a risk in Leicestershire; however, no historical incidents have been identified within the draft Order Limits.
- The majority of Leicestershire is underlain by non-permeable or low-permeability geology so where groundwater exists, it flows through strata very slowly and in limited quantities.

Northamptonshire County Council 2011

- The Northamptonshire PFRA (Ref 10B.31) includes the North Northamptonshire and West Northamptonshire LPAs.
- The majority of the draft Order Limits is in an area with <25% susceptibility to groundwater flooding.
- No areas identified to be at significant risk from ordinary watercourses.

Flood Investigation Reports

- 10B.4.9 Under Section 19 of the Flood and Water Management Act 2010 (Ref 10B.2), there is a statutory duty for LLFAs to investigate flood incidents if they meet certain criteria. Different LLFAs have different criteria for commencing an investigation into a flood incident.
- 10B.4.10 Records from all relevant LLFAs indicate that while there are Section 19 reports available, none of them indicate that the draft Order Limits have been affected.

Local Flood Risk Management Strategies

- 10B.4.11 Lincolnshire County Council, Leicestershire County Council, North Northamptonshire Council and West Northamptonshire Council, as the LLFAs, have a statutory requirement to produce LFRMSs. Their duties under the Flood and Water Management Act 2010 include the duty to '*develop, maintain, apply and monitor*' a flood risk management strategy, which covers flooding from surface water (overland runoff), groundwater, ordinary watercourses (i.e. watercourses that are not designated as Main Rivers), and highway drains.
- 10B.4.12 The LFRMS draws on information within other flood risk related documents, such as the PFRA and SFRA.

Lincolnshire County Council

- The Joint Lincolnshire Flood Risk and Water Management Strategy (Ref 10B.32) was published in 2020.
- Lincolnshire's open coast is subject to significant flood risk from tidal inundation. Lincolnshire was affected by significant coastal tidal surge events in 1953 and 2013. The coast is protected by a mix of defences.
- There is a risk of surface water flooding across the county.

Leicestershire County Council

- The Leicestershire LFRMS (Ref 10B.33) was published in 2024.
- Surface water flood risk is extensive across the county.
- The majority of Leicestershire is situated on geology and soils with properties that are associated with low groundwater flood risk. It is noted that the LLFA are not aware of any significant flooding incidents where groundwater has been the main source of risk.

Northamptonshire County Council

- The Northamptonshire LFRMS (Ref 10B.34) was published in 2016 and covers both North Northamptonshire and West Northamptonshire LPA areas.
- There are several historical flood events associated with surface water and fluvial flooding.
- The majority of the draft Order Limits is in an area with Negligible, Very Low or Low risk of groundwater flooding.

Sources of Flooding

10B.4.13 Potential sources of flooding include:

- fluvial;
- tidal;
- surface water;
- groundwater;
- reservoirs and artificial sources; and
- sewer/foul water flooding.

10B.4.14 With regard to flooding from reservoirs and other artificial sources, given the nature of the Project and the highly unlikely scenario of reservoirs failing due to the high standards of maintenance required in accordance with regulations, the risk of flooding from artificial sources is considered to be low. The Environment Agency Risk of Flooding from Reservoirs map (Ref 10B.35) shows that the majority of the draft Order Limits is outside of any reservoir inundation extent. There are small areas of the draft Order Limits located within the reservoir inundation extent; however, these areas are also at risk of tidal and/or fluvial flooding.

10B.4.15 The Project is not anticipated to impact on or increase baseline flood risk from artificial sources as there is limited baseline flood risk from artificial sources and any design/mitigation to manage tidal/fluvial flood risk would also manage any artificial source flood risk.

10B.4.16 With regard to foul water flooding, most of the land within the draft Order Limits is rural and in agricultural use, hence the risk of flooding from bursts and capacity exceedances of the foul sewer network is low for most of the land within the draft Order Limits. A review of the SFRAs did not highlight any parts of the draft Order Limits to be at elevated risk of flooding from sewers and water mains.

- 10B.4.17 For areas within the draft Order Limits which are more developed, the Environment Agency's Flood Map for Planning Surface Water mapping (Ref 10B.1) was reviewed to help identify any significant low spots or flow paths that water emanating from sewer/water main networks would travel along. No significant areas of risk to vulnerable Project infrastructure were identified.
- 10B.4.18 The Project is not anticipated to impact on or increase baseline flood risk from foul water flooding. This is because, due to the nature of the Project, foul water generation during operation (and maintenance) would be negligible and the Project would not therefore notably add to the loading/demand on sewer systems. During construction, foul water would be suitably managed in accordance with **Appendix 4A Draft Outline CoCP**.
- 10B.4.19 This pFRA therefore focuses on the following potential sources of flooding in relation to the proposed development as shown on **Figure 10.2 Fluvial Flood Risk** and **Figure 10.3 Surface Water Flood Risk**.
- fluvial;
 - tidal;
 - surface water; and
 - groundwater.
- 10B.4.20 Given the nature of the Project, there is an important distinction to be made between construction risk and operational risk. The construction phase would require various temporary works in terms of working areas, excavations and other elements, which would be removed once the works are complete. The operation (and maintenance) phase would require a smaller footprint of works, particularly in relation to new towers. The assessment presented below for each flood source assesses both construction and operation (and maintenance).
- 10B.4.21 A watercourse crossing register will be prepared at ES stage to show which watercourses would be crossed for the proposed activities once the design has been developed further.
- 10B.4.22 The assessment also considers both the potential impact on the Project, and the potential impacts elsewhere as a result of the Project.

Fluvial Flood Risk

Introduction

- 10B.4.23 The Environment Agency's Flood Map for Planning (Ref 10B.1) shows the Flood Zones as defined in Section 10B.2 of this pFRA. The Flood Zones do not take into account the presence of flood defences. It highlights that the draft Order Limits is largely within Flood Zone 1, as shown on **Figure 10.2 Fluvial Flood Risk**. Section 1 of the draft Order Limits and the eastern end of Section 2 of the draft Order Limits are located within Flood Zones 2 and 3. However, this is due to tidal sources which are discussed in paragraphs 10B.4.43 to 10B.4.61. There are other localised areas of Flood Zones 2 and 3 through all Sections of the draft Order Limits where watercourses are crossed. The approximate widths of the fluvial floodplain areas (based on Flood Zone 3) and the section of the Project they are located within are listed below. The fluvial floodplains within the draft Order Limits tend to be relatively narrow and often restricted to land immediately adjacent to watercourses. Larger

areas of fluvial floodplains are present in Section 4 associated with the River Welland, Langton Brook and Stonton Brook confluence, and Section 5 associated with the River Nene.

- Section 1:
 - tidal floodplain (discussed further in paragraphs 10B.4.43 to 10B.4.61); tidally influenced watercourses are River Welland and River Glen; and
 - extensive network of land drains.
- Section 2:
 - tidal floodplain at eastern end; tidally influenced watercourses are South Forty Foot Drain and Car Dyke;
 - Car Dyke tributary approximately 90 m;
 - East Glen River approximately 110 m;
 - East Glen River tributary (Grimsthorpe Park Beck – EGR5) approximately 45 m;
 - West Glen River approximately 90 m;
 - River Witham approximately 80 m;
 - unnamed ordinary watercourse near Beaumont Wood (Honey Pot Lane) approximately 40 m; and
 - network of land drains.
- Section 3:
 - River Wreake approximately 450 m;
 - Gaddesby Brook approximately 170 m;
 - Wymondham Brook approximately 60 m;
 - River Eye approximately 80 m;
 - Freeby Brook approximately 30 m and Freeby Brook tributary (FB 4) approximately 40 m;
 - Thorpe Brook approximately 110 m;
 - Scalford Brook approximately 100 m;
 - Austen Dyke approximately 100 m; and
 - Rearsby Brook approximately 40 m.
- Section 4:
 - Eye Brook approximately 40 m;
 - Stonton Brook approximately 80 m; and
 - Langton Brook and Stonton Brook confluence with River Welland approximately 900 m.

- Section 5:
 - Langton Brook and Stonton Brook confluence with River Welland approximately 900 m;
 - River Welland approximately 500 m;
 - Dingley Brook approximately 40 m;
 - River Jordan approximately 120 m;
 - River Isle approximately 120 m;
 - Slade Brook approximately 40 m;
 - unnamed ordinary watercourse near Thorpe Malsor Reservoir approximately 55 m;
 - unnamed ordinary watercourse near Cransley Reservoir approximately 40 m;
 - Pytchley Brook approximately 90 m;
 - Hardwick Brook approximately 50 m;
 - Harrowden Brook approximately 50 m;
 - Swanspool Brook approximately 75 m; and
 - River Nene and tributaries approximately 1.5 km.

10B.4.24 The Environment Agency's Flood Map for Planning (Ref 10B.1) also includes a layer showing how the Flood Zones may change when considering climate change. This shows that the flood extents are likely to increase slightly when considering climate change.

10B.4.25 Hydraulic model outputs from the Environment Agency will be reviewed at ES stage when the design has developed further. The requirement for additional hydraulic modelling will be determined once the design is developed further in consultation with the Environment Agency and LLFAs.

Construction phase risk assessment

10B.4.26 During construction, the majority of the works would take place outside of the floodplain in Flood Zone 1, where the risk of flooding from rivers is defined as very low. At watercourse crossings, there is a higher risk. However, commitments included in **Appendix 4A Draft Outline CoCP** and summarised in **Table 10B.1**, would be put in place to manage fluvial flood risk during construction.

10B.4.27 There would be a requirement to cross watercourses for the temporary construction access routes; however, flood risk effects would be managed through commitments W02, W03 and W04 in **Appendix 4A Draft Outline CoCP**. These commitments secure flood resilient haul road design, use of clear span bridges or suitably assessed and approved alternatives (where required) and reinstatement of land at the end of construction. Information on the proposed watercourse crossings will be included in a watercourse crossing register at ES stage.

10B.4.28 The proposed WMEL-A and WMEL-B substations are located within Flood Zone 1. However, a small watercourse flows through WMEL-B. The majority of construction compounds and laydown areas are located within Flood Zone 1. Some construction compounds and laydown areas are located within Flood Zone 3 at the eastern extent

of the draft Order Limits; however, this is associated with tidal sources. Construction works would be managed in accordance with the flood risk action plan, in line with commitment W07 of **Appendix 4A Draft Outline CoCP**. On receipt of a severe flood warning, the Main Works Contractor(s) would deploy suitable flood protection measures to safeguard work site personnel and equipment.

- 10B.4.29 All towers for the overhead line are located outside of the fluvial floodplain in Flood Zone 1. A small proportion of the construction working areas associated with the towers is partially located within the fluvial floodplain. As recorded in commitments W06, W10 and W11 in **Appendix 4A Draft Outline CoCP**, once the Project has been constructed, the working areas would be removed, and the sites reinstated.
- 10B.4.30 Some of the third-party infrastructure works associated with the Project would be located within the fluvial floodplain. Risks during construction would be managed in line with the measures described below. Due to the nature of the works, no change to the existing flood risk is anticipated once the third-party infrastructure works have been completed.
- 10B.4.31 The design and standard mitigation measures would reduce fluvial flood risk to the Project as well as limit any flood risk impacts arising from Project construction activities. With these measures in place the residual flood risk from fluvial sources would be low.

Operational phase risk assessment

- 10B.4.32 Flood Zones are shown on **Figure 10.2 Fluvial Flood Risk**. Overall, it is considered that the risk of flooding to the Project from rivers is low during operation (and maintenance) as the Project comprises overhead cables located above the floodplain. All towers and the new WMEL-A and WMEL-B substations are located in Flood Zone 1.
- 10B.4.33 There would be no permanent land raising within Flood Zone 3, nor any permanent changes to the channel form of any watercourses, and land would be restored to pre-construction condition.
- 10B.4.34 Where any permanent access routes pass through floodplains, any visits for routine inspections and maintenance of Project infrastructure would be programmed to avoid periods of significant high river levels and floodplain inundation.

Compensatory storage

- 10B.4.35 The construction of any permanent access routes in Flood Zone 3 may cause a small reduction in floodplain storage. The siting permanent access routes will be determined at ES stage and will be designed to avoid the floodplain where possible. Floodplain storage losses are therefore likely to be localised and very minor.
- 10B.4.36 Floodplain storage compensation areas would be located on land outside the mapped floodplain, which would be engineered to provide floodplain storage within the draft Order Limits. The areas would also be designed to drain following a flood event. Due to the likely small compensation volumes required, there would be ample space within the draft Order Limits. Calculations of compensatory storage will be undertaken at ES stage.

Decommissioning phase risk assessment

- 10B.4.37 The works required and associated flood risks during eventual decommissioning would be similar to those described previously, subject to any climate change impacts.
- 10B.4.38 More stringent mitigation could be implemented to address the risks associated with such future works. These would be identified through an appropriate assessment to be undertaken at the time.
- 10B.4.39 It is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Conclusion

- 10B.4.40 The pFRA has concluded that the Project during its construction would be generally at low risk of flooding from rivers (fluvial). Locally higher risks, particularly to temporary works within Main River floodplains, would be reduced through design and standard mitigation measures. These measures would also protect construction workers, limit damage to construction equipment and materials and also limit any impacts of the Project on fluvial flood risk.
- 10B.4.41 During the operation (and maintenance) of the Project, there would be low risk of fluvial flooding as the new substations and towers would be located within Flood Zone 1 and the overhead lines raised above the floodplain. There would be no increase in flood risk as a consequence of the Project's operation (and maintenance), subject to implementation of the recommended compensatory storage described in this pFRA.
- 10B.4.42 The works required and associated flood risks during eventual decommissioning would be similar, subject to any climate change impacts. More stringent mitigation could be implemented to address the risks associated with such future works, to be identified through an appropriate assessment to be undertaken at that time; it is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Tidal Flood Risk

Introduction

- 10B.4.43 As noted in paragraph 10B.4.23, Section 1 of the Project and the eastern end of Section 2 of the Project are located within Flood Zones 2 and 3 associated with tidal flooding from the sea which is located approximately 14 km to the east of the Project. The River Welland and River Glen in Section 1 are tidally influenced watercourses, as are the South Forty Foot Drain and Car Dyke watercourses in Section 2 of the Project.
- 10B.4.44 According to the Environment Agency's Asset Management Database (Ref 10B.36), there are flood defences in the form of embankments with a design Standard of Protection of 0.66% AEP located along the coast to the east of the Project.
- 10B.4.45 The Environment Agency provided tidal hydraulic modelling results from the Northern Area Tidal Model published in 2010 which shows that during the defended 0.5% AEP 2115 event the Project would not flood. The total sea level rise modelled for this event was 1.14 m using the 2006 Flood and Coastal Defence Project Appraisal Guidance 3 Economic Appraisal Supplementary Note to Operating Authorities –

Climate Change Impacts (Ref 10B.37). When considering the latest Environment Agency climate change allowances, between 2035 and 2115 (assuming an 80 year operational life), the total sea level rise is calculated to be 1.18 m (using Upper End allowances for the Anglian area). As there is only a 40 mm difference between the calculated sea level rise, the modelling results provided by the Environment Agency are considered appropriate to inform this pFRA.

- 10B.4.46 Therefore, when considering the presence of defences, the flood risk from tidal sources is considered to be low.

Residual risk

- 10B.4.47 Due to the presence of flood defences along the coastline to the east of the draft Order Limits, there is a residual risk to the Project if there was a breach of the flood defences.
- 10B.4.48 The Northern Area Tidal Model (2010) included breach scenarios at 102 breach locations along the coastal flood defences. The outputs provided include composite breach maps showing the maximum depth of flooding from all breach locations. The 0.5% AEP 2115 composite breach map shows that seven towers at the eastern extent of the draft Order Limits are located in the breach model extent with flood depths reaching a maximum of 1 m. The new substations are not located at the eastern extent of the draft Order Limits and therefore are not located within the breach modelled flood extent.
- 10B.4.49 The defended 0.5% AEP 2115 event model results and breach model results are shown on **Figure 10.6 Tidal Flood Risk**. Overall, it is considered that the risk of flooding to the Project from tidal sources is low during operation (and maintenance) as the Project comprises overhead cables located significantly above the floodplain and the substations are located outside of the modelled breach extent.
- 10B.4.50 Some of the third-party infrastructure works associated with the Project would be located within the tidal floodplain. Risks during construction would be managed in line with the measures described below. Due to the nature of the works, no change to the existing flood risk is anticipated once the third-party infrastructure works have been completed.

Construction phase risk assessment

- 10B.4.51 As noted in paragraph 10B.4.45, the Project is not shown to flood during the defended 0.5% AEP 2115 event, therefore the risk from tidal sources during construction is low. A residual flood risk remains in the event of a breach of the flood defences; however, all construction compounds and laydown areas are located outside of the 0.5% AEP 2115 breach event. Furthermore, commitments included in **Appendix 4A Draft Outline CoCP** and summarised in **Table 10B.1**, would be put in place to manage residual flood risk during construction.
- 10B.4.52 Construction works would be managed in accordance with the flood risk action plan, in line with commitment W07 of **Appendix 4A Draft Outline CoCP**. On receipt of a severe flood warning, the Main Works Contractor(s) would deploy suitable flood protection measures to safeguard work site personnel and equipment.

Operational phase risk assessment

- 10B.4.53 During operation (and maintenance), the overhead lines would be elevated and the proposed new substations would be located in Flood Zone 1 and outside of the modelled breach flood extent.
- 10B.4.54 The towers would be resilient to tidal flooding given their open, metal lattice structure and that the overhead lines carried by the towers would be significantly higher than anticipated flood depths. If the bases of the towers were flooded the Project would still be able to remain operational.
- 10B.4.55 Where any permanent access routes pass through the area identified to be at residual flood risk, any visits for routine inspections and maintenance of Project infrastructure would be programmed to avoid periods of significant floodplain inundation.

Decommissioning phase risk assessment

- 10B.4.56 The works required and associated flood risks during eventual decommissioning would be similar to those described previously, subject to any climate change impacts.
- 10B.4.57 More stringent mitigation could be implemented to address the risks associated with such future works. These would be identified through an appropriate assessment to be undertaken at the time.
- 10B.4.58 It is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Conclusion

- 10B.4.59 The pFRA has concluded that the Project during its construction would be generally at low risk of flooding from tidal sources. There is a residual risk of tidal flooding in the unlikely event of a breach in the flood defences. Risks to temporary works within tidal floodplains, would be reduced through embedded and standard mitigation measures. These measures would also protect construction workers, limit damages to construction equipment and materials and also limit any impacts of the Project on tidal flood risk.
- 10B.4.60 During the operation (and maintenance) of the Project, there would be low risk of tidal flooding as when considering the presence of flood defences, the Project is not shown to be at risk of tidal flooding. During an unlikely breach scenario, the new substations would not be located in the modelled breach flood extent and the overhead lines would be located above the tidal floodplain. There would be no increase in flood risk as a consequence of the Project's operation (and maintenance).
- 10B.4.61 The works required and associated flood risks during eventual decommissioning would be similar, subject to any climate change impacts. More stringent mitigation could be implemented to address the risks associated with such future works, to be identified through an appropriate assessment to be undertaken at the time; it is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Surface Water Flood Risk

Introduction

- 10B.4.62 The Environment Agency's Flood Map for Planning Surface Water mapping (May 2026) (Ref 10B.1) is informed by local model outputs and national flood model information. It illustrates those areas at elevated risk of surface water flooding, in low spots down-gradient of sloping ground or in the topographic valleys associated with current or former watercourses.
- 10B.4.63 The Environment Agency's Flood Map for Planning Surface Water mapping indicates surface water flood risk is variable along the Project alignment as shown on **Figure 10.3 Surface Water Flood Risk**. Most of the land within the draft Order Limits is shown to be located outside of surface water flood extents but there are multiple areas shown to be within surface water flood extents associated with ordinary watercourses and low spots in topography. There are more significant extents of surface water flood risk just west of Melton Mowbray, north east of Market Harborough, and east of Northampton.
- 10B.4.64 When considering surface water flood risk to the proposed substation locations, there are several small ordinary watercourses (field drains) located within and around the proposed location of WMEL-B. In particular, there is a narrow flow path with a high surface water flood risk through the centre of the WMEL-B Siting Area, which may be associated with a small field drain. For WMEL-A, there is a large surface water flow path directly through the proposed location, near to the southern boundary.
- 10B.4.65 The Environment Agency also map Surface Water flood extents including predicted climate change extents for 2061–2075 (Ref 10B.1). These show that the surface water flood extents are likely to increase slightly when considering the impacts of climate change.

Construction phase risk assessment

- 10B.4.66 During construction, activities would include topsoil stripping and excavation, and construction of temporary access routes and temporary construction compounds, which could temporarily change existing land surface permeabilities and influence the rainfall runoff regime. Also, there is potential for existing land drainage systems to be disrupted.
- 10B.4.67 **Appendix 4A Draft Outline CoCP** includes mitigation measures to reduce the impacts of these activities on land drainage and surface water flood risk.
- 10B.4.68 Commitment W11 states that appropriate control of runoff from working areas will be achieved through implementation of a DrMP. Further, the haul roads, access tracks, works compounds and laydown areas would have suitable drainage provisions, as required by commitment W06.
- 10B.4.69 Commitment AS09 states that appropriate technology/material will be installed in areas where heavy equipment would be used to reduce disturbance to the ground and minimise impacts on the existing land drainage regime. A Soil Management Plan would also include measures to help minimise impacts on the existing land drainage regime (a draft of which is provided as **Appendix 12A Draft Outline Soil Management Plan**).

- 10B.4.70 Commitment W06 states that once the Project has been constructed, the temporary haul road would be removed, and the ground surface would be reinstated. W10 also notes that replacement drainage schemes would be installed where appropriate. A specialised drainage contractor(s) would review the drainage designs and provide advice to National Grid and the Main Works Contractor(s) during all relevant construction and reinstatement activities.
- 10B.4.71 Additional information regarding the proposals for surface water management during the construction phase of the Project will be provided in a surface water Drainage Strategy at the ES stage.

Operational phase risk assessment

- 10B.4.72 The majority of the permanent Project infrastructure would be located outside of the surface water flood extents in the Environment Agency's Flood Map for Planning Surface Water mapping.
- 10B.4.73 A high-level drainage assessment has been undertaken for each of the proposed substation sites. Both substations have been designed to incorporate attenuation ponds to manage surface water runoff from the substations and associated access roads. Runoff will be attenuated and discharged at a reduced rate to an off-site watercourse, subject to agreement with the LLFA and IDB. The substation ponds have been designed to a 1% AEP event, with a 40% allowance for climate change resilience. The attenuation ponds have been preliminarily sized to limit discharge to the greenfield runoff rate for the 1% AEP event, including a 40% allowance for climate change. Infiltration testing is proposed as part of the ground investigation works. Should infiltration be demonstrated as feasible at either site, infiltration will be adopted as the primary surface water management strategy in place of discharge to a watercourse.
- 10B.4.74 A Drainage Strategy will be prepared at ES stage to manage surface water runoff from operational above ground infrastructure in accordance with the requirements and standards of the relevant LLFA and adopt sustainable drainage strategies designed to allow for resilience to climate change.
- 10B.4.75 The measures described would manage surface water runoff and potential effects on the land drainage regime such that the Project is not anticipated to increase surface water flood risk during its operational lifetime. The Project itself during its operation (and maintenance) would be of low vulnerability to surface water flooding.

Decommissioning phase risk assessment

- 10B.4.76 The works required and associated flood risks during eventual decommissioning would be similar to those described previously, subject to any climate change impacts.
- 10B.4.77 More stringent mitigation could be implemented to address the risks associated with such future works. These would be identified through an appropriate assessment to be undertaken at that time.
- 10B.4.78 It is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Conclusion

- 10B.4.79 This pFRA has concluded that there would not be an increase in surface water flood risk elsewhere as a consequence of the Project during its construction or operation (and maintenance), subject to implementation of the measures described.

Groundwater Flood Risk

Introduction

- 10B.4.80 Groundwater flood risk is not as well-defined as other sources of flooding, and an assessment of risk often requires consideration of geological conditions. Groundwater flooding can occur from two general mechanisms:
- Clearwater flooding – where the water table in unconfined aquifers rises above the ground surface, associated with permeable bedrock such as chalk and common in areas where winterbourne streams are present, which may run dry for much of the year.
 - River–groundwater interaction – where river levels interact with permeable superficial deposits along river valleys, potentially flooding areas away from the river without necessarily overtopping the banks.
- 10B.4.81 The groundwater flood risk across the draft Order Limits is represented in the Lincolnshire PFRA (Ref 10B.29) for the east of the Project, and in the Leicestershire SFRA (Ref 10B.24) for the west of the Project. The maps in these reports show that there is low susceptibility (<25% chance) of groundwater flooding across the majority of the draft Order Limits, including in the vicinity of the proposed substations. There are some small areas of greater susceptibility ($\geq 25\%$ <75% chance) of groundwater flooding distributed across the draft Order Limits, primarily near Melton Mowbray. As the Project proposes an overhead line, there should be limited interaction with groundwater and any associated flooding. Ground investigations will be undertaken at the proposed substation locations and other relevant locations (e.g. access routes) to confirm groundwater levels. This information will be used to inform the FRA submitted with the ES.
- 10B.4.82 In areas where ground conditions are suitable, infiltration drainage features may be adopted to discharge surface water runoff generated from impermeable surfaces introduced by the Project back to ground. These features would be designed with suitable capacity to prevent any groundwater afflux. In areas where surface water attenuation basins are proposed, where necessary these would be lined to prevent groundwater ingress. This would avoid any impact on groundwater flood risk locally and from groundwater–surface water interaction.

Construction phase risk assessment

- 10B.4.83 There is considered to be a low risk of flooding from groundwater across the majority of the draft Order Limits and therefore it is likely that there will be minimal interactions with groundwater during construction. The depth of excavations and requirement for dewatering is unknown at DES stage. These parameters will be refined through ground investigation and detailed design and reassessed at ES stage.

Operational phase risk assessment

- 10B.4.84 The Project is considered to be of low vulnerability to groundwater flooding during operation (and maintenance).
- 10B.4.85 The risk of groundwater flooding along the majority of the draft Order Limits is low. There are areas which are underlain by a Principal aquifer, as outlined in paragraph 10B.3.22, which would have an increased presence of groundwater in the bedrock and therefore an increased risk of groundwater flooding. There are also areas of superficial deposits within the draft Order Limits where there is an increased risk of groundwater emergence. However, the proposed Project infrastructure would be resilient to this form of flooding.
- 10B.4.86 It is not considered likely that the drainage infrastructure associated with new areas of permanent impermeable land would alter groundwater recharge patterns.

Decommissioning phase risk assessment

- 10B.4.87 The works required and associated flood risks during eventual decommissioning would be similar to those described previously, subject to any climate change impacts.
- 10B.4.88 More stringent mitigation could be implemented to address the risks associated with such future works. These would be identified through an appropriate assessment to be undertaken at that time.
- 10B.4.89 It is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

Conclusion

- 10B.4.90 Overall, the Project is at low risk of groundwater flooding, and neither construction activities nor the operation or decommissioning of the Project are anticipated to increase risk of flooding from this source.

Summary of Potential Flood Sources

- 10B.4.91 **Table 10B.8** provides a summary of the relative risk from all sources of flooding for both construction and operation (and maintenance) phases.

Table 10B.8 Summary of assessment of flood risk by source

Source	Degree of Hazard	Comment
Fluvial	Construction: low to medium/high locally	Construction: largely low risk with areas crossing watercourses at higher risk.
	Operation (and maintenance): low	Operation (and maintenance): no permanent changes to watercourses or their flow regimes. Requirement for compensatory storage will be confirmed at ES stage.
Tidal	Construction: low to high locally	Construction: low risk of flooding when considering presence of flood defences. Area at the eastern end of the draft Order Limits located within the 0.5% AEP

Source	Degree of Hazard	Comment
		2115 modelled breach extent in the unlikely event that a breach in the flood defences occurred.
	Operation (and maintenance): low to high locally	Operation (and maintenance): Project is not located within tidal flood extent when considering presence of flood defences. No changes to tidal flood risk expected due to operation (and maintenance) of the Project.
Surface water	Construction: low to medium/high locally	Construction: largely low risk, with some areas at higher risk.
	Operation (and maintenance): low	Operation (and maintenance): majority of Project infrastructure has low risk; measures would be in place to manage surface water runoff and minimise impacts on the land drainage regime.
Groundwater	Construction: low	Construction: limited groundwater interactions are likely due to nature of the Project and there is a low risk of groundwater flooding across majority of the draft Order Limits. Requirement for dewatering will be confirmed at ES stage. Groundwater flood risk at the substation locations will be confirmed following Ground Investigations.
	Operation (and maintenance): low	Operation (and maintenance): the Project is of low vulnerability to this source of flooding. No changes to groundwater flood risk expected due to operation (and maintenance) of the Project.

10B.5 Project Requirements

Sequential Test

- 10B.5.1 Paragraphs 10B.2.13 to 10B.2.17 of this pFRA set out the requirements of the Sequential and Exception Tests. This section summarises how these tests have been met.
- 10B.5.2 The Project, being a Nationally Significant Infrastructure Project for energy transmission, is classed as essential infrastructure. Development is appropriate for essential infrastructure in Flood Zones 1 and 2. Where the development is located in Flood Zone 3, application of the Exception Test is required.
- 10B.5.3 With regard to the ethos of the Sequential Test, which encourages the location of new development in areas at low risk of flooding, the analysis within the preceding sections has demonstrated that the majority of the draft Order Limits is located within Flood Zone 1 and in zones that are at low risk of flooding from other sources. This has been achieved through an iterative process of design informed by detailed routeing and siting studies and stakeholder feedback. However, given the linear nature of the Project and its large geographical scale, avoidance of all areas of fluvial and tidal floodplain and areas at risk of surface water flooding is not practicable. Works in these areas, however, would be largely temporary, associated with

construction of the Project, and during its operation (and maintenance) would be limited to some localised reaches of permanent routes of access in the fluvial and tidal floodplain.

Exception Test

- 10B.5.4 To satisfy planning requirements, an Exception Test is required to prove (NPPF paragraph 178):
- the development provides wider sustainability benefits to the community, that outweigh flood risk; and
 - the development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk overall.
- 10B.5.5 With regard to the first part of the test, the Project is a Nationally Significant Infrastructure Project that would play an important role in delivering renewable electricity efficiently, reliably and safely and will support the UK's move towards net zero.
- 10B.5.6 Localised reaches of permanent routes of access may lie within Flood Zone 3 (to be determined at ES stage when the design has developed further). These would be designed such that they are resilient to flooding, ensuring the Project would be safe and could continue to operate. A suite of measures would be adopted, as described in **Table 10B.1** to prevent flood risk increases during construction and operation (and maintenance) of the Project. Temporary worksites in floodplains would operate in accordance with commitment W07 of **Appendix 4A Draft Outline CoCP**, to safeguard construction personnel and prevent flood damages to construction equipment and materials.
- 10B.5.7 The Exception Test is therefore concluded to be satisfied, as the Project would bring significant benefits via its delivery of safe, reliable, and renewable electricity; the Project would not result in an increase in flood risk elsewhere; and has been designed to be resilient to flooding throughout its lifetime.

10B.6 Summary and Conclusions

- 10B.6.1 This pFRA has been carried out in accordance with NPS EN-1 (Ref 10B.3) and EN-5 (Ref 10B.4). Reference has also been made to the NPPF (Ref 10B.5) and the associated PPG for additional guidance regarding flood risk and development (Ref 10B.6).
- 10B.6.2 This pFRA has been informed through consultation with key stakeholders, including the Environment Agency, Leicestershire County Council, Lincolnshire County Council, West Northamptonshire Council and North Northamptonshire Council.
- 10B.6.3 This pFRA has focused on fluvial, tidal, pluvial (surface water), and groundwater flood risk. Flooding from sewers, reservoirs and other artificial sources was scoped out of the assessment due to the nature of the Project and likelihood of flooding from these sources.
- 10B.6.4 The predicted impacts of climate change have been included in the assessment. These include increases to peak flows, with respect to fluvial flooding; sea level rise, with respect to tidal flooding; and increased rainfall intensity, with respect to surface water flooding.

- 10B.6.5 A sequential approach has been taken in siting the Project infrastructure; however, due to the linear nature of the Project and its large geographical scale, some parts of the draft Order Limits necessarily encroach into areas with a medium or high likelihood of flooding. This triggers the NPPF Exception Test, and the evidence of satisfying the requirements of this has been presented in this pFRA.
- 10B.6.6 National Grid has made a number of commitments around flood risk management measures and land drainage. These are documented in **Appendix 4A Draft Outline CoCP**.
- 10B.6.7 Flood risk to and arising from the Project during construction has been assessed and the following points have been concluded:
- The majority of the Project is at low risk of fluvial flooding. Locally higher risks to temporary works within Main River floodplains would be reduced through embedded and standard mitigation measures which include managing these worksites in accordance with a flood risk action plan (commitment W07 of **Appendix 4A Draft Outline CoCP**). These measures would protect construction workers, limit damages to construction equipment and materials and also limit any impacts of the Project on fluvial flood risk.
 - The Project is at low risk of tidal flooding when considering the presence of flood defences. A small number of towers at the eastern extent of the draft Order Limits are proposed within the 0.5% AEP 2115 breach modelled extent in the unlikely event that a breach of the flood defences occurs. This risk, particularly to temporary works within the breach extent, would be reduced through design and standard mitigation measures which include managing these worksites in accordance with a flood risk action plan (commitment W07 of **Appendix 4A Draft Outline CoCP**). These measures would protect construction workers, limit damages to construction equipment and materials and also limit any impacts of the Project on tidal flood risk.
 - With respect to surface water flooding, during construction and operation (and maintenance), the Project is considered to be largely at low risk, with some areas at higher risk where ordinary watercourses are crossed and where ground levels are lower. Measures would be in place to manage surface water runoff and minimise impacts on the land drainage regime across the Project, including allowances for climate change resilience within the designs of operational SuDS.
 - During construction the Project is considered to be at low risk of flooding from groundwater and is not anticipated to increase flood risk from this source.
- 10B.6.8 During its operation (and maintenance) phase, the Project is considered to be at low risk of flooding from all sources assessed in this pFRA due to the mitigation measures built into its design. The new substations would be located within Flood Zone 1 and the new overhead lines would be raised significantly above flood depths associated with fluvial, tidal and surface water sources. The Project is not anticipated to increase flood risk elsewhere during its operation (and maintenance) as any losses of floodplain storage would be compensated for, and additional surface water runoff would be managed in line with national and local requirements. Further details on the proposals for compensatory storage and surface water drainage design have been included in this pFRA.
- 10B.6.9 The works required and associated flood risks during eventual decommissioning would be similar, subject to any climate change impacts. More stringent mitigation could be implemented to address the risks associated with such future works, to be

identified through an appropriate assessment to be undertaken at that time. It is not anticipated that there would be any flood risk obstacles to decommissioning that could not be overcome.

- 10B.6.10 In conclusion, this pFRA demonstrates that the requirements of EN-1 (Ref 10B.3), EN-5 (Ref 10B.4) and the NPPF (Ref 10B.5) and its associated PPG (Ref 10B.6) with respect to flood risk have been met.

References

- Ref 10B.1 Environment Agency (2026). *Flood Map for Planning*. [online]. Available at: <https://flood-map-for-planning.service.gov.uk/> [Accessed 29 May 2026].
- Ref 10B.2 Flood and Water Management Act 2010 [online]. Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> [Accessed 14 November 2025].
- Ref 10B.3 Department for Energy Security & Net Zero (2025). *Overarching National Policy Statement for Energy (EN-1)* [online]. Available at: <https://assets.publishing.service.gov.uk/media/695d1015f41883f4e50ed9ab/overarching-national-policy-statement-for-energy-en-1-web-accessible.pdf> [Accessed 28 January 2026].
- Ref 10B.4 Department for Energy Security & Net Zero (2025). *National Policy Statement for Electricity Networks Infrastructure (EN-5)* [online]. Available at: <https://assets.publishing.service.gov.uk/media/695d12e1b5c46330350ed9a1/national-policy-statement-for-electricity-networks-infrastructure-en-5-web-accessible.pdf> [Accessed 28 January 2026].
- Ref 10B.5 Department for Levelling Up, Housing and Communities (2024). *National Planning Policy Framework* [online]. Available at: https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf [Accessed 14 November 2025].
- Ref 10B.6 Ministry of Housing, Communities and Local Government (2025). *Flood Risk and Coastal Change National Planning Practice Guidance* [online]. Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change> [Accessed 14 November 2025].
- Ref 10B.7 Environment Agency (2022). *Flood risk assessments: climate change allowances* [online]. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> [Accessed 14 November 2025].
- Ref 10B.8 South East Lincolnshire Joint Strategic Planning Committee (2019). *South East Lincolnshire Local Plan 2011-2036* [online]. Available at: <https://southeastlincslocalplan.org/article/20102/Adopted-Plan> [Accessed 14 November 2025].
- Ref 10B.9 South Kesteven District Council (2020). *South Kesteven District Council Local Plan 2011-2036* [online]. Available at: <https://www.southkesteven.gov.uk/planning-building-control/planning-policy-local-plans/south-kesteven-local-plan> [Accessed 14 November 2025].
- Ref 10B.10 Melton Borough Council (2018). *Melton Local Plan 2011-2036* [online]. Available at: <https://www.meltonplan.co.uk/adoptedplan> [Accessed 14 November 2025].
- Ref 10B.11 Harborough District Council (2019). *Harborough Local Plan 2011-2031* [online]. Available at: https://www.harborough.gov.uk/info/20004/planning_strategy/220/harborough_local_plan_2011-2031 [Accessed 14 November 2025].

- Ref 10B.12 North Northamptonshire Joint Planning Unit (2016 & 2021). *North Northamptonshire Joint Core Strategies 2011-2031 and Part 2 Local Plans* [online]. Available at: <https://www.northnorthants.gov.uk/planning-strategies-and-plans/north-northamptonshire-local-plan> [Accessed 14 November 2025].
- Ref 10B.13 West Northamptonshire Joint Planning Unit (2014). *West Northamptonshire Joint Core Strategy Local Plan* [online]. Available at: <https://www.westnorthants.gov.uk/west-northamptonshire-joint-core-strategy/west-northamptonshire-joint-core-strategy-local-plan-part> [Accessed 14 November 2025].
- Ref 10B.14 Department for Environment, Food and Rural Affairs (2025). *National Standards for Sustainable Drainage Systems (SuDS)*. [online]. Available at: <https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds> [Accessed January 2026].
- Ref 10B.15 National Grid (2025). *Weston Marsh to East Leicestershire Corridor Preliminary Routeing and Siting Study*. [online]. Available at: <https://www.nationalgrid.com/document/561431/download> [Accessed 14 November 2025].
- Ref 10B.16 Ordnance Survey Mapping (2026). *OS Maps*. [online]. Available at: <https://explore.osmaps.com/> [Accessed 24 June 2026].
- Ref 10B.17 Cranfield University (2025). *Land Information System (LandIS) Soilscales Viewer*. [online]. Available at <https://www.landis.org.uk/soilscales/> [Accessed 14 November 2025].
- Ref 10B.18 British Geological Survey (2025). *Geology Viewer*. [online]. Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> [Accessed 14 November 2025].
- Ref 10B.19 Department for Environment, Food and Rural Affairs (2025). *MAGIC Maps*. [online]. Available at: <https://magic.defra.gov.uk/> [Accessed 14 November 2025].
- Ref 10B.20 Environment Agency (2025). *AIMS Spatial Flood Defences*. [online]. Available at: <https://environment.data.gov.uk/dataset/8e5be50f-d465-11e4-ba9a-f0def148f590> [Accessed 14 November 2025]
- Ref 10B.21 South East Lincolnshire Joint Strategic Planning Committee (2017). *South East Lincolnshire Strategic Flood Risk Assessment*. [online]. Available at: https://www.sholland.gov.uk/media/7937/South-East-Lincolnshire-Strategic-Flood-Risk-Assessment-Report-March-2017-including-guidance-on-applying-the-Sequential-Test-for-planning-applications/pdf/SE_Lincolnshire_SFRA_2017_v6.pdf?m=1607959961710 [Accessed 14 November 2025].
- Ref 10B.22 AECOM (2017). *South Kesteven District Council Strategic Flood Risk Assessment*. [online]. Available at: <https://www.southkesteven.gov.uk/sites/default/files/2023-08/SFRA%20Level%201%20%281of2%29.pdf> [Accessed 14 November 2025].

- Ref 10B.23 JBA Consulting (2015). *Melton Borough Council Level 1 and 2 Strategic Flood Risk Assessment*. [online]. Available at: https://40598510-d83b-48fe-b4fd-63400f103e39.filesusr.com/ugd/d246bd_3d585be70aaa4d94bf9ed2060cdcae2e.pdf [Accessed 14 November 2025].
- Ref 10B.24 JBA Consulting (2017). *Leicestershire and Leicester City Level 1 Strategic Flood Risk Assessment*. [online]. Available at: https://www.l1strategicgrowthplan.org.uk/wp-content/documents/pdf_document/2017s5956-Level-1-SFRA-Final-v2.0.pdf [Accessed 14 November 2025].
- Ref 10B.25 Scott Wilson (2009). *Harborough District Council Level 1 Strategic Flood Risk Assessment*. [online]. Available at: https://www.harborough.gov.uk/downloads/download/48/harborough_district_strategic_flood_risk_assessment [Accessed 14 November 2025].
- Ref 10B.26 Royal Haskoning (2010). *Kettering Strategic Flood Risk Assessment Level 2*. [online]. Available at: <https://www.northnorthants.gov.uk/flooding/surface-water-planning/planners-and-flood-risk> [Accessed 14 November 2025].
- Ref 10B.27 Northamptonshire County Council (2017). *Wellingborough Level 1 Strategic Flood Risk Assessment*. [online]. Available at: <https://www.northnorthants.gov.uk/flooding/surface-water-planning/planners-and-flood-risk> [Accessed 14 November 2025].
- Ref 10B.28 West Northamptonshire Joint Planning Unit (2019). *West Northamptonshire Strategic Flood Risk Assessment*. [online]. Available at: <https://www.westnorthants.gov.uk/flooding-and-flood-risk-management/statutory-and-project-documents-flood-risk> [Accessed 14 November 2025].
- Ref 10B.29 Lincolnshire County Council (2011). *Preliminary Flood Risk Assessment*. [online]. Available at: <https://www.lincolnshire.gov.uk/downloads/file/4382/preliminary-flood-risk-assessment-report> [Accessed 14 November 2025].
- Ref 10B.30 Leicestershire County Council (2011). *Preliminary Flood Risk Assessment*. [online]. Available at: https://www.leicestershire.gov.uk/sites/default/files/field/pdf/2016/9/19/prelim_flood_risk_assessment.pdf [Accessed 14 November 2025].
- Ref 10B.31 Northamptonshire County Council (2011). *Preliminary Flood Risk Assessment*. [online]. Available at: <https://www.westnorthants.gov.uk/flooding-and-flood-risk-management/statutory-and-project-documents-flood-risk> [Accessed 14 November 2025].
- Ref 10B.32 Lincolnshire County Council (2020). *Joint Lincolnshire Flood Risk and Water Management Strategy*. [online]. Available at: <https://www.lincolnshire.gov.uk/downloads/file/2365/joint-lincolnshire-flood-risk-and-water-management-partnership-framework-draft-strategy-2019-2050-pdf> [Accessed 14 November 2025].
- Ref 10B.33 Leicestershire County Council (2024). *Local Flood Risk Management Strategy for Leicestershire*. [online]. Available at: <https://www.leicestershire.gov.uk/sites/default/files/2024-02/Local-Flood-Risk-Management-Strategy-for-Leicestershire.pdf> [Accessed 14 November 2025].

- Ref 10B.34 Northamptonshire County Council (2016). *Local Flood Risk Management Strategy*. [online]. Available at: <https://www.westnorthants.gov.uk/flooding-and-flood-risk-management/local-flood-risk-management-strategy> [Accessed 14 November 2025]
- Ref 10B.35 Environment Agency (2024). *Risk of Flooding from Reservoirs*. [online] Available at: <https://check-long-term-flood-risk.service.gov.uk/map> [Accessed November 2025].
- Ref 10B.36 Environment Agency (2025). *Asset Management*. [online]. Available at: <https://environment.data.gov.uk/asset-management/index.html> [Accessed 14 November 2025].
- Ref 10B.37 Department for Environment, Food and Rural Affairs (2006). *Flood and Coastal Defence Appraisal Guidance FCDPAG3 Economic Appraisal*. [online]. Available at: <https://dpanther.fiu.edu/record/11352?v=pdf> [Accessed January 2026].

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com