

Flood Mitigation - OFGEM Justification Paper	
Name of Scheme/Programme	Flood Mitigation
Primary Investment Driver	Flood Risk Mitigation
Scheme reference/mechanism or category	N/A
Output references/type	N/A
Cost	£5.5m (Gross)
Delivery Year	2022-2025
Reporting Table	C2.24 – Legal and Safety
Outputs included in RIIO-T1 Business Plan	No

Issue Date	Issue No	Amendment Details
July 2019	Issue 1	First issue of document
December 2019	Issue 2	Amendments to volumes and costs

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1 Introduction

To address the risks associated with climate change and specifically flooding the Energy Networks Association (ENA) published Engineering Technical Report 138 – ‘Resilience to Flooding of Grid and Primary Substations’. To comply with this industry guidance SPT have identified a number of sites at risk from pluvial flooding.

This paper supports a proposal to carry out Flood Mitigation associated with the risk from pluvial flooding at sites identified following recently updated SEPA flood mapping.

It should be noted that this paper relates to works associated with the mitigation of pluvial flooding however there are other RIIO T2 flooding costs within Table C2.24 which are associated with the Kincardine Flood Mitigation project.

2 Background Information

The UK Climate Change Act 2008 gives the Secretary of State power to require companies to report on their climate change adaptation plans. This power was first exercised in 2010 with our first adaptation report produced in 2011 (round 1 reporting). We published our second round report in 2015 'Climate Change Adaptation Report – Round 2' and this provided an update on the risks identified for SP Energy Networks in the first report, as well as an update on the uncertainties and information available relating to risks from climate change since the first reports were published in 2011. The third round report is due for publication in 2020.

Our Round 1 report published in 2011 aligned with an assessment undertaken by the ENA, which coordinated an industry-wide response to the first call to report. SP Energy Networks was a contributor to this response, and considered the ENA assessment to be a robust and appropriate baseline for our subsequent network-specific assessments. Our network assessment focused mainly on the impacts listed below, in line with overall climate projections for hotter drier summers, warmer wetter winters and more frequent and intense storm events:

- Increased temperatures including an extension of the growing season;
- Drought and reduced soil moisture contents;
- Rising sea levels and coastal erosion;
- Rainfall and flooding, including river erosion;
- Storms, including lightning and other extreme events.

The full list of risks was then assessed using the ENA risk assessment framework, which involved assessing the relative impact and relative likelihood of each risk and was informed by the UKCP09 projections for the end of the century assuming a High Emissions Scenario and 90% probability level and no adaptation measures taken.

The 3 most highly-ranked risks all related to flooding of substation sites and were as follows:

- AR10 - Substations affected by fluvial (river) flooding due to increased winter rainfall, with loss of inability to function leading to reduced security of supply;
- AR11 - Substations affected by pluvial (surface water) flooding due to severe rainfall, with loss of ability to function leading to reduced security of supply;
- AR12 - There is a risk that due to extreme sea flooding a substation may be lost or unable to function leading to reduced system security of supply. A number of sites may be at risk from sea level rise/coastal erosion.

These risks all had high relative impact and high relative likelihood making them the most pressing of the identified risks.

To inform the development of our Investment Plan, and in advance of the third round reporting, a review was undertaken to confirm the risks identified for the transmission network identified in the 2015 second round report were still applicable, and the risk assessment remains valid.

Projects were undertaken in RIIO-T1 to mitigate risks AR10 and AR12 however risk AR11 was added into the 2nd round of reporting and so it is only as part of our RIIO-T2 plan that we are able to address the issues associated with this.

Following the publication of our second round adaptation report, updated data on pluvial flooding became available from the Scottish Environment Protection Agency (SEPA) in 2018. Based on the guidance within the Energy Networks Association (ENA) Engineering Technical Report (ETR) 138 – ‘Resilience to Flooding of Grid and Primary Substations’ to ensure protection of substations against a 1:1000yr flood event a desktop exercise using the SEPA flood maps and SPEN GIS data identified a list of 26 substation sites that were potentially at risk. Following further detailed assessments and site walkovers of these 26 sites it was determined that at 10 sites a detailed FRA is required to determine the level of risk associated with surface flooding.

3 Optioneering

The following is a summary of the options considered for this Programme.

	Option	Status	Reason for rejection
1	Do Nothing	Rejected	Based on industry guidance, flooding of substations and loss of supply due to this type of flood event is unacceptable. Therefore this option was rejected.
2	Undertake flood mitigation surveys and works	Proposed	

4 Detailed analysis

The assessment of the current SEPA flood maps and the company’s GIS system identified 26 sites where further consideration of flood mitigation was required. Further surveys of these sites identified the following 10 substations where works will be necessary to mitigate the risk of pluvial flooding.

Substation	Voltage (kV)
Carsfad	132
Crookston	132
Earlstoun	132
Galashiels	132
Gorgie	132
Meadowhead	132
Westfield	132
Elvanfoot	275
Mossmorran	275
Wishaw	275

4.1 Selected Option

It is necessary for SPT to undertake flood mitigation at these sites to reduce the risk to the network from pluvial flooding. This will ensure compliance with the requirement within ETR 138 to protect substations against a 1:1000yr flood event and provide network security from the effects of flooding.

4.2 Innovation

Innovation is a key component to deliver developments in all aspects of work. While the technology used in the project will be standard with a proven track record and the application adopted in line with industry standards, SPT will look to use innovate ways of project delivery and installation to deliver this programme of works.

5 Conclusion

SPT have identified 10 sites which are at risk from pluvial flooding. During the RIIO-T2 period SPT will undertake flood mitigation to reduce the risk to the network from pluvial flooding. This will ensure compliance with the requirements within ETR 138 to protect substations against a 1:1000yr flood event and provide network security from the effects of climate change. These works will be coordinated with other works to ensure an efficient and low cost solution is delivered.

- Predicted costs: £ 5.5m (Gross)
- Timing of investment: 2022-2025
- Declared outputs: N/A

6 Future Pathways – Net Zero

6.1 Primary Economic Driver

With the ever increasing risks present to society by climate change flooding of our substations is a major risk. The primary driver for this investment is to ensure that our substations can continue to operate in the event of a flood. We will undertake assessments, to determine the level of flood mitigation that is required, and will consider the risk of flooding both now and for future climate change scenarios.

6.2 Payback Periods

The project is related to existing substations whose ongoing need has been confirmed.

6.3 Pathways and End Points

The increased risks associated with climate change mean that mitigation against flooding will ensure the resilience of the network during a major flood event.

6.4 Asset Stranding Risks

The project is related to existing substations whose ongoing need has been confirmed.

6.5 Sensitivity to Carbon Prices

The project is related to existing substations whose ongoing need has been confirmed.

6.6 Future Asset Utilisation

The project is related to existing substations whose ongoing need has been confirmed. This project will ensure the resilience of the network during a major flood event.

6.7 Whole Systems Benefits

The project is related to existing substations whose ongoing need has been confirmed. This project will ensure the resilience of the network during a major flood event.

7 Outputs included in RIIO-T1 Plans

There are no RIIO-T1 outputs associated with the pluvial flood mitigation works detailed in this paper however it should be noted that there are other flooding costs within Table 2.24 which are associated with the completion of ongoing Kincardine Flood Mitigation project.