Re-opener Report

MSIP – ESO Driven Works

Project: Cellarhead Customer Connection

January 2022

nationalgrid

Contents

1. Executive summary

1. This submission requests additional allowance to provide a 132kV connection at Cellarhead Grid Supply Point (GSP) in Staffordshire. The connection is to accommodate a feeder circuit connection between Whitfield Bulk Supply Point (BSP) and Cellarhead GSP being installed by Western Power Distribution (WPD). This reinforcement is being completed by WPD to maintain required levels of system security.
2. The preferred connection solution is to provide a bus bar connection to existing bus bars, enabling WPD to construct their bay equipment using existing civil structures within a spare bay at Cellarhead 132kV substation. This approach minimises cost to the consumer, environmental impacts, and achieves the customer connection date.
3. Other options such as do nothing, market, and whole system solutions did not satisfy the need. Extending the site to accommodate WPDs new bay was considered, however it was identified that use of a spare bay within the current compound could provide the connection at a lower cost. The chosen connection option satisfies the technical requirements of the customer.
4. NGET are therefore seeking funding for these works via the Medium Sized Investment Project (MSIP) reopener mechanism under the 'ESO requirements' category.

5. The proposed delivery date for the works is [redacted] and all spend will be within the RIIO-T2 period. The funding requested is [redacted] in 18/19 price base and 80% of the total costs are either incurred already or have been contracted, giving high confidence in our cost submission.

2. Introduction

6. This document is the formal MSIP submission to Ofgem by NGET for the Cellarhead customer connection during RIIO T2. This is submitted under the MSIP re-opener provided for in Special Condition 3.14 of the NGET Transmission Licence.
7. The MSIP re-opener was introduced by Ofgem to allow Transmission Owners (TOs) to apply for funding for investments under £100m not included in baseline funding. TO's MSIP submissions allow for Ofgem to carry out an assessment of the need and cost of the proposed investment.
8. This submission is made in accordance with the 'RIIO-2 Re-opener Guidance and Applications Requirements' published by Ofgem in February 2021. The contents of the submission have also been informed by engagement between NGET and Ofgem with the aim of ensuring that this submission enables the Authority to make a positive timely decision on funding.
9. NGET has demonstrated that the proposed investment represents the lowest cost option for consumers and is the only feasible option that can facilitate WPD's required connection date. The submission provides a comparison of capital costs of options but does not include a detailed cost benefit analysis (CBA). It is our view that a CBA is not required in order to make an informed investment decision and as such one has not been provided
10. The works described in this submission are required to provide a connection for a customer, WPD, who are seeking a 132kV feeder circuit connection between Whitefield BSP and Cellarhead GSP.

[redacted]

13. This connection is not covered by either the RIIO-T2 generation or demand uncertainty mechanisms (UMs). The primary function of this customer connection is to provide additional circuit interconnection between the WPD distribution network and the 132kV substation at Cellarhead.
14. There is no contractual Transmission Entry Capacity (TEC) associated with connection that would be used to quantify the output under the generation uncertainty mechanism (UM) and there is no transformer required to facilitate the connection which would be used to measure output under the demand UM.
15. NGET are therefore seeking allowance for this connection via the Medium Sized Investment Project (MSIP) reopener mechanism under the 'ESO Driven Requirements' category.

3. Structure of the reopener submission

16. The table below signposts the structure of the document and sets out the purposes of each of the sections. This also lists the appendices. We invite Ofgem to consider the proposals set out in this submission and raise queries against anything that may require further clarification.

Chapter		Description
1.	Executive Summary	A high-level summary of the submission
2.	Introduction	High level overview of the project
3.	Document structure	Navigation tool
4.	Alignment with overall business strategy and commitments	The strategic context and overview
5.	Demonstration of the needs case	Sets out the drivers for the project
6.	Options analysis	Describes the range of options considered and shortlisted options
7.	Preferred option and detailed costs	Summarises the scope of works and benefits the efficient costs of the project, setting out the assumptions and methodology used and the evidence to support cost confidence including risks and contingency
8.	Project delivery	Details the proposed pathway to completion
9.	Price control deliverable	Obligation to deliver the works detailed
10.	Overview of assurance and point of contact.	Assurance statement
Appendices		
Ref.		**Title**
Appendix A		WPD report
Appendix B		Assurance statement letter
Appendix C		Ofgem ET UM submission template
Appendix C		Ofgem document guidance

4. Alignment with overall business strategy and commitments

The strategic context

17. NGET is required by our licence to provide connections for customers. Our baseline RIIO-T2 business plan included the customer connections we had sufficient understanding of and certainty about at that time. Over the course of a price control period, it is expected that existing customers may change their plans or new customers may apply for connections that can require investment within the price control period. These changes are managed through the agreed uncertainty and reopener mechanisms.

18. The interconnections between the high voltage transmission network and the lower voltage distribution networks are provided by Super Grid Transformers (SGTs). In England Wales, the transmission network generally consists of infrastructure operating at 275kV or 400kV. Substations that contain SGTs to provide connection to a distribution network are referred to as Grid Supply Points (GSPs). Generally, the low voltage side of the SGT will operate at 132kV and the distribution network operator (DNO) will be the owner of the 132kV substation to which the SGT is connected.

19. However, some GSPs, such as Cellarhead, provide connections for more than one DNO. In these cases, the 132kV substation is also owned by NGET and treated as transmission infrastructure. At such sites, NGET is responsible for the infrastructure works.

20. Traditionally, the connections between the transmission system and DNO networks were designed primarily to transfer power from the transmission network to distribution networks to supply the domestic and commercial customers connected to those networks. However, the growth in generation, often renewables, connected directly to distribution networks (referred to as embedded generation) has changed the nature of the connections between transmission and distribution networks, with embedded generation often seeking to be able to export power from the distribution network onto the transmission network. DNOs are now seeking greater flexibility from their connection to the transmission network with multi-directional power flows being common.

21. In response to the changing characteristics of both the distribution and transmission networks, DNOs are also seeking to reinforce their networks to meet these emerging customer needs. In this instance it has led to WPD seeking an additional circuit connection to the grid supply point. WPD is not seeking increased transfer capacity between the transmission and distribution network (in the form of a new SGT) but is seeking to provide additional capacity within their own network through increasing interconnection between distribution substations.

22. The changing nature of DNO networks is a key part of the Net Zero transition and NGET works closely with DNOs to understand their future capacity and connection requirements to ensure that the rapid growth in embedded generation, and the flexibility these customers offer, can be accommodated.

5. Demonstration of the needs case

NGET Needs Case

23. WPD has conducted its own option appraisal which led to a transmission solution, which is covered by Appendix A

24. [redacted].

25. NGET are required to complete works at Cellarhead substation to ensure the WPD connection can be made. NGET cannot provide the connection without completing these works.

WPD Needs Case

[redacted]

Section Summary – Need Case

- **The need case is driven by a Connection Application from WPD.**
- **NGET must provide a connection to the customer.**
- **The customer has a signed connection agreement for connection on [redacted].**
- **Reinforcement required within WPDs network to maintain required levels of security**

6. Options analysis

Summary

30. The options below consider only the works required to facilitate WPD's network reinforcement at Cellarhead substation.

Cellarhead Substation

31. Cellarhead 400kV substation is located in the West Midlands region of England. It is one of seventeen NGET Grid Supply Points (GSP) that supply WPD.

32. This GSP provides supplies to both WPD and the Scottish Power Energy Networks (SPEN) SP Manweb distribution network. The Cellarhead 132kV substation (known as CELL1) is defined as a shared site as and is therefore owned by NGET, however both distribution networks also own and operate assets within it. Figure 1 shows the location of Cellarhead on the transmission system schematic.

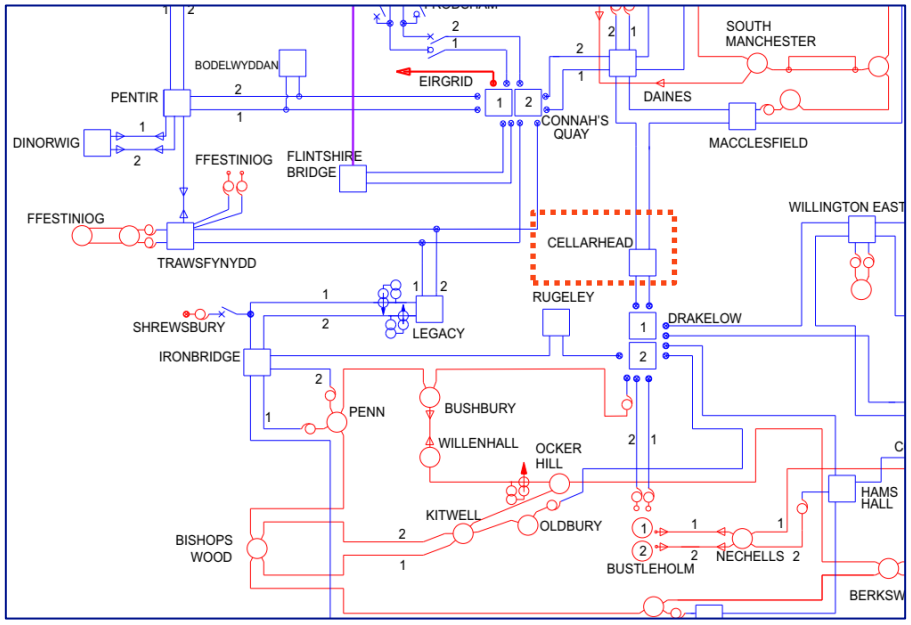

Figure 1 – Location of Cellarhead substation on transmission network

33. Figure 2 shows an aerial view of Cellarhead substation site, with the 132kV elements identified. Figure 3 depicts a simplified electrical layout of the 132kV substation, with the new circuit proposed.

Figure 2 – Aerial view of Cellarhead substation

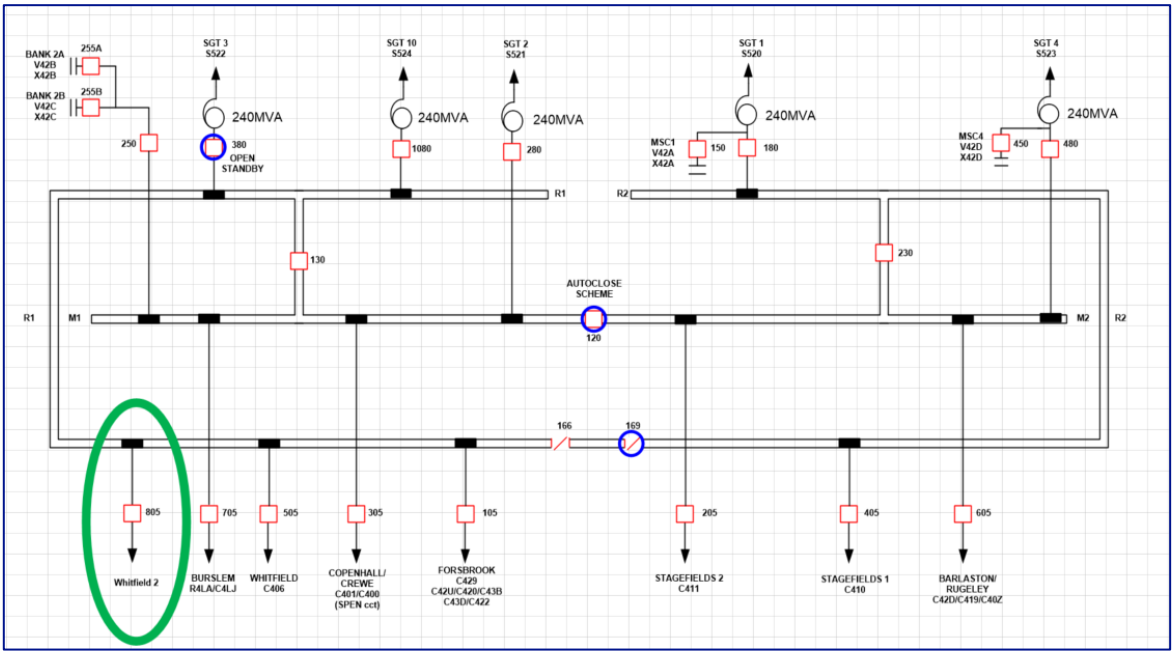

Figure 3 – Single line schematic of Cellarhead 132kV Substation with new circuit 'Whitfield 2' circled in green

Minimum Technical Requirements

34. WPD's new circuit does not provide a connection for a defined volume of embedded generation nor does it increase the group demand level applicable at the Cellarhead GSP. Therefore, the design standards for demand connections specified in chapter 3 of the National Electricity Transmission

System Security and Quality of Supply Standard (NETS SQSS) are not applicable when determining the electrical design of the new connection.

35. To meet the customer need case for a new 132kV circuit to be connected at Cellarhead 132kV substation (CELL1), a bay must be provided to facilitate the connection of the circuit to the substation busbars. [redacted]

36. NGET has studied the effect of adding an additional 132kV circuit to the CELL1 site. WPD have shared relevant data in order for NGET to study potential power flows and fault level infeed's. This is done to determine if the additional connection will trigger the need to upgrade any of the NGET owned assets at CELL1 (or any other local NGET sites that may be affected by the new connection).

37. These studies concluded that the existing assets could accommodate the new circuit without the need for upgrades to improve capacity of fault level ratings.

Long list of options

38. Generally, NGET will assess the following categories of option when assessing how to facilitate new connections:

- Do nothing
- Whole system / market-based solution
- Use / enhancement of existing assets
- Construction of new assets

Do nothing

39. This option is not applicable to this need case as NGET is obligated to provide a connection for this customer. There is no way to facilitate the customers application without providing some form of direct access to the transmission system.

Whole system / market-based solution

40. The requested connection from WPD requires a connection to the transmission network. Therefore, as a connection to the transmission network must be provided for this customer there is no whole system or market-based alternative to providing a physical connection to the transmission network. The connection does not trigger any other works in the local transmission network (e.g., replacement of circuit breakers due to increased fault levels or increased circuit ratings to manage higher loadings). Therefore, no whole system or market-based solutions need to be investigated as alternative to any infrastructure works required beyond the customer connection point.

Use / enhancement of existing assets

41. NGET has investigated options to utilise existing assets at the Cellarhead substation to reduce the cost and timescales for 132kV circuit connection. There is no existing spare, populated bay which WPD can connect to, and therefore the construction of new assets to provide the connection is required.

Construction of new assets

42. NGET has considered the option of new assets being constructed at Cellarhead substation to provide the WPD connection. As there is no existing populated spare bay to connect to, the connection will require the construction of a new bay.

43. However, existing civil structures and 132kV busbars as shown in Figure 4, have been identified as appropriate for the new connection at Cellarhead. These have not been used by a previous customer and can be utilised by WPD for mounting switchgear and to form the basis for the new bay. This will reduce the works required for the connection and provide greater efficiencies and cost savings to consumers. NGET have offered the spare bay to WPD, this option is referred to as No. 5 in table 1.

44. The use of the spare bay mitigates the need to extend the substation boundary beyond its current position. Such an option would add approximately xxxxx of cost and increase the programme due to the additional scope and associated planning permission requirements. This option is referred to as No. 4 in table 1.

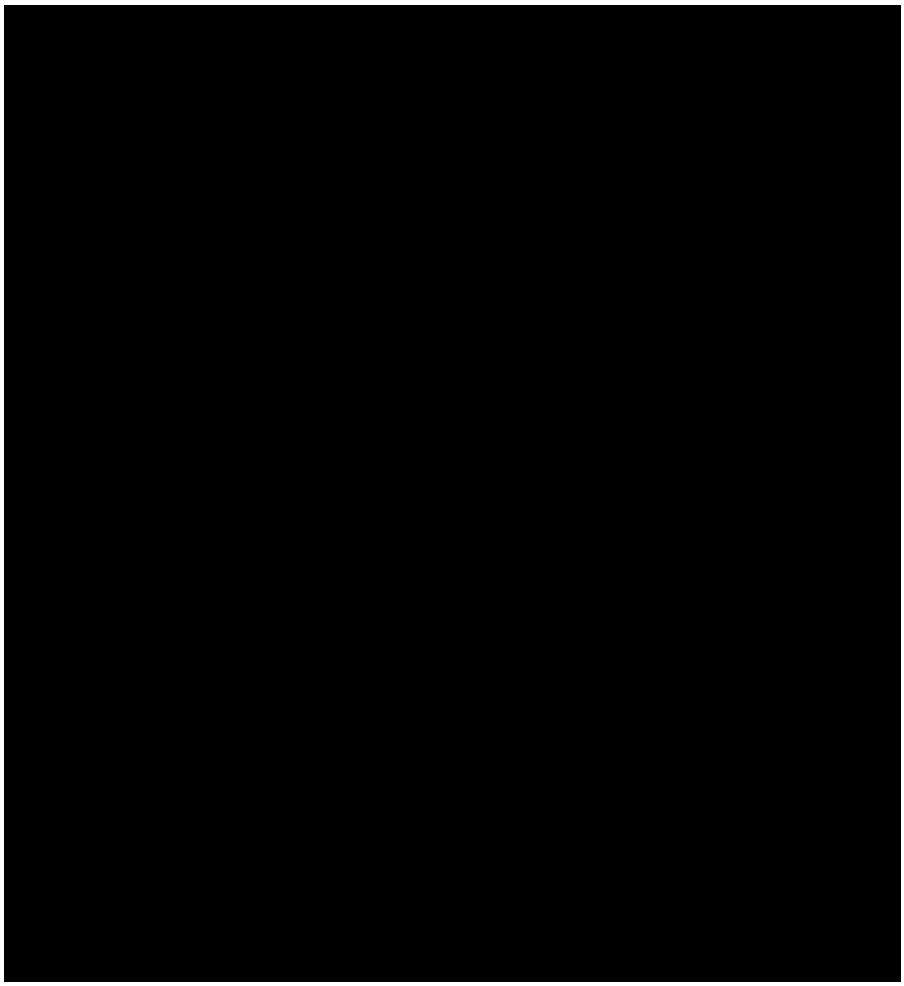

Figure 4 - Cellarhead Existing Civil Structures

45. The option of using the spare bay does enable the re-use of some existing assets and hence reduces the scope of works that must be carried out. This results in lower costs for both NGET and WPD and is therefore the most cost-effective option for the end consumer.

Selection of the preferred option

46. We initially identified a range of options that could potentially fulfil the needs of WPD and provide a connection in the timescales required.

No.	Option	Cost (£m)	Timescale	Selected (Y/N)
1	**Do Nothing**	0	N/A	N
2	**Whole System / Market-Based**	N/A	N/A	N
3	**Existing Assets**	N/A	N/A	N
4	**New Assets – [redacted]**	[redacted]	Late 2023	N
5	**New Assets – [redacted]**	[redacted]	June 2022	Y

Table 1 – Option summary

47. Investigation of the options identified that whole system and market-based options were not applicable in this case due to the need for the customer to have direct access to the transmission system.

48. [redacted]

Section Summary

- **Do Nothing, Market, and Whole System solutions were considered and ruled out as they can't meet the need case.**
- **The option to provide the customer a connection via existing assets was not chosen as there were no spare bays available.**
- **Extending the site to accommodate WPDs new bay was considered, however it was identified that use of a spare bay area within the current compound could provide the connection at a lower cost.**
- **The chosen connection option satisfies the technical requirements of the customer.**

7. Preferred option and detailed costs

Construction of a new feeder bay – Cellarhead 132kV Substation

[redacted]

[redacted]

Figure 5 - [redacted]

[redacted]

[redacted]

[redacted]

Figure 6 - [redacted]

Work Summary

[redacted]

Detailed costs

53. Since selection of the preferred option, NGET's scheme team has continued to develop the proposed works to fully understand scope, prepare detailed delivery plans, and engage with suppliers to refine costs.

Latest Cost Estimate

54. The following cost breakdown represents our latest view of costs for the proposed investment (18/19 price base).

Classification	Activities	Source	Prev. Yrs	FY22	FY23	FY24	Cost (£k)
	Total						
		Direct Allowances Requested					

55. Table 2 – Cost Estimate in 18/19 price base

56. The table below shows the assessment of cost firmness using the classification outlined in the Ofgem LOTI reopener guidance document published on 29th March 2021. This shows that 80% of the total costs are either incurred already or have been contracted, giving high confidence in our cost submission.

Cost Firmness	Project Management	Optioneering /Develop't	Contractor Costs	NG Site Costs	Commission	Contingency	Closeout	Totals
Total								

57. Table 3 – Cost firmness

Risk & Contingency

58. The following key programme and project risks have been identified and incorporated into the analysis to produce the contingency provided within Table 3:

Table 4: Key Risks

Cause	Description	Impact	Probability	Mitigation

Procurement Strategy

59. [redacted]

60. [redacted]

Cost benefit analysis

61. Our assessment of options has shown that the preferred option offers the lowest cost option for consumers, the earliest connection date for the customer, and the lowest level of technical and project risk.

62. As such, in line with Ofgem's guidance to develop MSIP submissions that are proportional to scale and cost of the investments proposed, it is not considered necessary or efficient to undertake a CBA process as part of this submission as the reasoning behind the selection of the preferred option are considered to be clear based on the information presented in previous sections.

Total Allowance Request

63. NGET requests that the following allowance is provided through the MSIP reopener mechanism to deliver the works described above. These allowances will be subject to the Opex Escalator mechanism.

	Prev. Yrs	FY22	FY23	FY24	Cost (£k)
Direct Allowances Requested	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Section Summary – Preferred Options and Detailed Costs

- **The preferred option requires NGET to [redacted] to facilitate the construction and connection [redacted] by WPD**
- **The total cost of the connection is [redacted] in 18/19 price base.**
- **80% of the total costs are either incurred already or have been contracted, giving high confidence in our cost submission.**

8. Project delivery and monitoring

64. A detailed project delivery plan has been prepared by the NGET scheme team. This plan facilitates the customer's contracted connection date of 30/06/2022.

65. The key project milestones are summarised below:

MILESTONE	DATE

9. Programme Coordination

66. The key stakeholders identified by NGET in this project are: WPD (the customer) and the ESO.

67. NGET has worked closely with WPD to develop the project and agree a programme that meets their need to achieve the desired connection date. To ensure our investment is efficient, we have closely tracked the progress of the customer in developing their aspects of the connection to ensure that NGET does not invest ahead of need.

68. The latest status of the customer project is summarised below:

MILESTONE	Status	Date

The progress of the customer indicates that they will be ready to connect by the contracted date and hence our investment should continue as planned to meet this agreed date.

10. Price Control deliverables

69. As there is no measurable output in terms of contracted TEC or transformers to be delivered for this project, it is proposed that an evaluative Price Control Deliverable is defined.

70. [redacted] for new WPD circuit 132kV circuit at Cellarhead 132kV substation by [redacted]

11. Overview of assurance and point of contact

71. Appendix B, the assurance statement letter, is the written confirmation in line with the assurance requirements set out in Ofgem's Re-opener Guidance[1] and Data Assurance Guidance document (currently under review).

72. This confirmation is provided by the Director of Regulation, Electricity Transmission where they are accountable for the RIIO-2 regulatory allowances for National Grid Electricity Transmission (NGET) including any changes to these allowances. They provide the following statements below regarding how this MSIP application has been prepared and submitted in relation to each of the three assurance points requested by Ofgem:

- It is accurate and robust, and that the proposed outcomes of the MSIP submission are financeable and represent good value for consumers.

- There were quality assurance processes in place to ensure the licensee has provided high-quality information to enable Ofgem to make decisions which are in the interests of consumers.

- The application has been subject to internal governance arrangements and received sign off at an appropriate level within the licensee.

73. NGET's designated point of contact for this MSIP application is Mohammed Farooq, Regulatory Development Manager, email mohammed.farooq@nationalgrid.com, telephone 07973 979 536.

[1] RIIO-2 Re-opener Guidance and Application Requirements Document: Version 1, 26 February 2021

Appendices

Appendix A – WPD Report

Redacted

Appendix B – Assurance Letter Statements

APPENDIX B - Cellarhead Assuranc

Appendix C – Ofgem ET UM submission template

Redacted

Appendix D – Ofgem document guidance

APPENDIX D - Ofgem Document G

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