MSIP Re-opener Report

Willesden & Kensall Green Microsoft Data Centre

January 2024

nationalgrid

Contents

Abbreviations

Table of Abbreviations

Abbreviation	Term
ACL	Available for Commercial Load
AIS	Air Insulated Switchgear
BCA	Bilateral Connection Agreement
CAI	Closely Associated Indirect
CBA	Cost Benefit Analysis
ECC	Engineering and Construction Contract
ESO	Electricity System Operator
iDNO	Independent Distribution Network Operator
FEED	Front-End Engineering Design
GIS	Gas Insulated Switchgear
GVA	Gross Value Added
HV	High Voltage
kV	Kilo Volt
MSFT	Microsoft MCIO Limited
MSIP	Medium Size Investment Project
MVA	Mega Volt Ampere
MVS	Minimum Viable Solution
NGESO	National Grid Electricity System Operator
NGET	National Grid Electricity Transmission
OPEX	Operational Expenditure
RIIO-T2	Revenue Incentives Innovation Outputs - Transmission 2
SEPD	Scottish Electricity Power Distribution
SQSS	Security and Quality of Supply Standard
TO	Transmission Owner
TOCO	Transmission Owner Connection Agreement
UKPD	UK Power Distribution

Executive summary

1. This Medium Sized Investment Project (MSIP) submission to Ofgem by National Grid Electricity Transmission (NGET) details and requests funding for the proposed Willesden 400kV & 66kV and Kensal Green 400kV 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.

2. The paper demonstrates the need for a total of XXXX of which XXXX are direct costs. These costs are for investment at Willesden 400kV & 66kV and Kensal Green 400kV substations (the 'Investment') in the north of London to provide connection for Microsoft Cloud Infrastructure and Operations (MCIO) Limited (hereinafter referred to as Microsoft). Microsoft are seeking to connect a 120MVA data centre at the forementioned substations and this MSIP summarises the optioneering analysis that led us to the proposed solution; to extend Kensal Green 400kV substation and Willesden 400kV substation to provide one connection from each (two total) and another two-connections via UK Power Distribution (UKPD), an Independent Distribution Network Operator (iDNO), under the Bilateral Connection Agreement at Willesden 66kV.

3. This is a statutory requirement on the back of a connection application made by Microsoft. The customer requested a connection from two geographical supply points for connection resiliency above the Security and Quality of Supply Standard (SQSS) minimum technical solution. A viable option is available, and NGET are confident in the customer connection demand and its associated timeline, based on the strategic need being aligned to government goals and timely progress made on the new data centre construction (which will generate the new demand) to date. The paper is divided into seven main sections.

4. Section 1 – **Introduction** - positions the Investment within the context of NGET's investment plan. It confirms the methodology and regional context papers relevant to this submission. For the Investment, this paper should be read in the context of significant energy demand growth in West London associated with the development of several new IT data centres that aligns with national policy objectives such as Build Back Better: Our Plan for Growth stressing the need for infrastructure investment to drive economic growth and recovery following the global Covid-19 pandemic.

5. Section 2 – **Establishing need** – establishes the investment drivers for the project, noting the strategic context and specific load drivers for this site. In this case, the need for the Investment was triggered by Microsoft requesting connections from independent supply points to meet sustainability requirements and connection resiliency. Microsoft have begun the construction of a new data centre in West London in north Acton, which highlights the customer readiness and reliability.

6. Section 3 – **Optioneering** – summarises the options considered for addressing the established need and summarises the reasons for progressing the selected options to detailed analysis. For the Investment, 6 options were identified, 1 of which was taken forward for

detailed analysis. It was found optimal to extend Kensal Green 400kV substation. Despite it not being the lowest cost option, this option offers the customer a level of redundancy that meets their requirements for continued operation even in the event of a circuit failure, thus providing the dependability and stability Microsoft seeks.

7. Section 4 – **Detailed options analysis** – outlines the detailed analysis undertaken in relation to the above shortlisted option, key stakeholder input and detailed costs. The funding requested is XXXX for the direct portion of costs in 2018/19 price base and XXX of the total costs are either incurred or have been contracted, giving high confidence in our cost submission.

8. As has previously been explored with Ofgem, this Investment represents a unique and complex customer scenario. Whilst this will be further detailed within the submission, it is important to draw out that the customer will fund the total cost of the investment above the minimum viable solution (equivalent to XXX) via the One-off charge mechanism under the existing contract. NGET seeks to obtain only the allowance for the minimum viable solution (equivalent to XX) which is the cost of the third connection from Willesden 66kV substation. Although a minimal viable solution is not being physically delivered, it is prudent to charge the customer for all costs associated with the scheme above the minimum Security and Quality of Supply Standard solution.

9. Section 5 – **Deliverability, risk and regulatory outcome** – identifies delivery risks and mitigations, and the proposed regulatory mechanism to be attached to the Investment. A delivery plan has been proposed, with completion date for the works being 30/08/2027. The works are staged with the spend occurring within RIIO-T2 period.

10. Section 6 – **Conclusion** – confirms the proposed solution, including its key outputs and cost. A direct allowance of XXXX in 2018/19 price base is requested.

11. Section 7 – **Overview of Assurance and Point of Contact** – confirms NGET's alignment of this submission with assurance requirements and the designated point of contact for this MSIP application.

Summary Table

MSIP Re-opener Application – Willesden & Kensall Green Microsoft Data Centre Connection	
Ofgem Scheme Reference/ Name of Scheme	Willesden & Kensall Green Microsoft Data Centre
Primary Investment Driver	Customer Connection
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6
PCD Primary Output	Provide a connection for Microsoft at NGET's Willesden 400kV & 66kV and Kensal Green 400kV substations by 30/08/2027
Total Project Cost (£m)	XXXX
Funding Allowance (£m)	XXXX
Output Delivery Year	2023/2024 and 2024/2025
Reporting Table	Annual RRP – PCD Table
PCD Modification Process	Special Condition 3.14, Appendix 1

Issue Date	Issue No	Amendment Details
31st January 2024	1	First issue of document.

Summary Spend Phasing Table					
Regulatory Year	**2023/24**	**2024/25**			
Spend £m	XXXX	XXXX			

1. Introduction

12. This document is the formal Medium Sized Investment Project (MSIP) submission to Ofgem by National Grid Electricity Transmission (NGET) for the Willesden 400kV and Kensal Green 400kV Customer Connection during RIIO-T2. This is submitted under the MSIP re-opener provided for in special condition 3.14.6 paragraph (f) of the NGET Transmission Licence: a system operability, constraint management or 0MW connection project or substation work, which is required to accommodate embedded generation, which in each case has been requested in writing by the Electricity System Operator (ESO). Further detail related to the eligibility of the Investment for this reopener mechanism is detailed later within this section.

13. The MSIP re-opener was introduced by Ofgem to allow Transmission Owners (TO) to apply for funding for investments under £100m in the network not included in baseline funding. TOs MSIP submissions allow for Ofgem to carry out an assessment of the need and cost of the proposed investment.

14. 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.

15. The works described in this submission are required to provide a connection for Microsoft Cloud Infrastructure Operations (MCIO) Limited (thereafter referred to as Microsoft) who are seeking to connect a 120MVA data centre at the existing Willesden 400kV & 66kV and Kensal Green 400kV substations.

16. NGET seeks to demonstrate that the proposed investment represents the best option for consumer value and is a feasible connection option that can facilitate the customer's desired connection date of 30th August 2027 which aligns with the customer's data centre construction programme.

1.1 Geographical Context

17. [redacted]

Figure 1 - Location of Willesden substation in relation to UK and London

18. [redacted]

Figure 2 - Location of the Kensal substation in relation to UK and London

1.2 MSIP Eligibility

19. This submission is made in accordance with the 'RIIO-2 Re-opener Guidance and Applications Requirements' published by Ofgem in February 2021. This MSIP specifically aligns to the sub-criteria of the Special Licence Condition 3.14.6 paragraph (f) which the Microsoft connection investment is eligible for: 'a system operability, constraint management or 0MW connection project or substation work, which is required to accommodate embedded generation, which in each case has been requested in writing by the Electricity System Operator (ESO)'.

20. This connection is not covered by either the RIIO-T2 generation or demand uncertainty mechanisms (UMs). Indeed, the Microsoft connection investment does not include any assets for which output could be measured against under the demand Uncertainty Mechanism (UM).

21. Furthermore, the works within this report were not included within the NGET RIIO-T2 Baseline allowances as the contracted request received from the ESO in January 2020 fell after NGET submitted its RIIO-T2 Business Plan in December 2019.

22. The eligibility of this Investment as an MSIP under special condition 3.14.6 paragraph (f) was identified through engagement with Ofgem which was finalised over email on the 28th of November 2023 (Appendix A).

23. Currently the customer is paying XXX of the scheme cost via a one-off charge, due to their requirements being significantly above the connection solution NGET is obligated to provide them under SQSS (otherwise known as the Minimum Viable Solution). The remaining XXX of the total scheme cost (equivalent to the estimated cost of providing this Minimum Viable Solution) is left unfunded. This portion of the cost has no associated assets to be delivered for which output could be measured against under the demand UM.

24. This engagement sought further clarification as to funding this delta between the Customer's one-off charge and the total scheme cost. Ofgem supported NGET in clarifying their understanding of Special Condition 3.14.6 paragraph (f) of the licence. The outcome of this clarification identified that as per paragraph 4.23 of the 'RIIO-2 Final Determinations Electricity Transmission System Annex' NGET could utilise the MSIP reopener in respect of 0MW outputs to apply for funding for additional works associated with facilitating a demand connection which does not result in additional export capacity being created.

25. Primarily, 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. However, Table 1 demonstrates how this proposal also meets the remaining MSIP eligibility criteria.

Table 1 - MSIP eligibility checklist

Criteria	Criteria has been met
Investment is not eligible for funding via the generation or demand Volume Driver Uncertainty Mechanism.	Yes
Investment sum < £100m not included in baseline funding.	Yes
Transmission investment	Yes

26. This MSIP was introduced to Ofgem on the XX XXXXXX XXX as part of the monthly NGET/Ofgem MSIP meeting. Therefore, the contents of the submission have 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.

1.3 Strategic Context

27. Energy demand within Greater London is expected to increase 172% by 2050, as the UK transitions to net zero.[1] Strategic network reinforcement in west London is necessary to accommodate this forecast growth in energy demand and supply imports. This issue has been highlighted by the Mayor of London as an urgent enabler for 2030 Net Zero target for London.

28. Significant energy demand growth is associated with the development of several new IT data centres in West London. NGET has a statutory duty to provide additional substation capacity to meet this demand to maintain an efficient, co-ordinated system of electricity transmission. The provision of additional electricity capacity to these businesses will deliver substantial economic benefits. It is estimated that the average amount of Gross Value Added (GVA) generated per new IT data centre is worth around £400m per annum to the UK economy.[2]

29. This is consistent with national policy objectives such as Build Back Better: Our Plan for Growth,[3] which stresses the importance of infrastructure delivery to the UK's economic prosperity and the need for infrastructure investment to drive economic growth and recovery following the global Covid-19 pandemic, boost productivity and enhance competitiveness.

30. While the two NGET Willesden substation enhancement MSIP submissions (Scottish Electricity Power Distribution (SEPD) and Microsoft are independent from each other, these expansions reflect a whole site solution that recognises both strong energy demand growth and customer connection offers within West London, as well as the current asset health of the current Willesden substation.

31. The minimum viable solution (MVS) NGET would have been obligated to provide the customer would have been three-connections at Willesden 66kV. Other cost-effective options were

[1] National Grid (2023), Electricity Ten Year Statement (ETYS); https://www.nationalgrideso.com/document/286591/download
[2] techUK (2020) The UK Data Centre Sector: The most important industry you've never heard of – Sector Overview (May 2020). Available from https://www.techuk.org/resource/uk-data-centre-sector-overview-2020.html [Accessed Dec 2023].
[3] HM Treasury (2021) Build Back Better: Our Plan for Growth (March 2021). Available from https://www.gov.uk/government/publications/build-back-better-our-plan-for-growth [Accessed December 2023].

explored with the customer which Microsoft declined on the basis that a single major failure of the Willesden 66kV substation, could result in their data centre becoming disconnected from the network resulting in major disruptions to their business with significant financial losses. Microsoft, as part of their sustainability plan, have not installed back up diesel generators and have opted for the additional connection resiliency from the network as their preferred solution. As such, the customer is willing to fund the one-off charge elements to achieve this strategy.

2. Establishing the need

32. NGET's overall strategy is centred around serving our customers and providing them with an efficient, effective and timely connection. The need for these works was triggered by a connection application made by Microsoft for the Willesden 400kV and Kensal Green 400kV Customer Connection during RIIO-T2. The connection application has been made to enable Microsoft to construct and operate a new data centre. The customer's aim is to have more than one connection to the network to ensure security of supply to their data centre.

33. NGET are required by our licence to provide secure and efficient connections for customers. The Microsoft connections were not part of our baseline RIIO-T2 business plan due to the timing of the connection offer. During the FEED period, the original offer for two-connections from Kensal Green 400kV substation was no longer a viable solution due to insufficient space to install new assets on site. NGET and Microsoft looked at other solutions to provide their need for circuit connection diversification for the data centre.

34. Given they have enhanced requirements above and beyond the minimum viable solution, the customer has signed an Agreement to Vary to capture all One-Off costs over and above the Security and Quality of Supply Standard minimum viable solution.

2.1 Customer Readiness and Reliability

35. Microsoft have started construction of a new data centre in north Acton west of London. The centre will provide important technology related infrastructure that is required for work, entertainment, and services such as schools, local businesses and hospitals.

36. In December 2020, (along with the developer XXXXXXX) Microsoft received planning permission for the construction of the new data centre. Construction is expected to last 24 months and begin in the first half of 2023. Construction is currently underway and currently Microsoft has not communicated any delays or adjustments to timescales. As such, it can be assumed that the planned opening will be achieved – the first half of 2025.

37. UKPD's construction work for the initial connection to Willesden substation is scheduled to be completed by October 2024, providing adequate capacity to meet Microsoft's initial electricity requirements in the first half of 2025. The data centre's demand will increase incrementally, and the initial connection provided by UKPD will be capable of powering the site. NGET's construction work for the second connection to Kensal Green substation is planned to be finished by August 2027, offering resilience (connection to two separate substations) and additional capacity to power the site as the data centre ramps up operations.

2.2 Load Related Drivers

38. The Investment driver for this MSIP is to facilitate the customer's request to connect at two independent supply points to meet their business case for sustainability. As mentioned previously, this is to eradicate their need to install and rely on diesel back-up generators.

39. Instead, they will be relying on their diversified network connections to provide resiliency, ensuring no single event would disconnect Microsoft sensitive customer data.

2.3 Future and forecast data.

40. The investment proposed in this submission is driven by a single customer connection, and the customer has a signed Bilateral Connection Agreements in place.

41. These works are not dependent on any wider scenario forecasts or outcomes. The customer has signed the Agreement to Vary to cover the One-Off costs, this submission covers the estimated value of the minimum viable solution only.

42. Therefore, this submission does not present any analysis of wider scenario forecasting or outcomes as the contractual position and latest project status are the primary measures of need case certainty for this investment.

2.4 Chronology of Connection Request

2.4.1 Microsoft MCIO Limited

43. In response to a Connection Application made by Microsoft to the ESO for a direct connection to the transmission network, ESO submitted a Connection Application to NGET on 21st January 2020. Microsoft had requested from the ESO, a direct connection from NGET's Kensal Green 400kV substation to Microsoft's Powergate 66kV substation, to be located within XXX from Willesden 400/275kV substation.

44. In response to the application received, on the 15th May 2020, NGET made the ESO a Transmission Owner Connection Offer (TOCO), with a proposed Completion Date of 28th November 2024. In response to Microsoft signing the Bilateral Connection Agreement (BCA) & Construction Agreement, the ESO signed NGET's TOCO on 25th January 2021, leading to the formation of the Transmission Owner Connection Agreement (TOCA) between the ESO and NGET.

45. Prior to the application for a connection from Willesden, Microsoft approached the local DNOs but due to their limited capacity and energisation programme, the delay was not acceptable which led to an application to NGESO for a connection to the transmission network.

2.4.2 UKPD – A separate but related connection

46. Simultaneously to this, an application was made from UKPD (an iDNO) for two connections at Willesden 66kV substation to connect a 120MVA data centre, which was connecting directly into Microsoft's data centre.

47. Following confirmation from Microsoft MCIO Limited and UKPD, it was identified that all four connections were intended for Microsoft MCIO Limited's data centre.

48. Although under two Bilateral Connection Agreements, NGET along with NGESO agreed with Microsoft and UKPD that the four-connections should be treated as one customer offer.

49. NGET was then able to assess the minimum viable solution which would satisfy this combined customer requirement. As per SQSS the MVS to meet this combined customer requirement was to provide one extra connection to Microsoft's data centre from Willesden 66kV substation. This would have resulted in three connections from Willesden 66kV overall when including the two under UKPD's BCA.

50. As will be detailed in the following section, the final preferred option as desired by the customer for their specific requirements included connections at Willesden 400kV and Kensal Green 400kV. Because this option represented a solution above the minimum viable it was agreed that these would be treated primarily as One-Off costs.

3. Optioneering

51. The NGET optioneering process is a rigorous and comprehensive methodology that considers all relevant factors to identify the best possible solutions for the needs of our customers. The process evaluates various options against a range of criteria, including cost, benefits, limitations, and technical feasibility. Our optioneering approach used to identify and evaluate schemes is built on the knowledge gained from various areas of the business whilst operating as a Transmission Operator (TO).

52. Through this process, NGET creates a long list of potential options, which are then carefully analysed and evaluated to determine their viability and suitability. The optioneering process is designed to ensure that all relevant options are considered, and that the most appropriate solution is selected based on a thorough assessment of all available information. This approach enables NGET to make informed decisions that align with its strategic objectives and maximise value for our customers.

53. The following section presents a long list and shortlist of options which were considered reasonably suitable to providing a solution to the investment need. A full long list of all options examined can be found in the table below.

3.1 Long List

54. NGET undertook a thorough optioneering study and identified a long list of 8 options that could provide a technical solution to the problem outlined in this MSIP.

55. The minimum viable solution (MVS) would be for new assets to be populated in an existing Willesden 66kV bay to facilitate the customer's connection.

56. However, following continued engagement and consultation with the customer, their strong preference for a solution above the minimum viable resulted in NGET assessing several additional options. These include facilitating the Microsoft data centre connections at Willesden 400kV & 66kV and Kensal Green 400kV substations.

57. It is important to note that the Willesden 66kV substation is NGET owned, however, SEPD and UK Power Networks own and operate assets within the substation footprint.

58. Our optioneering process fully adheres to the Ofgem Re-opener guidance and includes the following options:
    a. Do minimum,
    b. Option that delays capital expenditure, and
    c. Whole System / Market based flexibility option,
    d. Use /Enhancement of existing assets, and,
    e. Construction of new assets

59. The optioneering study considered multiple scenarios to ensure the varying demand and support from local generation combinations were all accounted for.

60. NGET assessed the following long list options as detailed in Table 2.

Table 2 - Long list of options

Option	Option Title	Option Description	Discounted / Taken Forward to Detailed Optioneering	Reason for discounting
1	Do Nothing	NGET would not facilitate connection to Microsoft.	Discounted	NGET is obligated to provide the connection for the customer. Therefore, this option is discounted.
2	Option to delay	NGET would not facilitate timely connection to Microsoft.	Discounted	Discounted because there are already delays in the project and it is thus not possible to further delay the connection date.
3	Whole system / market-based solution	NGET explores a whole system or market-based solution.	Discounted	Microsoft requires a connection to the transmission network. As this option does not provide a physical connection to the transmission network, instead looking at alternative solutions to deliver the connection, this option is discounted.
4	Connection from Willesden 275kV substation	Utilise existing assets at Willesden 275kV to reduce the cost and timescales for the Microsoft connection.	Discounted	Rejected by the client due to their requirement for connections from independent supply points to meet their business case for sustainability and resiliency i.e., not using backup diesel generators. This would prevent an event disconnecting Microsoft's sensitive customer data.
5	Teeing off an existing bay at Willesden 66kV substation to provide the minimum viable solution	Utilise existing assets at 66kV substation to reduce the cost and timescales for the Microsoft connection.	Discounted	Although this option provides the MVS, it does not meet the client's strict business case for resilience and diversity requirements. This connection at Willesden 66kV would be in addition to two connections are already being connected via the UK Power Distribution (UKPD) agreement to the data centre.
6	Extending Willesden 400kV substation	The construction of new assets to provide two connections for Microsoft	Discounted	Customer strongly opposed this option due to their requirement for connections from independent supply points to meet their business case for sustainability and resiliency i.e., not using backup diesel generators. This would prevent an event disconnecting Microsoft's sensitive customer data.
7	Extending Kensal Green 400kV substation and Willesden 400kV substation.	The construction of new assets at Kensall Green and Willesden to provide a connection for Microsoft.	Taken Forward	Taken forward as a potential option due to ability of providing a timely connection and meeting customer requirements around resiliency, removing the need for use of a backup diesel generator.

3.1.1 (Option 1) – Do Nothing – *Discounted.*

Option Description

61. Under this option, NGET would not facilitate connection to Microsoft.

Benefits

62. No capital spend or risk involved for the customer.

Limitations

63. 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 a connection to the transmission system.

3.1.2 (Option 2) – To delay – *Discounted.*

Option Description

64. This option seeks to explore the potential of delaying the connection to accommodate other connections in the meantime.

Benefits

65. No capital spend or risk involved for the customer. Potential for future solutions to become available that aren't currently an option.

Limitation

66. Microsoft has confirmed that they need the connection for the requested date and that a delay is not an option. Finding a solution that meets the customer's specific requirements, is both efficient and constructable given the space constraints at both Willesden and Kensal Green substations has been challenging, thus removing any potential of further delaying this connection.

3.1.3 (Option 3) – Whole system / market-based solution – *Discounted.*

Option Description

67. This option explores a potential whole system or market-based solution.

68. In this specific case, prior to making an application for a connection from Willesden, Microsoft approached the local DNOs to explore the ability to service its connection from the existing DNO network.

Benefits

69. An alternative solution to meet Microsoft's needs driven from the whole system or an alternative market-based technology could reduce the need for capital spend or risk involved.

Limitation/Benefits

70. Due to the limited capacity and energisation programme of the DNOs, the customer was unable to identify a suitable connection solution via could meet its timing requirements.

71. As such, the requested connection from Microsoft requires a connection to the transmission network. Therefore, as a connection to the transmission network must be provided for this customer there is no suitable whole system or market-based alternative to providing this physical connection to the transmission network.

3.1.4 (Option 4) – Connection from Willesden 275kV substation – *Discounted.*

Option Description

72. NGET investigated options to utilise existing assets at Willesden 275kV substation to reduce the cost and timescales required for enabling the Microsoft connection. These options consisted of the following:

73. Making use of spare bays within the 275kV substation to facilitate cable connections using existing cable routes within the footprint of the substation.

Benefits

74. By utilising existing assets on the network, NGET could reduce the relative cost and timescales associated with connecting Microsoft.

Limitations

75. NGET consulted on this option with Microsoft, however they very strongly opposed this solution on the basis that they require connections from independent supply points. The desire for these independent supply point connections is to meet their business case of sustainability via not requiring installation and use of a backup diesel generator. Instead, the diversified network connections act as circuit connection resiliency ensuring no single event can disconnect Microsoft and jeopardise its sensitive customers data. NGET understands the needs of Microsoft in this case and agreed to facilitate alongside their concerns, thus discounting this option.

3.1.5 (Option 5) – Teeing off an existing bay at Willesden 66kV substation to provide the **minimum viable solution (MVS)** – *Discounted*.

Option Description

76. NGET has investigated options to utilise existing assets at Willesden 66kV substation to reduce the cost and timescales for the Microsoft connection. This option consisted of the following:

77. Making use of an existing bay within the Willesden 66kV substation and bank the customers connection from this bay, reducing cost and timescales for Microsoft.

78. As explained in section 2.4, the minimum viable solution for meeting the combined agreements of Microsoft and UKPD is three connections from Willesden 66kV. To make sense of this option, it is important to note that two of the three connections from Willesden 66kV would already be assigned to the customer as per UKPD's original application and connection agreement.

79. Teeing off the existing bay at Willesden 66kV to connect Microsoft would have represented the third connection from the substation to make up the three total connections identified as part of the minimum viable solution for the combined customer and their respective agreements.

Benefits

80. By utilising existing assets on the network, NGET could reduce the relative cost and timescales required to connect the customer.

81. Furthermore, this option represents the Minimum Viable Solution as per the Security and Quality of Supply Standard (SQSS) for customer. As such, undertaking this option would have been the most efficient set of connections to meet but not exceed the obligations of the agreements to connect the customer.

Limitation

82. Similarly, to Option 4, NGET consulted on this option with Microsoft, however they very strongly opposed this solution on the basis of their requirements for diversity in connection from independent supply points. Because this teed connection would be from the same substation (Willesden 66KV) as the other two connections provided in association with the UKPD agreement, the customer determined this solution as not meeting their requirements for connection diversity.

83. This desire for connections from multiple supply points is to achieve resilience for their data centre, without installation and use of a backup diesel generator (as per their sustainability requirements).

84. It was on this basis that Option 5 was discounted and NGET therefore, worked with the customer to provide alternative options that better meet the requirements of the combined agreements of the customer.

3.1.6 (Option 6) – Extending Willesden 400kV substation – *Discounted*.

Option Description

85. NGET has considered the option of constructing new assets to provide two connections for Microsoft. The option included:

- Extending Willesden 400kV substation to connect two 400/66kV 180MVA super grid transformers directly to the customer data centre.
- At Willesden 400kV substation teeing in on two existing 400/275kV inter-bus transformers by adding two new 400/66kV 180MVA super grid transformer directly to the customer data centre.

Limitation/Benefits

86. Option 6 does not meet our customers' requirements for diversity and resilience, primarily because UKPD is already providing two customer connections into Willesden. Microsoft

requires at least one connection into a different substation to ensure resilience for their data centre in case of an outage at one of the substations. It was on this basis that Option 6 was discounted.

3.1.7 (Option 7) – Extending Kensal Green 400kV substation and Willesden 400kV substation. – *Taken forward.*

Option Description

87. NGET has considered the option of constructing new assets to provide a connection for Microsoft. Option 7 would include:

- Extending Kensal Green 400kV substation to connect a 400/66kV 180MVA super grid transformer directly to the customer data centre via a 66kV cable route along the Grand Union canal tow path.
- Extending Willesden 400kV substation to connect a 400/66kV 180MVA super grid transformer directly to the customer data centre.
- At Willesden 400kV substation teeing in on an existing 400/275kV inter-bus transformer by adding a new 400/66kV 180MVA super grid transformer directly to the customer data centre.

Benefits

88. The benefit of this option is that it meets the customers primary drivers on resilience by enabling connections from more than one location. This provides Microsoft with the resilience they require for their data centre, without installation of a backup diesel generator which would be against their sustainability targets.

89. NGET also assessed that this option would be deliverable in time to meet the customer's connection date.

Limitations

90. This option is more extensive than the minimum viable solution NGET is obliged to provide as per the SQSS. Compared to Option 5 (MVS), delivering Option 7 will incur more cost and time. However, as demonstrated throughout this section, given the requirements of the Customer for timing of the connection and resiliency of the solution, NGET was unable to agree or provide any other option other to meet the needs of Microsoft.

3.2 Short List

91. Following assessment of the options listed above, NGET considered the only feasible option to meet the needs of the customer were to construct new assets for two new connections from Kensal Green 400kV and Willesden 400kV & 66kV substations.

92. The alternate options were not feasible due to the customer strongly opposing all other options identified on the grounds the customer required resiliency and diversification over the minimum viable solution.

93. This option has been short-listed in Table 3 and will be explored further in the next section.

Table 3 - Short list

Option No.	Option	Description	Discounted / Taken Forward to Detailed Optioneering	Reason for taking forward
7	Extending Kensal Green 400kV and Willesden 400kV substations.	The construction of new assets to provide a connection for Microsoft	Taken Forward	Taken forward as the customer preferred option given their strong requirements for connection resiliency through diversified substations and time requirements.

4. Detailed Options Analysis

94. This section explains the detailed analysis undertaken for each shortlisted option and explains the rationale for the proposed solution developed from this option.

4.1 Options Analysis

95. As explained in section 3.2 (Short List) it was only possible to take forward one option for detailed analysis given the customer's requirements:

4.2 (Option 7) - Extending Kensal Green 400kV and Willesden 400kV substation.

Option description

96. When we consider both Bilateral Connection Agreements, Microsoft have applied for four-connections from NGET; therefore, this involves providing a four-circuit connection from two independent supply points on the transmission system.

97. Of these four connections, two are under the existing Bilateral Connection Agreement with Microsoft from Kensal Green 400kV. The other two-connections are via UKPD, an Independent Distribution Network Operator (iDNO), under the Bilateral Connection Agreement at Willesden 66kV.

98. Given analysis undertaken to explore a diversified solution for the customer's needs, the proposed works were identified as per Option 7. This takes a detour from the original four connections to offer instead two-connections under the existing Bilateral Connection Agreement: one-connection at Kensal Green 400kV and one-connection at Willesden 400kV connecting directly into Microsoft's data centre to provide resiliency and diversification for the customer.

Solution design

99. During the Front-End Engineering Design (FEED) phase, the design established that due to space constraints at Kensal Green 400kV substation, only a single connection could be constructed from this substation. NGET project team began to develop options which were later presented to the customer.

100. NGET and the customer concluded:

    f. One-connection at Kensal Green 400kV substation

    g. One-connection at Willesden 400kV substation.

101. Microsoft have a signed an Agreement to Vary amending the original offer scope that specifies a connection date of 30 August 2027.

102. Figure 3 shows the general layout of the Willesden site where two connections are provided by UKPD, the red circles show the bay positions within the Willesden 66kV substation. The general arrangement drawing show the individual bay configurations.

Figure 3 - Willesden 66kV UKPD 2 connections for Microsoft

103. Figure 4 shows the cable routes taken along the canal towpath to connect Microsoft Powergate 66kV substation from Willesden and Kensal Green 400kV substations.

Figure 4 - Willesden 400kV third connection and Kensal Green 400kV forth connection for Microsoft

104. Furthermore, Figure 5 shows the location plan for Willesden and Figure 6 shows the location plan for Kensal connection.

Figure 5 - Location plan for Willesden 400kV, 275kV and 66kV substation and the area for Microsoft.

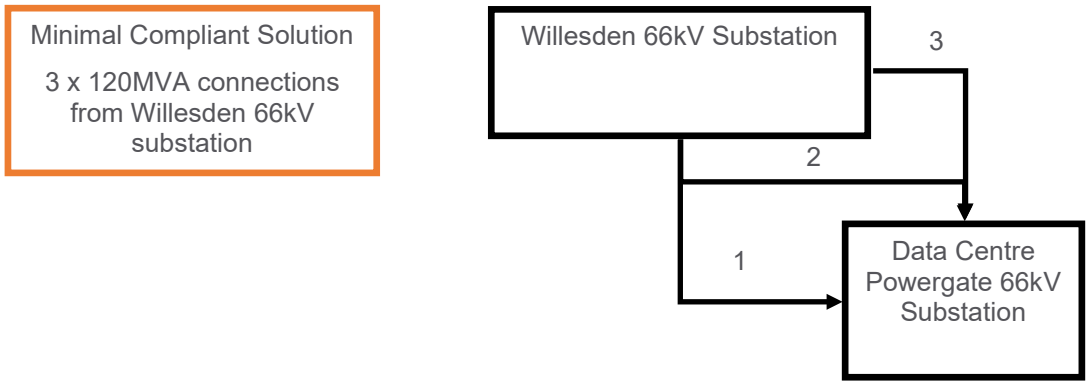
Figure 6 - Location plan for Kensal Green 400kV substation and the area for Microsoft.

Point of Connection Overview

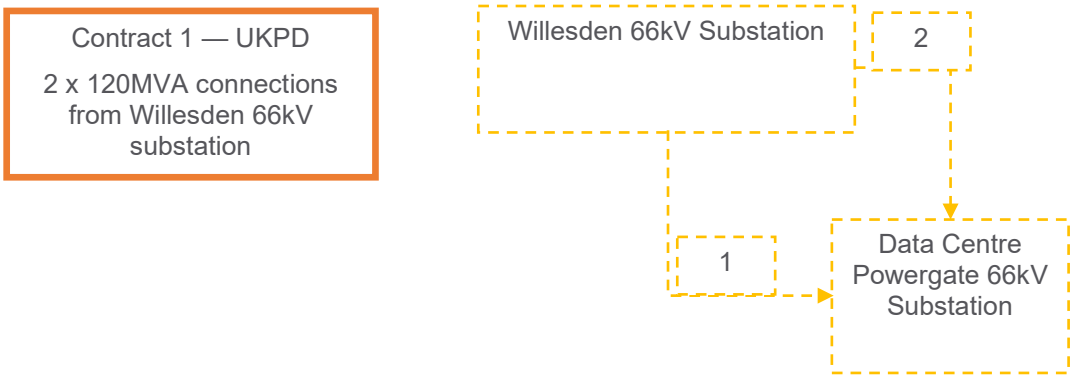
105. The diagram below illustrates the initial minimum viable solution proposed to Microsoft which considered three connections from Willesden 66kV. This would have been the most optimal solution because it provided the best option for consumer value. Although this option satisfied the technical requirements of the customer, it did not satisfy the commercial and financial impacts on their business model.

106. Microsoft required their data centre not be disconnected from the network following the worst-case scenario which if an event occurred would have tripped and caused a black out of the entire Willesden 66kV substation.

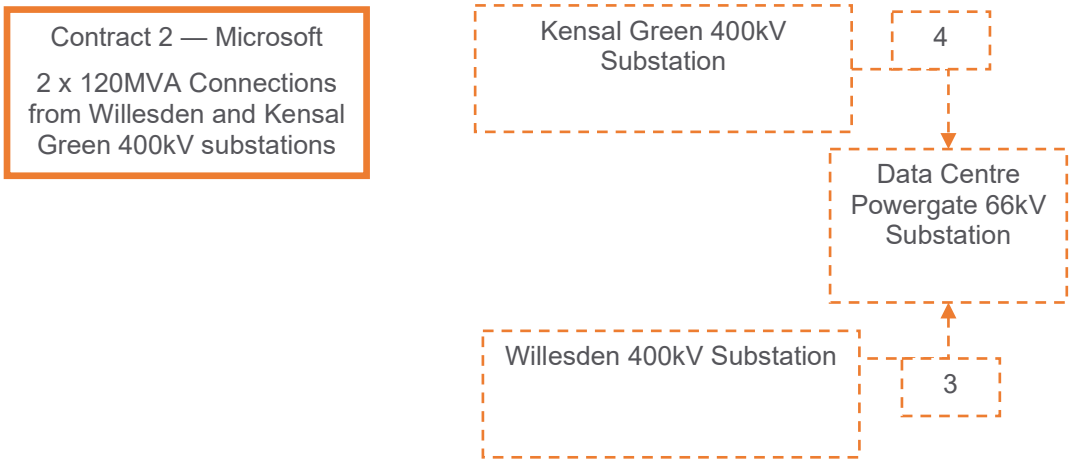
107. Therefore, Microsoft had concerns that this option would not fulfil their security of supply strategy and thus the solution (Option 4) was rejected on those terms. Whilst NGET went to great efforts to work collaboratively with the customer to explore the different, cost, timing and environmental impacts of each option, NGET determined it was required fundamentally to meet the needs of its customer and thus it agreed to discount this option.



108. The line diagram below shows the two connections that UKPD will construct for Microsoft.



109. The line diagram below shows the two connections that NGET will construct for Microsoft.



Benefits

110. This option offers Microsoft a level of redundancy that ensures continued operation, even in the event of a circuit failure. A total blackout at the data centre is avoided, maintaining business continuity and uptime.

111. Although it might not be the most economical choice, it stands out as the preferred choice for our customer, who was seeking dependability and stability. Microsoft acknowledges the merits of this alternative and encourages NGET to advance with its implementation.

112. Space provision for a future connection has been maintained. This connection is customer agnostic and can provide quicker connections in the future, which in the face of current constraints provides a large benefit to future connection requirements, especially within a congested landscape such as London. The provision of the future connection has been agreed to be funded by the customer and thus is not burdened by the consumers.

Limitations

113. This option uses additional operational land than the minimum viable solution NGET is obliged to provide as per the SQSS and will incur more cost and time. However, as demonstrated throughout this section, given the requirements of the Customer for timing of the connection and resiliency of the solution, NGET was unable to agree or provide any other option other to meet the needs of Microsoft.

Volumes

114. The proposed volumes of work to connect at Kensal Green and Willesden is outlined in Table 4 below.

Table 4 - Volume of works

Asset	Volume
XXXXXXXXXX	X
XXXXXXXXXX	X
XXXXXXXXXX	X
XXXXXXXXXX	X

Asset	Volume
XXXXXXXXXXX	X
XXXXXXXXXXX	X

Cost

115. The primary criteria for success in this connection project is to provide a solution that is in the interest of consumers whilst fundamentally meeting the requirements of the customer with a connection date that aligns with their construction programme. NGET have taken significant steps to brief the customer on the feasibility of connection options, the cost, programme and risk implications to allow the customer to make a fully informed choice on the one-off works. Despite this engagement, the customer has strongly required NGET to support an option that is higher than the minimal viable solution.

116. As these works are deemed over and above the minimum viable solution, these costs will be captured as a One-Off cost paid by Microsoft. Indeed, all costs above the minimum viable solution will be paid for by the customer as One-off cost. NGET extensively engaged with the customer such that they understand the reason for meeting the costs of the one-off works. Therefore, Microsoft have signed an Agreement to Vary to pay for all the One-Off Costs above the minimum viable solution.

117. The proposed completion date for the works is 30/08/2027 and spend will be across the RIIO-T2 period. The funding allowance request in this MSIP reopener covers the cost allowance of the minimum viable solution. The total estimated cost of the minimal viable solution is XXXX in 18/19 price base and makes up X% of the total capital expenditure. The remainder is covered by the customer via the One-off charge mechanism under the existing contract. Further breakdown will be provided in the detailed cost section.

4.3 Preferred Option

118. NGET briefed Microsoft in determining the feasibility of connection options to reach the preferred option, based on minimising costs, environmental impacts, and achieving the connection date for the customer. A high-level summary of estimated costs of each option are detailed in Table 5.

119. During the rigorous and detailed optioneering process, each option was also judged on whether it met the client's requirements. Upon analysis it was determined that only option 7 fulfilled the client's requirements. Therefore, the preferred option is to construct two new connections from Kensal Green 400kV and Willesden 400kV & 66kV substations.

120. Alternative options proposed to the client were rejected on grounds of lack of resilience and diversification.

121. In summary the option provides the client with a level of reliability that electricity should be supplied event if faced with the event of a circuit failure or a blackout. Although this option is not the most economical in the interest of consumers, the client has acknowledged the benefits of the option and the future dependability it offers to it. As such, the client is paying

for all costs associated with this more extensive option and consumers will only be associated with costs up to the minimum viable solution NGET would have been obliged to provide.

Table 5 - Assessment of Options with Costs

No.	Option	Cost (£) in 18/19 price base	Timescale	Selected (Y/N)
1	Do Nothing	N/A	N/A	N
2	Whole System / Market-Based	N/A	N/A	N
3	Existing Assets – Tee'd Connection	XXXX	XXXXX	N
4	New Assets – Two New Bays	XXXX	XXXXX	Y

4.4 Lifetime Cost Benefit Analysis

122. Due to the customer's emphasis on addressing concerns about the safety of the supply, and in line with Ofgem's MSIP guidance of developing a submission which is proportional to scale and cost of the investments proposed, a Cost Benefit Analysis (CBA) was deemed as not appropriate for this submission. The customer stressed that addressing their concerns was more important than finding the most cost-effective answer – this resulted in the identification of only one feasible Option to fundamentally be assessed. Given that Microsoft values resilience above cost, it follows that evaluating options based on financial grounds (CBA) would fail to reflect the customer's genuine priorities.

123. Performing a cost-benefit analysis (CBA) would likely confirm what we already know - that the minimal viable solution is the most cost-effective option and will show a higher NPV compared to the solution preferred by our customer. While a CBA could have been useful if there were multiple solutions that met both NGET's design requirements and our customer's connection and resilience requirements, unfortunately, no other suitable solution was identified for this connection request.

4.5 Detailed costs

4.5.1 Introduction

124. This section provides a breakdown of the overall costs for 120MW Data Centre Connection for Microsoft at Willesden and Kensal Green including an expenditure profile for all Regulatory Years of delivery.

125. The following cost estimate breakdown represents our latest view of costs for the proposed investment, all costs are presented in 2018/19 price base, unless otherwise stated.

126. Appendix B Willesden Microsoft Cost Model submitted alongside this document provides a breakdown of the costs in more detail and should be reviewed alongside this chapter.

127. This Chapter is broken down into the following sections:

4.5.2 Total Allowance Request

4.5.3 Cost Estimate

4.5.4 Cost Firmness

4.5.5 Direct & Closely Associated Indirect (CAI)

4.5.6 Detailed breakdown of Direct costs.

4.5.2 Total Allowance Request

128. Total project costs are [redacted]. NGET requests [redacted] allowance is provided through the MSIP reopener mechanism to recover the direct portion of costs and deliver works described above. The MSIP reopener mechanism is subject to the OPEX escalator and therefore indirect costs will be funded under this route.

Table 6 - Allowance request – Cost Model tab reference 1.0

£	2023/24	2024/25	Total
Total Project Costs	[redacted]	[redacted]	[redacted]
Allowance Request (Direct Only)	[redacted]	[redacted]	[redacted]

4.5.3 Cost Estimate

129. The total cost to develop and deliver the Data Centre Connection project is [redacted] including indirect costs and costs incurred to date.

130. [redacted]. The costs presented are for a third, theoretical connection to Willesden 66kV and this is the basis of the cost build up and the funding application.

131. The table below shows a summary of total costs.

Table 7 - Cost Summary – Cost Model tab reference 1.1

Element	Total (£)	Classification	Source
Contractor Costs			
Main Works Contractor	[redacted]	Direct/CAI	Comparable project MWC
Third Party Costs	[redacted]	Direct/CAI	Comparable project costs
National Grid Costs			
Direct Procurement	[redacted]	Direct	Comparable project costs
ET Ops	[redacted]	Direct	Estimated NG resource costs
Project Management	[redacted]	CAI	
Project Services	[redacted]	CAI	
Support Functions	[redacted]	CAI	

Element	Total (£)	Classification	Source
Lands	-	Direct	
Consents	-	Direct	
Legal	XXXX	Direct	Comparable project costs
NGET Portfolio Costs	XXXX	CAI	NGET internal estimate
Other			
Estimated Inflation	XXXX	Direct	Inflation calculation
Risk	XXXX	Direct	Risk Assessment
Total	XXXX		

132. The table below shows a summary of total costs phased annually.

Table 8 – Annual Phasing – Cost Model tab reference 1.1

Element	2023/24	2024/25	Total (£)
Contractor Costs			
Main Works Contractor	XXXX	XXXX	XXXX
Third Party Costs	XXXX	-	XXXX
National Grid Costs			
Direct Procurement	XXXX	-	XXXX
ET Ops	XXXX	XXXX	XXXX
Project Management	XXXX	XXXX	XXXX
Project Services	XXXX	XXXX	XXXX
Support Functions	XXXX	XXXX	XXXX
Lands	-	-	-
Consents	-	-	-
Legal	-	XXXX	XXXX
NGET Portfolio Costs	XXXX	XXXX	XXXX
Other			
Estimated Inflation	XXXX	XXXX	XXXX
Risk	XXXX	XXXX	XXXX
Total	XXXX	XXXX	XXXX

4.5.4 Cost Firmness

133. The table (Table 9) below shows the assessment of cost firmness using the classification outlined in the Ofgem Large Onshore Transmission Investment (LOTI) reopener guidance document published on 29th March 2021.

134. The majority (XXX) of the costs relate to the estimated main works contractor costs to carry out the design, procurement, and installation of the new assets. The cost base used is for the comparable XXXX project at Willesden 66kV and is based on a XXXX XXXX contract. The

staff costs have also been used and are estimates at this time. As the third connection is not physically being construction, the UKPD project costs have been applied as these would match the works at the same substation thus providing a certainty on project costs.

Table 9 – Cost Firmness – Cost Model Tab reference 1.8

Cost Firmness	Total (£)	Notes
4 - Estimated	XXXX	All costs, as based on equivalent project
Total	XXXX	

4.5.5 Direct & CAI Split

135. Table 10 below provides the split between direct and indirect costs related to this project.

136. The costs of the CAI activities are incremental to the funding we received as part of our T2 baseline allowances. The T2 Baseline allowances for CAI were determined through Ofgem's regression (econometric) model, one of the key inputs being the baseline load and non-load capital allowances and as such no funding has been provided for this MSIP project. The costs are therefore in addition to the CAI allowances provided in T2 Final Determinations and should there be funded via the Opex Escalator mechanism.

137. The following table represents the split of Direct and CAI spend within this MSIP submission. The split is based on NGET's understanding of the definition of the scope of Closely Associated Indirects at the time of preparation (January 2024), and in particular the classification of those activities undertaken by contractors in the course of delivering assets.

138. NGET notes that work is ongoing between the TOs and Ofgem regarding application of the Opex Escalator mechanism and the definition of Indirect activities, and therefore this interpretation of CAI may be is subject to change. It is worth nothing that, should the Opex Escalator be applied by Ofgem to the January 2024 MSIPs in the same manner as it was applied by Ofgem to NGET's January 2022 MSIPs (in its decision of 6 October 2023) , it is unlikely that incurred CAI spend will be fully funded on all projects; we therefore believe that such under-funding should fall within the scope of the Opex Escalator True-up Mechanism currently being discussed with Ofgem.

Table 10 – CAI/Direct split – Cost Model Tab reference 1.8

Classification	Total (£)	% of total
CAI	XXXX	XXXX
Direct	XXXX	XXXX
Grand Total	XXXX	XXXX

4.5.6 Detailed Breakdown of Direct costs

139. The following sections discuss the component parts of the project's Direct costs.

4.5.6.1 Contractor estimate ([redacted])

140. As detailed above, a proxy has been used to estimate the contractor costs for these works and [redacted]

141. The main works contractor used in this estimate was tendered through a competitive tender process, evaluated, challenged and contract awarded providing a high-level cost certainty.

142. The tables below show a summary of direct main works contractor costs required to deliver the Data Centre Connection [redacted] Contractor Closely Associated Indirect costs have been excluded from the below table but further detail on these items can be found in Willesden Microsoft Cost Model, tab 1.2.

143. The key activities are:

   a. [redacted]
   b. [redacted]
   c. [redacted]

144. No spend / work has been completed as the costs presented are estimates of like for like works All forecasts are based on comparable [redacted] costs for this type of connection at Willesden.

Table 11 – Main Works Contractor Breakdown - Cost Model tab reference 1.2

		Direct	
Cost Code	Scope	2023/24 price base (£)	2018/19 price base (£)
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
		[redacted]	[redacted]

4.5.6.2 Third Party Costs ([redacted])

145. The table below shows a summary of the main third-party direct costs required to deliver the Data Centre Connection project. Third Party Closely Associated Indirect costs have been excluded from the below table but further detail on these items can be found in Willesden Microsoft Cost Model, tab 1.3.

146. NGET have acquired these services through a national framework agreement with approved costs based on the work required to complete the design services. This provides value for money.

147. No spend / work has been completed as the costs presented are estimates of like for like works. All forecasts are based on comparable [redacted] costs for this type of connection at Willesden.

Table 12 – Third party costs – Cost Model tab reference 1.3

Description	2023/24	2024/25	Total (£)
[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]

148. This cost relates to design assurance – required to verify and approve design related activities to enable construction drawings to be produced for the site teams building the assets.

4.5.6.3 Direct Procurement ([redacted])

149. [redacted]

150. The tables below show the [redacted] required to be procured for the hypothetical Data Centre Connection project, which would be required to provide a direct connection to the data centre.

Table 13 – Direct procurement – Cost Model tab reference 1.4

Description	2023/24	2024/25	Total (£)
[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]

4.5.6.4 ET Operations ([redacted])

151. This cost category relates to the Direct element of NGET's in-house resource supporting the project's delivery.

Table 14 – ET operations cost summary - Cost Model tab reference 1.5.

Description	Total (£)
[redacted]	[redacted]

Description	Total (£)
[redacted]	[redacted]
Total	[redacted]

152. The days and rates used to calculate these costs are shown in the Willesden Microsoft Cost Model, tab 1.5.

4.5.6.5 Lands, Consents and Legal ([redacted])

153. The table below summaries the legal activities required to complete Data Centre Connection project interface agreement which identifies the customers assets on NGET land.

154. The costs provided have been agreed by NGET lands team for third parties to carry out this legal work. Costs used have been taken from a previous comparable project which the customer has installed assets on NGET land.

Table 15 – Lands Costs – Cost Model Tab reference 1.6

Description	Total (£)
[redacted]	[redacted]
[redacted]	[redacted]
Total	[redacted]

155. These are interface agreements which grants Microsoft the right to install, use, retain, repair, inspect, test, remove and modify their assets on NGETs land.

4.5.6.6 Estimated Inflation ([redacted])

156. [redacted]

5. Deliverability, risk and regulatory outcome

5.1 Deliverability

117. This section will document the approach to delivery, list any potential deliverability constraints and associated mitigation strategies that will need to be implemented to minimize the risk.

5.1.1 Procurement Strategy

157. This MSIP seeks an allowance to cover the costs associated with the minimum viable solution (MVS) that are not being covered by the one-off payment of the customer. The MVS is the third connection at Willesden 66kV. However, as demonstrated across the Optioneering and Detailed Option Analysis of this paper, no physical works will be carried out to tangibly deliver this MVS. This is because Microsoft has strong requirements which has led the customer to need a more resilient option that explores the connection to two substations rather than one. Therefore, a procurement strategy has been developed for the preferred option and not the minimal viable solution.

158. The main works contract has been selected via a competitive process and has been awarded using a [redacted] to design and construct two connection bays at Willesden 66kV to connect the data centre.

5.1.2 Work undertaken in RIIO-T2

159. NGET have undertaken the following work in RIIO-T2 to ensure that we can provide a timely connection:

- Designs,
- Surveys, and
- First site access.

5.1.3 Project Plan

160. A detailed project delivery plan has been prepared by the NGET scheme team. This plan facilitates the customer's planned connection date of 30/08/2027.

161. The key project milestones are summarised below.

Table 16 – Key Project Milestones

Milestone	Date
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

5.1.4 Risk & Mitigations

162. A risk management process has been adopted to set out a framework for managing reasonably foreseeable risks in a proactive, efficient approach that will not impede delivery of this project. This process is an iterative process and is reviewed on a regular basis to capture any new risks, update any existing risks and remove any risks that have materialised.

163. The following key programme and project risks have been identified and incorporated into the analysis to produce the contingency provided within Table 17.

164. [redacted]

165. No risks have materialised or been retired at the time of submission.

166. Only risks with a probability of at least [redacted] have been included in the table below, the full list can be found in tab 4.1 of the Willesden Microsoft Cost Model.

Table 17 – Key risks

Description & Cause	Impact	Probability pre-mitigation	Mitigation
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Description & Cause	Impact	Probability pre-mitigation	Mitigation
XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXX XXXXXX XXX XXXXXXX XXXXX	XX%	XXX XXXXXX XX XXXXXXX XXXXXXXXX XXXXX.

5.2 Stakeholder Engagement

167. The key stakeholder identified by NGET in this project is Microsoft.

168. NGET has worked closely with the customer to develop and agree a programme that meets the customers need to achieve a connection date as early as possible.

169. The works being identified in the third connection fall within the ownership boundary of NGET, therefore minimal stakeholder engagement has been required. The local Distribution Network Owners have been informed of the local works taking place and regular site co-ordination meetings with all parties at site are taking place.

170. Wider stakeholder engagements have taken place which cover the over and above works for cable routes to the Microsoft data centre substation from both Willesden and Kensal Green substations.

171. Microsoft have approved consents for the two UKPD cable routes connection Willesden to the data centre.

5.3 Security for Consumers

172. Customers looking for a connection to the transmission system are signatories to the Connection and Use of System Code (the CUSC), which describes the associated rights and obligations. Customers contract directly with the ESO, who has an agreement with NGET covered by the SO-TO Code (STC).

173. One of the customer's obligations in the CUSC relates to the liabilities that are incurred if a customer terminates their connection agreement before the works are complete. These arrangements differ for generation and demand.

174. For demand, such as in this submission, customers' liabilities are based on the actual costs incurred and this is mirrored in the ESO's agreement with NGET. This means that should a demand customer terminate before the works are complete, the costs incurred to date will be recovered from the customer itself.

175. This arrangement means that the customer is prepared to make a financial commitment to the works being undertaken on their behalf and supports the need case for the investment.

5.4 Price Control Deliverables

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

177. Provide a connection for Microsoft at NGET's Willesden 400kV & 66kV and Kensal Green 400kV substations by 30/08/2027.

6. Conclusion

178. This document is the formal MSIP submission to Ofgem by NGET for the Microsoft Data Centre 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.

179. Throughout the paper the need for investment at Kensall Green 400kV, Willesden 400kV and 66kV has been demonstrated with the optioneering methodology that has led the preferred option. The table below summarises main drivers for the investment, the selected option, estimated costs and forecasted outputs.

Main Drivers	To provide a connection from Willesden 400kV and Kensal Green 400kV for a new data centre built and operated by Microsoft.
Selected Option	To extend Willesden and Kensal Green 400kV substations. This will involve providing a four-circuit connection from two independent points on the transmission system. One-connection is under the existing Bilateral Connection Agreement from Kensal Green 400kV, one-connection is from Willesden 400kV under the Agreement to Vary and another two-connections are via UKPD, an Independent Distribution Network Operator, under the Bilateral Connection Agreement at Willesden 66kV.
Estimated Costs	XXXXX XXXXX
Outputs	Available for commercial load in 2027

7. Overview of assurance and point of contact.

180. Appendix D, contains the assurance statement letter, providing written confirmation in line with the assurance requirements set out in Ofgem's Re-opener Guidance and Application Requirements Document, dated 17th February 2023.

181. This confirmation is provided by the Head of Future Price Controls, Electricity Transmission, accountable for re-opener submission for 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 best value for consumers.
- Quality assurance processes are in place to ensure NGET 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 NGET.

182. NGET's designated point of contact for this MSIP application is XXXX XXX, Regulatory Development Manager, email XXXXXXXXXXXXXXXXX, telephone XXXXXXXXXXX.

8. Appendix

Appendix A Ofgem/ NGET Bilateral Monthly Meeting Notes	RE_ [EXTERNAL] RE_ MSIP - Monthly NGE
Appendix B Microsoft Cost Model	MSIP%20Willesden%20Microsoft%20cost%
Appendix C Microsoft Estimated Inflation Model	Willesden%20Microsoft%20Estimated%20I
Appendix D Assurance Statement Letter	APPENDIX D - Assurance Statement
Appendix E Reopener Guidance Checklist	APPENDIX E - Reopener Guidance -
Appendix F Direct Costs/Asset Table	MSIPs%20Jan%2024%20Direct%20Costs%

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

nationalgrid