

ENGINEERING JUSTIFICATION PAPER (EJP)



# Network Capability - West Import Resilience Project

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RIIO-GT3 NGT\_EJP05

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# 1 Summary Table

Table 1: Summary table for West Import Resilience Project

Name of Project	West Import Resilien	ce Project	
Scheme Reference	NGT_EJP05_Network Capability: West Import Resilience Project_RIIO-GT3		
Primary Investment Driver	Network Capability		
Project Initiation Year	FY2024		
Project Close Out Year	FY2028		
Total Installed Cost Estimate (£m, 2023/24)			
Cost Estimate Accuracy (%)			
Project Spend to date (£)	0		
Current Project Stage Gate	Stage 4.0		
Reporting Table Ref	11.6		
Outputs included in RIIO-GT2 Business Plan	No		
Spend apportionment	GT2 (£m 23/24)	GT3 (£m 23/24)	GT4 (£m 23/24)
			0

# 2 Executive Summary

- 2.1.1 This paper discusses National Gas Transmission's (NGT) proposal to submit a Network Capability Uncertainty

  Mechanism (UM) cost reopener submission in 2026 with an approximate value of f

  network constraint via installation of 9km of pipeline.
- This project has been developed to
- 2.1.3 The proposed option in this paper is supported by the Network Capability Assessment (within NGT\_A10\_System Operator Annex\_RIIO\_GT3) and should be read in conjunction with that document.
- This project seeks to
- 2.1.5 This project has been driven by the fact that the proposed Western Gas Network Project (WGN) submitted to Ofgem via Funded Incremental Obligated Capacity Re-opener (FIOC) application in May 2023 has not proceeded. WGN was designed to accommodate the incremental capacity request.
- 2.1.6 This project takes forward an element of the Western Gas Network Project following termination of the Planning and Advanced Reservation of Capacity Agreement (PARCA) to mitigate against a modelled future network constraint. We have the design, consents and pre-construction activities completed to deliver this project at the lowest possible cost to consumers if we deliver on the work previously undertaken as part of the Western Gas Network Project FIOC.
- This request will be
- 2.1.8 We intend to submit a request for funding via uncertainty mechanism in RIIO-GT3 due to low confidence in the cost estimate currently available. As the project closure phase for the WGN project is still ongoing, we need to establish the costs of what has been delivered to date and is recoverable against the funding required to deliver this project. We need to obtain confirmation on costs from the Main Works Contractor following a change to the scope of works. We have decided to not expose the consumer to this risk of cost uncertainties so intend to carry out further development of the cost estimate.
- 2.1.10 To date, the cancelled Western Gas project completed detailed design on the pipeline section and has planning and land easement consents in place. Long lead items have been purchased with the option available to us to reuse these materials if a funding decision is obtained expeditiously. We intend to capitalise on existing materials, land consents and design work to deliver this project for the lowest cost to the consumer. If we do not act in a timely manner the consents will expire, and we will have to obtain long lead items again, increasing the project costs. This project will need to take the existing design for the pipeline element and progress this through to completion of the pipeline onsite.
- 2.1.11 The below table shows our intended spend for this project.

Table 2: RIIO-GT3 funding request for West Import Resilience Project (£m 23/24)

Intervention	2025	2026	2027	2028	2029	2030	2031	Total
West Import Resilience Project	ev.				90			
Total								

# 3 Project status and request summary

	This project has been developed to resolve a
3.1.2	The investment in this paper is supported by the Network Capability Assessment (within NGT_A10_System Operator Annex_RIIO_GT3) and should be read in conjunction with that document.
3.1.4	The Western Gas Network Project (WGN) submitted to Ofgem via FIOC application in May 2023 was designed to accommodate the incremental capacity request, project included:
	The installation of    of new pipeline between
	of new pipeline between
	<ul> <li>Related works at several existing Above Ground Installations (AGIs) to facilitate the connection of new pipelines.</li> </ul>
	<ul> <li>Related works at several existing Above Ground Installations (AGIs) and compressor stations to facilitate the pressure uprating and increased flow rates. This category includes modifications.</li> </ul>
3.1.5	Ultimately the project, which was due to be funded by the FIOC mechanism was halted and did not proceed,
	on this aborted project is provided <u>here.</u>
3.1.6	NGT have reviewed the options and propose to install pipeline between due to it being able to mitigate the identified risk.  and propose to due to it being able to mitigate the options available to mitigate the identified risk.
3.1.7	We intend to submit a request for funding via uncertainty mechanism in RIIO-GT3 due to low confidence in the cost estimate currently available. As the project closure phase for the WGN project is still ongoing, we need to establish the costs of what has been delivered to date and is recoverable against the funding required to deliver this project. We need to obtain confirmation on costs from the Main Works Contractor following a change to the scope of works. We have decided to not expose the consumer to this risk of cost uncertainties so intend to carry out further development of the cost estimate.
3.1.8	
	Further information on these figures on forecast UK gas import levels is available in the NGT_A10_System Operator Annex_RIIO_GT3.
3.1.10	To date, the cancelled Western Gas project completed detailed design on the pipeline section and has planning and land easement consents in place. Long lead items have been purchased with the option available to us to reuse

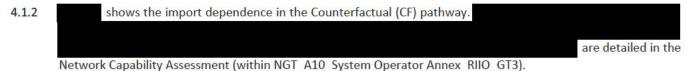
these materials if a funding decision is obtained expeditiously. We intend to capitalise on existing materials, land consents and design work to deliver this project for the lowest cost to the consumer. If we do not act in a timely manner the consents will expire and we will have to obtain long lead items again, increasing the project costs. This project will need to take the existing design for the pipeline element and progress this through to completion of the pipeline onsite.

- 3.1.11 Due to previously undertaken design and enabling works, we have a good understanding of the required scope of this project to mitigate the future constraint risk. We currently have low confidence in project costs due to the close out for the FIOC ongoing. We are looking to continue development of the project costs and intend to provide an update on costs once available. The Uncertainty Mechanism cost submission will be to execute the project fully to commissioning of the pipeline for operational use. If we continue at pace, we will be able to utilise existing planning, land consents and materials. We would welcome the opportunity to discuss this.
- 3.1.12 The scope of this document is aligned with our Asset Management System (AMS) and relates to our Business Plan Commitments (BPCs): meeting our critical obligations every hour of every day and delivering a resilience network fit for the future. More information on our AMS and a description of our BPCs is provided in our NGT\_A08\_Network Asset Management Strategy\_RIIO\_GT3 and our BPCs are detailed within our NGT\_Main\_Business\_Plan\_RIIO-GT3.

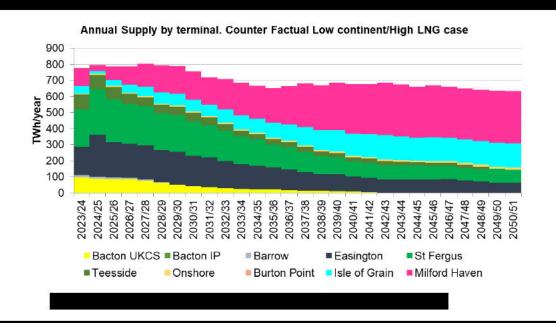
# 4 Problem/Opportunity Statement

#### Why are we doing this work?

4.1.1 Due to the decline of gas supply from the UK continental shelf and reduced supplies from continental Europe there is an This EJP assesses a range of physical and commercial options to manage these constraints. This is to ensure we continue to meet our obligations under the Gas Act 1986 to develop and maintain an efficient and economical pipeline system for the conveyance of gas.









#### What circumstances would change the need for this project?

- 4.1.9 There are several circumstances which would change the need for this project:
  - Changes in UK supply and demand beyond the FES models.
  - Changes in European markets and thus flows through interconnectors.
  - Changes in global LNG markets.
- **4.1.10** Reducing levels of gas supplies within the UK Continental shelf require gas to be sourced from elsewhere. This increases the reliance on gas imports from This decline triggers the need to invest. Changes to this supply pattern impact upon the need for this investment.
- **4.1.11** Gas markets have been affected by the conflict between Russia and Ukraine. In response, the European Union plans to make Europe independent from Russian fossil fuels by 2030.
- 4.1.12 Until last year, 45% of Europe's annual gas demand had come from Russia. This could result in a sustained increase of LNG gas supply a to meet the increase in interconnector export demand at as seen in 2022. This arises due to the limited LNG importation facilities on the continent. It is expected that this will continue in the short term, although there remains uncertainty on the levels of exports required over the long term.
- 4.1.13 An increase in LNG importation facilities on the continent or a reversal to the European mandate to reduce reliance on Russian fossil fuels would reduce the amount of amount of gas required to be imported into

#### What are we going to do with this project?

- 4.1.14 NGT intend to continue development of this project to produce a robust cost estimate for taking the project to completion. We intend to develop an Uncertainty Mechanism cost submission to Ofgem for review in April 2026 to request the funding to implement the project.
  - Following obtaining the funding required to deliver the project, NGT will deliver the project to
- 4.1.16 NGT propose to undertake this project using a combination of internal and external resource.

#### What makes this project difficult?

- 4.1.17 The installation of a pipeline is a complex project to deliver due to the logistical scale involved, long lead materials and timescales surrounding land consents and easement rights along with environmental permissions to conduct excevation
- **4.1.18** NGT have considered the risks that might threaten the successful delivery of this project. The below table shows the risks NGT have assessed for this project.

Table 3: Key project risks

Risk	Description
Change of Law	Land Consents Procurement/ Construction Legislation
Physical Conditions	Ground conditions Archaeology Contaminated Ground Environmental Uncharted services
Weather	Prolonged weather events Extreme weather events
Prevention Event	Population affecting pandemic such as Covid-19 Pandemic affecting farming industry such as Foot and Mouth

Scope Change	Change to requirements mid-way through project due to unforeseen event.
Protestor Action	NGT have experienced protestor activity on projects (a.g., as this is a linear project the risk of trespass by protesters is significantly greater than on a one site project.
Defective Materials	Materials supplied could be unusable.

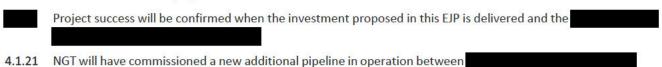
#### What are the key milestones?

**4.1.19** The below table shows the key milestones for this project. These are currently an indicative view and might be subject to change as we develop the project.

Table 4: Key project milestones

Network Development Stage Gates	Sanction Dates
F1 (Scope Establishment)	November 2024
F2 (Option Selection)	March 2025
F3 (Conceptual Design Dev/Long Lead Items)	March 2025
F4 (Execute Project)	June 2025
ACL (Available for Commercial Load)	Completion by the end of RIIO-GT3
T6	October 2027
F5 (Reconcile and Closure)	June 2028

## How will we understand if the project has been successful?



# 4.2 Related Projects

- 4.2.1 This project is related to the cancelled Western Gas Network Project which was initially submitted to Ofgem under the FIOC re-opener mechanism. This was to deliver an increased scope including pipeline and compressor works in response to a PARCA application. If delivered, this project would have consequentially reduced the forecasted constraint risk. Following the cancellation, we have reviewed the options to mitigate against this forecasted constraint risk. By capitalising on the works completed to date, we can deliver the project described in this EJP for the lowest cost to the consumer preventing future network constraint costs being borne by the consumer.
- 4.2.2 Several separate projects are being progressed by NGT at some of these sites. Commissioning of the 4.2.3 - This project, currently ongoing, will This data will inform our for the system modelling but will not affect the scope of this pipeline project. The new unit at 4.2.4 funded by UM in RIIO-T2 provides additional compression will provide benefit against this identified constraint risk. Once completed this pipeline will complement the new compressor unit and bring in greater operational flexibility. 4.2.5 The Portfolio of RIIO-GT3 asset health works to be delivered between interacts with this investment. These improve the reliability and capability of existing compressor units which provide benefit However, in insolation these do not reduce it to a level that can be tolerated, against this hence the need for the additional pipeline proposed in this EJP.

# 4.3 Project Boundaries

- 4.3.1 The project is designed to mitigate against the

  It does provide benefit to the wider network in that it gives greater resilience and enhanced operational flexibility.
- 4.3.2 It does not resolve any wider network constraint events that appear in some scenarios in the long term.
- 4.3.3 It does not include any works to adjacent compressor sites or include any asset health works to assets at the connection points. Funding requests for these works will sit within the relevant EJPs.

# 5 Project Definition

## 5.1 Supply and Demand Scenario Discussion and Selection

- 5.1.1 Under our licence we are required to plan and develop the pipe-line system to meet the peak aggregate daily demand.
- 5.1.2 The FES 2023 Falling Short Scenario has been used for the cost benefit analysis due to time constraints to submit in December 2024. This scenario was selected as it provides the worst-case demand forecast. There is progress on decarbonisation compared to today, however it is slower than in the other scenarios and fails to meet the UK Net Zero target by 2050. For three zones (South Wales, Scotland and South East) we have done sensitivity analysis using the Leading the Way scenario.
- 5.1.3 These CBAs will be updated with FES 2024 data for the final data table submission in March 2025. We do not expect there to be any material difference to our investment decisions due to this update as there is not a significant difference between the FES 2023 Leading the Way and Falling Short scenarios and the FES 2024 Holistic Transition and Counterfactual scenarios, respectively.
- 5.1.4 As a prudent operator the system should be planned for the most challenging demand scenario to ensure we remain compliant with our licence.

## 5.2 Future Requirements

5.2.1 The gas landscape has changed considerably in the last 20 years. With the continued decline of UK Continental Shelf (UKCS) supplies and the need to decarbonise, National Gas expects gas supply and demand patterns to continue to change going forwards. As highlighted in our uncertainties to the problem/opportunity statement, various factors create uncertainty on the extent and speed of change. Given this uncertainty, it is impossible to forecast a single energy future over the long term. Each year in July the FES is published. These scenarios are created by drawing on National Energy System Operator (NESO) own analysis and input from stakeholders across the energy industry.

During RIIO-GT3 Figure 5 shows there is an increased import dependence across all four pathways in the 2024 FES. With supplies from continental Europe only expected during very high demand days. Most of this increase is expected to be in the form of LNG. in the Problem/Opportunity Statement section showed how annual supplies from

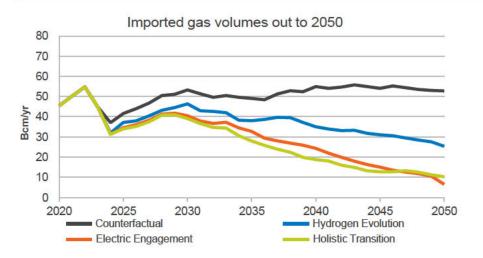


Figure 5: Imported gas volumes out to 2050.

5.2.3 Network analysis has been carried out to assess the risk of constraint costs arising over a wide range of plausible demand scenarios for the current intact network. The network analysis has been carried out using our capability analysis process which has been developed to assist in defining the capability of the NTS. The result is shown in the form of 'Flame Charts' in Figure 6. Further details of the capability analysis process and the creation of the Flame Charts are given in the Network Capability Assessment (within NGT A10 System Operator Annex RIIO GT3).

The chart shows the supply/demand at the South Wales Entry boundary for both the HT and CF pathway. This is the point where gas flows leave South Wales and enters the rest of the NTS. This "boundary" is used for the purposes of defining capability across a range of supplies and supplies and demands. The assessment of the flows is done on a net flow basis, i.e., supply less demand. As the level of flows which can be accepted from is impacted by the level of demand in changing demand patterns impact this capability going forward.

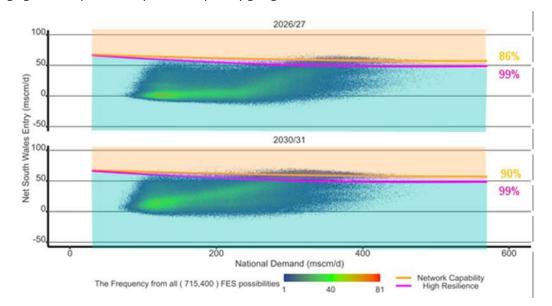


Figure 6: South Wales Entry Capability at the start and end of RIIO-GT3

5.2.5 Figure 6 shows an increase in the number of days above our capability by 2030/31. It also shows how importance of our ability to deliver the intact capability with the average number of days above the high resilience line increasing from 10 to 22 by the end of the RIIO-GT3 period.

5.2.6	The increase in supplies will also see an increase in the expect run hours at each of the compressor stations.	

5.2.7 In Chapter 6 Options Considered we consider the full range of options. Under the Do Nothing option we manage the increase in days above our capability through operational tools. With compressor modifications we look to improve the resilience of the current stations to reduce the number of days we are not able to provide the full capability. This option also looks at ways to mitigate the risk of not having sufficient operating hours on the back-up unit at a look at ways to increase the Network Capability through the installation of new pipelines.

#### **5.3** Project Scope Summary

5.3.1 The project being progressed has been identified following a comprehensive evaluation process of options to remove the constraint risk.

5.3.2 The Project scope presented in this EJP is to complete the installation

The below table shows proposed design parameters of the pipeline.



# **6 Options Considered**

- 6.1.1 NGT has considered 16 options to mitigate the constraint defined in this EJP. These options comprise of a mix of interventions ranging from Do Nothing, Pipeline installation and Compressor modifications. Where an option falls short in capability, the cost of using operational tools is included to mitigate the constraint. These are either locational actions or buy-backs. A locational action is used to encourage the market to either reduce in supply or increase in demand in the area. A buyback is a commercial solution to buyback all the capacity to the level of capability the network can deliver.
- 6.1.2 NGT has not considered commercial contracts to mitigate against the identified problem. Typically, the commercial and regulatory options are suited to providing operational benefit which is of short duration (e.g., mitigating a short-term compressor trip). For this project, this option has been discounted due to not being able to resolve this over a long period of time and being of higher cost to the consumer if utilised over a long period of time.
- 6.1.3 All below options assume that the existing compressors on the NTS remain in operation and that the new unit funded via RIIO-T2 UM at section is considered as within the existing fleet. For example, in Option three below, this would be for an additional new unit, on top of the one funded by RIIO-T2 UM.

#### **Do Nothing (Counterfactual)**

- 6.1.4 If we do nothing, there will be no changes to the network and no investment cost.
- 6.1.5 This results in a scenario in which constraint risk materialises or a situation where our availability is not adequate to meet with future network demands.



## Option One-Install 9km of new pipeline

- 6.1.7 This option is the installation of built using first principles estimation utilising costs developed from procurement exercises during the Western Gas Project. NGT has removed some spend from the cost estimate within this EJP for design works completed to date.
- 6.1.8 The benefit of this option is that it reduces the identified constraint by providing

  . Works to deliver this option are currently ongoing with land consents in place and detailed design works currently being undertaken. Completion of the pipeline and commissioning activities are programmed for financial year 2027/28.
- 6.1.9 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.

#### **Option Two-**

- 6.1.10 This option is the Construct a between and a rebuild kit of spares for For the pipeline installation, the cost estimate has been built using first principles estimation utilising costs developed from procurement exercises during the Western Gas Project. NGT has removed some spend from the cost estimate within this EJP for design works completed to date. The cost for the spares kit has been developed by using first principles estimation utilising costs provided by Original Equipment Manufacturers.
- 6.1.12 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.

- UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
- By carrying spares this reduces the return to service from failure from a period of 7 months to 3 months.

Option Three- plus Plus New Unit

- 6.1.13 This option is the construction a between between and construction of a new Gas Driven compressor unit at a construction.
- 6.1.14 The benefit of this option is that it reduces the identified constraint by providing approximately

  This additional compression will provide additional resilience to the compressor fleet and greater operational flexibility. The compressor will predominantly pull the increased volume of gas from and push it North. This will remove the risk of requiring the backup compressor unit for more than 500 hours, its current derogation limit. Works to deliver the pipeline option are currently ongoing with land consents in place and detailed design works currently being undertaken. Completion of the pipeline and commissioning activities are programmed for financial year 2027/2028. The installation of the new unit will be commenced in FY26 and be commissioned in FY31.
- 6.1.15 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - Existing NTS compressors remain in operation with no changes to configuration.

#### **Option Four -All new build pipelines**

- 6.1.16 This option is the construction a between and of pipeline between . The cost estimate has been built using first principles estimation.
- 6.1.17 The benefit of this option is that it reduces the identified constraint by providing approximately

  Works to deliver the pipeline option are currently ongoing with land consents in place and detailed design works currently being undertaken. Completion of the pipeline and commissioning activities are programmed for financial year 2027/28.
- 6.1.18 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - Churchover configuration remains as currently is.

Option Five - All new build pipelines plus

Spares

6.1.19 This option is the construction a between . It also includes a rebuild kit of spares for

The cost estimate has been built using first principles estimation.

- 6.1.20 The benefit of this option is that it reduces the identified constraint and provides additional capacity to the NTS. It also increases the availability of compressor. The spares kit enables works to restore the functionality of the compressor to be completed quicker without waiting for long lead items. Works to deliver the pipeline option are currently ongoing with land consents in place and detailed design works currently being undertaken. Completion of the pipeline and commissioning activities are programmed for financial year 2027/28.
- 6.1.21 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.

- UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
- configuration remains as currently is.
- By carrying spares this reduces the return to service from failure from a period of 7 months to 3 months.

#### Option Six - All new build pipelines plus Wormington New Unit

6.1.22 This option is the construction between

It also includes the construction of a new Gas Driven compressor unit at . The cost estimate has been built using first principles estimation.

- 6.1.23 The benefit of this option is that it reduces the identified constraint and provides additional compression to the NTS. This additional compression will provide additional resilience to the compressor fleet and greater operational flexibility. The compressor will predominantly pull the increased volume of gas from and push it North. This will remove the risk of requiring the backup compressor unit for more than 500 hours, its current derogation limit. Works to deliver the pipeline option are currently ongoing with land consents in place and detailed design works currently being undertaken. Completion of the pipeline and commissioning activities are programmed for financial year 2027/28. The installation of the new unit will be commenced in FY26 and be commissioned in FY31.
- 6.1.24 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - configuration remains as currently is.
  - Existing NTS compressors remain in operation with no changes to configuration.

#### Option Seven - All new build pipelines plus Uprating

6.1.25	This option is the construction a	
		. It also includes the
	. The cost es	timate has been built using first principles estimation.

- 6.1.26 The benefit of this option is that it reduces the identified constraint and enables Feeder 28 to operate at increased pressures giving the NTS greater operational flexibility. Completion of the pipeline and uprating of Feeder 28 are programmed for completion in financial year 2027/28.
- 6.1.27 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - experiences ranges of pressure that trigger the requirement to uprate.

#### Option Eight - All new build pipelines plus Uprating plus Spares

6.1.28 This option is the construction a between It also includes the a rebuild kit of spares for estimation.

- 6.1.29 The benefit of this option is that it reduces the identified constraint and enables to operate at increased pressures giving the NTS greater operational flexibility. The spares kit enables works to restore the functionality of the compressor to be completed quicker without waiting for long lead items. Completion of the pipeline and uprating of are programmed for completion in financial year 2027/28.
- 6.1.30 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.

- UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
- experiences ranges of pressure that trigger the requirement to uprate.
- By carrying spares this reduces the return to service from failure from a period of 7 months to 3 months.

## Option Nine - All new build pipelines plus Uprating plus New Unit

- 6.1.31 This option is the construction a between . It also includes the uprating of to withstand increased pressures a construction of a new compressor unit at first principles estimation.
- 6.1.32 The benefit of this option is that it reduces the identified constraint and enables pressures giving the NTS greater operational flexibility. The new compressor unit will provide additional compression to the NTS, providing additional resilience to the compressor fleet and greater operational flexibility. The compressor will predominantly pull the increased volume of gas from and push it North. This will remove the risk of requiring the backup compressor unit for more than 500 hours, its current derogation limit. Completion of the pipeline and uprating of are programmed for completion in financial year 2027/28.
- 6.1.33 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - experiences ranges of pressure that trigger the requirement to uprate.
  - Existing NTS compressors remain in operation with no changes to configuration.

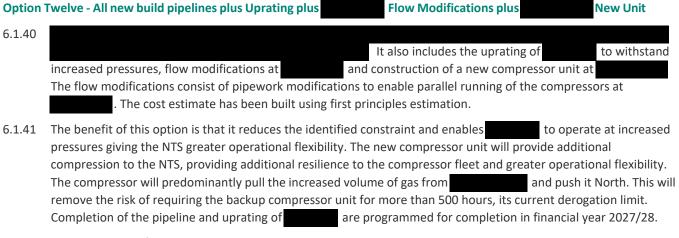
## Option Ten - All new build pipelines plus Uprating plus Flow Modifications

- 6.1.34 This option is the construction a between It also includes the uprating of to withstand increased pressures. The flow modifications consist of pipework modifications to enable parallel running of the compressors at . The cost estimate has been built using first principles estimation.
- 6.1.35 The benefit of this option is that it reduces the identified constraint and enables to operate at increased pressures giving the NTS greater operational flexibility. Completion of the pipeline and uprating of programmed for completion in financial year 2027/28.
- 6.1.36 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - experiences ranges of pressure that trigger the requirement to uprate.

#### Option Eleven - All new build pipelines plus Uprating plus Flow Modifications plus **Spares** 6.1.37 It also includes the uprating of to withstand increased pressures, flow modifications at and a rebuild kit of spares for The flow modifications consist of pipework modifications to enable parallel running of the compressors at cost estimate has been built using first principles estimation. 6.1.38 The benefit of this option is that it reduces the identified constraint and enables to operate at increased pressures giving the NTS greater operational flexibility. The spares kit enables works to restore the functionality of the compressor to be completed quicker without waiting for long lead items. Completion of the pipeline and are programmed for completion in financial year 2027/2028. uprating of

6.1.39 The assumptions for this option are:

- The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
- UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
- experiences ranges of pressure that trigger the requirement to uprate.
- By carrying spares this reduces the return to service from failure from a period of 7 months to 3 months.



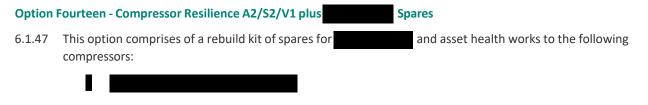
- 6.1.42 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - Feeder 28 experiences ranges of pressure that trigger the requirement to uprate.
  - Existing NTS compressors remain in operation with no changes to configuration.

#### Option Thirteen - Compressor Resilience A2/S2/V1

6.1.43 This option comprises of asset health works to the following compressors:



- 6.1.44 The cost estimate for this option has been built using a mix of data for historic completed works along with costs elements built from first principles estimation.
- 6.1.45 The benefit of this option is that it reduces the identified constraint and increases the availability of the compressor fleet in the locale of the constraint. It also does not require the construction of a new pipeline with the associated disruption to landowners. The completion of the asset health works listed above will be FY31.
- 6.1.46 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - The asset health works increase availability of existing compressors which reduce the need to run the compressor unit restricted by the 500 hour derogated limit.



- 6.1.48 The cost estimate for this option has been built using a mix of data for historic completed works along with costs elements built from first principles estimation.
- 6.1.49 The benefit of this option is that it reduces the identified constraint and increases the availability of the compressor fleet in the locale of the constraint. It also does not require the construction of a new pipeline with the associated disruption to landowners. The spares kit enables works to restore the functionality of the compressor to be completed quicker without waiting for long lead items. The completion of the asset health works listed above will be FY31.
- 6.1.50 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - The asset health works increase availability of existing compressors which enable an increased volume of gas to be moved preventing the constraint.
  - By carrying spares this reduces the return to service from failure from a period of 7 months to 3 months.

Option	Fifteen - Compressor Resilience A2/S2/V1 plus  New Unit
6.1.51	This option comprises of construction of a new compressor unit at following compressors:

- 6.1.52 The cost estimate for this option has been built using a mix of data for historic completed works along with costs elements built from first principles estimation.
- 6.1.53 The benefit of this option is that it reduces the identified constraint and increases the availability of the compressor fleet in the locale of the constraint. It also does not require the construction of a new pipeline with the associated disruption to landowners. The new compressor unit will provide additional compression to the NTS, providing additional resilience to the compressor fleet and greater operational flexibility. The compressor will predominantly pull the increased volume of gas from and push it North. The completion of the new compressor installation and asset health works listed above will be FY31.
- 6.1.54 The assumptions for this option are:
  - The modelled scenarios materialise and that the constraint risk is realised triggering the requirement for this option.
  - UK gas supply and demand patterns continue to follow current patterns with reliance on LNG imports.
  - The asset health works increase availability of existing compressors, by improving the condition and reducing the likelihood of trips, minor and major failures as well as reducing the return to service time.
  - The new compressor and increased availability of existing compressors provide sufficient mitigation against the constraint and are maintained to meet the availability level in perpetuity.

#### 6.2 Option Cost estimate details

6.2.1 The costs for this project are currently under development. Currently available costs as an indicative guide for the above options have been provided in the below table:

Table 7: Options cost summary

Option	Investment Unit Cost (£m 23/24 prices)	Unit of Measure	Costing Methodology	
1		Per project	Assumption developed utilising Western Gas Project cost book	
2		Per project	Assumption developed utilising Western Gas Project cost book and estimate from subject matter expert	
3		Per project	Assumption developed utilising Western Gas Project cost book and historic submissions	
4		Per project	Assumption developed utilising Western Gas Project cost book	
5		Per project	Assumption developed utilising Western Gas Project cost book and estimate from subject matter expert	
6		Per project	Assumption developed utilising Western Gas Project cost book and historic submissions	
7		Per project	Assumption developed utilising Western Gas Project cost book	
8		Per project	Assumption developed utilising Western Gas Project cost book and estimate from subject matter expert	
9		Per project	Assumption developed utilising Western Gas Project cost book and historic submissions	
10		Per project	Assumption developed utilising Western Gas Project cost book	
11		Per project	Assumption developed utilising Western Gas Project cost book and estimate from subject matter expert	
12		Per project	Assumption built using Asset health, historic submissions and estimates from Subject matter expert.	
13		Per project	Assumption built using Asset health, historic submissions and estimates from Subject matter expert.	
14		Per project	Assumption built using Asset health, historic submissions and estimates from Subject matter expert.	
15		Per project	Assumption built using Asset health, historic submissions.	

6.2.2 A cost breakdown continues to be developed for this project. The cost below is for the been extrapolated from Western Gas Project cost book for indicative purposes. These costs will be developed and refined during our development of this project and a cost breakdown will be provided as part of our intention to submit an uncertainty mechanism cost submission in April 2026 or sooner is possible.

Table 8: Option cost estimate details

Wormington to Honeybourne New pipeline				
Item	Cost (£ 23/24)	% of total installed cost		
Project Management	12			
Scope Development				
Land Management				
NG Procurement				
Outage				
Design				
Build				
Testing and Commissioning				
Close out				
Contingency				
Total Installed Cost				
Cost Estimate Accuracy				

# 6.3 Options Technical Summary table

# **6.3.1** The above options have been compared in the below table:

Table 9: Options technical summary table

Option	Project Start Date	Project Commissioning Date	Project Design Life (years)	Option Operating Cost vs Current	Installed cost (£m 23/24 prices)	Cost estimate accuracy
Do Nothing (Counterfactual)	N/A	N/A	N/A	N/A		N/A
	FY26	FY28	40	Additional Section to Inspect and manage CP system.		+/- 30%
	FY26	FY28	40	Additional Section to Inspect and manage CP system.		+/- 50%
	FY26	FY31	40	Additional Section to Inspect and manage CP system. Additional compressor Asset Health works.		+/- 50%
All new build pipelines	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.		+/- 50%
All new build pipelines plus Spares	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.		+/- 50%
All new build pipelines plus New Unit	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system. Additional compressor Asset Health works.	nal pipeline ct and manage Additional ssset Health	
All new build pipelines plus Uprating	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.		+/- 50%
All new build pipelines plus Uprating plus Spares	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.	3	+/- 50%
All new build pipelines plus Uprating plus New Unit	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system. Additional compressor Asset Health works.		+/- 50%
All new build pipelines plus Uprating plus Flow Modifications	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.		+/- 50%
All new build pipelines plus Uprating plus Flow Modifications plus Spares	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system.	,	+/- 50%
All new build pipelines plus Uprating plus Flow Modifications plus New Unit	FY26	FY31	40	Two additional pipeline sections to Inspect and manage CP system. Additional compressor Asset Health works.		+/- 50%
Compressor Resilience A2/S2/V1	FY26	FY31	25	Sustain increased compressor asset health works		+/- 50%
Compressor Resilience A2/S2/V1 plus Spares	FY26	FY31	25	Sustain increased compressor asset health works		+/- 50%
Compressor Resilience A2/S2/V1 plus New Unit	FY26	FY31	40	Sustain increased compressor asset health works		+/- 50%

# 7 Business Case Outline and Discussion

## 7.1 Key Business Case Drivers Description



• Capability – Declining flows from UKCS is increasing the import dependency of GB.

Further information on this driver is available section 5.2

Future Requirements and in the zone 4 section of our Network Capability Assessment.

- **Resilience** The increase in supplies entering the on derogated units at compressor station.

  ASEP will result in an increase in run hours
- Emissions Compliance Two units at do not meet the Medium Combustion Plant Directive (MCPD) emissions limits and will be derogated from 2030.

## 7.2 Supply and Demand Scenario Sensitivities

- 7.2.1 In addition to the Leading the Way and Falling Short assessment we have undertaken sensitivity analysis to test there is sufficient resilience at compressor station.
- 7.2.2 The sensitivity analysis is based on the same probabilistic supply and demand models for Leading the Way and Falling Short. The worst year out of the modelled 980 years is assessed. This is used to test the risk of derogated compressors having insufficient run hours to support the expected flows.

All modelled future supply and demand scenarios trigger	

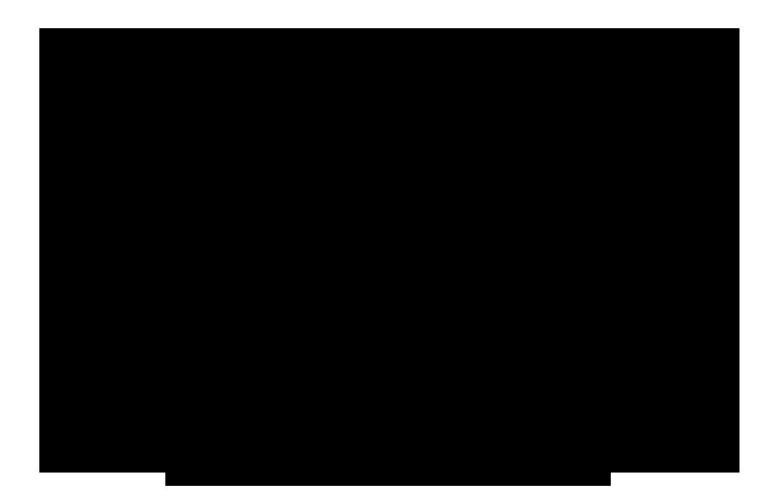
- 7.2.4 Importation of gas from into the UK is unlikely to change in the short to medium term due to the proposed European Commission plan to become independent of Russian fossil fuels by 2030.
- 7.2.5 Due to the scenario will move this payback period and will make many discounted options cost unbeneficial.

## 7.3 Business Case Summary

- 7.3.1 In developing our plans and making our decision, we have been fully cognisant of the need to develop plans that are value for money and deliverable while trying to mitigate against the network capacity constraint.
- 7.3.2 We have assessed 16 options in the CBA. In line with the HM Treasury Green Book and RIIO-GT3 business plan guidance, we have appraised these portfolio options utilising NPV calculated at the 20-year point. The analysis evaluates the value of proposed investments in RIIO-GT3, Present Value (PV), PV Benefits, NPV, Cost Benefit (CB) ratio, Payback period after end of RIIO-GT3 and Payback year of each option.
- 7.3.3 The benefits of each option considered is summarised in Table 9 compared to the anticipated intact entry
- 7.3.4 The intact entry availability is a measure of how much uptime the assets have. This is considered as the time available for to be used for their intended operational purposes. Reasons for being unavailable include outages, maintenance, or unplanned events which take the assets out of service.

Option	Option Cost (£m, 2023/24)	Intact Entry Availability	Benefits
0 - Counterfactual		86%	
	0		
7 - 4 + pressure elevation of			
8 - 4 + pressure elevation of plus spares			
9 - 4 + pressure elevation of plus new			
Modifications (max flow) - 2 from 2	2		
11 - 10 plus spares	, <b>=</b> ,		
12 - 10 plus new 13 - Compressor			
Resilience (a2,s2,∨1) 14 - Compressor Resilience (a2,s2,∨1) plus			
spares (V4 at ) 15 - Compressor	_	<b>—</b>	
Resilience (a2,s2,v1) plus new			

7.3.5 As the graph below shows all options analysed in the CBA offer a positive return on investment in the CT pathway with benefits being realised instantaneously on completion due to the high level of forecasted constraints.



# 7.3.6 The below table provides a comparison between the options described within this EJP.

Table 11: Business Case Summary Table

Option Title	Supply and Demand Scenario Description	Project Commissioning Date	Total Installed (£m,23/24 price base)	Cost Estimate Accuracy	Project Operating Lifespan	Project NPV
Do Nothing (Counterfactual)	FES 2023- Falling Short	N/A	0	N/A	40 years	N/A
	FES 2023- Falling Short	FY28		+/- 30%	40 years	£1009.16
	FES 2023- Falling Short	FY31		+/- 50%	40 years	£1058.94
	FES 2023- Falling Short	FY31		+/- 50%	40 years	£907.24
All new build pipelines	FES 2023- Falling Short	FY31		+/- 50%	40 years	£969.17
All new build pipelines plus Spares	FES 2023- Falling Short	FY31		+/- 50%	40 years	£1018.15

All new build pipelines plus New Unit	FES 2023- Falling Short	FY31	+/- 50%	40 years	£873.26
All new build pipelines plus Uprating	FES 2023- Falling Short	FY31	+/- 50%	40 years	£928.51
All new build pipelines plus Uprating plus Spares	FES 2023- Falling Short	FY31	+/- 50%	40 years	£976.25
All new build pipelines plus Uprating plus New Unit	FES 2023- Falling Short	FY31	+/- 50%	40 years	£856.59
All new build pipelines plus Uprating plus Flow Modifications	FES 2023- Falling Short	FY31	+/- 50%	40 years	£928.52
All new build pipelines plus Uprating plus Flow Modifications plus Spares	FES 2023- Falling Short	FY31	+/- 50%	40 years	£993.51
All new build pipelines plus Uprating plus Flow Modifications plus New Unit	FES 2023- Falling Short	FY31	+/- 50%	40 years	£852.70
Compressor Resilience A2/S2/V1	FES 2023- Falling Short	FY31	+/- 50%	25 years	£842.05
Compressor Resilience A2/S2/V1 plus Spares	FES 2023- Falling Short	FY31	+/- 50%	25 years	£888.41
Compressor Resilience A2/S2/V1 plus New Unit	FES 2023- Falling Short	FY31	+/- 50%	40 years	£766.34

7.3.7	for to	op 10 Options in the CBA. Alternative optio	ons that are based on
	upgrading zonal compression do not deliver as m	nuch benefit and are 3 of the bottom 5 opt	ions. Combinations on
	top of and	Spares do not provide enough addi	tional benefit to negate
	the additional cost.		
7.3.8	A sensitivity was conducted against the Leading t constraints. This leads to lower NPVs for all optic		patterns, there are fewer
7.3.9	Against the Leading the Way Scenario, best option.	plus	Spares, is still the



- 7.3.10 The constraints expected under the Leading Way sensitivity peak in 2030, making options that are delivered early in the period that resolve constraints the most beneficial.
- 7.3.11 The two FES scenarios represent two of the boundary points of potential future energy landscapes and there are a wide range of possible supply demand possibilities between them. Comparing between the large NPVs in the Falling Short CBA and the relatively small negative NPVs in the Leading the Way CBA, there is a broad range of potential future energy landscapes between the two FES scenarios, with their respective supply demand patterns, in which Option 2 would be continuing to be the best option.
- 7.3.12 There is currently a broad cost accuracy range (+/- 30%) for the chosen option. For the Chosen Option under the Leading the Way sensitivity, there is a range of uncertainty in which Option 2 could be cost beneficial. Simply if the Costs were less than expected then the Option would be cost beneficial under the current delivery timescales.
- 7.3.13 Option 2 is the best Option under both FES Scenarios and the consequences of not doing it are high. Based on the analysis it has a high cost benefit ratio and delivering it early will resolve expected constraints.



# 8 Preferred Option Scope and Project Plan

# 8.1 Preferred Option

- 8.1.1 The preferred option is to construct a 9km pipeline between which is listed as Option two in the CBA. This is preferred as it reduces the identified constraint risk for the lowest capital costs. This option retains both compressor units so limits the risk of breaching the 500 hour derogation limits on each unit.
- 8.1.2 It is proposed to fund this project via Uncertainty Mechanism cost reopener submission. This UM cost submission is intended to provide the funding to progress the project from its current state to delivery and commissioning of the new pipeline. The submission will confirm the cost to deliver the project. The UM will be triggered by the licensee.
- 8.1.3 Significant development of the design works for this option have been completed previously as part of the development of the Western Gas project, resulting in clear understanding of the scope. The current uncertainty surround project costs, so our preferred approach is to submit an Uncertainty Mechanism cost submission for the funding to complete the project in April 2026.

## 8.2 Project Spend Profile

8.2.1 An indicative project spend profile is provided below. It should be noted that this is based on continuing with existing land and planning consents and the materials required for the pipeline being able to be manufactured to programme.



#### 8.3 Efficient Cost

- 8.3.1 NGT will consider the below points during development of this project to ensure that the cost is efficient:
  - Previously funded design, enabling works and materials from the Western Gas Network Project FIOC will
    not be included within this funding request.
  - Utilise previously undertaken archaeology reports, bore hole results, Land consent investigations and agreements where possible to avoid duplication.

## 8.4 Project Plan

8.4.1 Project delivery has been split into three phases which align with our Network Development Process (ND500) as follows. Commissioning dates are not relevant to all intervention types but take place at the end of the delivery phase.

Delivery Phase	ND500 Stage Gate(s)
Preparation	T0, T1, F1 (Scope establishment), T2, F2 (Option selection), T3, F3 (Conceptual Design Development and Long Lead Items Purchase), T4
Delivery	F4 (Execute Project), T5, Available for Commercial Load (ACL), T6
Close Out	F5 (Reconcile and Close)

8.4.2 The below table shows the summary plan and provisional delivery phases for this project within RIIO-GT3. Internal stakeholder engagement has identified when we can obtain network access, where required, to complete these works.

Table 13: West Import Resilience Project Programme for RIIO-GT3 period

Sanction/Intervention	RIIO-T2		RIIO-GT3				
Sanction/ Intervention	FY25	FY26	FY27	FY28	FY29	FY30	FY31
West Import Resilience Project Sanction							

- 8.4.3 Planning and land consents have been obtained for this project as part of the cancelled Western Gas project. It is essential that we achieve the above programme to prevent re-applying for these consents resulting in increasing costs for the consumer. Long lead items have also been obtained which NGT have the option to secure to prevent wastage and increased project costs.
- 8.4.4 The work has been profiled based on a deliverability assessment across the whole NGT plan and is deliverable alongside the worklist proposed in the RIIO-GT3 submission.
- 8.4.5 Development of this project is ongoing to ensure that we achieve the project programme.

# 8.5 Key Business Risks and Opportunities

- **8.5.1** Changes to system operation or supply and demand scenarios will not impact upon the proposal in this EJP. All future modelled scenarios show a constraint materialising in this location which requires mitigation.
- **8.5.2** The transition to hydrogen, could result in the need to redesign the NTS which would have an impact on the proposals in this EJP. Any decision relating to re-purposing of the existing network is likely to increase the need to deliver the mitigation proposed in this EJP.
- 8.5.3 The constraint risk is forecast to rise over RIIO-GT3 as shown in the above <u>figure</u>. This risk will result in difficulties operating the network and impact upon the amount of gas we can import onto the NTS. If we do not install the pipeline proposed in this EJP, the constraint cost significantly climbs which result in increased costs to the consumer.
- 8.5.4 The Planning agreements and land consents are currently in place to deliver this project, obtained during the Western Gas project. If we do not continue development of this project and fail to deliver against the proposed project programme, we will have to re-apply for these consents which will significantly delay the project, increased project costs and result in the constraint cost materialising. The construction of this pipeline must be undertaken in Summer 2027 at the latest to retain the existing consents.
- 8.5.5 Long lead steel pipeline materials have been ordered as part of the Western Gas Network FIOC Project. There is an agreement in place be able to acquire these materials for usage or confirm they are to be scrapped. This presents us the opportunity to use these materials and reduce wastage of raw materials. Failure to acquire these materials will result in increased costs and programme to re-order them. This will jeopardise the overall project as this will impact land consent deadlines. To ensure successful delivery of this project we need to secure the materials for use in this project.
- 8.5.6 This project capitalises on the previous enabling and design works undertaken as part of the cancelled Western Gas Network Project FIOC. This results in the project being able to be delivered utilising previous funding received to deliver a reduction in future network constraint at the lowest cost to the consumer.

#### 8.6 Outputs included in RIIO-GT2 Plans

8.6.1 There are no outputs from RIIO-T2 plans to be included within RIIO-GT3.

# 9 Appendices

9.1	Ofgem	<b>FIOC</b>	update-	Western	Gas	<b>Network</b>	Pro	ject
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Final Update - Western Gas Network - FIOC Project Direction

