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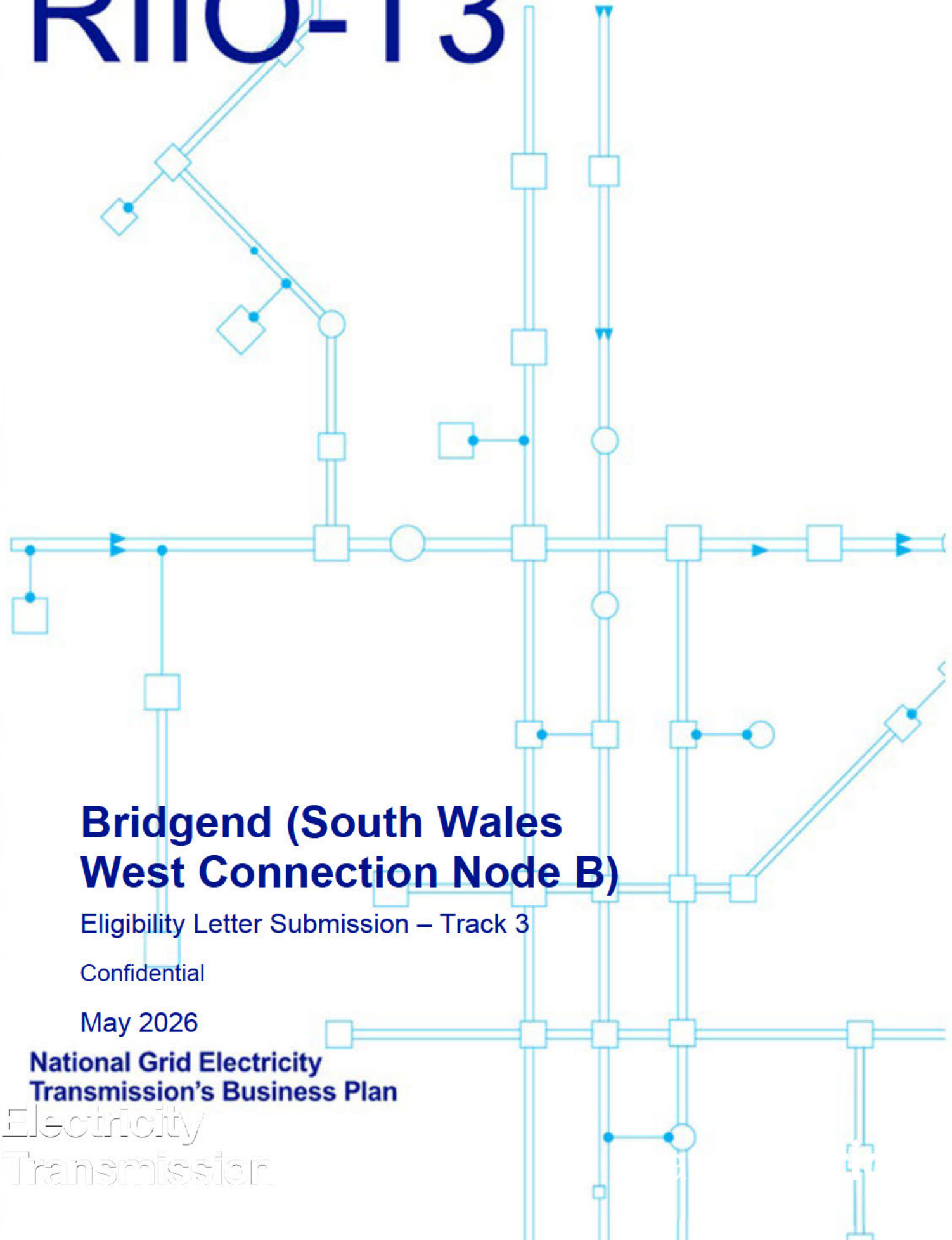

Bridgend (South Wales West Connection Node B)

Eligibility Letter Submission – Track 3

Confidential

May 2026

National Grid Electricity Transmission's Business Plan

Electricity Transmission

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Reference and summary table

Field	Description
Name of the Project	Bridgend (South Wales West Connection Node B)
TO's preferred re-opener track	Track 3 Eligibility Letter (EL), reflecting that optioneering is ongoing and a preferred solution has not yet been formally determined.
RRP References	No OSR created to date. Will be included in RRP26 submission.
BPDT / Scheme Reference Number	Not Applicable.
Load Board Reference	Not Applicable.
Investment drivers	**Strategic demand and generation** The project consists of two primary investment drivers: • [redacted] a nationally significant AI data-centre customer, contracted for up to [redacted] of demand ([redacted]) • Anticipated Celtic Sea floating offshore wind (non-contracted), included on a least-regret system planning basis. • Approximately [redacted] of additional regional data-centre demand was previously provisionally aggregated at Bridgend (now expected to be localised at South Wales West Connection Node D in the Swansea area, reducing the required scope at Bridgend).
PASE Compliance	A preferred solution has not yet been confirmed for this investment. The shortlisted configurations comprise AIS and GIS options (Options E-10 and E-11), both delivering a reduced footprint relative to the long-list configurations. The emerging GIS configuration (Option E-11) is anticipated to be non-PASE, subject to completion of optioneering and detailed design.
Outputs	Subject to the conclusion of optioneering, construction of a new 400/132 kV transmission connection node at Bridgend to: • [redacted] contracted strategic demand and • provide capability for the integration of anticipated Celtic Sea floating offshore wind generation in line with NESO least-regret planning assumptions. • [redacted]
Shortlist of options considered	The shortlisted options for Bridgend are: • **Option E-10:** 400/132 kV DBB AIS substation with demand connected at the transformer low-voltage side. • **Option E-11:** 400/132 kV DBB SF_6-free GIS substation with demand connected at the transformer low-voltage side. Both configurations deliver a reduced footprint relative to the long-list options, reflecting constraints at the preferred development area.
Preferred Solution	A preferred solution has not yet been formally confirmed; however, Option E-11 (GIS) is emerging as the direction of travel, with its configuration providing the smallest footprint and greatest ability to avoid interaction with subsurface constraints. This supports

Field	Description		
	improved delivery confidence and programme certainty via reduced construction risk. Option E-10 (AIS) remains a credible alternative and continues to be developed through FEED.		
Expected Forecast Costs	Estimated capital cost range: [redacted] (23/24 prices, [redacted]) This reflects the range of the GIS and AIS configurations respectively.		
Delivery Year	The indicative delivery milestones for this project are [redacted] Range is reflective option-dependent delivery outcomes, with earlier delivery associated with the Option E-11 (GIS) and later delivery associated with Option E-10 (AIS).		
Applicable Reporting Tables	No OSR created to date. Will be included in RRP26 submission.		
Historic Funding Interactions	Not applicable		
Interactive projects	[redacted] • South Wales West Connection Node D (Swansea), associated with re-localised regional demand.		
Spend Apportionment	T2 (FY 2022- 2026) [redacted]	T3 (FY 2027 – FY 2031) [redacted]	T4+ (FY 2032 – FY 2037+) [redacted]

1. Executive Summary

1.1. Project Summary

This investment will create a new 400 kV transmission connection node in Bridgend, South Wales. It will enable up [redacted] of contracted strategic demand to be connected, supporting the Government's goals for expanding AI infrastructure and driving economic growth throughout the UK.

Additionally, the project will provide a 400 kV interface capable of handling approximately 1.5 GW from anticipated Celtic Sea offshore wind developments, helping advance net zero, clean energy, and energy security objectives. The design also preserves options for future extendability by safeguarding layouts and maintaining spare capacity without unnecessary over-building.

1.2. Submission Purpose

This Eligibility Letter is being submitted as part of the RIIO-ET3 Load Re-opener (LR) mechanism under Special Condition 3.18 (Load Re-opener and Price Control Deliverable) of the Electricity Transmission Licence Conditions.

[redacted]

This submission requests Ofgem's approval of project eligibility against the Load Re-opener criteria, together with a determination on the appropriate re-opener track for the Bridgend project and approval of Pre-Construction Funding (PCF) under Special Condition 3.15.

In addition, while recognising the early-stage nature of the submission, NGET would welcome Ofgem's early views on the strategic direction of the project, including the emerging optioneering approach, ahead of a formal Track 3 EL Needs Case submission.

1.3. Needs Case

The proposed investment is load-driven and is required to deliver a new 400 kV transmission connection node in, Bridgend, South Wales, to meet confirmed and anticipated system requirements that cannot be accommodated by the existing network.

The primary driver for the investment is:

- [redacted] contracted strategic demand associated with [redacted], with an

In addition, the proposed investment takes regard to NESO system planning outcomes that inform coordinated network design and helps to ensure that transmission solutions are coherent with wider system strategy and avoid the risk of inefficient future reinforcement. In this context, NGET has taken account of anticipated offshore wind generation, including Celtic Sea floating wind, as follows:

- Up to ~1.5 GW of anticipated Celtic Sea floating offshore wind generation, identified through NESO-led system planning, including the Holistic Network Design Follow-Up Exercise (HNDFUE) and Beyond 2030: Celtic Sea Strategic Network Design. These outputs identify the need for additional 400 kV transmission capability in South Wales in the mid-2030s timeframe as part of a coordinated, whole-system network design.
- Having regard to this planning context, NGET has proportionately considered anticipated Celtic Sea generation as a needs case within the proposed Bridgend investment

System planning assessments confirm that the existing and proximate network cannot accommodate these requirements and within the required timescales. Without this investment, NGET would be unable to meet its contractual obligations, or act in a coordinated and efficient manner in developing the transmission system.

1.4. Optioneering to date

A structured optioneering process was undertaken to identify a proportionate and deliverable solution, taking account of contracted strategic demand, regional demand growth, and relevant NESO system planning outcomes. Strategic options considered included do-minimum, market-based, non-transmission, reuse of existing assets, and new-build. All options other than a new transmission node were discounted at an early stage on engineering and deliverability grounds as they fail to deliver the required outcomes.

Siting optioneering identified DEV7 as the most deliverable location. For a technical solution within DEV7, two options were shortlisted: an AIS and a GIS configuration, each reflecting a reduced footprint relative to earlier configurations. These configurations have been developed to accommodate the contracted strategic demand [redacted] while appropriately taking account of anticipated generation requirements associated with Celtic Sea floating offshore wind, as identified through NESO system planning outcomes.

The shortlisted configurations reflect the revised system requirements and optioneering, following the reallocation of approximately [redacted] regional AI data-centre demand that was provisionally aggregated at Bridgend during early system development. Subsequent system planning identified the need for a separate transmission connection node in the Swansea area (South Wales West Connection Node D) to accommodate wider regional embedded demand growth.

The establishment of South Wales West Connection Node D enables connection requirements to be rationalised between the two nodes, with the [redacted] of data-centre demand more appropriately accommodated at Node D. As a result, the required scope at Bridgend is lower than initially assessed, enabling smaller substation footprints than those associated with earlier configurations and reducing overall delivery risk. This allows the investment to be progressed based on core drivers ([redacted]), while retaining the ability for proportionate future extension where required.

Based on optioneering to date, the GIS solution is emerging as the preferred direction of travel, reflecting its smaller footprint, improved management of ground risk and greater programme certainty within a constrained site context. However, the AIS configuration remains under active consideration.

A final decision on the preferred option will be made following further development work and delivery risk assessment to ensure alignment with delivery requirements, with the outcome to be presented in the subsequent Needs Case and Optioneering submission.

1.5. Cost Estimate

Based on the latest Cost Book (2023/24 prices) and early project estimates, indicative costs are as follows, inclusive of risk and contingency:

- **Option E-10 – DEV7 AIS configuration (reduced footprint):** [redacted]
  Higher costs are driven by a larger substation footprint on more constrained land, which significantly increases earthworks and ground remediation requirements. The AIS scope also includes additional cable works to avoid OHL duck-under arrangements, together with greater landscaping and screening requirements.

- **Option E-11 – DEV7 GIS configuration (reduced footprint):** [redacted]
  Lower overall costs reflect a reduced GIS footprint, resulting in simpler earthworks, less complex OHL interfaces, and reduced landscaping and screening requirements.

1.6. Indicative Delivery Programme

The project is currently planned to deliver an enduring 400 kV connection node between [redacted], reflecting the range of delivery outcomes associated with the shortlisted options and the constraints at the DEV7 site.

The later end of the range reflects a prudent planning position for the AIS option (Option E-10), where extensive ground remediation across the substation footprint must be completed before construction can commence, limiting scope for concurrent working (for example, restricting the ability to progress access works, foundations and permanent works in parallel).

By contrast, the GIS configuration (Option E-11) which delivers a smaller footprint relative to both long-list configurations and the AIS option, is expected to benefit from the avoidance of the historic landfill and limits coal-mining remediation to discrete areas, primarily associated with access. Subject to confirmation through intrusive ground investigation and detailed design, this creates the opportunity for concurrent delivery of access works and foundation activities, creating the potential for delivery up to 18 months earlier than the AIS option.

[redacted] Delivery of the enduring solution remains dependent on completion of design and consenting activities, long-lead equipment procurement, system access and effective management of site-specific risks, notably ground conditions and access.

2. Introduction

2.1. Bridgend (South Wales West Connection Node B)

This Eligibility Letter is submitted under Special Condition 3.18 (Load Re-opener and Price Control Deliverable) of the Electricity Transmission Licence Conditions for investment associated with the delivery of a new South Wales West Connection Node at Bridgend. This submission is requesting:

- Approval of the investment need arising from anticipated connection requirements in South Wales West, including early views on the requirement for additional transmission connection capability, and initial views on optioneering approach which considers the potential development of a new connection node and a reduced footprint approach to enable deliverability.
- Confirmation of the appropriate Assessment Track (Track 3 EL) for the project, reflecting that optioneering is ongoing.
- Approval of Pre-Construction Funding (PCF) under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable) to enable continued development of the investment, including the conclusion of optioneering and maturation of a preferred solution.

Subject to Ofgem confirming project eligibility and PCF applicability, we will continue development and intend to subsequently submit a Needs Case in line with the re-opener process in subsequent reopener windows.

2.1.1. Eligibility & Project Track Statement & PASE

Bridgend is driven by the need to facilitate demand and generation connections which require the establishment of a new compliant connection node in the South Wales West area. The investment is therefore load-driven, and the investment need and associated proposal did not form part of the baseline portfolio for RIIO-T3 Final Determinations.

At this stage, a preferred solution has not yet been confirmed. Optioneering remains open; however, early indications suggest that the emerging solution is likely to be a GIS-based configuration (non-PASE).

Both shortlisted options (AIS and GIS) deliver a reduced footprint relative to the long-list, with the GIS providing the smaller footprint of the two. On this basis, we currently anticipate that the project would fall within Assessment Track 3 EL; however, we welcome Ofgem's determination of the appropriate assessment track as part of this submission.

2.1.2. Pre-Construction Funding Request

Under Special Condition 3.15 of the Electricity Transmission licence, this investment qualifies for allowances equal to [redacted] of its total forecasted cost ([redacted] at the time of this Load Re-opener Eligibility Letter submission).

Based on our current forecast we have provided below breakdown of costs amounting [redacted] as part of this submission. This equates to [redacted] of the "latest total forecast costs project costs.

Table 1 below summarises the activities covered by the application of these PCF allowances based on our current progress of PCF and EEW spend. This position will be updated as we continue to mature this investment and ultimately reconciled at Project Assessment stage of the re-opener.

We confirm that no PCF activity included in this submission has been funded through baseline allowances, other re-openers, or alternative licence mechanisms.

Table 1: Estimated costs for pre-construction activities (£m, 23/24 prices)

No	Description	Total Forecast Costs £m
1	Surveys	3.9
2	Planning Consent approvals	3.0

3	Early Enabling Works	18.7
Total		**25.6**

2.2. Project Background

2.2.1. Chronology to the investment

[redacted]

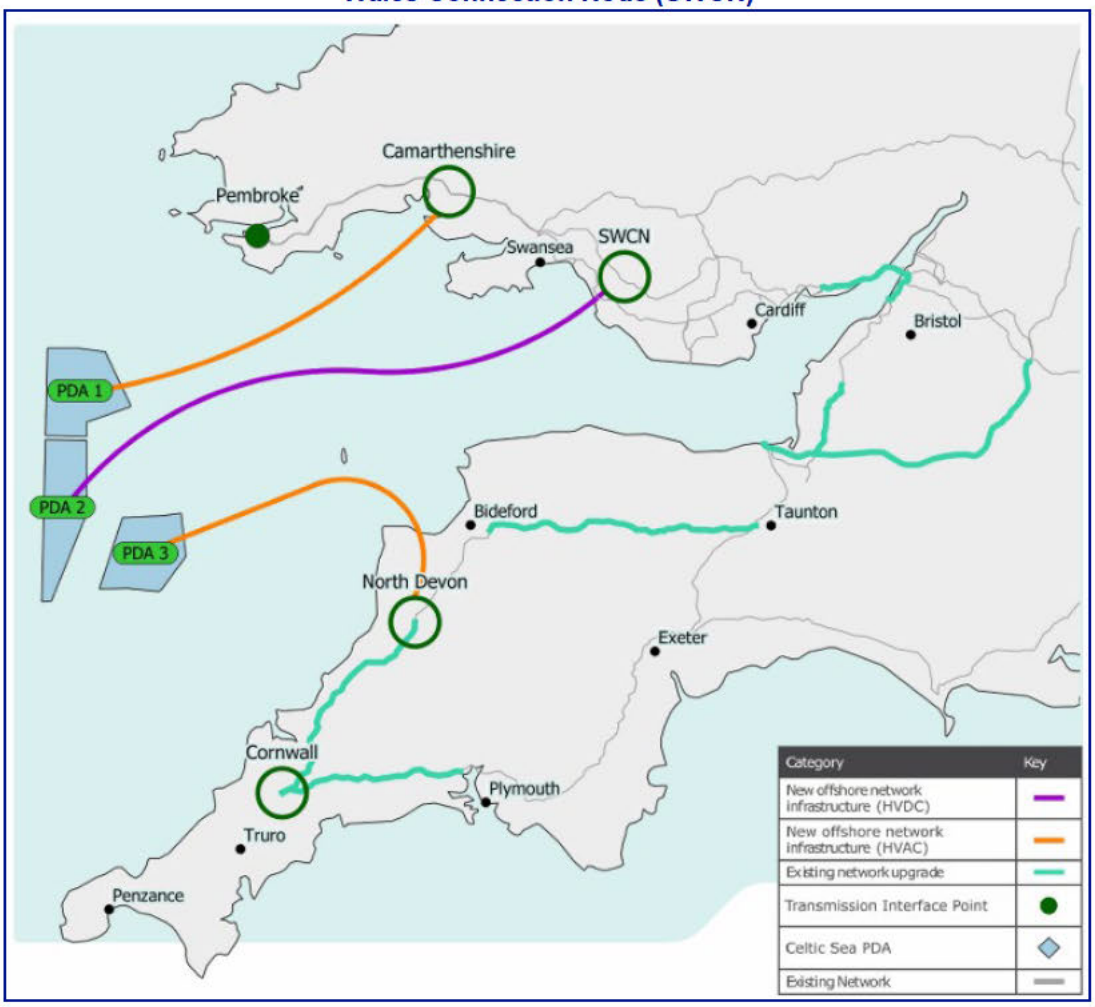
Strategic Offshore Transmission Planning

In parallel, strategic offshore transmission planning continued through 2023–2024 under the Offshore Transmission Network Review and the Holistic Network Design Follow-Up Exercise, building on the Holistic Network Design (July 2022). These NESO-led processes set out coordinated system planning outcomes and design recommendations for accommodating offshore wind generation beyond 2030, including anticipated Celtic Sea development.

This strategic need was subsequently further outlined through NESO's Beyond 2030[1]: Celtic Sea Strategic Network Design, published in August 2024 at the request of DESNZ and in advance of The Crown Estate Round 5[2] leasing. The assessment identified a requirement for additional transmission capacity in South Wales to accommodate Celtic Sea floating offshore wind in the mid-2030s, while not prescribing a specific onshore landing point, voltage level, or delivery solution.

[1] Beyond 2030: Celtic Sea
[2] https://www.thecrownestate.co.uk/our-business/marine/round-5

Figure 1: NESO's Beyond 2030: Celtic Sea Design Recommendation, including a South Wales Connection Node (SWCN)



As system development for the Bridgend node progressed, this emerging 400 kV node (SWWCNB) was identified as a credible and efficient option, consistent with NESO's system planning outcomes, as part of a coordinated network design capable of accommodating anticipated offshore generation alongside contracted strategic demand. On this basis, anticipated Celtic Sea generation was provisionally considered within planning and optioneering for the already-triggered Bridgend node. This assignment did not pre-empt any future connection offers or delivery solutions, nor did it rely on any contractual commitment from Celtic Sea generators at that time.

[redacted]

Emergence of a new Node (SWWCND)

By mid-2025, the accumulation of Celtic Sea offshore wind, [redacted] strategic demand, and the additional [redacted] of demand significantly expanded the scope of Bridgend, driving larger substation footprints, additional SGTs and bays, and revised layout and remediation assumptions. However, continued growth in embedded demand in the Swansea North area subsequently crossed the threshold at which a new transmission node became unavoidable.

In Early 2026, this triggered a new South Wales West Connection Node D, initially driven by further demand entering the pipeline. Node D proposes a new 400 kV substation with three 400/132 kV 460 MVA SGTs feeding an NGED-owned 132 kV substation, with an [redacted]

The triggering of Node D introduced consideration as to system-level re-optimisation between the two schemes during optioneering. Swansea is geographically and electrically closer to the demand sites provisionally aggregated at Bridgend, potentially allowing that demand to be re-localised. This could potentially enable an outcome in which Bridgend, focuses on its core strategic drivers, [redacted] and Celtic Sea offshore wind, while the new node in Swansea absorbs localised embedded and directly connected demand.

In effect, Node D relieves Node B by localising demand that would otherwise increase the required scope at Bridgend. This enables Bridgend to progress with a reduced scope, creating the potential to support timely delivery requirements. This remains subject to formal optioneering and confirmation. Node D is outside the scope of this eligibility letter.

[redacted]

2.2.2. Regional and network context

The proposed investment is located at Bridgend, within the South Wales West region of the National Grid Electricity Transmission (NGET) network. The surrounding transmission network comprises a combination of 400 kV and 275 kV infrastructure, with existing major substations located at Swansea North, Baglan Bay, Margam and Aberthaw, which historically served industrial demand and generation across the region.

The South Wales transmission system is broadly configured as a 400 kV ring, supported by a parallel coastal 275 kV network with multiple interface points between the two voltage levels. While the 275 kV network continues to play an important role in supplying existing demand, the scale and concentration of new requirements, particularly Celtic Sea floating offshore wind and large strategic demand, exceed the capability of the 275 kV system. The enabling works required on the 275kV were expected to extend beyond what is deemed reasonable to connect strategic demand & offshore wind.

High level system planning considerations indicate that accommodating this level of new generation and other pending connections 275 kV network, through uprating and associated reinforcement, would necessitate extensive and coordinated works across a significant proportion of the South Wales system. The scale, complexity and delivery timescales associated with such reinforcement would introduce material programme risk and would not support timely delivery of the required connections.

Our strategy in South Wales is therefore based on optimising the existing 400 kV and 275 kV networks to enable the timely delivery of contracted strategic demand and generation connections, representing the most proportionate and least-regret approach for consumers. In doing so, this approach supports regional and government economic growth objectives, aligns with wider

connections reform objectives, and ensures that South Wales can contribute effectively to the UK's decarbonisation ambitions while safeguarding consumer value. On this basis, bulk power connections in South Wales are appropriately accommodated on the 400 kV network, with appropriate assessments to determine optimal landing points. Larger schemes, including the landing for Celtic Sea offshore wind into South Wales, drive the need for new substations that can also provide opportunities for other customer connections and can be aligned to our longer-term asset health plans for adjacent sites.

South Wales is emerging as a politically supported data-centre expansion region. The UK Government has designated AI growth zones in both North and South Wales.. These growth zones are supported by a combination of government funding and private sector partners, with long-term funding packages for skills, infrastructure and innovation, and are explicitly dependent on access to stable, high-capacity electricity supply.

South Wales has become attractive for hyperscale data-centre development due to the availability of large brownfield sites, strong fibre connectivity, and direct access to the transmission system. Examples include the former Ford engine plant at Bridgend, where multi-building hyperscale campuses are proposed, as well as sites across the Newport–Cardiff corridor and the Global Centre of Rail Excellence (GCRE), which is actively seeking energy-intensive partners.

NGET's strategy in South Wales includes significant investment in upgrading or replacing several substations, alongside uprating of existing 400kV lines to accommodate the significant industrial and data centres demands in the region as well as new renewables and large-scale battery storage connections for power resilience and flexibility.

Figure 3: Location new SWWCNB within the existing network

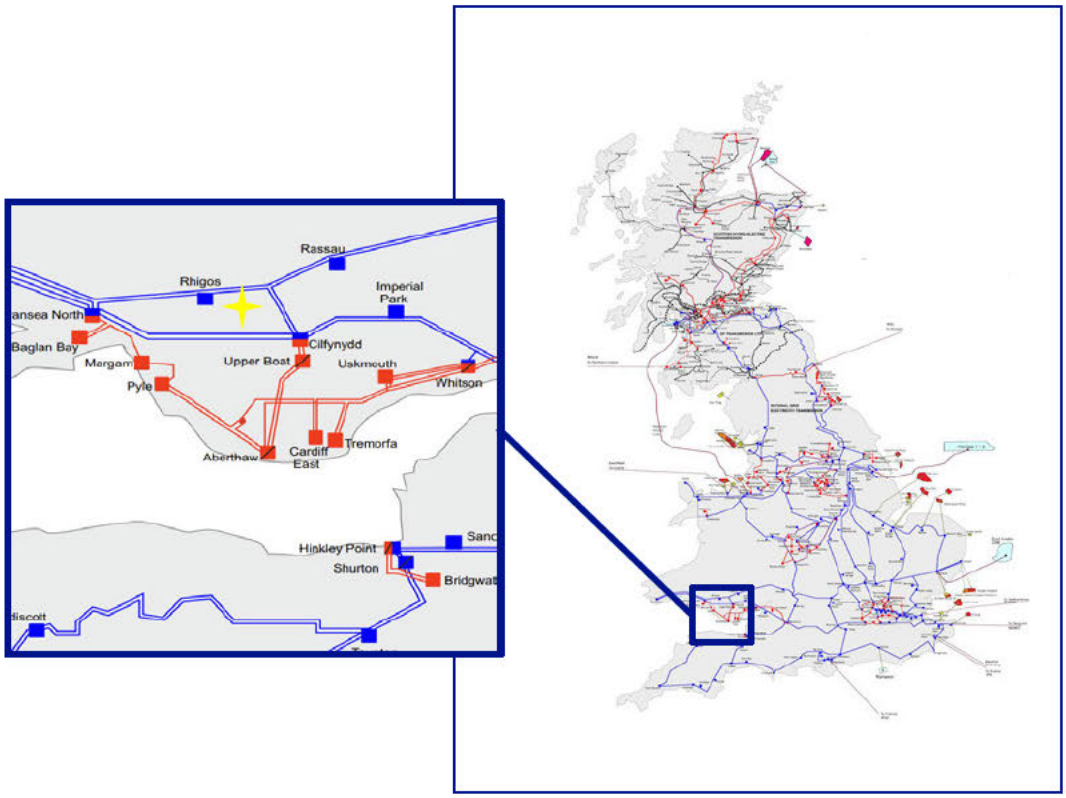
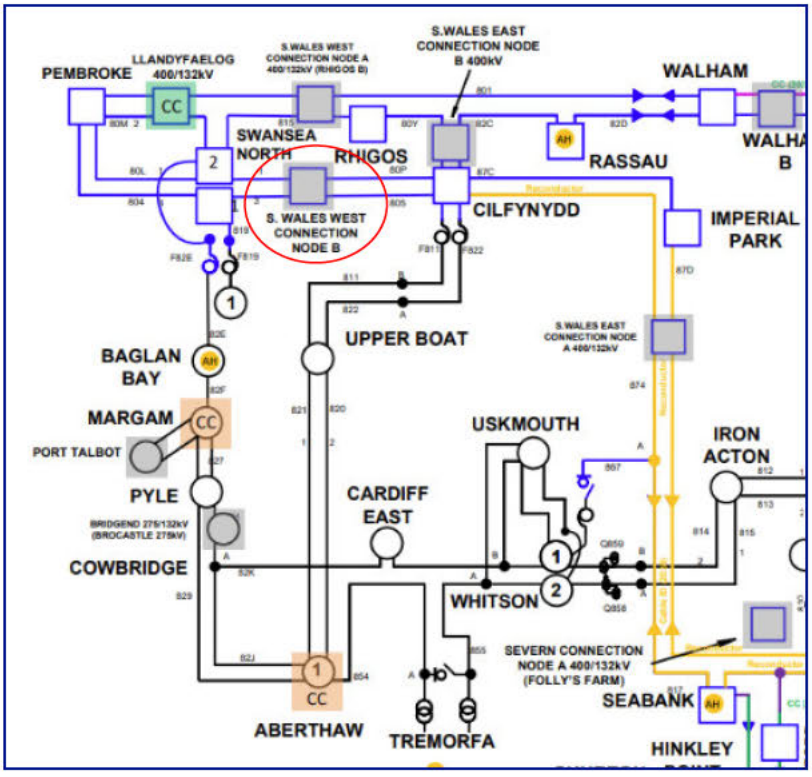


Figure 4: Network configuration including SWWCNB



2.2.2.1. Interactive Projects

The South Wales West Connection Node B (Bridgend) investment interacts with a limited number of related schemes within the South Wales region. These interactions have been considered as part of the optioneering and whole system assessment, and none are expected to compromise the deliverability or eligibility of the proposed investment.

South Wales West Connection Node D (Swansea area)

During the development of South Wales West Connection Node B, additional large-scale demand ([redacted], geographically aligned with the Swansea and Baglan areas, was provisionally aggregated at Bridgend due to the absence of alternative available transmission connection points at that time. Subsequent growth in local embedded and directly connected demand has since triggered a new transmission requirement in the Swansea area, now referred to as South Wales West Connection Node D.

The triggering of Node D introduces the potential for system level re optimisation, whereby this additional demand may be more appropriately accommodated closer to its point of use. This could relieve scope, cost and delivery risk at Bridgend while improving whole system efficiency and reducing the extent of long-distance transmission connections. Allocation of demand between Node B and Node D remains subject to ongoing optioneering and system planning activity, and Node D itself sits outside the scope of this Eligibility Letter submission.

[redacted]

2.2.3. Site Background

There is no existing 400 kV substation at Bridgend. The proposed investment therefore relates to the development of a new transmission connection node.

The proposed site for investment (see Section 4.3) is located in the Bridgend area within the South Wales West region and comprises a predominantly brownfield and previously industrial land parcel. The site lies outside the Common Land boundary.

The surrounding land includes a mix of agricultural and limited residential uses, with the potential for historic ground contamination associated with former landfill activity and external storage. The site is located within an area identified by the Mining Remediation Authority (MRA) as a Development High Risk Area, reflecting the presence of historic coal mining and associated subsurface uncertainty. Notwithstanding these characteristics, the site provides sufficient land to accommodate new transmission infrastructure while minimising interaction with residential areas and is considered suitable for the development of a new transmission connection node, subject to detailed technical, environmental and planning considerations.

2.2.4. Historical Funding

Not applicable to this proposed investment.

2.2.4.1. Early Asset Write Off (EAWO)

Not applicable to this proposed investment.

3. Project Driver and Needs Case

The Bridgend investment is driven by the need to accommodate contracted strategic demand in South Wales that cannot be met by the existing transmission infrastructure. In particular, the project is driven by the connection of [redacted] Additionally, three additional regional data-centre connection applications ([redacted]) emerged during early system development and were provisionally considered at Bridgend as an interim system planning response.

The investment has also been developed taking account of NESO system planning outcomes that inform coordinated network design to accommodate anticipated offshore wind generation, specifically Celtic Sea floating offshore wind, which has been identified through NESO system planning studies as requiring additional 400 kV transmission capacity in South Wales in the mid-2030s timeframe.

There is no existing transmission substation at Bridgend, and nearby substations within the South Wales West network, including Swansea North, Baglan Bay, Margam and Aberthaw, are either constrained, electrically unsuitable, or geographically sub-optimal to accommodate this demand (and anticipated future requirements) within the required timescales without extensive reinforcement. As a result, the establishment of a new transmission connection node at Bridgend was identified as the most appropriate means of providing a point of connection.

3.1. Customers

Table 2: Overview of Customers allocated at Bridgend (SWWCNB)

Customer	TOCA Signed	Capacity	Scope of Connection	Contracted connection date	Customer status
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Celtic Sea	No, but Holding Offer[3] available	1.5GW offshore wind	2 x 400kV bays	2035	In the latest BSBN[4] Celtic Sea are showing as Gate 1. There are ongoing discussions with all parties to resolve this.
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[3] Holding Offer refers to an interim, non-firm position under NESO's Connections Reform arrangements. It does not represent a committed connection, confirmed landing point, or delivery solution.
[4] Bilateral System Boundary Notification - NESO connections-reform planning output used to show how customers are currently being treated at the system boundary for queue-management and Gate status purposes.

[redacted]

Table 3: Bridgend Project Drivers

Driver	Description	Capacity	ACL(s)	Connection Reform
Strategic Demand	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Additional Demand (No longer project drivers at Bridgend due to reallocation to a new node. Included for contextual purposes)	[redacted]	[redacted]	[redacted]	[redacted]

Strategic Demand Driver [redacted]

The primary driver for investment at Bridgend is the connection of [redacted], a nationally significant hyperscale data-centre developer, contracted for up [redacted] demand [redacted] development represents a major inward investment in South Wales, with significant capital investment, and forms part of a wider cluster of data-centre developments underpinning the UK's AI capability.

[redacted] is a strategic demand connection, supported by UK Government engagement through the Office for Investment, reflecting its importance to national digital infrastructure, economic growth and competitiveness. The scale and firmness of the contracted demand necessitate a new, dedicated transmission connection node capable of supplying power reliably. The Bridgend connection is therefore required to meet a clear and committed customer obligation, with delivery timelines that are critical to realising the benefits of investment in the region.

NESO-Identified Anticipated Generation Requirements- Celtic Sea Floating Offshore Wind

In addition to contracted strategic demand from [redacted], the Bridgend investment has been developed having regard to NESO system planning outputs, which are produced under NESO's statutory role as System Operator to identify anticipated future system needs.

Celtic Sea floating offshore wind is a UK Government-backed offshore wind programme, progressed through The Crown Estate's Floating Offshore Wind Leasing Round 5, and forms part of national policy to expand offshore wind deployment beyond 2030. Leasing Round 5 makes provision for up to ~4.5 GW of floating offshore wind capacity, across three Project Development Areas, each of up to ~1.5 GW, located in the Celtic Sea off the coasts of South Wales and South-West England.

In advance of leasing, and in support of national offshore wind policy, NESO undertook a dedicated strategic network design exercise (Beyond 2030: Celtic Sea), building on the Holistic Network Design (HND) and the Holistic Network Design Follow-Up Exercise (HNDFUE). NESO's system planning outcomes identify a requirement for additional 400 kV transmission capability in South Wales in the mid-2030s timeframe to accommodate a proportion of anticipated Celtic Sea generation

as part of a coordinated, whole-system network design, while not prescribing a specific onshore landing point, voltage level or delivery solution.

NGET has regard to such system planning outputs and seeks to ensure investment decisions are coherent with wider system strategy, while avoiding the risk of network inefficiency, or avoidable future re-work. In this context, and as part of least-regret strategic planning, up to ~1.5 GW of anticipated Celtic Sea generation has been considered within the proposed investment at Bridgend. This reflects a proportionate response to NESO's planning context, ensuring that the proposed investment does not preclude efficient future system development.

For clarity, NGET has also considered, at a high level, how the specification of Bridgend might differ if anticipated Celtic Sea floating offshore wind generation were instead accommodated at an alternative connection point through future system planning decisions. In such circumstances, the enduring scope at Bridgend would be driven by the contracted strategic demand associated with [redacted] and at a conceptual level this would be expected to reduce the generation-led requirements on the node, potentially enabling a smaller substation configuration with fewer 400kV bays and a reduced spatial footprint or alternatively there is scope for providing further futureproofing capacity.

This counterfactual is for context only. It does not reflect the current system planning position, under which Bridgend has been identified as a credible and efficient connection node for both contracted strategic demand and anticipated Celtic Sea generation, nor does it alter the scope or eligibility of the investment proposed in this submission.

Further Data Centre Demand – now outside the scope of this submission

In addition to the primary strategic demand and generation drivers, a further ~[redacted] of large-scale demand has emerged within South Wales, comprising three separate connection agreements: [redacted] These customers are geographically aligned with the Swansea / Baglan corridor and represent a material aggregation of regional demand.

At the point these connection requests were received, no alternative new 400 kV connection node had been identified in the Swansea area. Swansea North was already fully utilised, with limited physical space and a concentration of existing generation connections, while Baglan Bay and the wider South Wales 275 kV network were constrained and unable to accommodate additional demand without significant reinforcement.

In this context and following the triggering of South Wales West Connection Node B (Bridgend) by the combination of [redacted] strategic demand and Celtic Sea floating offshore wind requirements, the feasibility of accommodating this additional regional demand at Node B was assessed as a pragmatic interim system solution.

Subsequently, continued growth in large-scale demand within the Swansea area resulted in the triggering of a separate 400 kV connection node, South Wales West Connection Node D, providing a connection point closer to the source of data centre demand. As a result, the allocation [redacted] is now expected to be re-optimised and reallocated to Node D.

Node D sits outside the scope of this submission and is referenced here solely to provide context. The scope of this submission therefore remains focused on Bridgend (Node B).

[redacted]

[redacted]

3.2. Asset Health

Though the selection of the preferred load-driven intervention may affect how we manage the health of interfacing assets, there is currently no asset health driver directly associated with this scheme.

3.3. Interactive Projects

The Bridgend investment interacts with a limited number of related schemes within the South Wales region. These interactions have been considered as part of the optioneering and whole system assessment, and none are expected to impact the deliverability or eligibility of the proposed investment.

South Wales West Connection Node D (Swansea area)

During the development of South Wales West Connection Node B, additional large-scale demand (approximately [redacted] geographically aligned with the Swansea and Baglan areas, was provisionally aggregated at Bridgend due to the absence of alternative available transmission connection points at that time. Subsequent growth in local embedded and directly connected demand has since triggered a new transmission requirement in the Swansea area, now referred to as South Wales West Connection Node D.

The triggering of Node D introduces the potential for system level re optimisation, whereby this additional demand may be more appropriately accommodated closer to its point of use. This could relieve scope, cost and delivery risk at Bridgend while improving whole system efficiency and reducing the extent of long-distance transmission connections. Allocation of demand between Node B and Node D remains subject to ongoing optioneering and system planning activity, and Node D itself sits outside the scope of this Eligibility Letter submission.

[redacted]

4. Optioneering

4.1. Strategic Options

Considering the investment drivers for a new transmission node, a strategic direction-setting exercise was undertaken to establish the most appropriate investment approach capable of addressing both contracted strategic demand and anticipated future system requirements. In line with NGET's standard optioneering process, the following broad strategic options were considered.

Table 5: Strategic Option Categories

Category	Description	Assessment
A: Do minimum	Maintaining the network its current state and not facilitating the new connections.	Discounted – Failure to meet contractual obligations under STC
B: Market-based solution	Accommodating customer demand through the procurement and use of ancillary services only.	Would not meet the scale or delivery requirements
C: Non-transmission, whole systems solution	The required customer connection is accommodated by a DNO.	Would not meet the scale or delivery requirements
D: Making use of existing substations	Facilitating the requested connection by utilising the existing substation (extension, uprating, etc.)	Utilisation of existing substations and the 275 kV network would require extensive uprating and coordinated reinforcement, with significant programme and delivery risk. In addition, the nearest 400 kV substations (Swansea North and Cilfynydd), acting as remote ends, are limited by transmission capacity and location, and were not identified as suitable connection points.
E: Building new substations	Facilitating the requested connection by building a new substation.	Based on above : it is the only option that meets the minimum customer(s) requirements and therefore taken forward for further development

The strategic assessment indicated that option categories A–C would not meet the scale or delivery requirements, while option category D is constrained by the limitations of existing substations/network. On this basis, the assessment concluded that the development of a new transmission substation (Category E) represents the most credible and deliverable strategic direction to address the investment drivers.

4.3. Siting Optioneering

Overview

A siting study is underway to identify a location capable of accommodating a new 400 kV transmission connection node that is technically feasible, consentable and deliverable within the required timescales.

The primary objective of the Study was to identify candidate cites suitable for the development of an Air-Insulated Switchgear (AIS) substation. Recognising the physical, environmental and land-use constraints within the study area, the assessment has also necessitated the consideration of Gas-Insulated Switchgear (GIS) solutions, in both coupled and decoupled configurations, where AIS development may be constrained by land availability and consenting considerations, geotechnical or geo-environmental risk.

This section summarises the work undertaken to date through the siting study process and presents the emerging siting position based on comparative assessment. While further technical and environmental work is required to confirm and optimise the preferred solution, the assessment below reflects the structured filtering, shortlisting and comparative appraisal completed at this stage.

Approach

Siting study search area (≤2 km)
In line with the siting study methodology, the search area focused on land within 2 km of the Swansea North–Cilfynydd 1 & 3 overhead line circuits along the 4YW route, consistent with the defined Limit of Deviation used in the study.

This search identified several potential development areas; however, the majority were discounted at an early stage due to a combination of challenging topography, extensive areas of Common Land combined with environmental constraints, and the prevalence of historic coal mining and landfill. These factors significantly constrained the availability of land parcels capable of accommodating a substation platform of the required scale without introducing unacceptable environmental, consenting, constructability or programme risk.

Within the search area, the extent and continuity of Common Land across the Bridgend area emerged as a particularly material consideration. As illustrated in Figure 4, a belt of Common Land interacts directly with the search area, introducing distinct statutory requirements and consenting routes that have the potential to materially affect deliverability and programme certainty. NGET's position on Common Land, and how associated risks are assessed and managed through the siting process, is set out in Appendix A4.

Development Areas identified through the siting study

The siting study identified a series of Development Areas (DEV1–DEV7) for further consideration (See Figure 4):

- DEV1–DEV4 were identified and discounted through the study due to a combination of Common Land impacts, significant topographical constraints, environmental sensitivities and access limitations.
- DEV5, DEV6 and DEV7 were identified as Development Areas capable of accommodating the required infrastructure in principle and were therefore progressed beyond the initial filtering stage for further consideration.
    - DEV5 comprises a Development Area located outside the Common Land boundary, to the north of Pant Hirwaun and within the setting of the Mynydd y Gaer Special Landscape Area. The land parcel benefits from sufficient scale to accommodate a transmission

substation in principle and avoids the need for Common Land consent. However, the site is in relatively close proximity to residential receptors and is subject to an extant, consente [redacted]

- DEV6 comprises a Development Area located outside the Common Land boundary, that looked to benefit from natural screening and access characteristics compared to other sites within the study area, and without conflicts with consented development.
- DEV7 comprises a land parcel adjacent to the Swansea North–Cilfynydd 1 & 3 overhead line corridor (4YW route), including previously disturbed land affected by historic landfill and legacy coal-mining activity. The area is of sufficient scale to accommodate a reduced-footprint transmission substation, subject to further ground investigation and remediation considerations.

Initial shortlisting and emerging preferred option

Following assessment, DEV5, DEV6 and DEV7 were progressed to a shortlisting assessment, reflecting their indicative potential to accommodate the required infrastructure in principle.

At this stage, DEV5 was set aside from further comparative assessment due to the presence of a consented DNS solar development, which constrained technical solutions and, from an engineering perspective, the site was only suitable for GIS technology and would have required complex OHL entry requirements through and around pockets of residential dwellings. The formal comparative assessment therefore focused on DEV6 and DEV7.

A comparative assessment was undertaken between DEV6 and DEV7. Following this assessment, DEV6 was initially identified as a holding preferred site within draft siting study, reflecting its relative advantages in terms of location, avoidance of Common Land, access arrangements and overall delivery risk.

DEV7 was still retained as a credible alternative, subject to further investigation of ground conditions and land-use constraints.

[redacted]

6 [redacted]

Reconsideration of Preferred Option following site-specific environmental and ground risk considerations

Subsequent detailed investigations materially changed the preferred siting position.

For DEV6, commissioned surveys, including geotechnical assessment with coal mining risk analysis, preliminary ecological appraisal, stage-2 ecology surveys, and earthworks feasibility, identified previously under-appreciated constraints. These included extensive historic coal mining, the presence of high-value habitats, and the requirement for large cut-and-fill[7] earthworks to construct a suitable platform.

These findings give rise to remediation and earthworks, elevated programme risk (particularly associated with coal remediation duration), higher carbon and biodiversity impacts, increased consenting risk. Early landowner engagement indicated a low likelihood of securing the site through voluntary agreement, increasing the probability that compulsory purchase would be required. On this basis, DEV6 was viewed as unlikely to be deliverable within the timescales required to support customer connections

A comparative reassessment confirmed that DEV7, while still presenting constraints, offered a more balanced and deliverable risk profile. DEV7 involves fewer land interests, presents a greater likelihood of voluntary land acquisition, and exhibits comparatively lower environmental and ground risk than DEV6. While historic landfill and mining remain relevant considerations, these risks are more manageable within programme and consenting constraints.

The following tables set out the detailed comparative assessment of geotechnical and geoenvironmental factors, followed by landscape, visual and wider environmental considerations, which together informed this position.

[7] Cut and fill refers to the earthworks required to create a level construction platform on uneven ground. Cut-and-fill analysis at DEV6 shows that forming a compliant platform would require extensive site-wide earthworks, involving very large material movements and tens of thousands of HGV trips, with further impacts if material cannot be reused on site.

Geotechnical & Geoenvironmental Comparison of DEV6 and DEV 7

Table 6: Geotechnical & Geoenvironmental Comparison of DEV6 and DEV 7

	DEV 6	DEV 7
Topography & Geological setting	• DEV6 is characterised by steeply rising topography and is underlain by Carboniferous Coal Measures with superficial glacial till. • Desk-based assessment confirms the site lies within a Coal Authority Development High Risk Area, with significant 'Made Ground' anticipated from historic opencast backfilling and former railway activity.	• DEV7 is underlain by Carboniferous Coal Measures with superficial glacial till and exhibits complex structural geology. • The site also lies within a Coal Authority Development High Risk Area. Historic opencast mining, mine entries and shafts are recorded across and adjacent to the site, with potential for shallow underground workings beneath parts of the site.
Principal geotechnical constraint & distribution	• Extensive historic coal mining, including recorded opencast excavations beneath the proposed development area, underground workings across and beyond the site, and multiple recorded mine entries in the vicinity. • These factors give rise to an unavoidable, site-wide geotechnical constraint that applies to all credible development layouts. • In addition, the steep topography necessitates substantial cut-and-fill earthworks, introducing further slope stability risk	• A key differentiator from DEV6 is the presence of a historical landfill within the central part of DEV7, with uncertain depth and lateral extent at this stage, alongside areas of Made Ground associated with historic buildings and railway infrastructure. • Unlike DEV6, these constraints are not uniform across the site, resulting in a more variable geotechnical risk profile. The landfill extent appears locally confined and may be avoided through layout selection, subject to further investigation.

Geoenvironmental contamination & groundwater risk	• Potential for contamination within Made Ground and groundwater associated from historic railway, mining and landfilling activities. • Worked coal seams also present a potential source of mine gas, posing risks to human health and new structures	• Also potential contamination within Made Ground and groundwater associated with historic agricultural, mining, railway and landfilling activities. • Asbestos-containing materials were observed during walkover surveys. • The historical landfill represents a potential source of landfill gas, posing risks if disturbed during construction. • Similar to DEV6, worked coal seams may also present a source of mine gas.

Landscape, Visual Setting and Environmental Constraints

Table 7: Landscape, Visual Setting and Environmental Constraints Comparison

Evaluation	DEV6	DEV7
Landscape context	Predominantly rural agricultural landscape with open fields and limited built development. High sensitivity to change requiring careful integration of development form and scale.	Similar rural agricultural landscape with high sensitivity to change and limited capacity to absorb large-scale transmission infrastructure.
Overall environmental constraint	Environmentally constrained; environmental considerations materially influence deliverability when considered in combination.	Environmentally constrained; environmental considerations materially influence deliverability when considered in combination.
Statutory ecological designations	Blackmill Woodlands SSSI and SAC located approximately 600 m to the north. No direct encroachment, but proximity to European and national designations introduces elevated sensitivity and potential indirect effects. Three priority habitats, including irreplaceable wet woodland, materially increasing environmental and consenting risk.	No direct interaction with statutory ecological designations. Located at a greater distance from the Blackmill Woodlands SSSI and SAC, with no clear linkage identified at desk-based level. Affects fewer priority habitats than DEV6, with no wet woodland impacted; environmental risk is driven primarily by layout rather than site-wide earthworks.
Valley setting & long-range views	Located within a valley landscape where landform and elevation influence visibility. Likely visible from elevated receptors; no complete visual containment.	Similarly located within a valley setting with potential visibility from elevated receptors and no complete visual containment.
Landscape designations	Lies outside designated landscapes but within an open rural setting sensitive to change.	Located closer to the Mynydd y Gaer Special Landscape Area (SLA), a non-statutory designation reflecting local landscape value and visual amenity.
Topography & earthworks	Pronounced level variation with implications for platform formation and landscape integration, contributing materially to environmental and delivery risk.	Topography remains a consideration but does not give rise to the same earthworks-led environmental risk identified at DEV6; landscape effects are expected to be driven primarily by layout and design.
Overall comparative position	Elevated environmental sensitivity driven by proximity to statutory designations and major earthworks requirements.	Elevated landscape sensitivity due to proximity to SLA, but lower statutory ecological risk and no site-wide earthworks constraint identified at this stage.

Summary – DEV7 as the emerging preferred site

Both DEV6 and DEV7 are constrained from a geotechnical, landscape and environmental perspective, and neither site is unconstrained in isolation. At DEV6, however, ground and environmental risks are site-wide and largely unavoidable, driven by extensive historic coal mining, significant earthworks requirements and proximity to statutory ecological designations, materially increasing delivery and consenting risk.

DEV7, while still subject to historic mining and environmental considerations, presents a more spatially variable and manageable risk profile, with no direct interaction with statutory ecological designations and greater opportunity to mitigate impacts through layout and design. When considered in combination, DEV7 offers a more balanced and deliverable basis for progression than DEV6, supporting its preferred position.

Further work required

A final phase of challenge and review will be undertaken to confirm the optimal technology choice, layout orientation and arrangement within DEV7. This will be progressed through National Grid's normal engineering and investment governance, supported by a targeted Quantified Risk Assessment (QRA) and integrated programme and delivery risk review.

In parallel, further environmental and technical surveys will be completed, including LVIA , flood risk, ecology, archaeology, UXO, intrusive and non-intrusive ground investigation, topographical survey, GPR, earthing and resistivity surveys, utilities verification and targeted geotechnical testing. These activities are intended to confirm, refine and optimise the preferred solution, informing development rather than revisiting site selection or strategic direction.

4.4. Longlist of options considered

An overview of the assessment of our longlist options is provided in the table below. Layout drawings are provided in supporting document and Appendix A4 to this document.

Key Points to note are as follows:

Options E1 to E-9: New transmission substation with shared 132 kV infrastructure (discounted)

- Where the paper refers to a "new substation" in the context of Options 3–9, this denotes a co-located transmission substation comprising both 400 kV substation and a shared 132 kV substation.
    - Ownership: NGET owns the 400 kV assets, the 400/132 kV transformers, and the shared 132 kV substation and busbars. Customers connect into the NGET-owned 132 kV system.
    - This configuration would result in significantly higher cost to consumers, as all assets are classified as Infrastructure Assets and therefore funded by consumers through transmission charges.
    - At a high level, we considered whether a connection-led boundary, with assets provided on a sole-use (connection-asset) basis and funded through connection charges, could be pursued as an alternative. Delivering such an arrangement would require significantly greater transformer volumes to meet N-2 redundancy on an individual customer basis. This would materially increase the size of the substation platform beyond the available and suitable land parcels, and given identified constraints at DEV6 and DEV7, would introduce unacceptable construction and programme risk beyond that already presented throughout Options E-1 to E-9

Options E-10 and E-11: Reduced footprint configurations with sole-use 132 kV connections

- As reduced footprint configurations, Options E-10 and E-11 **do not** include a 132 kV shared substation i.e. customers are treated as sole-use connections:
    - Anticipated Celtic Sea generation connects at the 400 kV level via dedicated 400 kV bays.
    - NGET provides the 400 kV switchgear and the 400/132 kV Supergrid Transformers and downstream 132kV bays only; the connection boundary is at the low-voltage (132 kV) side of the transformers, beyond which customers are responsible for designing, constructing, owning and operating their own 132 kV network and substation/s.
        - NGET build and construct the 400 kV infrastructure and 400/132kV transformers only
        - No 132 kV busbar/substation is provided by NGET
        - [redacted] (demand) takes supply directly from the LV (132kV) side of the transformers
        - [redacted] (demand) is responsible for building and owning their own 132 kV cable circuits from the NGET site to their site where a customer owned 132kV substation will be constructed.

Table 8: Longlist Options

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
Option A: Do Minimum/ Nothing **Not progressed**	No network reinforcement; customers not connected.	N/A	N/A	NGET has a legal obligation to provide a means of connection for developments requiring connection to the transmission network.
High level option(s) to utilise existing substations for Demand and Generation				
Option D-1: Use of existing Infrastructure in the region **Not progressed**	Reinforce existing substations and circuits to accommodate new demand and generation, including significant uprating at Pyle, Margam, Swansea North, Cilfynydd and Baglan Bay. It was not reasonable to consider a whole system solution including the DNO for this option as the scale of generation and demand is considered too great for LV connections.	N/A	High environmental and consenting burden due to extensive network rebuilds and reconductoring across multiple routes.	**Engineering, Deliverability & Consumer value: materially** higher cost, extensive scope, and delivery too late to support offshore wind and demand connections. **Utilisation of Existing Substations Generation:** Delivery would require extensive reinforcement works across multiple existing substations and circuits, including plant upgrades and reconductoring over long distances. This approach introduces material engineering complexity, consenting burden and delivery risk, with limited ability to phase or localise works. As a result, it does not provide a robust or timely solution to accommodate the forecast scale of generation and was not progressed further. **Utilisation of Existing Substations for Demand at 132kV & Below:** This option considered accommodating additional demand through the existing 275kV network in proximity to the developers. However, assessment confirmed that all proximate substations are constrained by limited demand headroom on the South Wales 275 kV network, which is already operating near capacity. Alternative substations with available capacity are located at a distance from the Developers locations and would require extensive circuit reinforcement and long connection routes, resulting in increased engineering complexity, consenting risk and programme delay. As such, this option does not provide a timely or deliverable solution for the forecast demand and has not been progressed further. **Utilisation of Existing Substations for demand at HV:** Recent industry discussions have explored the potential for large demand customers to connect directly at 400kV/275kV. However, the applicability of this approach remains uncertain within the current

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
				legislative and regulatory framework, including interpretation of the Electricity Act and associated transmission licence obligations. At the time of this submission, there is no clear precedent or confirmed regulatory position that would support firm demand connections directly at 400kV, and therefore this option cannot be relied upon as a deliverable solution within the required timescales at this current point. Should this position change, it is electrically feasible to connect [redacted] at 400kV in either Cilfynydd or Swansea North via extensions to both sites.
High level options for Development Area 6				
Option E-1: DEV6 – Outdoor AIS substation **Not progressed**	AIS Substation located in Development area 6. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 3 sections & 3 couplers.	Appendix A4	BNG Loss; 203.41 Units - 224.85 units tCO_2: 42k -44.5k • 1200-1600m hedgerow removal • c.1000m streams and ditches removal DEV6 options present unacceptable consenting risk. Surveys confirm that the required substation scale leads to unavoidable habitat loss that cannot be mitigated through reasonable layout refinement, resulting in poor alignment with Welsh planning policy and a high risk of objection or refusal.	**DEV6 options were not taken forward due to fundamental deliverability, environmental constraints & programme.** DEV6 options were not taken forward due to fundamental deliverability constraints. All DEV6 configurations require very large substation footprints which, in the case of Option E-1 & E-3, exceed the developable boundary identified through the siting study, extending beyond the area considered suitable for substation development. All options require 0.5–1.0 million m^3 of cut and fill, equivalent to tens of thousands of heavy plant movements and extended bulk earthworks activity. The figures exclude bulking, which would materially increase loose volumes and temporary storage requirements. When combined with battering constraints, limited space for material management and interaction with deep historic mining, the scale and complexity of earthworks render these options undeliverable from a construction and programme risk perspective. Programme assessments undertaken as part of option development indicated that, depending on configuration and sequencing of remediation and earthworks, delivery forecasts for DEV6 options extended into the late 2030s, materially beyond the contracted and strategic customer requirements and with limited scope for acceleration. The scale and extent of the developments would also give rise to substantial and unavoidable environmental impacts, including significant hedgerow and watercourse loss, leading to poor
Option E-2: DEV6 – GIS substation **Not progressed**	GIS Substation located in Development area 6. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers.	Appendix A4		

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
	An NGET owned 132kV AIS substation consisting of 3 sections & 3 couplers.			alignment with the mitigation hierarchy under Welsh planning policy and a high consenting risk. In addition, DEV6 involves multiple land interests, direct impact on residential properties, and early with landowners suggests a level of resistance, materially increasing the likelihood of compulsory purchase. Taken together, cumulative engineering requirements, environmental, land and programme risks, renders all DEV6 options undeliverable within the required timescales and they have therefore been discounted. **Economic/Consumer value** The estimated cost range is [redacted] (2023/24 prices). This excludes the cost of additional MITS circuits, which would have been required under these options.
Option E-3: DEV6 AIS DBB wrap-around / triple-in-line **Not progressed**	AIS DBB Wrap Around/ Triple inline substation in development area 6. The 400kV site consists of 6 sections, 3 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 4 sections & 3 couplers	Appendix A4		
High level options for Development Area 7				
Option E-4: DEV7 AIS (South-facing 132 kV) **Not progressed**	AIS Substation located in Development area 7. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 3 sections & 3 couplers. Scope includes upgrades to the existing [redacted] road.	Appendix A4	**BNG Loss;** 123.88 Units - 178.5 Units **tCO_2;** 44.2k-44.6k • 1000m – 2200m Hedgerow removal • 950m - 2280m stream and ditch removal. The siting study and Preliminary Ecological Appraisal identify DEV7 as comprising a series of small, tightly bounded agricultural field parcels, defined by dense networks of hedgerows, ditches and	**Options E-4, E-6, E-7 & E-9 were not taken forward due to low delivery confidence and elevated consenting risk arising from the cumulative scale of subsurface intervention required.** Optioneering and micro siting demonstrate that substation configurations of this scale necessitate extensive coal-mining remediation, landfill remediation and major utility diversions (including a low-pressure gas main), none of which can be meaningfully avoided within the constrained DEV7 site envelope with developments of this scale. Although more compact layouts, such as Options E-6 and E-9, offered limited footprint reduction, this did not materially reduce interaction with subsurface hazards or the extent of required ground intervention.

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
Option E-5: DEV7 AIS (South-facing 132 kV) – New access road **Not progressed**	Scope similar to that of Option E-4 but instead of upgrading the B4280, this option would create a new access road roughly 1.3km connecting to the A4061 through the common land. This would require NGET to purchase exchange land.	As Option E-4	watercourses, with limited areas of unconstrained land. For larger substation configurations (Options E-4 to E-9), the scale and geometry of the developments relative to these tight field boundaries significantly restrict opportunities to avoid or microsite away from environmentally sensitive features. Despite layout iteration, the footprint and associated enabling works for options of this scale necessarily extend across multiple field parcels and boundary features, resulting in interaction with hedgerows, drainage ditches and watercourses identified in the PEA as forming part of the local habitat and hydrological network. The constrained parcel pattern, when combined with known subsurface constraints at DEV7 (historic coal mining, areas of recorded landfill and existing utility infrastructure), limits the ability to meaningfully step through avoidance, minimisation and mitigation in sequence. As a result, environmental effects for Options E-4 to E-9 are driven primarily by the inherent scale of development within a tightly constrained field pattern, rather than by layout choice alone, increasing the complexity and sensitivity of the consenting process.	The scale and duration of the required remediation, diversionary works and enabling activities introduce significant construction uncertainty and extended programme risk, with [redacted]. From a consenting perspective, the reliance on widespread ground remediation and diversionary works materially increases land take, construction impacts and environmental effects, limiting the ability to demonstrate an avoidance-led solution and heightening the risk of objection and delay. Variants to Options E-4 and E-7 were explored to reduce intervention associated with the [redacted] however, these were discounted due to additional environmental impacts on non-statutory designated land (SINC) and the requirement for deregistration and exchange of common land. Option E-7, while offering partial relief from certain coal-mining constraints, would still require significant subsurface intervention and introduce further consenting complexity through the need for a Development Consent Order due to overhead line entries exceeding 2 km. Taken together, the cumulative nature of the required subsurface works undermines both delivery confidence and the robustness of the consenting position, rendering Options E-4 to E-9 unsuitable when compared with the shortlisted reduced footprint alternatives. **Economic/Consumer Value** Cost Range [redacted] Note that these costs exclude the additional MITS circuits that would have been required if these options were selected.
Option E-6: DEV7 GIS **Not progressed**	GIS Substation located in Development area 7. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 3 sections & 3 couplers.	Appendix A4		
Option E-7: DEV7 AIS (North-facing 132 kV) **Not progressed**	AIS Substation Located in Development Area 7. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 4 sections & 3 couplers. Scope also includes upgrades to the [redacted]	Appendix A4		**Economic/Consumer value** The estimated cost range is [redacted] This excludes the cost of additional MITS circuits, which would have been required under these options.

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
Option E-8: DEV7 AIS (North-facing 132 kV) – New access road **Not progressed**	AIS Substation Located in Development Area 7. Double Busbar, Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 4 sections, 4 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 4 sections & 3 couplers. Scope also includes a new access road through common land as per Option E-5	As Option E-7		
Option E-9: DEV7 AIS DBB wrap-around / triple-in-line **Not progressed**	AIS DBB Wrap Around/ Triple inline substation in development area 7. The 400kV site consists of 6 sections, 3 bus couplers, Voltage control equipment (Subject to studies), 7 x 400/132kV 460MVA Supergrid Transformers, 2 x 400/275kV 1100MVA Interbus transformers. An NGET owned 132kV AIS substation consisting of 4 sections & 3 couplers	Appendix A4		
Reduced footprint configurations at Development Area 7				
Option E-10: DEV7 AIS configuration (reduced footprint) **Progressed to shortlist**	AIS DBB Substation in Development Area 7. Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 2 sections, 2 bus couplers, 4 x 400/132kV 460MVA Supergrid Transformers. The scope will	Figure 8	**BNG Loss;** Still being established tCO_2; -30.5k	• Designed to accommodate the confirmed strategic demand ([redacted] and Celtic Sea generation requirements. • Represents the most compact configuration in the long-list. • The option materially reduces the scale and complexity of the substation relative to the baseline/long-list AIS configurations, with a simplified arrangement comprising fewer sections, couplers and transformers. This reduced scope translates

Option	Technical Description	Relevant Diagrams or Layout References	Consenting Risks & Environmental Constraints	Rationale for rejecting or taking forward the option
	include 132kV Bays on the LV side of the Supergrid Transformers with NGET owning the 132kV circuit breakers.			directly into a smaller substation footprint, which is a critical consideration at DEV7 given the presence of historic coal mining, landfill risk and subsurface uncertainty. By limiting the size of the required platform, Option E-10 offers greater flexibility to avoid or minimise interaction with subsurface hazards, thereby reducing the extent of remediation and earthworks required. • From a delivery perspective, the reduced footprint and simplified configuration improve programme certainty relative to larger baseline/ long-list options by reducing enabling works, construction duration and associated risk. • While reduced relative to the long-list, the AIS configuration remains larger than the equivalent reduced GIS configuration (Option E-11), resulting in greater interaction with subsurface constraints and increased earthworks and remediation requirements at DEV7.
Option E-11: DEV7 GIS configuration (reduced footprint) **Progressed to shortlist**	GIS DBB Substation in Development Area 7. Double circuit turn in of the Swansea-Cilfynydd 1&3 circuits. The 400kV site consists of 2 sections, 2 bus couplers, 4 x 400/132kV 460MVA Supergrid Transformers. The scope will include 132kV Bays on the LV side of the Supergrid Transformers with NGET owning the 132kV circuit breakers.	Figure 9	**BNG Loss;** Still being established tCO_2: -27.3k	• Represents the most compact and least intrusive configuration capable of meeting the confirmed system requirements. • GIS technology enables a materially reduced substation footprint compared with AIS-based solutions, which is a critical advantage at DEV7. • Deliberately scoped to accommodate only the confirmed strategic demand ([redacted]) and the Celtic Sea generation connection. • From a deliverability perspective, the combination of a reduced footprint and simplified configuration provides the greatest opportunity to accelerate programme relative to larger AIS and GIS options, improving opportunity for alignment with required customer connection timescales.

4.4.1. Shortlisting rationale and influence of stakeholder considerations

The optioneering process for the scheme has been undertaken across two closely related dimensions: siting optioneering (where the infrastructure could be located) and technology optioneering (how the infrastructure could be configured). These two strands are inherently interdependent and have therefore been considered in parallel, with deliverability used as a unifying lens. The physical, consenting and environmental constraints of the site directly influence the feasibility, scale and configuration of viable technology solutions.

The siting optioneering initially assessed a wide range of locations and ultimately identified DEV6 and DEV7 as the only credible sites capable of accommodating the required infrastructure. DEV7 was taken forward as the preferred siting option, reflecting comparatively fewer land interests, improved prospects for land assembly, and greater flexibility to accommodate reduced-footprint substation solutions. However, DEV7 remains a constrained site, with challenges including historic coal mining and landfill risk, subsurface uncertainty, enabling works requirements, and environmental and programme sensitivities.

These siting constraints have had a direct and material influence on the technology optioneering. Larger, future-proofed substation solutions were tested but were found to amplify subsurface, environmental and programme risk, particularly due to the scale of earthworks and remediation required to form large substation platforms. As a result, technology optioneering focused on whether alternative configurations, including AIS versus GIS and compact layouts could better align with the physical realities of the site by reducing footprint, limiting ground disturbance and improving deliverability.

Across both strands, deliverability has been a primary discriminator, with particular emphasis on programme certainty, construction complexity, land acquisition risk, consenting risk and the ability to meet customer connection timescales. Options that were technically feasible in principle were discounted where they were assessed as undeliverable within the required timescales, or where their scale materially increased programme and construction risk.

Stakeholder engagement has been undertaken to inform the development and assessment of options, particularly in relation to deliverability considerations. While stakeholders have not influenced the initial longlisting of options, ongoing engagement is informing the refinement and shortlisting process.

- Engagement with the [redacted] particularly in relation to site access and suitability for construction traffic. This is being considered as part of ongoing feasibility and access planning.
- Engagement with local landowners has informed site feasibility, including confirmation of willingness to enter into land acquisition discussions. This has supported the continued consideration of DEV7 within the shortlisting process.

4.5. Short-list of options considered

4.5.1. Option E-10 –DEV7 AIS configuration (reduced footprint, 400/132 kV substation with demand connected at the 132 kV transformer low-voltage side)

Option E-10 represents a reduced scope transmission solution at DEV7, intended to accommodate contracted demand from [redacted] and anticipated Celtic Sea generation connection. The configuration reflects the rationalised system requirements and delivers a reduced footprint relative to the long-list configurations, aligned to the constrained nature of the DEV7 site.

Technically, Option E-10 comprises a 400/132 kV transmission substation with a 400 kV double-busbar arrangement with a double-circuit turn-in of the Swansea–Cilfynydd 1 and 3 circuits, providing an operable configuration consistent with regional transmission design practice. The 400 kV switchyard is arranged in two sections with two bus couplers and includes:

- two 400kV bays reserved for Celtic Sea connections;
- four feeder bays;
- four supergrid transformer (SGT) bays; and
- four future bays, two of which are configured as back-to-back bays with the bus couplers.

The design includes four 400/132 kV, 460 MVA supergrid transformers, which together provide the point of connection for [redacted] four demand circuits at the 132 kV low-voltage side. There is no standalone 132 kV substation; instead, demand is connected directly at the LV side of the transformers, with NGET owning the associated LV circuit breakers. Voltage control equipment is included within the baseline configuration to support compliant system operability.

The solution remains under development through FEED and the layout presented should be considered indicative. While the AIS configuration is smaller than the baseline AIS options, current assessments indicate that the overall footprint remains significant within the constrained DEV7 site.

Optioneering and micrositing undertaken to date confirm that, irrespective of orientation, an AIS-based solution of this scale cannot fully avoid subsurface constraints at DEV7. Residual interaction with historic landfill and coal-mining features is unavoidable, either through direct overlap or via enabling works and platform formation. While the reduced scope limits the extent of remediation when compared with larger baseline AIS options in the long-list, the footprint still remains too large to deliver a wholly avoidance-led outcome in ground-risk terms.

As such, Option E-10 offers programme and constructability benefits relative to larger AIS configurations but continues to carry geotechnical and remediation risk arising from unavoidable interaction with landfill and historic mining across the site.

4.5.2. Option E-11 –DEV7 GIS configuration (reduced footprint, 400/132 kV SF_6-free GIS substation with demand connected at the 132 kV transformer low-voltage side)

Option E-11 represents the GIS equivalent of the shortlisted configuration at DEV7. It is intended to meet the same contracted 2031 strategic demand requirements and anticipated Celtic Sea generation as Option E-10, while utilising SF_6-free GIS technology to further reduce the scale of the development further and reduce construction programme risk within the constrained DEV 7 site.

From a technical perspective, Option 11 adopts a largely equivalent configuration to Option E-10, with the primary difference being the use of SF6-free GIS plant in place of AIS. The solution comprises a 400/132 kV transmission substation with a 400 kV double-busbar arrangement with a double-circuit turn-in of the Swansea–Cilfynydd 1 and 3 circuits, delivering the same system capability, operability and resilience as Option E-10.

The GIS substation is arranged in two main sections with bus couplers and incorporates:

- two 400kV bays reserved for Celtic Sea generation connections;
- four feeder bays;
- four supergrid transformer (SGT) bays; and
- four future bays, provided within the initial hall layout and suitable for either future generation connections or additional transmission circuits.

The design includes four 400/132 kV, 460 MVA supergrid transformers, providing transformation from 400 kV to 132 kV. There is no standalone 132 kV substation; instead, [redacted] connect via four demand circuits at the 132 kV low-voltage side of the supergrid transformers, with NGET owning the associated LV circuit breakers.

The GIS Hall will be sized to allow for up to one additional future 400kV section, to facilitate for future expansion. Voltage control equipment is included within the base design to support compliant system operation.

The solution also remains under development through FEED and the layout presented should be considered indicative. However, evidence from desktop optioneering, micrositing and preliminary ground-risk assessments indicates that the configuration delivers the smallest substation platform

of all DEV7 options. Current layouts indicate that the substation platform itself can be sited to wholly avoid the historic landfill and to largely avoid areas of historic coal mining, materially reducing remediation requirements relative to AIS configuration in Option E-10.

While the access arrangement remains under development and is anticipated to traverse areas affected by historic coal workings, this interaction is currently considered manageable through conventional mitigation measures, including piled foundation solutions, subject to confirmation through intrusive ground investigation and detailed design.

By minimising land take, ground disturbance and dependence on extensive remediation, the GIS configuration provides the strongest basis for an avoidance-led approach to subsurface risk, improved programme resilience, and reduced consenting exposure.

4.6. Qualitative Assessment of Shortlisted Options

This assessment is based on current evidence and remains subject to refinement as further surveys, design development and optioneering activities are completed.

	Optioneering Categories				
Option	**Engineering**	**Environmental**	**Deliverability**	**Economic/Consumer Value**	**Consenting /Stakeholder**
Option E-10: 400/132 kV AIS substation with demand connected at the 132 kV transformer LV side (reduced footprint)	• Can fully meets network requirements for a new South Wales West Connection Node, supporting large scale strategic demand & generation. • Double-busbar 400 kV AIS design with double-circuit OHL turn-ins; compliant with NGTS & SQSS requirements for fault level, voltage stability and system operability. • Larger platform requiring ~250 k m³ cut; footprint constrained by site. • Future extendibility limited to the East only. • Net increase of 3 new OHL towers (4 constructed, 1 removed). • Likely to require a temporary diversion prior to construction.	• Unavoidable interaction with historic landfill, creating long-term ownership and management liabilities. • C.600m hedgerow removal and removal of a pond. • Environmental effects driven by footprint scale rather than layout inefficiency, limiting scope for avoidance within the Welsh mitigation hierarchy.	[redacted] • Delivery is dependent on access via the [redacted] • Offers the latest in-service date across the 2 shortlisted options. • Presents higher construction and programme risk due to the scale of earthworks and unavoidable interaction with historic landfill and coal mining, resulting in complex sequencing, remediation uncertainty and increased exposure to delay. • May require diversion of a low - pressure gas main. Programme outlook: The indicative worst-case ACL date is [redacted] reflecting the above constraints and representing a delay to the contracted [redacted] Opportunities for programme reduction are limited to up to one year, contingent on the [redacted] upgrade being delivered sequentially alongside development and early detailed design activities, resulting in a best-case ACL date of [redacted]	• [redacted] driven by a larger and more elongated substation footprint, requiring extensive coal-mining and landfill remediation, additional earthworks, landscaping and mitigation, and the inclusion of short cable sections to avoid overhead-line duck-under constraints. • Higher cost risk due to increased earthworks and ground-mitigation requirements, greater exposure to subsurface uncertainty, and more complex construction and environmental mitigation activities.	<u>Stakeholder</u> • Two land interests across 3 parcels of land. • Close proximity to 1 residential property that would not be in scope of acquisition. <u>Consenting</u> • Larger above-ground presence increases perceived scale near receptors, elevating amenity and objection risk • Larger footprint, but open-air AIS arrangement is visually permeable and can reduce long-range visual mass compared to enclosed GIS structures

	Optioneering Categories				
Option	**Engineering**	**Environmental**	**Deliverability**	**Economic/Consumer Value**	**Consenting /Stakeholder**
	Benefit	Neutral	Detractor	Neutral	Neutral
Option E-11: 400/132 kV Sf6-free GIS substation with demand connected at the 132 kV transformer LV side (reduced footprint)	• Can fully meets network requirements for a new South Wales West Connection Node, supporting large scale demand & generation connections. • Double-busbar 400 kV GIS design with double-circuit OHL turn-ins; compliant with NGTS & SQSS requirements for fault level, voltage stability and system operability. • Future extendibility to the west for generation or other circuits and extendable to the east for both generation and demand. • Net increase of 3 new towers (5 constructed, 2 removed). • Compact layout requiring ~70 k m³ cut, materially reducing platform scale. • Likely to require a temporary diversion prior to construction	• SF-6 free GIS • C.300m hedgerow removal • Lower risk of interference with the area identified as landfill • Compact footprint enables greater avoidance and minimisation of habitat loss, supporting stronger alignment with planning policy	[redacted] • Offers the earliest in-service date of the two shortlisted options. • Construction risk remains due to ground conditions; however, the reduced GIS footprint limits the extent of earthworks and subsurface interaction, resulting in a lower relative construction and programme risk compared to the AIS-based Option E-10 • Substation delivery remains reliant on access via [redacted], consistent with Option E-10. Programme outlook: The indicative worst-case ACL date is [redacted] reflecting the residual ground-related risks described above. Opportunities for programme reduction are more than for Option E-10, reflecting greater flexibility to deliver the [redacted] access upgrades earlier and the ability to absorb the assumed 6-month remediation duration within the wider civils programme. This supports a best-case ACL date of [redacted] subject to confirmation through ground investigations, providing an opportunity to absorb the 6 months allocated into the wider civils	[redacted] • Acquisition of the landfill not required so no ongoing liability. • Lower expected risk-adjusted cost to consumers due to reduced enabling works and improved delivery certainty. • Offers the earliest in service date for strategic demand [redacted]	<u>Stakeholder</u> • Two land interests across two parcels • Unlike Option E-10, the reduced GIS footprint allows greater flexibility to avoid proximity to the nearby residential receptor outside of acquisition scope. <u>Consenting</u> • Smaller GIS footprint reduces perceived scale and improves flexibility to mitigate visual and residential impacts.

	Optioneering Categories				
Option	Engineering	Environmental	Deliverability	Economic/Consumer Value	Consenting /Stakeholder
			programme resulting in a best case ACL of [redacted]		
	Benefit	Neutral	Neutral	Benefit	Benefit

4.6.1. Conclusion from detailed qualitative assessment

The DEV7 area has emerged as the most deliverable location following comparative assessment to date, with initial analysis indicating that minimising substation footprint is critical due to the coal mining legacy, subsurface uncertainty and constrained site geometry. Larger configurations materially increase delivery risk and are therefore less suitable at this location.

On this basis, the shortlisted configurations at DEV7 (Options E-10 and E-11) represent the most credible options to deliver the required system outputs within acceptable programme, cost and consenting risk. Both configurations deliver a reduced footprint relative to the long-list options

A key outcome of the shortlisted approach is that it enables the additional [redacted] drivers aggregated at Bridgend (See Chapter 3.1) to be more appropriately accommodated at the triggered South Wales West Connection Node D (Swansea area).

This re-allocation reduces scope, cost and delivery risk at Bridgend while also avoiding the need for extensive long-distance transmission connections between Swansea and Bridgend. Such connections would significantly increase cable length, construction complexity, cost exposure and could undermine the economic viability of the associated customer developments.

Importantly, this additional demand requirement does not fall away. It is instead re-localised to a node that is electrically and geographically closer to the respective demand centre drivers (Swansea), resulting in a more efficient and proportionate network outcome in the best interest of consumers.

At this stage of optioneering, Option E-11 is emerging as the preferred direction of travel, offering a smaller footprint, lower indicative cost and the earliest achievable ACL date. Options E-10 and E-11 are being progressed through FEED, with Option E-10 retained as a credible alternative.

It should be noted that this work remains ongoing, and the outcomes presented here reflect the current best understanding of siting, design constraints and stakeholder inputs. Further refinement will take place as ground investigations, environmental surveys, highways engagement and design maturation progress.

Consideration of alternative Celtic Sea Connection outcomes on Bridgend Scope

NGET has considered how the specification of Bridgend / South Wales West Connection Node B might differ if anticipated Celtic Sea floating offshore wind generation were instead accommodated at an alternative connection point through future system planning decisions. In this scenario, the enduring scope at Bridgend would continue to be driven by contracted demand, and NGET would consider whether to

(i) remove the two Celtic Sea 400 kV bays from the initial scope while retaining appropriate future-proofing provision, or

(ii) (ii) retain the bay space within the initial design as additional spare 400 kV capacity for future use.

For Option E-10, removal of the two Celtic Sea generation bays may offer a limited reduction in overall substation footprint, estimated at approximately 50 m, subject to detailed design confirmation. However, it is not anticipated at this stage that such a reduction would be sufficient to avoid the underlying site constraints at DEV7.

For Option E-11, the substation footprint is primarily driven by the supergrid transformers and removal of the Celtic Sea bays is not expected to materially reduce overall footprint.

If Celtic Sea generation does not materialise at Bridgend, NGET would reassess specification decisions more broadly to ensure the solution remains appropriate, proportionate and in the best interests of consumers.

4.6.2. PASE Compliance

The preferred solution has not yet been formally selected. However, the emerging direction of travel indicates that Option E-11 is favoured based on the qualitative assessment undertaken to date.

Should this position be confirmed as siting study elements are finalised and the solution taken forward as the final scheme, it would be progressed as a Non-PASE solution.

4.6.3. Has future proofing been considered in the proposed Investment?

Future proofing has been considered throughout the optioneering process to date to ensure that either shortlisted options can respond to credible future system drivers without committing to unnecessary upfront scope, cost or environmental impact.

For Options E-10 and E-11, future proofing can be achieved through a combination of designed electrical flexibility and planned physical extendibility, rather than by over-sizing the initial substation platform or transformer capacity.

Both Options E-10 and E-11 are designed to include 4 spare bays at 400 kV, providing the ability to accommodate future connections such as additional generation, future MITS circuits or voltage control equipment network reconfiguration without requiring wholesale substation reconstruction. The Option E-10 arrangements also allow for additional back-to-back bays to be introduced adjacent to the bus couplers, increasing the available spare bay count if required. 13kV Shunt Reactors are included within the base design, ensuring operational flexibility as system conditions evolve.

Both options anticipate future physical extension within the defined and constrained DEV7 site envelope. As part of the initial scheme, it is proposed that sufficient earthworks would be undertaken to establish a suitable substation platform and limited prepared areas within the overall site boundary, should future expansion be required and any necessary remediation completed to enable a future extension of the substation, should it be required. For the arrangements, this is expected to provide sufficient prepared space for:

- a future additional 400kV section; and
- the installation of two additional supergrid transformers, enabling an increase in demand or generation capacity beyond the initial [redacted].

The mechanism for enabling this future provision differs between the shortlisted options.

For the Option E-10 AIS solution, future physical extension is effectively constrained to the eastern side of the site, reflecting the proximity of Common Land to the west. As such, while additional demand-led reinforcement could be accommodated to the east, further western expansion would be materially constrained.

By contrast, the Option E-11 GIS solution provides greater spatial flexibility. The compact GIS arrangement allows future extension to the east to accommodate additional demand, and to either the east or west to accommodate future generation connections, without materially increasing land take or re-opening constrained ground. This flexibility is enabled primarily through the up-front sizing of the GIS hall and internal configuration, rather than reliance on additional external platform formation. This does not imply additional land acquisition or relaxation of site constraints.

At this stage, Option E-10 is assumed at a 4 kA continuous rating and Option E-11 at 5 kA, reflecting current type-registered equipment availability. Should AIS be selected as the preferred option, a further assessment would be undertaken to confirm whether a 4 kA or 5 kA rating is appropriate, informed by detailed system studies and equipment availability.

Overall, Options E-10 and E-11 provide a balanced and proportionate future-proofing strategy: enabling credible future expansion through pre-planned bays, land and remediation, whilst minimizing the cost, risk and environmental harm associated with over-building capacity that is not yet required. An approach aligned with whole-system efficiency and consumer value.

It is recognised that the ability to continue extending the site is inherently constrained, and that further expansion beyond the currently envisaged scope would require material additional intervention, including interaction with historic coal mining, disturbance of landfill, and/or the acquisition of Common Land. Such interventions would introduce significant environmental, consenting and programme risk

4.7. Quantitative analysis of shortlisted Options

4.7.1. Cost estimates

In assessing the emerging shortlisted options to delivering a new node at Bridgend, indicative cost estimates have been developed for the shortlisted (Options E-10 and E-11) to enable an initial quantitative comparison. These estimates are proportionate to the current level of option definition and are intended to support relative assessment only. As such, any cost differential between the options remains indicative and is subject to confirmation through more detailed cost development, appraisal and refinement as design maturity increases.

All capex costs are based on NGET's latest Cost Book (2023/24 prices). Estimating Unit Lines (EULs), comprising typical assets and services aligned to the outline scope of works for each option, have been applied to generate the cost estimates. These EULs draw on historic project cost data, supplemented by market insight, and are suitable for comparative assessment at this stage. The estimates do not reflect option-specific site conditions, detailed consenting requirements or ground condition risks, which will be considered as the project develops.

Contingency of [redacted] has been applied consistently across all shortlisted options to reflect project risk and unforeseen circumstances.

Table 9: Early Cost Estimates for Shortlisted Options

Options	OHL (£m)	Cables (£m)	Substation (£m)	Total (exc. risk) (£m)	Biodiversity 5%	Total (incl. 13.8% risk) (£m)
Option E-10 (AIS)	7.8	4.6	261.2	273.5	13.7	326.8
Option E-11 (GIS)	5.5	-	255.4	261.0	13.0	311.8

4.7.2. Cost drivers

The primary cost drivers for Options E-10 (AIS) and E-11 (GIS) relate to ground conditions, access requirements and landscape mitigation.

- Coal mining and landfill remediation costs are materially higher for the Option E-10, reflecting its larger and more elongated footprint and the resulting greater extent of ground treatment and earthworks required to form a compliant substation platform. By contrast, Option E-11 benefits from a more compact layout, which materially reduces exposure to subsurface constraints and limits the scale and complexity of remediation and earthworks.
- Access-related costs, including upgrades to the [redacted] are common to both options and are driven by shared construction traffic and abnormal indivisible load requirements. However, the Option E-10 also requires the inclusion of short cable sections and associated equipment to avoid overhead-line duck-under constraints, which are not required for the Option E-11 configuration. The need for this additional cabling and associated civil and electrical works introduces an [redacted] whereas the Option-E11 can achieve the required network crossings without cables, further reinforcing its relative cost and deliverability advantage.
- Landscaping and screening costs are also higher for the Option E-10 option, reflecting the larger site extent and greater visual and environmental footprint. The reduced spatial footprint of the GIS solution enables lower landscape mitigation requirements and improved flexibility to minimise environmental impacts through layout and micrositing.

Table 10: Indicative Cost drivers

Item	Option E-10 (£m, 23/24 price base)	Option E-11 (£m, 23/24 price base)

Coal Mining and Landfill	36.67	16.29
B4280 Upgrades	3.6	3.6
Landscaping & Screening	6.8	3.2

4.8. Cost-Benefit Analysis

A full Cost Benefit Analysis (CBA) is not presented at this stage, as it remains under active development and subject to further refinement. However, initial indicative analysis undertaken to date suggests both options at DEV 7 are expected to deliver positive net benefits, with broadly comparable NPVs, reflecting earlier delivery and a reduction in delivery and system risk relative to alternative approaches. At this early stage, Option E-11 shows a marginally higher NPV than Option E-10, although the difference is not considered material and should not be interpreted as a confirmed preference. This preliminary position is indicative only and will be tested and confirmed through the full CBA at the next stage of the Load Reopener process.

Table 11: Early Cost Benefit Analysis (CBA)

Option	NPV
Option E-10	(356.52)
Option E-11	(342.10)

4.9. Project Benefits

Although a preferred option has not yet been formally selected, the emerging solutions under consideration are expected to deliver the following key benefits, subject to final option selection and confirmation through subsequent stages.

- **Strategic demand capability:**

  The project will enable the connection of up to [redacted] of nationally significant strategic demand for [redacted] at Bridgend, supporting AI-led digital infrastructure, inward investment and UK Government growth objectives.

- **Strategic generation capability:**

  The investment will provide a new 400 kV transmission interface capable of accommodating up to ~1.5 GW of Celtic Sea floating offshore wind, supporting UK clean power, net-zero and energy security objectives.

- **Efficient and proportionate delivery:**

  Adoption of a minimal footprint reduces delivery and cost risk by limiting scope, land take and construction complexity to what is required to meet confirmed strategic demand and offshore generation requirements. This avoids over-sizing at Bridgend, improves programme certainty and reduces exposure to ground, consenting and affordability risk. Any additional demand beyond these strategic requirements is more appropriately addressed at an alternative connection node.

- **Socio-economic and regional benefits:**

  Investment in new transmission infrastructure at Bridgend strengthens South Wales as a location for strategic industry, supporting regeneration of post-industrial land, long-term employment opportunities and skills development, and delivering wider regional economic benefits.

5. Project Delivery

5.1. Indicative Delivery Programme

Indicative delivery assessment has been undertaken to understand the achievable ACLs for Bridgend, recognising the early stage of solution development and the absence of a confirmed preferred option at this point.

The indicative ACL positions presented are not firm commitments and reflect high-level programme assessment only. They are intended to illustrate relative and indicative delivery performance between shortlisted optioneering options, rather than define a confirmed customer delivery date. ACLs are subject to refinement as the project development progresses.

The milestone dates shown reflect a prudent, critical-path delivery position. Subject to confirmation through ongoing investigations and detailed design, there may be opportunity to accelerate the programme by approximately 18 months if the [redacted] access works can be delivered concurrently and coal-mining risk can be managed through the use of piled foundations.

Table 12: Key Milestone

(Indicative)Milestone	Dates (Option E-10)	Dates (Option E-11)
Gate B	June 2026	June 2026
Gate C	January 2028	January 2028
Tender Launch	Jan 2027	January 2027
Contract Award	October 2027	October 2027
First Site Access	October 2029	October 2029
First ACL	June 2035	March 2034
All works complete	October 2035	August 2034

Programme differentiation between Option E-10 (AIS) and Option E-11 (GIS)

The programme difference between the two shortlisted options is driven primarily by the scale and nature of ground remediation and the resulting critical path dependencies. Refer to Appendix A6 for indicative programmes for each option.

Option E-10

Option E-10 retains a relatively large and elongated footprint, resulting in unavoidable interaction with historic landfill and coal mining across the substation platform. This drives the need for more extensive and onerous remediation, which the current programme assumes must be undertaken largely sequentially ahead of permanent works. As a result, remediation sits on the critical path, limits opportunities for overlap with construction activities, and reduces programme flexibility, leading to a later achievable in-service date and higher programme risk.

Option E-11

Option E-11 benefits from a materially reduced and more compact footprint, which desktop optioneering indicates can avoid the historic landfill entirely and confine coal-mining remediation largely to discrete areas, primarily associated with access. This significantly reduces the scale and duration of remediation assumed within the programme. While the baseline programme remains conservative, the reduced spatial overlap between remediation and permanent works introduces greater opportunity for concurrent activities, providing a shorter critical path and a more resilient and optimisable programme. This underpins an earlier in-service date relative to the AIS option.

Summary

Both options are currently programmed on a prudent, largely sequential basis. However, Option E-11 offers a structurally stronger programme position, with fewer hard dependencies on extensive remediation and clearer opportunity for concurrency as design matures. This provides greater confidence in delivery against strategic customer timescales, subject to confirmation through FEED and detailed sequencing.

5.2. Procurement and Contracting Strategy

[redacted]

5.3. Delivery risks

Table 13: Delivery Risk

Risk	Mitigation
Access – The [redacted] in the Local Highways view is unsuitable for AIL. Meaning without intervention, NGET may not be able to deliver and instal transformers to the site.	Non-intrusive and intrusive surveys to be carried out at the earliest opportunity along with a detailed structural assessment of as build information and future requirements. If intervention is required, utilisation of a [redacted] to upgrade the road.
Geotechnical and Geoenvironmental – Risk that either the coal mining or landfill is materially worse or more contaminated than desktop assessments suggest.	Establish scope of GI early and ensure that sufficient data is captured so that risk and extents of the developments are fed into design stages early focusing on avoidance. Engagement with the [redacted] Scope any Remediation works early.

Ecology – Risk that ecology is materially worse than first anticipated.	Ensure comprehensive set of surveys are complete across multiple seasons.
[redacted]	Continue to engage positively with the PIL's Agree Land Option once option is selected.
[redacted]	[redacted]

6. Proposed working arrangements

6.1. Details of proposed working arrangements between TO's

No proposed working arrangements between NGET & other TO's

6.2. Details of proposed working arrangements between DNO's

NGET has undertaken early, non-binding engagement with National Grid Electricity Distribution (NGED) to support alignment between transmission and distribution planning in South Wales. This has included exploratory discussions around potential future industrial demand and alternative connection pathways.

[redacted]

These discussions have informed the future-proofing approach for the Bridgend scheme. Options E-10 and E-11 been developed on the basis that sufficient land could be acquired and remediated to enable proportionate future extension, including the potential installation of two additional supergrid transformers, should credible future demand materialise.

Any such arrangements would be progressed through formal connection applications and governance, and the position will be reviewed and confirmed at the next stage of the funding request, when discussions with NGED and potential customers are expected to have further matured. There are no joint delivery dependencies that affect the scope, timing or eligibility of the proposed investment at this stage.

7. Conclusion

This eligibility letter submission sets out the case for investment to deliver a new South Wales transmission node in Bridgend and seeks Ofgem's confirmation of eligibility under Special Condition 3.18, approval of Pre-Construction Funding (PCF) under Special Condition 3.15, confirmation Track 3 EL is the appropriate Load Re-opener assessment track, and Ofgem's early views on the needs case and emerging direction of travel.

The proposed investment is primarily driven by contracted strategic demand [redacted] The [redacted] connection timescale for [redacted] is driven by the customer's requirements and supported by UK Government departments as part of the delivery of nationally significant strategic demand.

The investment has also been developed taking account of NESO system planning outcomes that inform coordinated network design to accommodate anticipated offshore wind generation, including Celtic Sea floating offshore wind, in the mid-2030s timeframe. In combination, these requirements necessitate the establishment of a new 400 kV transmission connection node in South Wales West.

Optioneering and siting assessment undertaken to date have identified DEV7 in the Bridgend area as the most deliverable location for the new node. Subsequent assessment demonstrate that the reduced configurations represent the most proportionate response to the project delivery requirements, minimising construction and programme risk, reflecting the constrained site conditions at DEV7.

A preferred solution has not yet been formally selected; however, the emerging direction of travel indicates that Option E-11, a reduced footprint 400/132 kV SF_6-free GIS substation with demand connected at the 132 kV transformer low voltage side at DEV7 is likely to provide the most balanced outcome in terms of deliverability, programme certainty and consumer value. This position is subject to confirmation, as optioneering concludes and siting elements are finalised, ahead of a subsequent submission as part of the Load Reopener process.

Appendix

A2 System Design Table

Table 14: System Design Table

System Design Table	Circuit/Project	Option E-1, E-2, E-4, E-6 & E-7 – Double Busbar	Option E-3 & E-9 – Tripple in Line/ Double Bus Wrap Around	Option E-10 & E-11
Thermal and Fault Design	Existing Voltage (if applicable)	N/A	N/A	N/A
	New Voltage	400kV	400kV	400kV
	Existing Continuous Rating (if applicable)	N/A	N/A	N/A
	New Continuous Rating	5000A Continuous	4000A Continuous	For Option E-10 (AIS, 4 kA) and Option E-11 (GIS, 5 kA)
	Existing Fault Rating (if applicable)	N/A	N/A	N/A
	New Fault Rating	63kA for 1sec		63kA for 1sec
ESO Dispatchable Services	Existing MVAr Rating (if applicable)	N/A	N/A	N/A
	New MVAr Rating (if applicable)	Celtic Sea Offshore Wind Farm: +/- 734 MVAr (0.9 lead and lag) Galileo Energy storage: +/- 0 MVAr (1.0 PF) IPC Energy storage: +/- 164 MVAr (0.95 lead and lag)		Celtic Sea Offshore Wind Farm: +/- 734 MVAr (0.9 lead and lag)
	Existing GVA Rating (if applicable)	N/A		N/A
	New GVA Rating	N/A		N/A
System Requirements	Present Demand (if applicable)	N/A	N/A	N/A
	2050 Future Demand	4*460MVA SGTs (Stage 1) & 3*460MVA SGTs (Stage 2) to supply: 860 MW Vantage Data Centre. (Stage 1) 600MW COED Darcy Land DC1 & DC2 Data Centre. (Stage 2) 500MW Aurora Utilities Data entre. (Stage 2)		Galileo Energy storage: 200MW IPC Energy storage: 500MW 4*460MVA SGTs to supply 860 MW Vantage Data Centre.

System Design Table	Circuit/Project	Option E-1, E-2, E-4, E-6 & E-7 – Double Busbar	Option E-3 & E-9 – Tripple in Line/ Double Bus Wrap Around	Option E-10 & E-11
				Meanwhile, there are 2 customers interested in connecting to South Wales West Connection Node B, however this option cannot accommodate them all, therefore another substation is needed: 600MW COED Darcy Land DC1 & DC2 Data Centre. 500MW Aurora Utilities Data Centre.

	Present Generation (if applicable)	N/A	N/A	N/A
	Future Generation Count	Celtic Sea Offshore Wind Farm: 1500MW Galileo Energy storage: 200MW IPC Energy storage: 500MW		Celtic Sea Offshore Wind Farm: 1500MW Galileo Energy storage: 200MW IPC Energy storage: 500MW
	Future Generation Capacity	2800MW Remaining		2800MW Remaining
Initial Design Considerations	Limiting Factor	Category 5 5000 MW security limit		Category 5 5000 MW security limit
	AIS/ GIS	AIS	AIS	Option E-10 – AIS & Option E-11 – GIS
	Busbar Design	Double Busbar (Stage 1) Double Busbar Extension (Stage 2)	Triple In Line/Double Busbar wrap around (Stage 1) Triple In Line/Double Busbar wrap around Extension (Stage 2)	Double Busbar (reduced footprint approach)
	Cable/ OHL/ Mixed	OHL Double turn-in (Stage 1) MITS Circuit turn-in (stage 2)	OHL Double turn-in (Stage 1) MITS Circuit turn-in (stage 2)	OHL Double turn-in
	SI Strategic Investment	South Wales West Connection Node B was initially considered as a landing point for AC6. This was subsequently replaced by WCDC5. Network Development suggested that there is not a clear driver to reinforce B8 & B9 with WCDC5 so hasn't been submitted as an option for tCSNP2 refresh. It is considered as an alternative option for WCDC4 however this is still not looking likely. Due to uncertainty, it is assumed that this could be accommodated in one of the 'spare bays'		South Wales West Connection Node B was initially considered as a landing point for AC6. This was subsequently replaced by WCDC5. Network Development suggested that there is not a clear driver to reinforce B8 & B9 with WCDC5 so hasn't been submitted as an option for tCSNP2 refresh. It is considered as an alternative option for WCDC4 however this is still not looking likely. Due to uncertainty, it is assumed that this could be accommodated in one of the 'spare bays'

A3. NGET position on Common Land

Common land in Wales presents a significant consenting and programme risk for nationally significant electricity transmission projects where it is required to be compulsorily acquired outside the Planning Act 2008 regime.

Where a Compulsory Purchase Order includes common land, the Acquisition of Land Act 1981 requires the acquiring authority to either secure a specific certificate from the Welsh Ministers or proceed through Special Senedd Procedure, unless narrow statutory exceptions apply. Special Senedd Procedure is particularly onerous and common land is protected. NGET have an environmental duty and compulsory acquisition of common land has the potential to introduce multi-year delays to project delivery and consenting uncertainty, creating a material risk to strategic customer connection dates.

The statutory exceptions to avoid Special Senedd Procedure are limited and highly constrained. They require either the provision of suitable and proximate exchange land of equal advantage, land take below a very de-minimis threshold, or acquisition for the purposes of preservation or improved management of the land. In practice, identifying suitable exchange land that meets Welsh Government guidance and public interest tests is often challenging, and where required, certificate applications and any associated inquiry processes carry inherent uncertainty and delay risk.

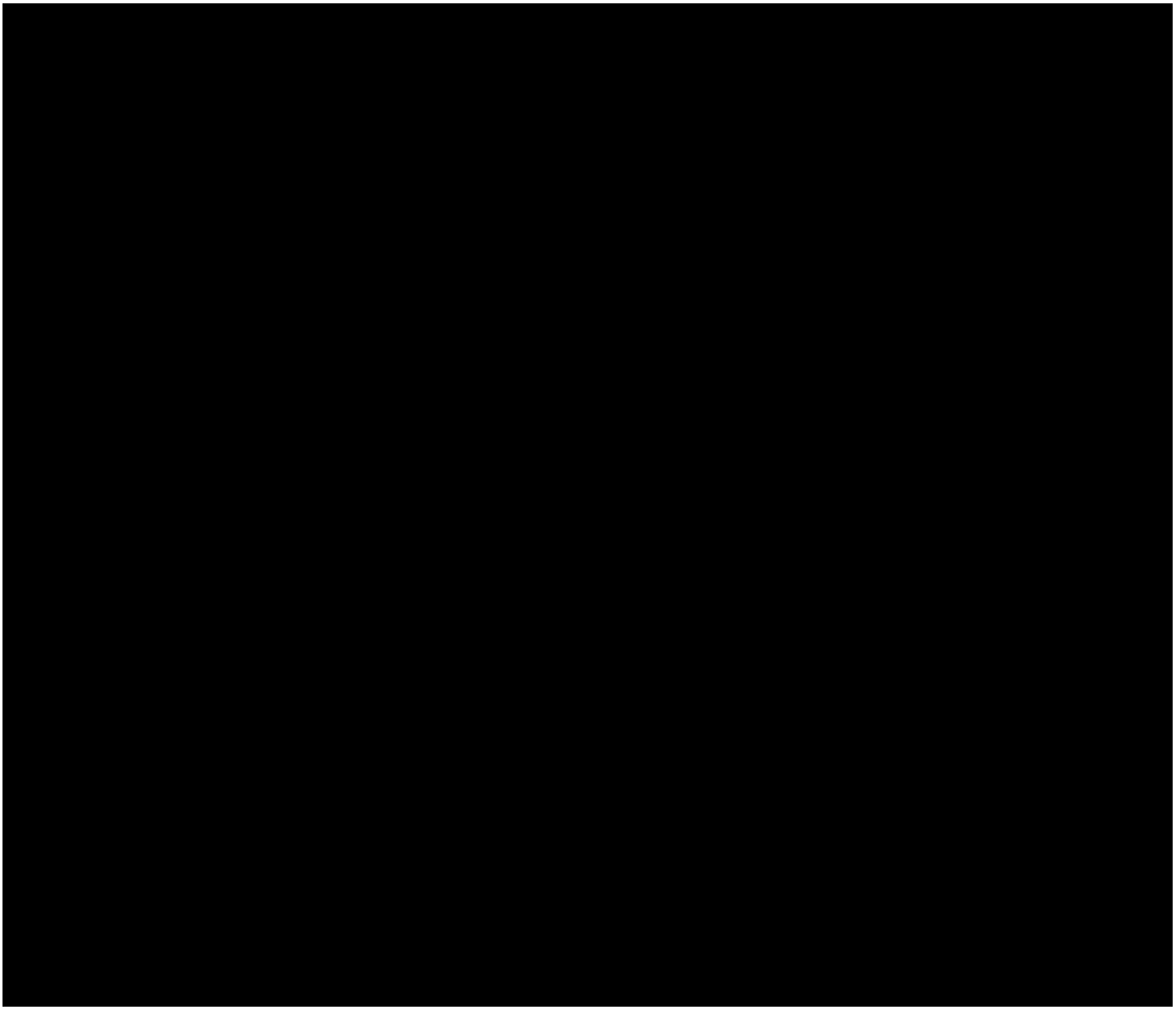
In addition, deregistration of common land under the Commons Act 2006 is generally not always achievable, where NGET does not already control both the release land and the replacement land, further constraining delivery options.

Given these requirements, NGET's position is to assess the risk, harm and mitigation considering our environmental licence duties and deregistration requirements to the common land wherever reasonably practicable, particularly for projects driven by firm customer demand and defined delivery milestones. Limiting the amount of development in common land (which has statutory protection) reduces harm and consenting complexity, limits exposure to Special Senedd Procedure, and provides greater confidence in programme certainty and deliverability.

Where interaction with common land cannot be avoided, this would need to be identified at the earliest possible stage, with parallel consideration of certification requirements and programme impacts. However, such scenarios are recognised as high risk and materially less attractive than non-common-land alternatives.

A4. SLDs and Layout Diagrams of Longlist Options

See supporting information document ‘Appendix A4 – Bridgend SLDs and Layout Drawings’ for the full suite of SLDs and Layout Drawings.



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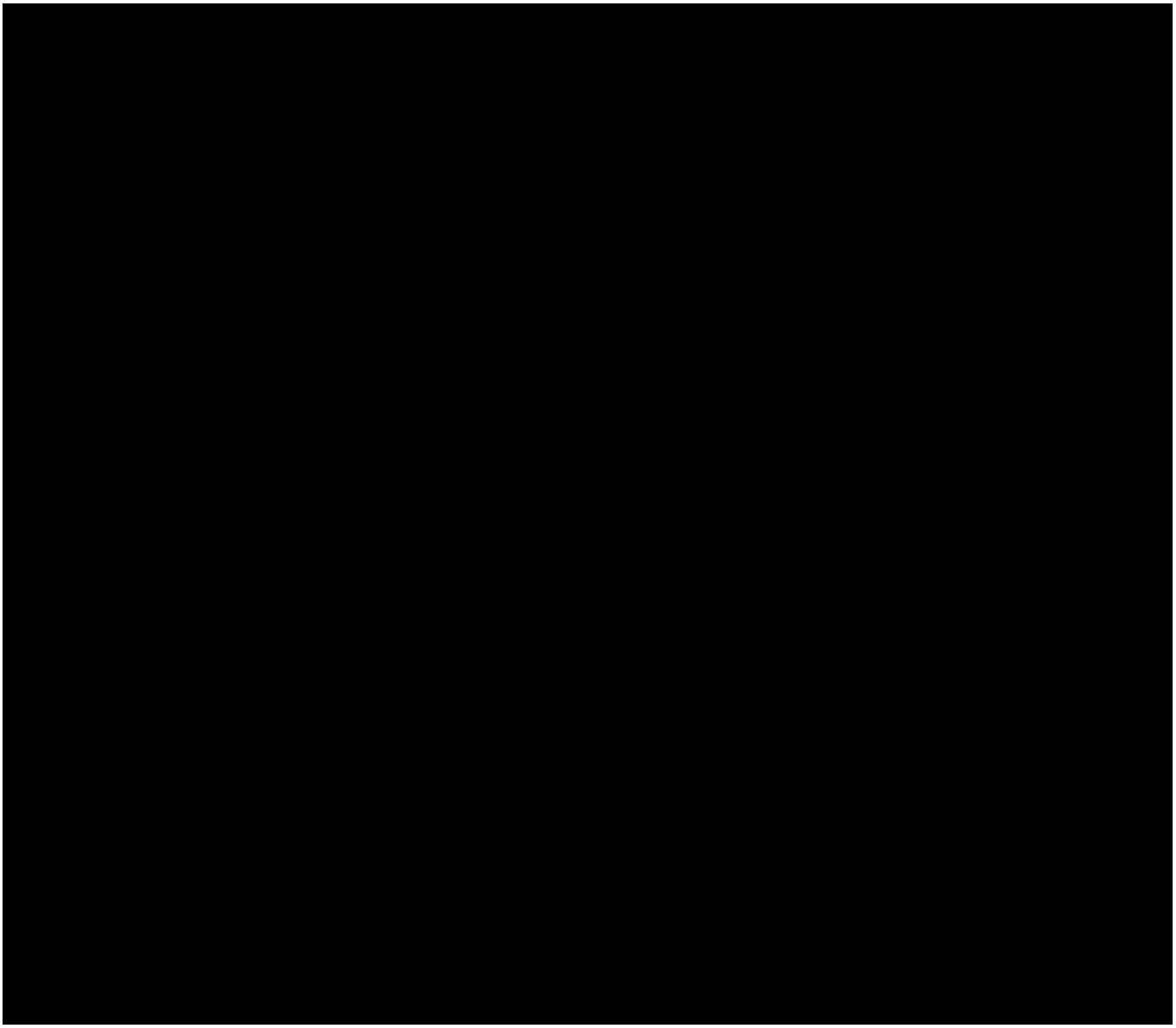
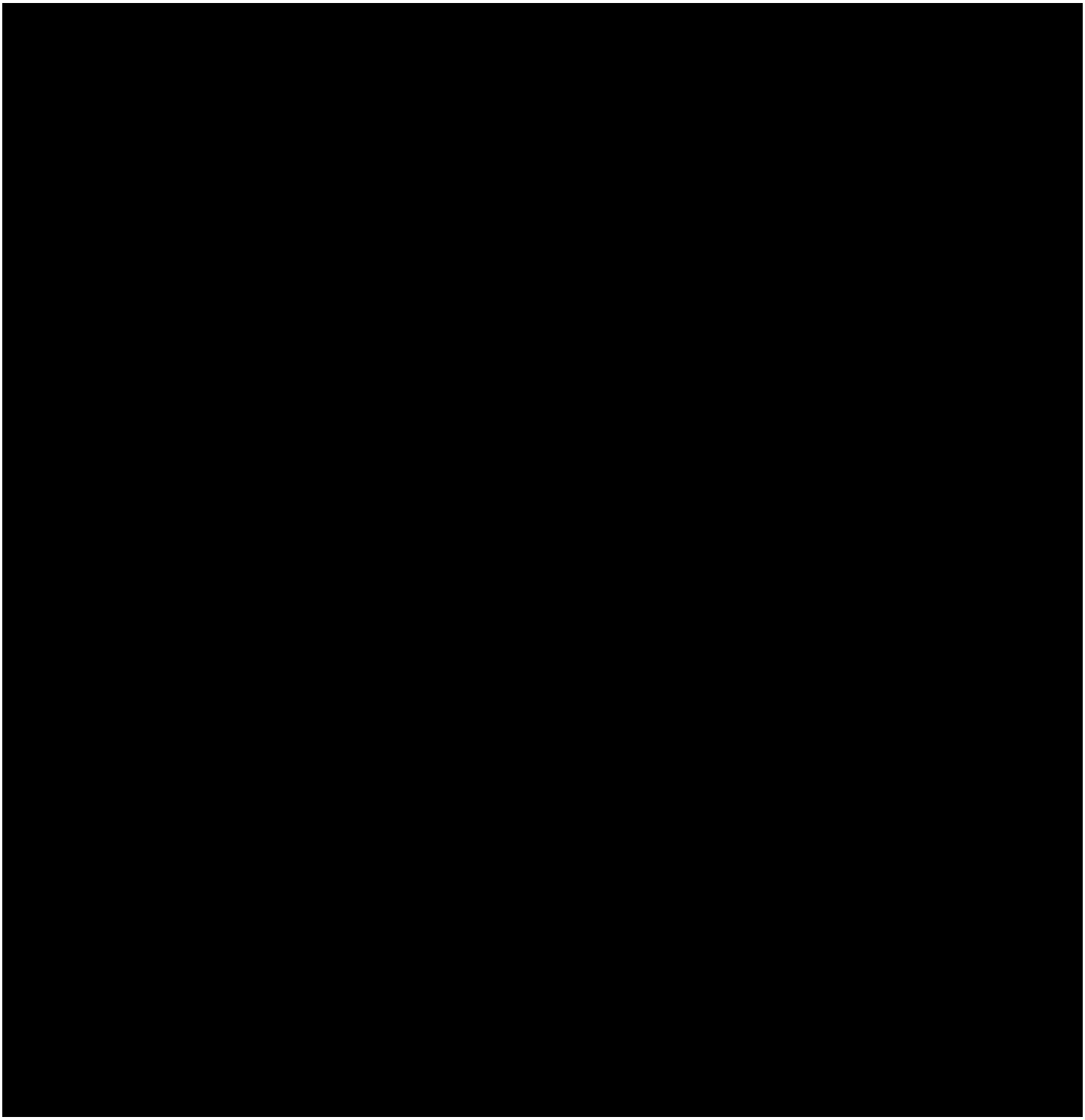
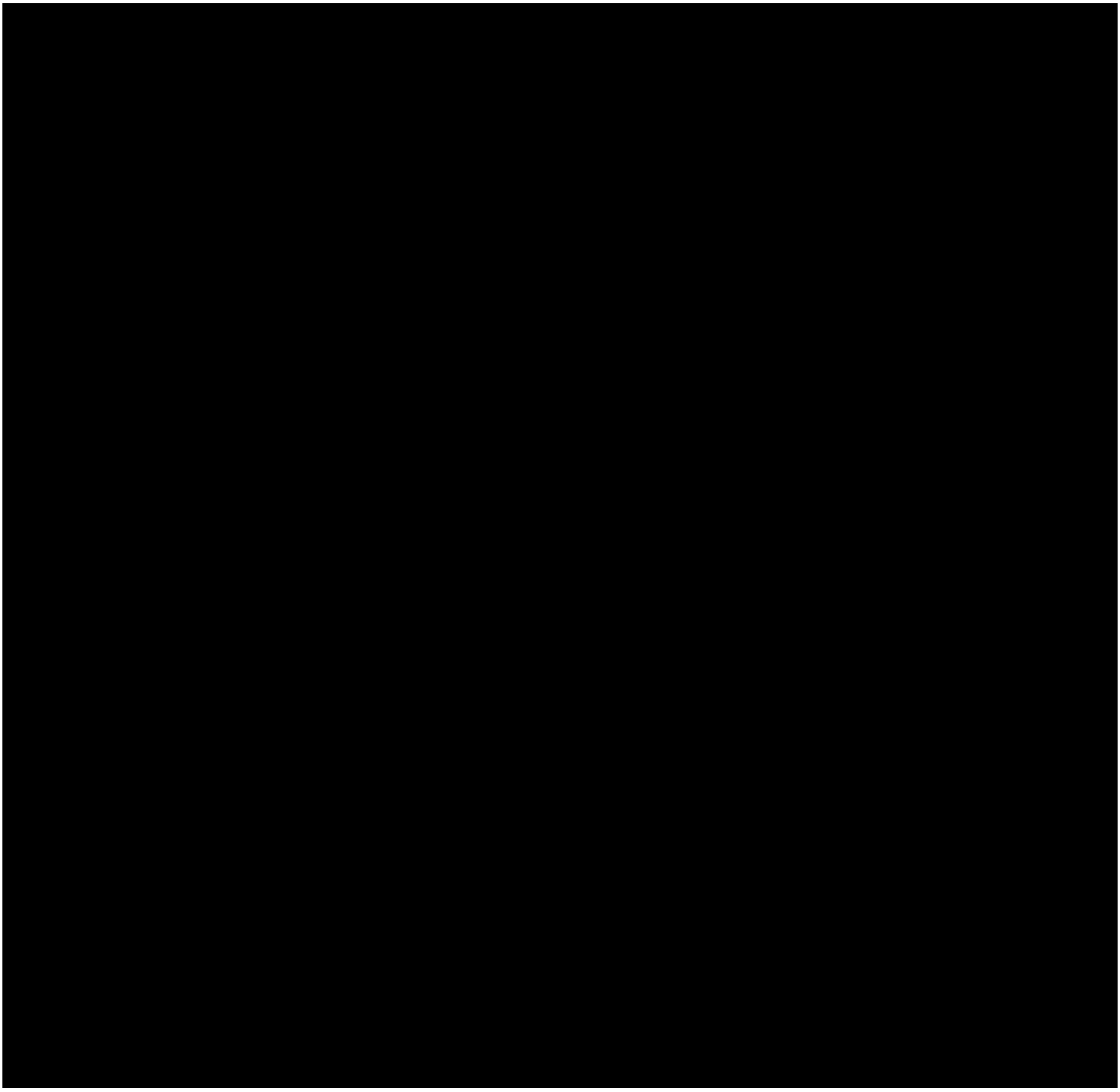
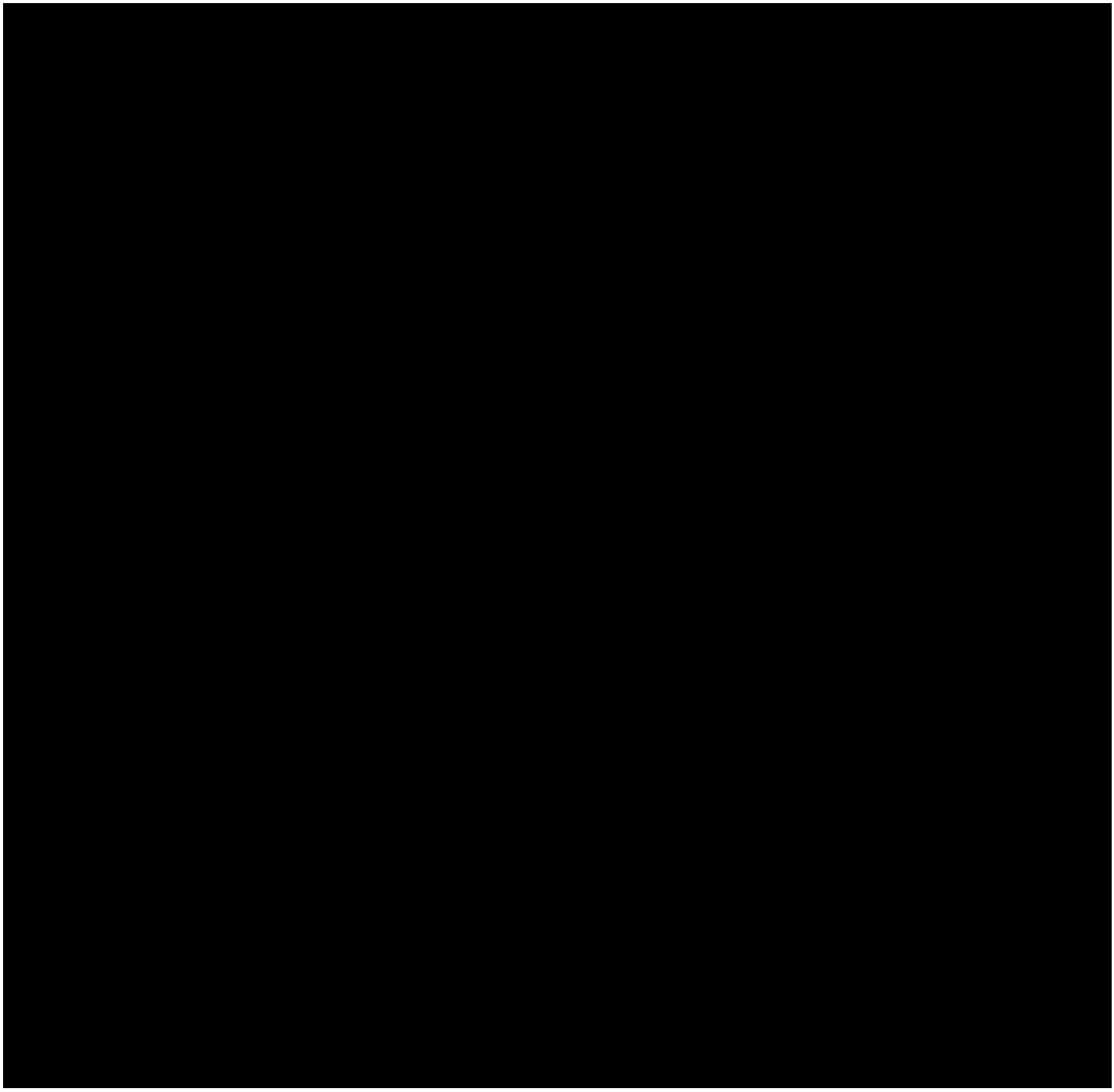
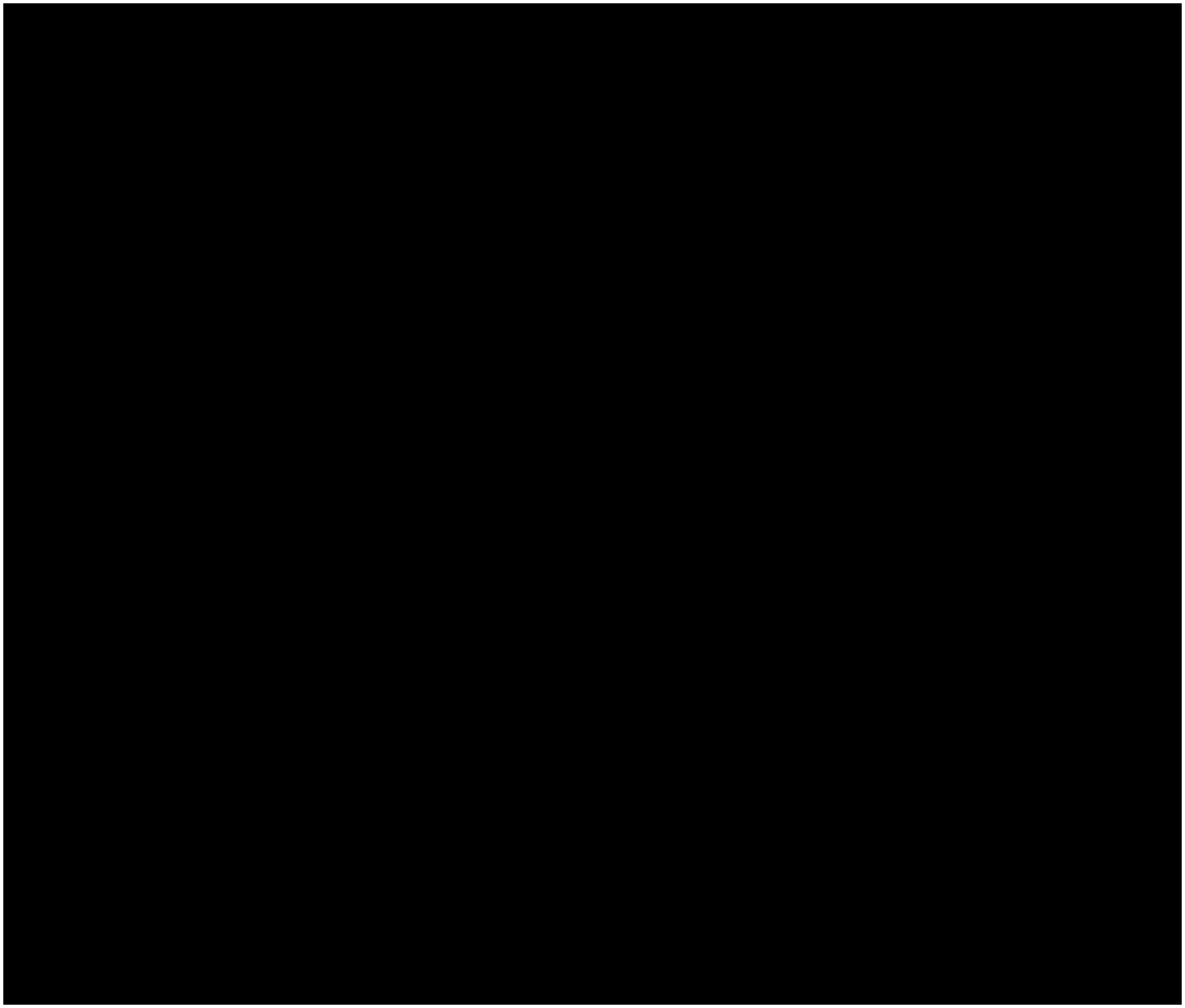


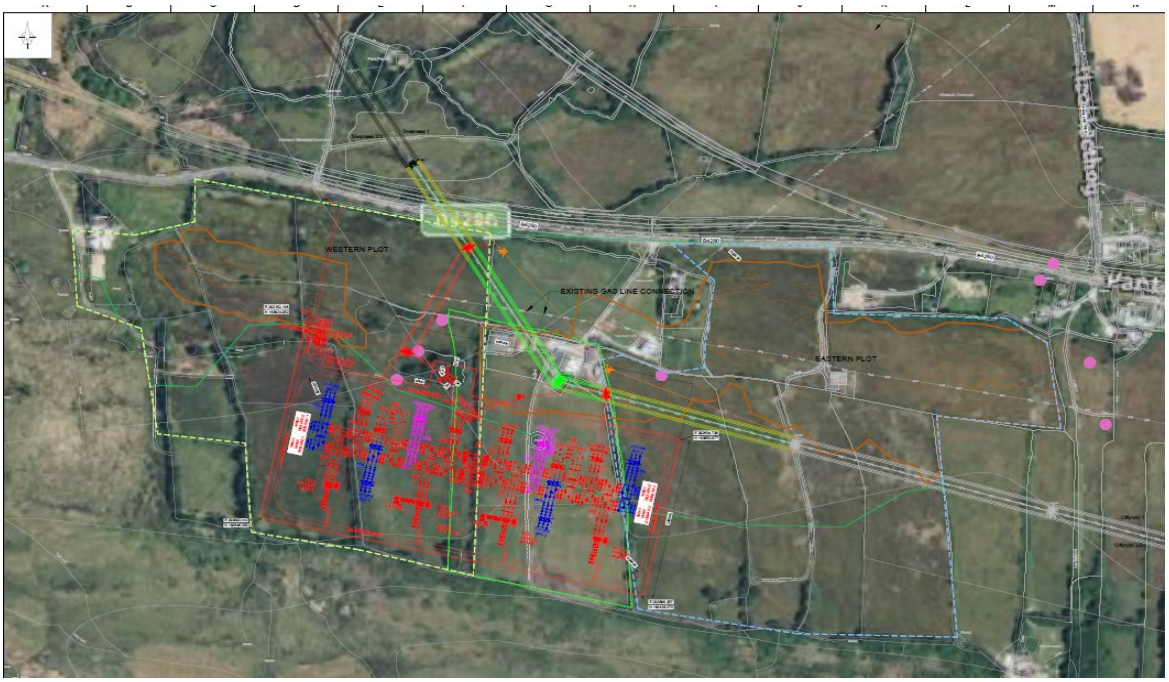




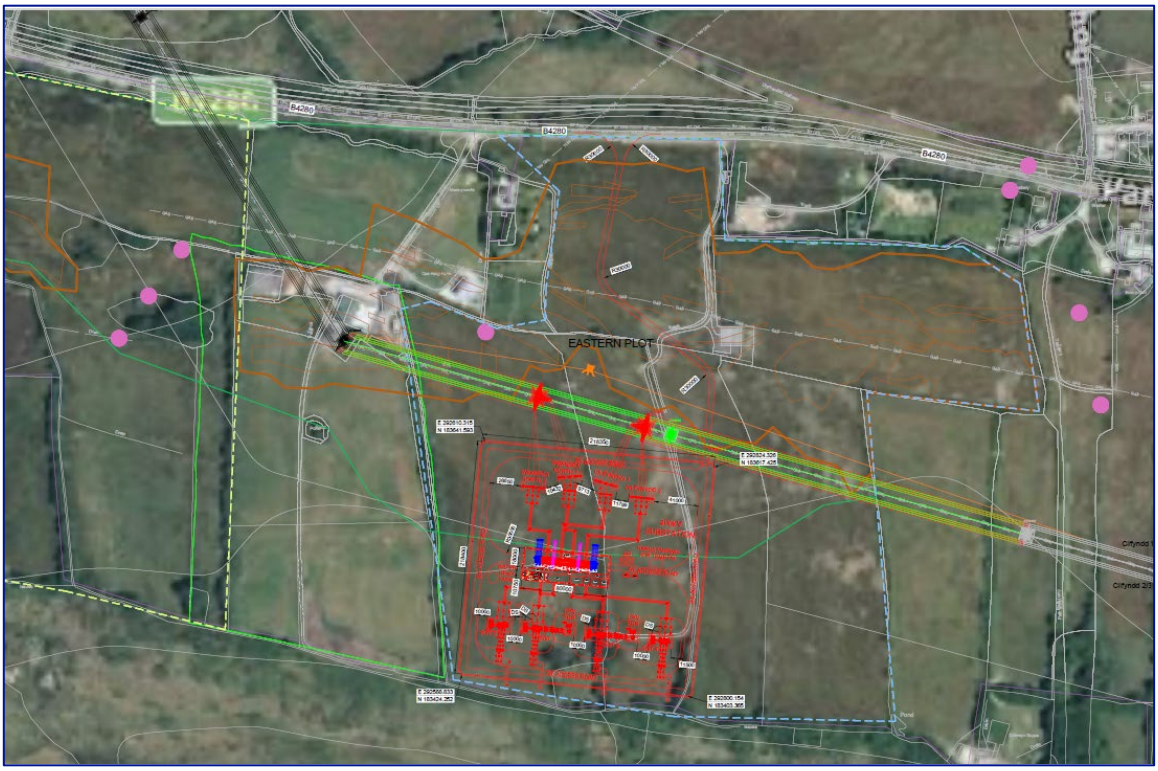


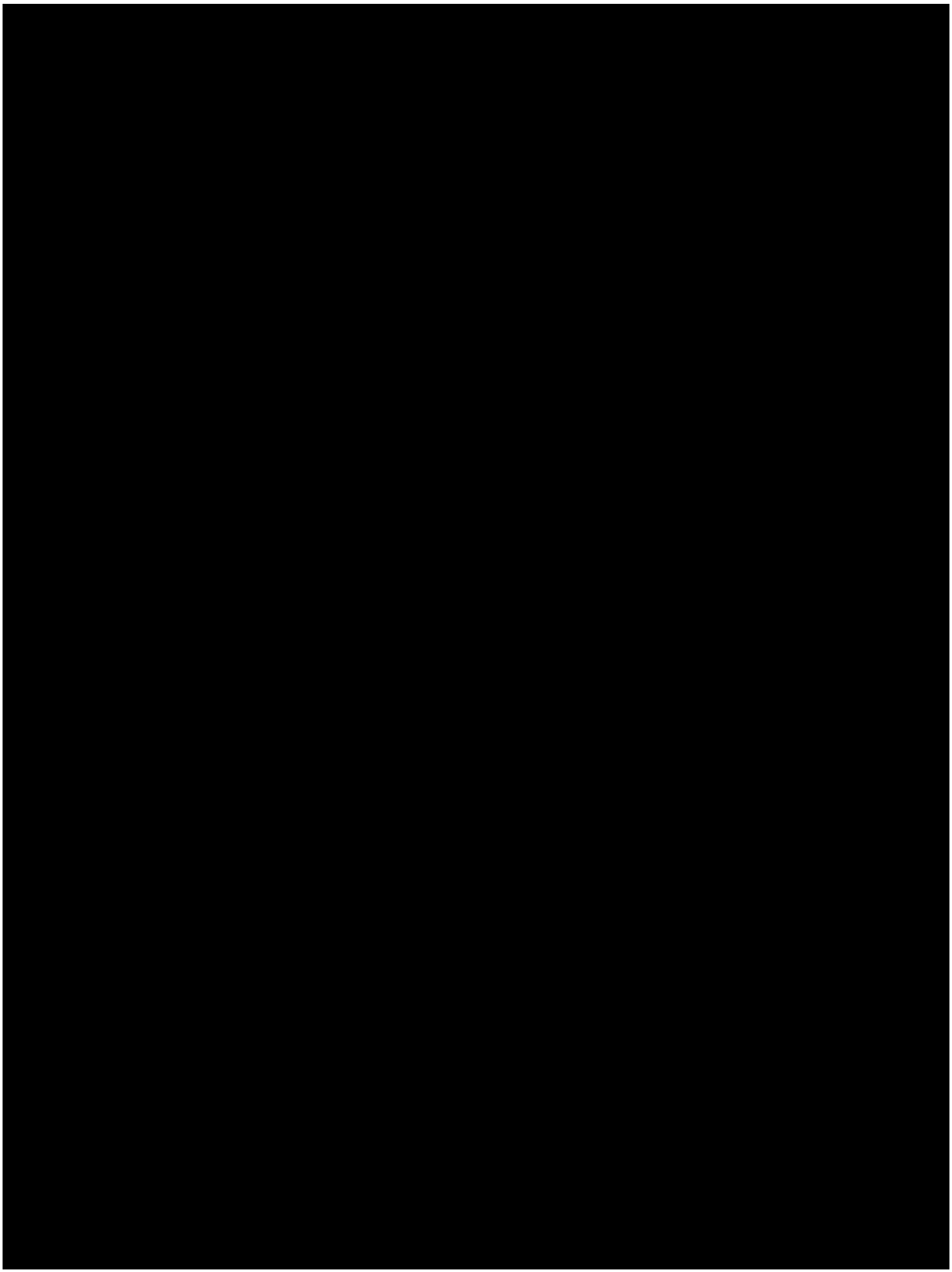


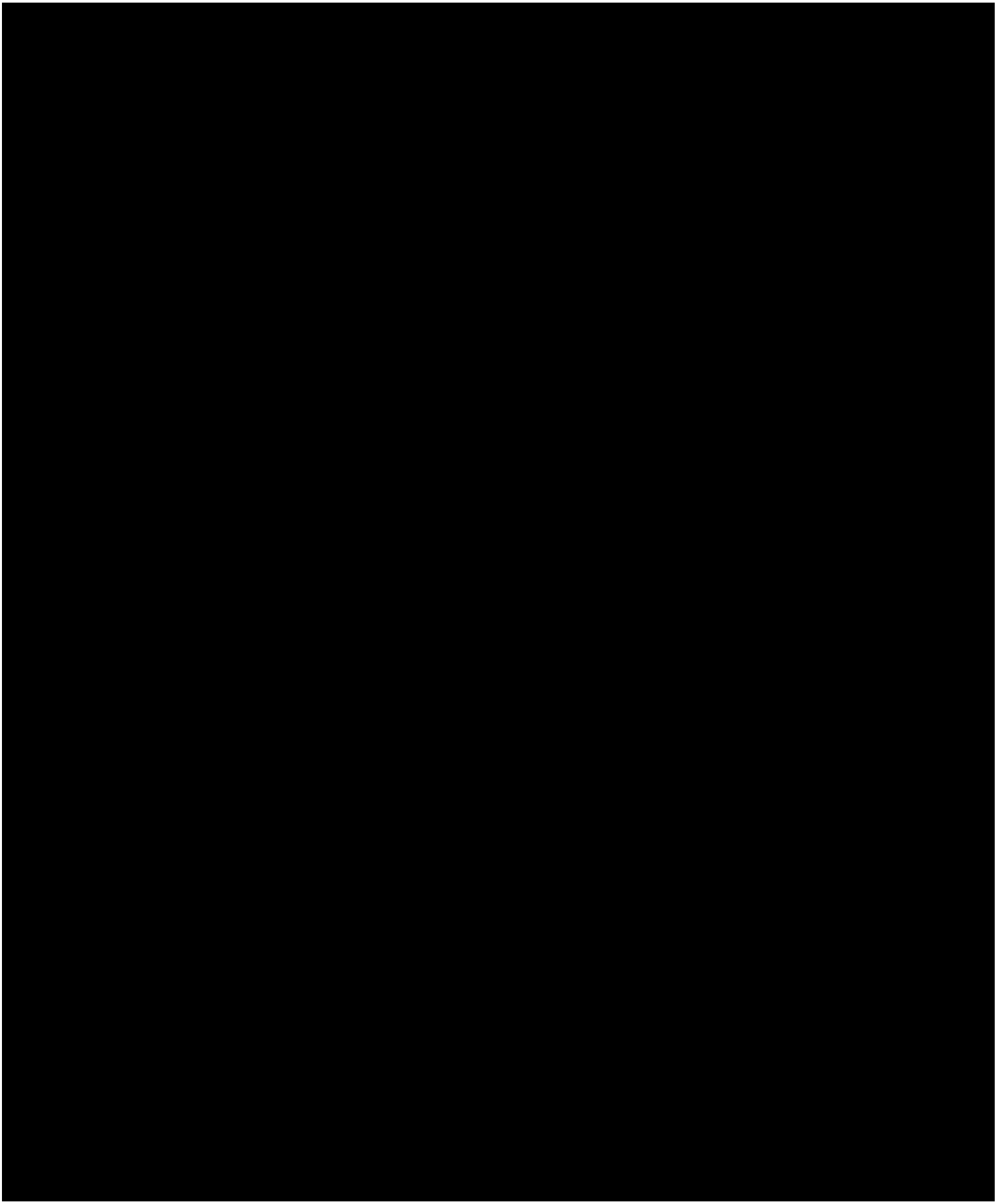
A4.8. Option E-10: Reduced footprint AIS on DEV7



A4.9. Option E-11: Reduced footprint GIS on DEV 7







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