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3.0 NEED AND ALTERNATIVES

3.1 Introduction

- 3.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) sets out the need and reasonable alternatives, and the design progression that has been considered during the evolution of the Proposed Development and design process as presented in the EIAR Chapter 5: The Proposed Development.
- 3.1.2 Schedule 6 to the Planning and Development Regulations, as substituted by Article 97 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the ‘EIA Regulations’), states that the Environmental Impact Assessment Report (EIAR) should contain ‘*A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment*’. This chapter recognises and fulfils this requirement in respect of the Proposed Development.
- 3.1.3 This does not impose a general requirement to assess potential alternatives, only to describe those “**reasonable** alternatives” that have been “studied by the person or persons who prepared the EIAR”. **(emphasis added)**
- 3.1.4 In relation to alternatives, ‘*Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018*’¹ states (Section 4.2) that the information provided must include ‘*A description of the reasonable alternatives studied by the developer*’ and ‘*an indication of the main reasons for the option chosen...*’. Reasonable alternatives as defined in the Government guidance (refer to Section 4.12 and 4.13) ‘*may relate to matters such as project design, technology, location, size and scale*’ however there is no requirement for each of these alternatives to be assessed in detail and the guidance states that a broad description of each main (and reasonable) alternative studied and the key environmental issues associated with each is sufficient.
- 3.1.5 Furthermore, the guidance is clear in that ‘*some projects may be site specific so the consideration of alternative sites may not be relevant*’ (Section 4.13). This statement is particularly relevant to the Proposed Development.
- 3.1.6 In addition, the 2022 EPA EIA Guidelines² states (Section 3.4.1), that ‘*the objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with ‘an indication of the main reasons for selecting the chosen option’. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how*

¹Government of Ireland, (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment <https://www.opr.ie/wp-content/uploads/2019/08/2018-Environmental-Impact-Assessment-1.pdf>

² Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports https://www.epa.ie/publications/monitoringassessment/assessment/EIAR_Guidelines_2022_Web.pdf

environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.'

- 3.1.7 In this context, the consideration of reasonable alternatives and design evolution has been undertaken with the aim of avoiding and/or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce and, if possible, remedy), while maintaining operational efficiency and cost-effectiveness, and considering other relevant matters such as available land and planning policy.

3.2 The Need for the Proposed Development

- 3.2.1 Ireland is in the process of transitioning from a centralised, fossil fuel based electrical power generation network to a more distributed, renewable energy based generation network. To facilitate the continued expansion of Ireland's renewable generation capacity, and support security of supply, modes of supporting the electricity network during periods when there is a gap between renewable power generation and power demand will be needed. This project is designed specifically for this purpose, being able to respond quickly to shortfalls in power generation at times of high demand.

- 3.2.2 As a responsive power generator, the proposed open cycle gas turbine (OCGT) plant will facilitate the integration of more renewable generation into the electricity network, helping to maintain security of supply and supporting Ireland in its transition to a low carbon economy. This type of generation capacity is urgently required – not just to support the transition to renewables but also given the heightened level of supply risk facing the country due to factors such as:

- Lower than expected availability of existing power stations;
- Anticipated new power stations not being delivered as planned;
- Growth in demand for electricity, due to increased activity by high energy industries;
- The expected closure in the coming years of existing power stations which provide approx. 25% of conventional generation capacity³.

- 3.2.3 The need for the Proposed Development is recognised at national, regional, and local level as detailed in EIA Chapter 2 which also provides a summary of relevant action plans and policy documents.

3.3 The 'Do Nothing' Scenario

- 3.3.1 A 'Do Nothing' scenario in which the Proposed Development does not proceed is the baseline against which the impacts of the Proposed Development will be compared within the assessment.

- 3.3.2 An application for a power generation project Ref: 21/2192 (as per definition in EIA Chapter 1 – 'Approved Development'), was submitted to Galway County Council (GCC) in November 2021, proposes an OCGT plant on the western portion of the existing Tynagh Power Station site (i.e. on a different footprint to the Proposed Development) and plans to demolish the existing workshop, administration building and car park,

3 Government of Ireland (2021), Policy Statement on Security of Electricity Supply

relocate these items to the lands adjoining and to the immediate north of the power station facility and develop a 299MW OCGT on the western side of the existing power station site. Planning approval was obtained for the Approved Development Ref: 21/2192 in April 2023, however the Applicant is unable to implement it (i.e. will not build/operate the Approved Development Ref: 21/2192') for the foreseeable future due to a range of viability constraints. The Proposed Development, Tynagh North OCGT (the subject of this EIAR), is for development of a separate 350MW OCGT facility on lands immediately to the north of the existing Tynagh Power Station site.

- 3.3.3 Tynagh North OCGT would be accessed via the existing Tynagh Power Station to the south but would function independently of both it and, if it were to be developed, the Approved Development Ref. 21/2192, with a separate diesel offloading and storage facility (required in the emergency event of an interruption to the gas supply at the same time as a high demand for electricity generation). Tynagh North OCGT would be capable of generating 350MW of electricity and, as with Approved Development Ref. 21/2192, would benefit from proximity to the existing gas and electrical grid infrastructure that serves Tynagh Power Station. The Proposed Development will have separate connections to this infrastructure, by way of a new Above Ground Installation (AGI) to connect to the existing high pressure gas pipeline to the west, and a bay within the existing electricity substation to the south.
- 3.3.4 For the purposes of this EIAR, the 'Do Nothing' scenario assumes no development of a Tynagh North OCGT by the Applicant north of the existing Tynagh Power Station site.
- 3.3.5 The 'Do Nothing' scenario would result in the Proposed Development not being constructed. The 'Do Nothing' scenario would not enable the Applicant to create additional electrical generating capacity, thus would exacerbate security of supply concerns for Ireland.
- 3.3.6 In relation to the 'Do Nothing' scenario, Chapters 7-18 of this EIAR provide a comparison where the environmental effects of the Proposed Development as set out in this EIAR would not occur.

3.4 Alternative Site Locations

- 3.4.1 The proposed technology is a responsive power generator and has the capability to rapidly start to fill the gap between renewable power generation and demand. The reserve power provided by the Proposed Development will be critical to maintaining security of supply for the electricity system in Ireland.
- 3.4.2 The technology chosen requires suitable available land of sufficient dimensions and also requires a main fuel supply (gas) and an electrical grid connection.
- 3.4.3 EP UK Investments Ltd (EPUKI), the parent company of the Applicant (EP Energy Developments Ltd), owns the majority shareholding of Tynagh Energy Limited, the owner of Tynagh Power Station, and therefore has an interest in the existing Tynagh Power Station site. The new, lower carbon power generation which is proposed will make use of the existing high pressure gas pipeline and the existing electrical infrastructure (albeit with new separate connection) to the Tynagh Power Station site. The proximity to the key primary infrastructure requirements (i.e., the gas supply and electrical connection for power export) and existing built infrastructure and services is a key consideration in the selection of the lands at the Tynagh Power Station site.

3.4.4 As stated in Section 3.1 above, the guidance is clear in that *'some projects may be site specific so the consideration of alternative sites may not be relevant'*. This statement is particularly relevant to the Proposed Development.

3.4.5 The availability of land under the control of the Applicant, utilisation of existing infrastructure and proximity to the grid connection and utilities identified the chosen location as the optimum position available to the Applicant. Therefore, identification of sites not under the Applicant's control is not a reasonable alternative that is required to be considered in this EIAR.

3.5 Alternative Technical Solutions

3.5.1 The Proposed Development aims to provide security of supply to the Irish electricity network in a manner that is complementary to the growing installed levels of intermittent renewable generation. This requires high availability of rapidly dispatchable generation which can only be achieved, at the large scale, using thermal plant.

3.5.2 The alternative technology to the OCGT is medium speed gas engines, typically in the range of 10-18 MW. OCGT technology was selected over medium speed gas engines for the following reasons:

- Gas engines with a similar total output would require a larger physical footprint than a comparable OCGT and so would limit the electrical output available on the site;
- Medium speed gas engines generally have higher unabated NOx emissions than OCGTs, requiring additional equipment and chemicals to deliver similar levels of emissions. Due to the increased number of generators required for medium speed gas engines, there are also generally more stacks required for the gas engines; and
- Gas engines require more cooling infrastructure than OCGTs thus increasing the footprint of the generators.

3.6 Alternative Layouts

3.6.1 The design for the Proposed Development considered alternative technologies and layouts. In addition to selection of technology, the design for the Proposed Development considered a number of layout options. These options took into consideration the available land, existing constraints, proximity to receptors and the existing infrastructure associated with the existing Tynagh Power Station plant.

3.6.2 As detailed in Section 3.1.6 of this EIAR chapter the 2022 EPA EIA Guidelines⁴ states that *'...The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative...'*

Layout Review – Tynagh North Option A

3.6.3 Due to the site topography utilising the land west of the overhead lines in the northern portion of the site will require a greater amount of earth works due to the positioning and

⁴ Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports

https://www.epa.ie/publications/monitoringassessment/assessment/EIAR_Guidelines_2022_Web.pdf

engineering alignment requirements of the plant. A mound of historic mine spoil and demolition wastes is located to the northern extent of the site and this is found to provide restriction for certain engineering layout options without significant earthworks and associated engineering solutions.

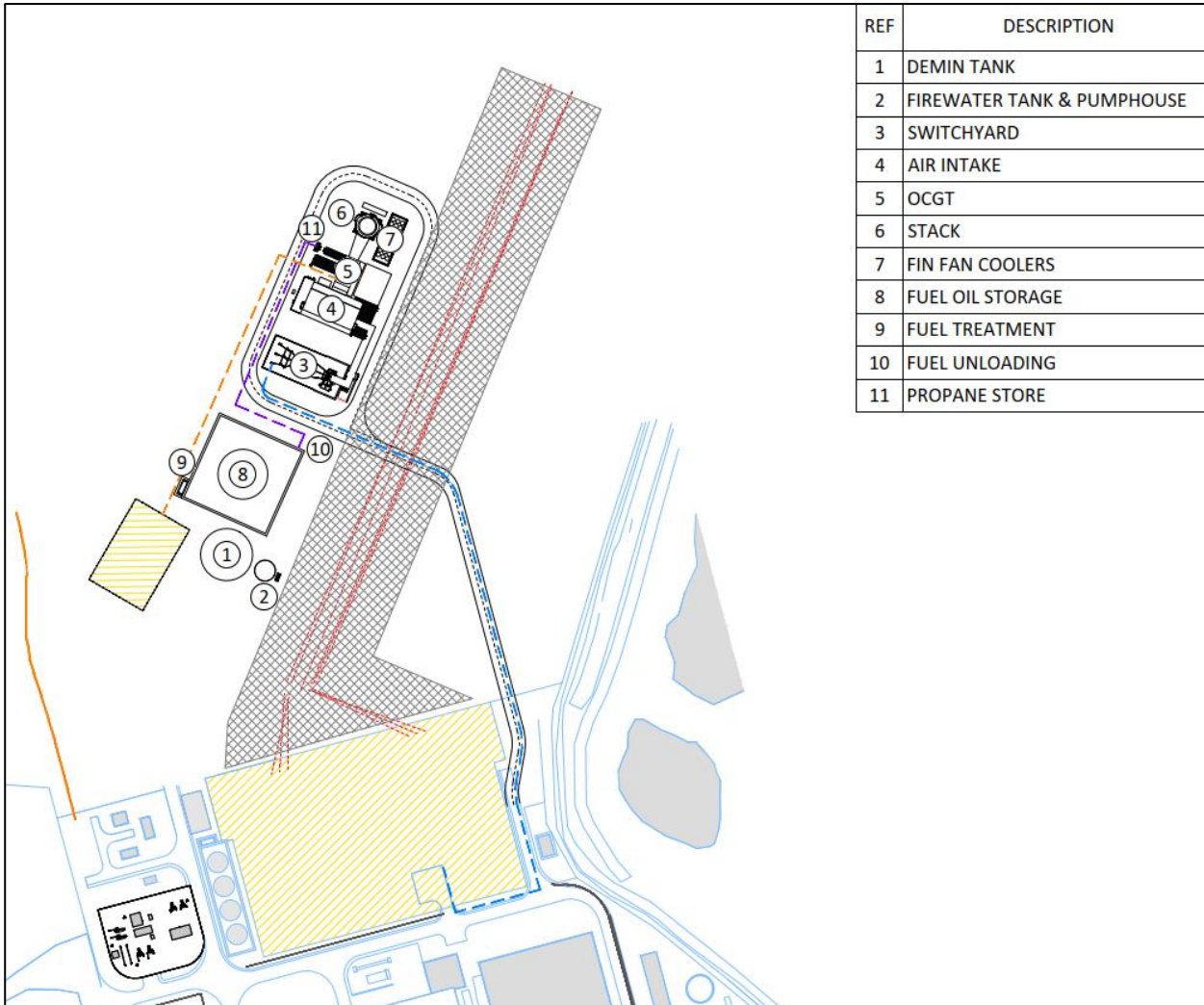


Plate 3.1: Site Plan – Layout Option Tynagh North Option A

Layout Review – Tynagh North Option B

3.6.4 A review of alternative layout designs indicates that, from the site topography, a design option east of the overhead lines on the land to the north of the existing power station will require fewer earthworks to be undertaken due to the arrangement of proposed plant avoiding the historic mound of mine spoil. This layout Option B provides the most viable and deliverable form of development, and has been developed further as the ‘Proposed Development’ for the planning application.

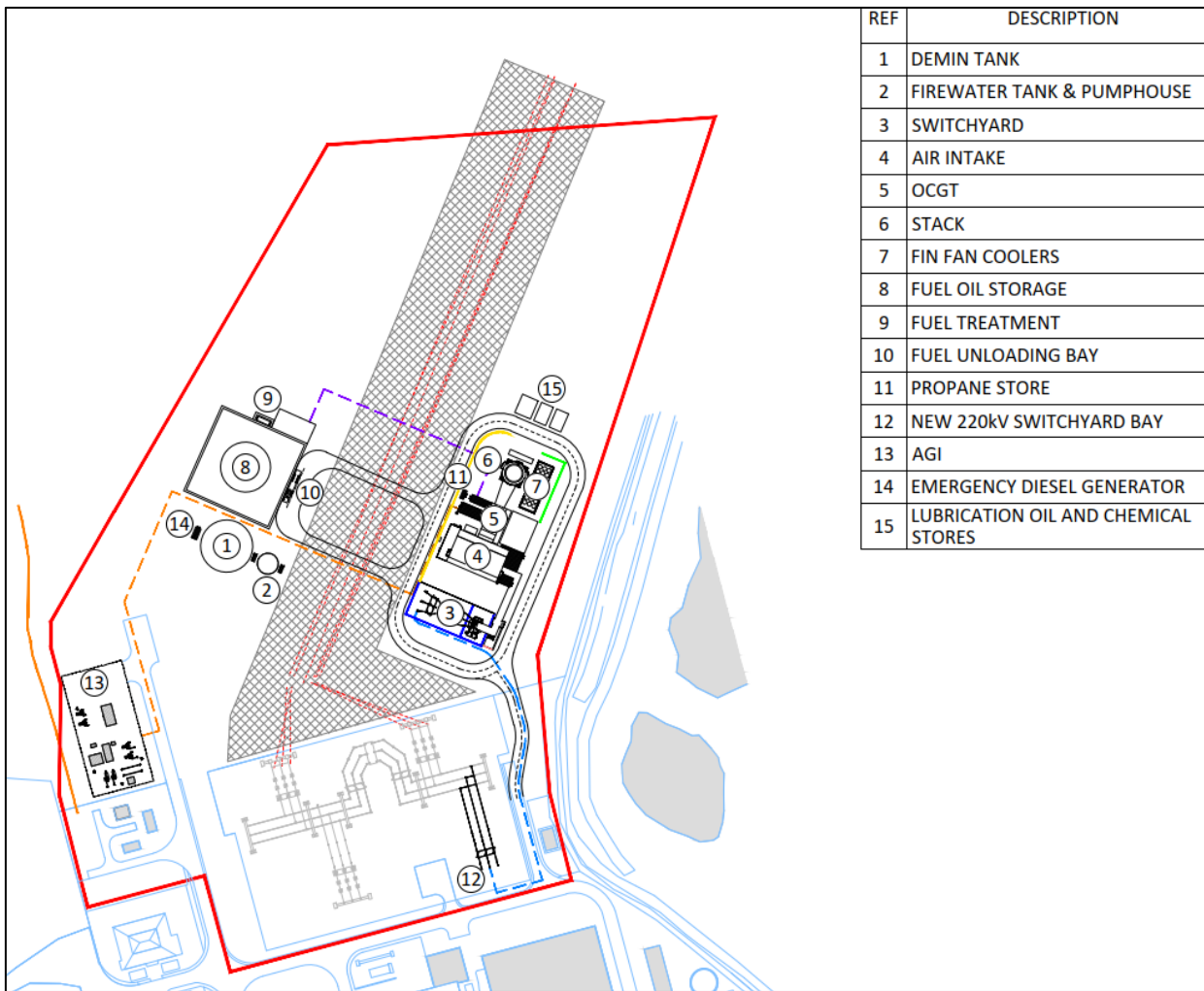


Plate 3.2: Site Plan - Layout Option – Tynagh North Option B

3.7 Comparison of Key Considerations and Environmental Effects

3.7.1 A comparison of key considerations and relevant environmental effects between the reasonable alternatives studied is presented below in Table 3.1. The environmental effects of key considerations have been appraised alongside technical and commercial considerations.

Table 3.1: Layout Design – Key Considerations

DESCRIPTION OF DESIGN ELEMENT	SUMMARY OF OPTIONS CONSIDERED	COMPARISON OF EFFECTS	OUTCOME
Sizing of Proposed Development	The size of the Proposed Development is a commercial and technical consideration based on the available electricity export, gas	A larger turbine would have been very challenging to locate in the available land. All Technology options considered the same sized Proposed Development and	The selection of a 350 MW OCGT strikes a good balance in utilising the existing on site gas and electrical connections.

DESCRIPTION OF DESIGN ELEMENT	SUMMARY OF OPTIONS CONSIDERED	COMPARISON OF EFFECTS	OUTCOME
	import and availability of suitable technology and equipment. All Technology options considered the same sized Proposed Development.	therefore there was no comparison of effects between Layout Option A or B.	There is availability of suitably sized technical solutions in the market that can meet the range of requirements at this output, including emissions, noise and electrical grid requirements.
OCGT Positioning	The OCGT was considered to be located to the west (Option A) or to the east (Option B) of the overhead electricity lines.	With the unit located west of the overhead electricity lines the topography was less favourable for an optimum engineering layout without the requirement for significant earthworks and the environmental and programme implications that would add to the project.	Option B, located to the east of the overhead lines represented the optimum layout from an engineering perspective without significant earthworks.
Emissions stack height	For both Options, emissions from the stack have been modelled at heights between 20m and 70m, at 5m increments except for between 30m and 42m where a 2m increment was used. The Air Quality Assessment (refer to EIAR Appendix 7A, Volume II) evaluates the optimum release height in terms of the dispersion of pollutants which would occur, against the visual constraints of further increases in release height.	The stack height determination shows that the benefit of incremental increases in release height up to 35m is relatively pronounced. At heights above 40m, the air quality benefit of increasing release height further is reduced. A 40m emission stack is determined to provide better dispersion of pollutants when considering the effects on neighbouring developments.	The air dispersion modelling determined that 40m represents a height at which the visual impacts of further increases in stack release heights outweigh the benefits to air quality, in terms of human health.

3.7.2 A summary of the environmental effects against the key environmental topics in this EIAR is presented in qualitative terms below in Table 3.2.

Table 3.2: Preliminary Environmental Review of Layout Options

ENVIRONMENTAL TOPIC	ALTERNATIVE LAYOUT TYNAGH NORTH OPTION A	ALTERNATIVE LAYOUT TYNAGH NORTH OPTION B
Air and Climate	<p>The difference in stack location and surrounding buildings configuration between Option A and the Proposed Development are marginal enough that the results for Option A would likely to be similar.</p> <p>The marginal differences between Option A and the Proposed Development would not present any air quality constraints of significance and was not a key consideration.</p> <p>Overall, Option A would not present any air quality constraints of significance.</p>	<p>The difference in stack location between Option B and the Proposed Development is marginal enough that the results for Option B would likely to be similar.</p> <p>While air flow downwash from the OCGT buildings would be slightly different at Option B, the marginal infrastructure difference would not present any air quality constraints of significance and was not a key consideration.</p> <p>Overall, Option B would not present any air quality constraints of significance.</p>
Cultural Heritage	<p>This Option A would not present any cultural heritage constraints of significance.</p>	<p>This Option B would not present any cultural heritage constraints of significance.</p>
Biodiversity	<p>Option A is located on brownfield (former disused mining land) and immediately adjacent the existing power station hard standing area and would not present significant constraints on protected or notable species.</p>	<p>Option B is located on brownfield (former disused mining land) and immediately adjacent the existing power station hard standing area and would not present significant constraints on protected or notable species.</p>
Landscape and Visual	<p>The proposed emission stack and built infrastructure will be slightly closer to the existing CCGT stack and Submitted Development and, due to grouping of built infrastructure, would have a marginally reduced visual impact than Option B.</p>	<p>The proposed emission stack and built infrastructure will be further from the existing CCGT stack and would have a marginally greater visual impact than Option A however the positioning of Option B is further from the main road and residential receptors located to the west of the site.</p>

ENVIRONMENTAL TOPIC	ALTERNATIVE LAYOUT TYNAGH NORTH OPTION A	ALTERNATIVE LAYOUT TYNAGH NORTH OPTION B
Noise and Vibration	This Option A for the OCGT would be located on the existing brownfield area to the north of the existing CCGT Power Station. This option would be closer to key residential receptors to the west than Option B.	This Option B for the OCGT would be located on the existing brownfield area to the north of the existing CCGT Power Station. This option would be further from key residential receptors to the west than Option A.
Water Environment	No constraints of significance in relation to water environment.	No constraints of significance in relation to water environment.
Soils and Geology	To create a suitable development platform of appropriate level for site engineering, Option A would require significant excavation and earthworks into the western mound (and potentially export of excavated material offsite). The topography for Option A is less optimal than it is for Option B.	No constraints of significance in relation to soils and geology. The topography of the brownfield area for Option B is more favourable than for Option A with less earthworks needed and no requirement to export excavated material off site.
Traffic	The option would be accessed from the existing Site access off Gurtymadden to Tynagh Road. No constraints over other options.	The option would be accessed from the existing Site access off Gurtymadden to Tynagh Road. No constraints over other options.
Land Use	No land use constraints however (as per Soils and Geology above) the site topography for Option A is less optimal than it is for Option B.	No land use constraints.

3.8 Design Option Process

- 3.8.1 The design process for the Proposed Development considered alternative layouts and technologies as detailed above.
- 3.8.2 Preliminary appraisal was undertaken through desk based and site assessments to inform the design option process. Wider community or stakeholder consultations have not been undertaken prior to the submission of this EIAR, however lands in the immediate vicinity of the Proposed Development Site have been the subject of a planning application for separate power related development in recent years, which has included the submission of an EIAR. In the preparation of this EIAR, cognisance has been undertaken of relevant formal consultation, consultee responses and third-party comments in relation to that separate project.
- 3.8.3 From a review of environmental, commercial, and engineering constraints the layout options were reviewed and taken forward or discarded as follows:
- **Alternative Layout Option A** -- was rejected as the existing site topography proposed was sub-optimal for OCGT positioning and site layout;
 - **Alternative Layout Option B** is the Proposed Development option assessed in the EIAR (and submitted for planning) as presented in EIAR Chapter 5: The Proposed Development. Tynagh North Option A would generate the same output as proposed for Option B and has the same benefits as Option A in terms of access to existing gas and electrical connections, but the site topography limited suitable layout options without significant earthworks.

3.9 Conclusions

- 3.9.1 The 'Do Nothing' scenario was considered but discounted on the basis that there is a clear need for the Proposed Development.
- 3.9.2 Reasonable alternative layouts (Plates 3.1 and 3.2) within the site and reasonable alternative technologies have been considered, with consideration and comparison of environmental effects.
- 3.9.3 The Proposed Development design has evolved following consideration of available site area, existing site infrastructure and connection to the existing gas supply and existing electrical substation. The environmental effects of the chosen Proposed Development design option have been appraised alongside technical and commercial considerations.

3.10 References

European Union Planning and Development (Environmental Impact Assessment) Regulations 2018 S.I. No. 296/2018