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Profile Park Power Plant

Planning Application SD21A/0167

Response to Request of Further Information

Profile Park Power Plant

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1.0 INTRODUCTION

Greener Ideas Limited (GIL) is proposing to develop a gas fired peaking power plant at a site located in Profile Park, Dublin 22. Unlike traditional power stations, peaking plants generally run only when there is a high demand for electricity, typically during morning and evening peak usage times.

The need for peaking plants on the Irish electricity grid has grown, as renewable forms of power generation increase their penetration onto the system. The variability of renewable power generation increases EirGrid's challenge to operate an efficient, safe, and secure electricity system. This is especially the case in the greater Dublin region, where demand is growing rapidly, and there is expected to be a large increase in offshore wind power generation by 2030.

The modular design of the Profile Park peaker power plant, and its fast response capability, means it can react quickly to vary its output. So, mirroring the peaks and troughs of electricity generation, from renewable generators. The proposed plant will also be hydrogen enabled, in preparation for running on renewable gas when it is available. Which is consistent with the policy objectives set out in the Climate Action Plan 2021.

The construction of peaking plants, such as the one proposed for Profile Park, are in line with the government policy statement published on 30th November 2021[1]. Which states that the Government has approved "***the development of new conventional generation (including gas-fired and gasoil/distillate-fired generation) is a national priority and should be permitted and supported in order to ensure security of electricity supply and support the growth of renewable electricity generation***". The construction of peaking plants will also facilitate the decommissioning of the older less efficient power plants, which the government policy statement states that, "***existing conventional electricity generation capacity, including existing coal, heavy fuel oil and biomass fired generation, should be retained until the new conventional electricity generation capacity is developed in order to ensure security of electricity supply***". For example, it is expected that Moneypoint, a 915MW coal fired power station, will remain operational, beyond the previous target closure date of 2025, but only until it is replaced by new generation capacity[2].

The need for the Profile Park peaking plant has also been recently emphasised by the operator of Ireland's electricity market SEMO, who awarded the plant a 10-year capacity market contract, starting in October 2024[3]. This in turn has prompted EirGrid to issue the plant a grid connection offer, as directed by the Commission for the Regulation of Utilities, in March 2021[4].

It can therefore be seen that the construction of the Profile Park peaking plant not only supports development in the local area, but also in the greater Dublin region. And is in line with policies set out in the National Development Plan and the Climate Action Plan 2021, which target the development of circa 2,000 MW of flexible gas-fired generation capacity.

[1] Dept of the Environment, Climate and Communications: *Policy Statement on Security of Energy Supply*.

[2] Dept of the Environment, Climate and Communications: *Press Release*

[3] SEM Capacity Market: *Final Capacity Auction Results 2024/2025 T3 Capacity Auction*

[4] Commission for the Regulation of Utilities: *CRU21030a CRU Direction to EirGrid*

1.1 BACKGROUND & STRATEGIC CONTEXT

A planning application for the proposed plant was submitted to South Dublin County Council on the 25th June 2021. The application was supported by an Environmental Impact Assessment Report (EIAR). The need for the development was set out in Chapter 4 which included the following:

- Ireland will not achieve its 2020 carbon emissions targets. The need to significantly improve its performance in terms of decarbonisation in order to meet the 2030 targets are more and more important.

- The proposed power plant is consistent with the overarching strategy to achieve its binding 2030 emission targets. Gas fired power plant technology allows the delivery of an efficient, safe and secure electricity system by helping to manage fluctuating electricity demands and compensate for shortages occurring from wind or solar power. As a lower-carbon generation source it will also be a vital technology to mitigate the deficiency in electricity generation following the planned closure of fossil fuel power plants across the island of Ireland in the next six years.

- Electricity demand is increasing rapidly in the greater Dublin region primarily due to the growth of data centres which require large amounts of power. However, as large consumers of electricity, data centres also pose particular challenges to the future planning and operation of a sustainable power system.

Since the planning application was submitted to South Dublin County Council there has been further developments in relation to electricity supply challenges. EirGrid, which is the Transmission Systems Operator, has published its Generation Capacity Statement (GCS) for the years 2021 to 2030. In this report EirGrid has noted the following:

- The withdrawal of previously procured generation, and a recent auction which did not clear the desired amount of electricity capacity, means that if no action is taken, there is the potential for a shortfall in Ireland over the next five winters.

- Since January 2020, there have been eight system alerts in Ireland due to a combination of factors. These include periods of very low wind, limited interconnector support from Great Britain due to its tight margins, prolonged outages at two large gas generators due to technical problems and the impact of Covid-19 on maintenance schedules.

- Approximately 500MW of contracted generation expected to be delivered in 2022/23 will now not be delivered, leaving a significant generation gap in advance of the planned retirement of existing elements of the existing generator fleet.

- Actual electricity demand has continued to increase – Ireland experienced record system demand peaks in the winter of 2020/21, on the 3rd (5112MW) and 7th December (5357MW).

- The long-term demand forecast in Ireland continues to be heavily influenced by the expected growth of large energy users, primarily data centres. EirGrid's analysis shows that demand from data centres could account for 23% of all demand in Ireland by 2030.

- The reliability of the existing, older, fleet has declined beyond typical expectations, as evidenced by the prolonged outage of two reliable large gas generation units IN Cork and Dublin.

EirGrids CEO Mr. Mark Foley further advised in relation to the report that:

"*It is clear from the report that* ***new, cleaner gas-fired generation plant*** *is required now to address this issue, especially for when wind and solar generation is low. Appropriate volumes of* ***dispatchable flexible gas generation are critical*** *to support the transition to a low-carbon power system into the next decade, as we move to 70% renewables by 2030 and, ultimately, a zero-carbon power system.*"

"*It is very important that the market gets a clear signal that new clean gas generation has a key role to play in the all-island power system over the next decade and beyond, and that market participants can feel confident to invest and participate in the market."*

The immediate short-term risk of electricity shortages in 2022 have been reduced due to the return to operation of two large gas generation units in Cork and Dublin. Although the risk has declined, it is still expected that winter supply margins will remain tight and there may be system alerts over the coming winter period. The long-term risks of electricity shortages beyond 2021/2022 however remain. Acknowledging the criticality of the issue, the Commission for the Regulation of Utilities (CRU), incorporating the recommendations of EirGrid and in conjunction with the Department of Environment, Climate and Communications (DECC), has developed a programme of work actions that will be delivered in the coming months and years. These actions include:

- The delivery, through the all-island capacity auctions of over 2000MW of enduring flexible and efficient gas-fired generation capacity by 2030, to provide for growing demand, replace retiring generators and support additional penetration of renewables to meet our 2030 decarbonisation policy goals.

It is clear therefore, that there is an urgent demand for gas fired power plant to be consented, constructed and operational to address Ireland's climate targets for 2030. And address the immediate security of supply issues and 'keep the lights on' longer term.

It should also be noted that both the EirGrid GCS statement and the CRU programme of work actions, predated the Climate Action Plan 2021, which was published in November 2021. Which increased the share of renewable electricity, as part of the overall electricity supply mix, from 70% to 80% for 2030. This target provides additional urgency to ensure power plants such as that proposed in Profile Park are operational at the earliest possible time. Some of the relevant targets included in the Climate Action Plan 2021 included:

- Deliver circa 2 GW of new flexible gas-fired power stations in support of a high variable renewable electricity system.

- Ensure that 20-30% of system demand is flexible by 2030.

- Carry out a work programme to identify a route to deliver 1-3 TWh of zero emissions gas (including green hydrogen) by 2030.

Regarding green hydrogen the Climate Action Plan 2021 notes:

"*Green hydrogen has been identified as having the potential to support decarbonisation across several sectors, and, in high-temperature heat for industry and in electricity generation…. Sector coupling is already happening, with the increased electrification of the heat and transport sectors. Some of the challenges that this presents for the electricity sector can be solved by renewable green hydrogen, including as back-up for intermittent renewables".*

The power plant proposed at Profile Park is hydrogen enabled, in preparation for running on renewable gas when it is available. Therefore, the plant and is consistent with the policy objectives set out in the Climate Action Plan 2021.

As indicated in the EIAR originally submitted to SDCC and in this response to the Further Information request. The proposed peaker power plant has the design flexibility to support the demands of both the local area, and the greater Dublin region. It will also support in the development of offshore wind power generation in the Irish Sea. With regard to emissions (i.e. noise, water, air etc) it has been demonstrated that these impacts are all acceptable and within the relevant statutory and best practise limits and thresholds. The proposed peaking power plant is therefore clearly consistent with the policies and objectives set out in the National Development Plan and the Climate Action Plan 2021, which target the development of circa 2,000 MW of flexible gas-fired generation capacity.

1.2 PLANNING APPLICATION HISTORY

As previously described a planning application for the proposed plant was submitted to South Dublin County Council on the 25th June 2021 (SDCC Register: SD21A/0167).

A Request for Further Information (RFI) was issued by the Council on the 20th August 2021.

This report represents GIL's response to the RFI which is set out in the same sequence as the items raised in the RFI received from the Council. There are 9 no. RFI items which are summarised below under the following headings:

- RFI 1: Design Statement
- RFI 2: Design Updates
- RFI 3: Landscaping
- RFI 4: Surface Water Management (General)
- RFI 5: Surface Water Management (SUDS)
- RFI 6: Flooding
- RFI 7: Noise
- RFI 8: Archaeology
- RFI 9: Site Access and Mobility

The remainder of this report sets out the detail response to the RFI under the above headings.

2.0 RFI 1: DESIGN STATEMENT

a) **The applicant is requested to provide an addendum to the submitted design statement, which takes into consideration an assessment in terms of Paragraph 11.2.0 and tables 11.17 and 11.18 of the County Development Plan.**
b) **The applicant is requested to make modifications to address all requirements laid out in the sections of the County Development as listed in Item a).**
c) **to the design shall be clearly reasoned and should demonstrate compliance with the objectives and policies of the County Development Plan.**

It is noted that the Councils Record of Executive Business and Chief Executives Order indicates that:

"*The design statement provided by the applicant is extensive and has covered a significant amount of information and the detail provided within it is welcomed. However, in order to fully assess the proposal, the Planning Authority requires the Design Statement to include an assessment in terms of Paragraph 11.2.0 and tables 11.17 and 11.18 of the CDP and modifications to address all requirements laid out in these sections. This matter should be addressed via additional information*".

Given the above requirement, an updated Design Statement has been prepared which provides a comprehensive analysis of Section 11.2.0 and Tables 11.17 and 11.18 of the County Development Plan (CDP) 2016-2022.

The updated Design Statement is included in Appendix 1.

3.0 RFI 2: DESIGN UPDATES

a) **The Planning Authority has concerns regarding the design of the proposed development in terms of bulk and massing. There are also concerns that the proposed development represents an overdevelopment of the site given its footprint, hardstanding and underground attenuation tank. The applicant is requested to review the submitted development and revise the plans / provide further justification for the scale in terms of:**

i. **Main gas generation building - there is currently no breaking up in terms of the design of the facades.**
ii. **The applicant is requested to revisit the design of the elevations fronting the site boundaries and add detail.**
iii. **Scale / height of the tanks - these appear quite prominent in the local context. The applicant is requested to reduce the scale of these (this could include an increased number of smaller tanks).**
iv. **Scale and height of the stacks. These are extremely prominent and are encased in a structure for the most part. The stacks are significantly taller than all surrounding structures. The applicant is requested to reduce the height and bulk of the structures. The Planning Authority would welcome a height of no more than 25m.**
v. **Overall level of development on the site. There are concerns that the proposal is overdevelopment. The applicant is requested to set out the percentage of land taken by buildings / tanks etc, roads and open spaces / attenuation. The applicant should investigate other lands to attenuate to provide for open and natural attenuation.**

3.1 CONTEXT

The original planning application proposed the development of a gas fired power plant of up to 125MW. To address SDCC's RFI, the planning application has been reduced to a development of up to 102MW. The original planning application assumed that 6 no. gas engines would be installed in a gas engine building measuring approximately 1735m^2 including a building height of 18.5m. GIL has removed one of those engines, thereby reducing the engines number from six to five. The result is that the engine building has reduced in footprint from 1735m^2 to 1580m^2 and the height of that building has reduced from 18.5m down to 15.5m. In addition, in the original planning application the overall size of the tank farm was 986m^2 with the updated site layout, the tank farm has been reduced in size to 580m^2.

These design modifications are summarised in the table below.

Design Element	Original Dimension	Proposed New Dimension	Reduction / Increase
Plant Electrical output	Up to 125MW	Up to 102MW	Reduction
Number of Gas Engines	6	5	Reduction
Area of Gas Engine Hall	1735m^2	1510m^2	Reduction
Height of Gas Engine Hall	18.5m	15.5m	Reduction
Area of Tank Farm	986m^2	580m^2	Reduction
Stack Height	31.8m	28.0m	Reduction
Attenuation Tank	490m^3	355m^3	Reduction

In the original planning application, the stack height was 31.8m in height. With the reconfigured site layout and the reduction in gas engines from 6 to 5 no, it has been possible to reduce the stack height to 28m. It is not feasible to reduce the stack height any lower without compromising the operational viability of the power plant. Whilst the 28m stack does not reduce the stack to 25m it is noted that this target itself is arbitrary in terms of aesthetics and visual impact. For example, the finished floor level at the proposed power plant will be 74.8m AOD and so therefore the maximum single stack height would be 102.8m AOD. In comparison, the nearby Google development comprises 25 no. stacks with a height of 25m. However, these stacks are based on a finished floor levels of 77.85m AOD and therefore the maximum height of these 25 no. stacks is 102.85m which is a higher elevation than the single stack associated with the proposed power plant development.

The above design changes and other minor changes associated with responding the SDCC request for further information are indicated in a revised suite of planning drawings which accompany this technical report.

3.2 VISUAL IMPACT ASSOCIATED WITH DESIGN UPDATES

Macroworks has completed the following updates to the Landscape and Visual Impact Assessment (LVIA) submitted as part of the planning application to SDCC. This section should be read in conjunction with the following documents which are provided in a separate Appendix 2 which includes the following:

- RFI Photomontages;
- Landscape Mitigation Plan;
- Landscape Sections.

The Zone of Theoretical Visibility (ZTV) mapping has been revised to reflect the reduction in height of the proposed Engine Hall from 18.5m down to 15.5m and the reduction in stack height from 31.8 down to 28m. The revised ZTV map is presented in Figure 1.1 below, and although it appears almost identical to the original ZTV map pattern as presented in the Landscape and Visual Impact Assessment contained in the EIA Report, the statistical variation equates to a 4.5% reduction in visibility for the revised stacks within the study area and a 3% reduction for the revised engine hall.

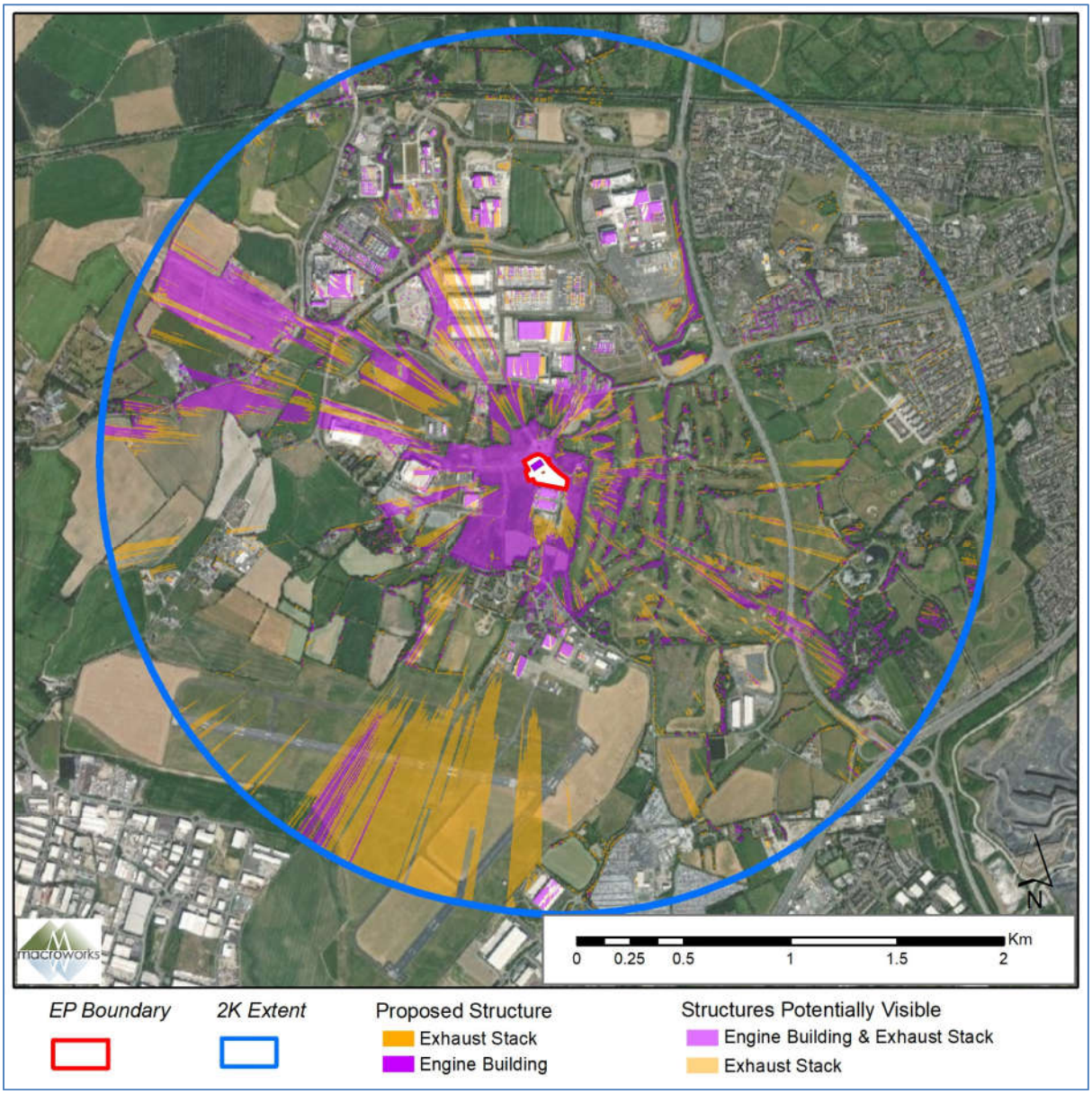

Figure 3-1: Revised Digital Surface Model (DSM) Visibility map using the lower stack and engine hall heights

The main method of response to RFI Item 2 will be the comparative assessment of visual impacts from each of the original LVIA viewpoint locations. The assessment will follow the same methodology as outlined in the original LVIA, but in an abbreviated form (see Table 3.1) as it is not necessary, for example, to redescribe the existing view or attribute sensitivity again. Furthermore, the focus will be on the change in residual (post-mitigation establishment) visual impacts as opposed to changes in pre-mitigation effects.

Table 3-1 Comparative Visual Impact Assessment (Original vs RFI Revised)

VP no.	Original Significance of Visual Impact (Residual)	Change in the Magnitude of Visual Impact	Residual significance of Impact Change?
VP1	Moderate-slight / Neutral -Negative	The engine hall is the main feature of the view. This has been shortened to accommodate one less gas engine than the original proposal (5 down from 6) and also reduced in height by 3m (18.5m down to 15.5m). In addition, the external fence design, which now appears more suited to the business setting than the original palisade fence. This has been facilitated in-part, by the provision of a paladine (wire mesh) security fence further into the site. These changes are noticeable but relatively subtle in the pre-mitigation view and mainly at the western end. The main change is that the proposed native woodland mix has been brought right up to the boundary where it fully screens the proposed structures from view and provides a dense green backdrop against which the perimeter security fence can visually recede. The view is truncated in closer proximity, but the engine hall building is no longer in view.	**Yes, reduced to Slight / Neutral-Negative**
VP2	Moderate-slight / Neutral -Negative	In this instance the height and mass of the proposed engine hall is noticeably but subtly reduced, and this is further aided by the revised colour scheme which darkens half of the hall to give a stronger impression on solid and void to break down the visual bulk. Likewise, the stacks appear narrower, further away and lower in the revised development giving an impression of reduced bulk and massing. The rearrangement of the tanks also allows partial obscuring of the stacks with a dark tone feature, which also serves to break down massing.	**Marginal reduction, but not great enough to warrant dropping by a full category**
VP3	Slight / Neutral-Negative	The reduction in stack height and engine room height are not readily discernible from here as the stacks are marginally closer and the position of the engine room has been slightly changed and reoriented. The most obvious change is a slightly greater concentration of tanks filling a previous void near the middle of the development that was previously more open. Countering this is less of a concentration of bulky structures to the right of the stacks. In addition, the external fence design, which now appears more suited to the business setting than the original palisade fence. The boundary arrangement is changed such that the woodland is closer to the viewer where it backs a green palisade fence that is introduced on the	**No**

		boundary. On balance there is no material change in visual impact.	
VP4	Slight / Neutral-Negative	A marginal reduction in the length and height of the engine hall is apparent from here for the revised scheme, but this is matched by greater bulk for the stack housing, albeit at a marginally lesser height. The most noticeable and beneficial change is the revised colour scheme for the engine hall which brings in a full height vertical band covering half of the structure. This recedes more against the backdrop of terrain and serves to visually break down the massing of the building especially at this distance.	**Marginal reduction, but not great enough to warrant dropping by a full category**
VP5	Slight / Neutral-Negative	The only element visible from here is the stacks, which are marginally reduced in height for the revised scheme. However, this is balanced by the fact that the stack housing appears slightly broader and closer to the intervening building generating a continuity of bulky form. These are very nuanced changes to the view and the visual impact is not deemed to be materially changed.	**No**
VP6	Imperceptible / Neutral	The very top of the stack remains potentially visible for the revised scheme and will not be materially different, in visual impact terms, to the original design.	**No**
VP7	Slight-imperceptible / Neutral-Negative	Whilst the reduction in the height of the engine hall has removed it from view behind an existing intervening building, the reduction in height of the stacks is balanced by a broader view of them marginally closer to the viewer. These are very nuanced changes to the view and the visual impact is not deemed to be materially changed.	**No**
VP8	Slight-imperceptible / Neutral-Negative	Neither the original nor the revised development are readily visible from here in any detail, instead, presenting as general bulk beyond intervening vegetation, Consequently there is no discernible variation in visual impact.	**No**

3.2.1 Comparative Visual Impact Assessment Conclusion

As can be seen from the viewpoint by viewpoint comparative assessment contained in Table 3.1, the overall change in visual impact is a subtle reduction for those views closest to the site and an immaterial change for those further away. The only viewpoint to experience a reduction of visual impact great enough for the original judgement to be changed was VP1, where the removal of the Engine Hall from view resulted in a reduction from Moderate-slight significance to Slight significance. However, the quality of effect remained Negative-neutral because the proposed foreground mitigation continues to block the current view across the site. In the case of both VP2 and VP4, there is a marginal improvement in the view of the development and correspondingly subtle reduction in visual impact. However, this was not deemed to be a distinct enough change to reduce the visual impact assessment by a full category. It should not be perceived that the revised design is ineffectual because it does not markedly reduce the visual

impact of the development. Instead, it is a considered refinement and minor improvement to what is still a new and substantial scale power plant on a vacant site in an industrial park. The revised design has also also facilitated the opportunity to provide a revised design to the external fencing to provide a higher quality, less industrial design using a 'system railing' mounted on a plinth wall between piers rather than a palisade fence.

The original LVIA did not conclude that significant visual impacts will occur for the submitted design and the current RFI design is considered an improvement, albeit subtle, on that design.

3.2.2 Landscape Impact

In terms of landscape effects, there will be an increase in unpaved greenspace and permeable ground relative to the original design as the footprint of buildings and overall plot ratio has been reduced. This allows for a greater degree of landscape planting with associated biodiversity benefit. This results in a marginal reduction in physical land cover effects. The impacts on landscape character are closely linked to the visual impact and it is considered these will be marginally reduced by the slightly lesser bulk of the revised RFI development as well as the altered colour scheme. The latter introduced a stronger vertical element to the colour scheme to take advantage or perceived solid and void (dark and light) to reduce the perceived bulk of the largest elements and in particular the engine hall. This is considered to be effective, but without having a marked reduction in the overall landscape / townscape impact.

3.3 AIR QUALITY IMPACT ASSOCIATED WITH DESIGN UPDATES

An updated air quality impact assessment has been undertaken which indicates that the power plant would operate in compliance with the air quality limit values for the protection of human health. It is predicted that air emissions from the installation will not have a significant impact on the local environment. An updated Air Quality Assessment is included in Appendix 3.

3.4 NOISE AND VIBRATION IMPACT ASSOCIATED WITH DESIGN UPDATES

An updated noise and vibration impact assessment has bee undertaken which indicates that the associated impact is 'Not Significant' at all locations for daytime and evening periods. An updated Noise and Vibration assessment is discussed in more detail in response to RFI No. 7.

3.5 AVIATION IMPACT ASSOCIATED WITH DESIGN UPDATES

The 28m stack height reduces the thermal plume scales which had previously been demonstrated to be acceptable for the 31.8m stack in respect of any aviation safety impacts at Casement Aerodrome (refer to Appendix 16.1 of the EIA Report submitted to SDCC).

3.6 APPROPRIATE ASSESSMENT CONSIDERATIONS ASSOCIATED WITH DESIGN UPDATES

The design changes which are subject to this RFI response will result in no change to the findings of the Screening for Appropriate Assessment which was submitted as part of the planning application to SDCC. The screening assessment concluded that the proposed development, either alone or in-combination with other plans and projects, will not result in significant effects on any European site, in view the conservation objectives of the site, and therefore a Stage 2 Appropriate Assessment was not required.

3.7 SURFACE WATER DRAINAGE CONSIDERATIONS ASSOCIATED WITH DESIGN UPDATES

A comprehensive response on proposals to attenuate surface water using natural attenuation is provided in response to RFI No. 4. In summary, the introduction of additional SuDS measures has reduced the volume of the surface water attenuation tank. The SuDS measures included are a combination of the following features:

- Permeable paving;
- Dry swale / bioretention area;
- Attenuation Tank;
- Petrol interceptor; and
- Hydrobrake.

b) The applicant is also requested to provide an existing layout plan, indicating all natural features present.

Figure 11.2 which was provided in Chapter 12 (Biodiversity) of the EIA Report originally submitted to SDCC is reproduced in this report in Appendix 4. This figure shows the existing habitats / natural features on the site of the proposed power plant. These include:

- Wet grassland (dominant habitat on site);
- Hedgerow (i.e. on fence line associated with neighbouring data centre); and
- Eroding/Upland river (i.e. Baldonnel Stream).

There are no other natural features on site.

A topographical survey illustrating the existing site levels is also provided in Appendix 4.

4.0 RFI 3: LANDSCAPING

The proposed power station introduces significant hardstanding and building development into the landscape which potentially runs contrary to Policy IE Objective 5 in the County Development Plan and other policies and objectives contained in Chapters 7 and 8 of the same plan. The applicant is requested to provide revised proposals demonstrating the following:

1) **A reduction in hardstanding and soil sealing across the entire site**
2) **Increased planting to provide, that includes for the augmentation of biodiversity and increased ecology on the site. Clearly demonstrating how it links to other Green Infrastructure in the area.**

As shown in Appendix 4 the existing habitats on the site and surrounding areas include:

- Wet grassland (dominant habitat on site).
- Hedgerow (i.e. on fence line associated with neighbouring data centre)
- Eroding/Upland river (i.e. Baldonnel Stream).
- Dry calcareous natural grassland.

The development of the proposed power plant incorporating the new updates will see the introduction of unpaved greenspace and permeable ground relative to the original design as the footprint of buildings and overall plot ratio has been reduced. This allows for a greater degree of landscape planting with associated biodiversity benefit.

The only existing planting in the immediate vicinity of the proposed powerplant is within the fence line of the neighbouring data centre. The proposed power plant includes native hedgerow and native woodland mix along much of the shared boundary with this data centre. This planting will complement and enhance the existing planting and the remainder of the planting scheme in particular along the sites western boundary will provide new landscaping in what is current exposed grassland.

3) **How the landscape proposals can provide for above ground attenuation incorporating natural solutions. Please note the Planning Authority only accept underground attenuation tanks as a last resort. An alternative location should be sought and found for the provision of nature-based solutions and above ground attenuation or perhaps an alternative location should be found for the proposed development.**

Please refer to the response provided in RFI 4(a) in respect of updated SuDS proposals for the proposed power plant development site. These proposals have been incorporated fully into the Landscape Mitigation Plan.

4) **A landscape layout that ensures that a higher percentage of the soft natural SuDS features in the landscape are retained and augmented.**

Please refer to the response provided in RFI 4(a) in respect of updated SuDS proposals for the proposed power plant development site. These proposals have been incorporated fully into the Landscape Mitigation Plan.

5.0 RFI 4: SURFACE WATER MANAGEMENT (GENERAL)

a) **In order for Water Services to assess surface water attenuation proposals, the applicant is requested to submit a report including design calculations showing how surface water up to and including the 1:100 (1%) year critical storm with climate change allowance will be attenuated on site to predeveloped greenfield run off rates. The report should include the following site information:**
   - **SAAR (Standard Average Annual Rainfall) Value**
   - **SOIL Value**
   - **MET Eireann Rainfall Data**
   - **Site Area**
   - **A breakdown of all proposed area types in m2 for the site eg. Roads, Hardstanding, Grasscrete,**
   - **Grass etc.**

5.1 INTRODUCTION

A new surface water drainage system incorporating Sustainable Urban Drainage Systems (SuDs) features will collect run off from the proposed development.

The surface water drainage has been designed in accordance with the "Greater Dublin Regional Code of Practice for Drainage Work" (Draft version 6.0) and the CDP 2016-2022. In addition, the recommendations of the Greater Dublin Strategic Drainage Strategy (GDSDS) and EN752:2017 *Drain and sewer systems outside buildings - sewer system management* have been incorporated into the surface water design.

The SuDS design incorporates the following parameters:

- Return period for pipe network 2 years,
- Time of entry 4 minutes
- Pipe Friction (Ks) 0.6 mm
- Minimum Velocity 0.75 m/s
- M5 – 2D = 62.1
- M5-60 = 16.9 mm
- Ratio r (M5-60/M5-2D) = 0.272
- Climate Change 20% for rainfall intensities.

Attenuated surface water will discharge to the Baldonnel Stream.

The surface water drainage network has been designed and simulated for a range of storm events (including 1 in 1, 1 in 30 and 1 in 100-year storm events) using the Network module of Microdrainage. Refer to Appendix 5 Surface Water Drainage Calculations for Microdrainage results.

A breakdown of the impermeable areas contributing to the network in Table 5-1.

Table 5-1 Breakdown of Impermeable Areas

Type of Surface	Runoff Coefficient	Gross Area (sq.m)
Tarmac Surfaced Roads	0.90	1,175
Gravel Surface Roads	0.80	1,140
Crushed Road Hardstand Area	0.60	6,020
Concrete Hardstanding	0.90	605

Grasscrete Parking	0.60	323
Pedestrian Footways	0.90	1,030
Roof	0.9	2,268
Open Space	0.0	5,410

5.2 ATTENUATION

It is proposed to attenuated runoff from the proposed development to Greenfield Runoff or Q_{bar} as per the recommendations of the GDSDS. Q_{bar} is estimated at 5.1l/s using the *Institute of Hydrology* equation.

$$Q_{bar[rural]} = 0.00108\ x\ AREA^{0.89} x SAAR^{1.17} x\ SPR^{\ 2.17}$$

Where.

$Q_{bar[rural]}$ = is the mean annual flood flow from a rural catchment

$AREA$ = the area of the catchment in ha. = 50ha

$SAAR$ = is the standard average annual rainfall = 1000

SPR = Standard Percentage Runoff coefficient for the soil category, where SPR values for the 5 soil types are as follows; Soil 1 = 0.1; Soil 2 = 0.3; Soil 3 =0.37; Soil 4 = 0.47; Soil 5 = 0.53

A SPR value of 0.3 (Soil Type 2) has been applied for the subject site.

$$Q_{bar[rural]} = 0.00108\ x\ 50^{0.89} x 1000^{1.17} x\ 0.3^{2.17}$$

$$Q_{bar[rural]} = 138.3l/s\ for\ 50ha\ or\ \ 5.10/s\ for\ an\ area\ of\ 1.84ha$$

5.2.1 SuDs (Sustainable Urban Drainage Systems)

A number of SuDs features have been proposed into the surface water drainage system in accordance with the GDSDs. SuDs are incorporated to attenuate runoff and volumes; reduce pollutant concentrations in surface water and to replicate the natural characteristics of surface water run off for the site in its pre-developed state. The following SuDs features are proposed.

5.2.1.1 Attenuation Tanks

Surface water runoff from the site will be collected and directed towards the proposed Pluvial Cube attenuation tank. This attenuation tank has been reduced in size from 490m^2 to 355m^2.The tank will be located beneath the Permeable Grasscrete Car Parking area. The surface water infrastructure will cater for the storage of a 1 in 100 year storm event.

5.2.1.2 Permeable Paving

It is proposed to install permeable Grasscrete within the parking areas of the site. The water once permeated into the pavement will be allowed to infiltrate into the ground. The inclusion of the permeable paving will slow the surface water to be treated on site and provide storage. Refer to *Figure 5-1*.

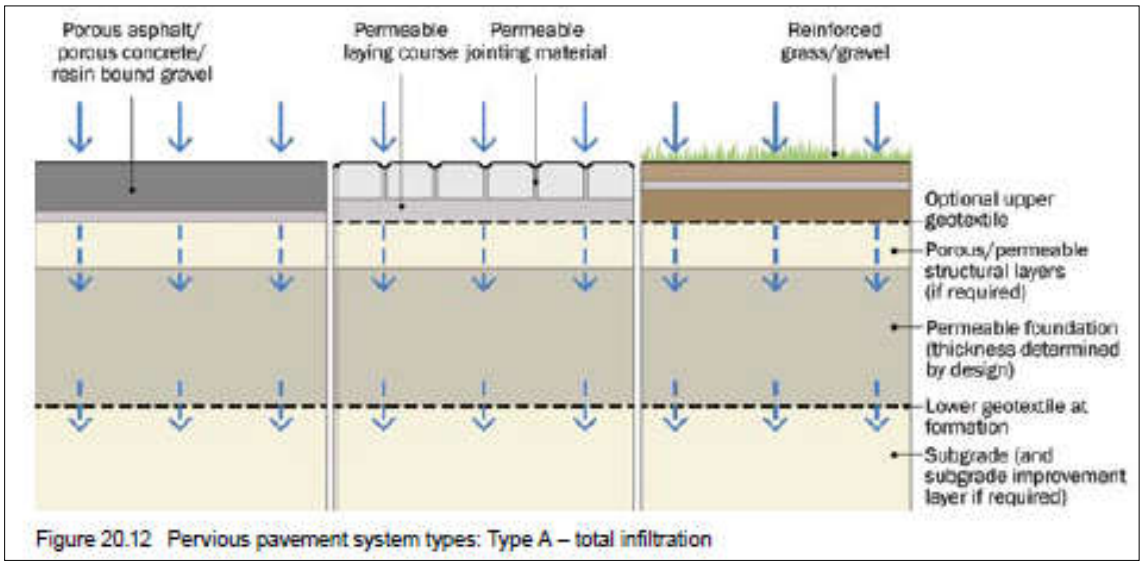

Figure 5-1: Typical Cross Section of an infiltration permeable paving (Extract from CIRA SuDs Manual)

5.2.1.3 Dry Swale/Bioretention area

The dry swale is a vegetated conveyance channel, designed to include a filter bed of prepared soil that overlays an underdrain system. This underdrain provides additional treatment and conveyance capacity beneath the base of the swale/bioretention and prevents water logging. To prevent infiltration, or where groundwater levels are high, a liner is to be introduced at the base. Refer to

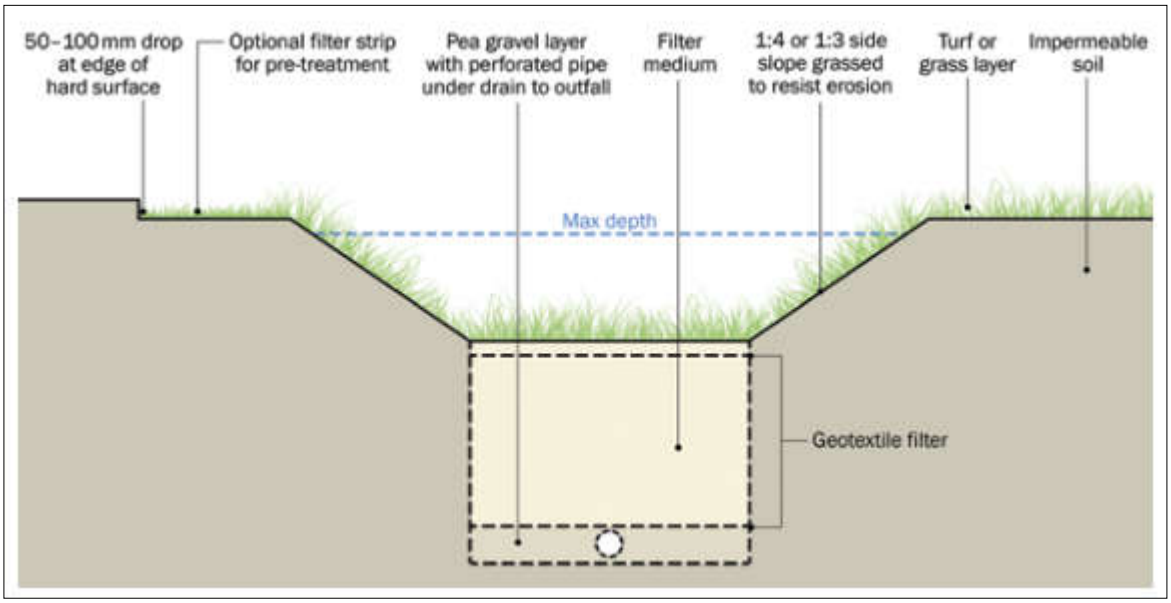

Figure 5-2: Typical Cross Section of dry swale/bioretention area (Extract from CIRA SuDs Manual)

5.2.1.4 Petrol Interceptor

It is proposed to flow all the surface water collected through a petrol interceptor before discharging to the Baldonnel Stream to ensure a certain level of treatment is provided to the surface water.

5.2.1.5 Hydrobrake

The rate of discharge from the proposed development will be controlled using two Hydrobrakes. The total rate of discharged was determined using the QBAR greenfield run off method. The total rate of discharge was calculated at 5.1l/s.

b) **The applicant is requested to submit a cross section detail of all proposed Sustainable Drainage (SuDS) features for the development ie. Grasscrete, Swales permeable paving, infiltration basins etc. The applicant shall also examine whether there is potential to include further SuDS features across the site such as detention basins, further swales, filter drains etc.**

Please refer Planning Application Drawings 11069-2004 and 11069-2011 for SuDS details.

c) **The applicant is requested to submit a revised surface water drainage layout showing that surface water is discharged to the Baldonnel Stream in the direction of flow and not against the flow which is currently proposed. The drawing shall also show that the proposed attenuation system is a minimum of 3m away from all existing and proposed Wastewater and Water supply infrastructure on the site also external to the site.**

Please refer Planning Application Drawings 11069-2004 and 11069-2011 for SuDS details.

6.0 RFI 5: SURFACE WATER MANAGEMENT (SUDS)

There is a lack of SuDS (Sustainable Drainage System) shown for the proposed development. Natural SUDS features should be incorporated into the proposed drainage system that address amenity, biodiversity and water quality as well as volume attenuation. The use of underground tanks should be avoided.

The applicant shall show further proposed SuDS features for the development such as green roofs, living walls, further natural swales, channel rills, integrated tree pits, bioretention, above ground attenuation, detention basins, reed bed/wetland etc. and other such SuDS and show what attenuation capacity is provided by such SuDS. The SuDS features should be integrated into the landscape proposal and details provided on how they work.

Please refer to the response provided to RFI 4(a)(b)(c) in relation to the introduction of additional SuDS and the reduction in size of the surface water attenuation tank from 490m^2 to 355m^2. This tank is located underneath the car parking spaces within the site and dos not impact on the availability of other parts of the site to provide natural attenuation. In addition, a number of additional SUDS measures are achieved on the site through the introduction of the following:

- Permeable paving;
- Dry swale / bioretention area;
- Detention basin;
- Petrol interceptor; and
- Hydrobrake.

The combination of the above measures will replicate the natural characteristics of surface water run off for the site in its pre-developed state. The Attenuation tank enables the surface water runoff from the site to be as per the pre developed greenfield rate, by attenuating the excess storm water until it is able to discharge the water slowly into the existing stream. Due to the compensatory flood storage and function of the site there is limited green space to accommodate more softer SuDs measures.

There are four main categories of benefits associated with SuDS. These are water quantity, water quality, amenity and biodiversity. The design criteria for these categories are provided in Table 6.1 along with a commentary on how the proposed power plant site is proposed in accordance with same.

Table 6-1 Design Criteria for SuDS

Category	Design Criteria	Commentary
Water quantity	1. Use surface water runoff as a resource. 2. Support the management of flood risk in the receiving catchment. 3. Protect morphology and ecology in receiving waters. 4. Preserve and protect natural hydrological systems on the site. 5. Drain the site effectively. 6. Manage on site flood risk. 7. Design system flexibility to cope with future change.	The SuDS design philosophy for the proposed power plant will replicate the natural characteristics of surface water run off for the site in its pre-developed state. The surface water drainage has been designed in accordance with the "Greater Dublin Regional Code of Practice for Drainage Work" (Draft version 6.0) and the CDP 2016-2022. In addition, the recommendations of the Greater Dublin Strategic Drainage Strategy (GDSDS) and EN752:2017 *Drain and sewer systems outside buildings - sewer system management* have been incorporated into the surface water design. The total rate of discharged was determined using the QBAR greenfield run off method. The total rate of discharge was calculated at 5.1l/s and will discharge to the Baldonnel Stream. A Climate Change allowance of 20% has been incorporated into the design for rainfall intensities. Volumetric compensation flood storage (refer response to RFI No. 6) is provided within the subject site through the design of a grassed flood storage area to provide open attenuation on site. The proposed storage area provides 1034m^3 of floodplain storage, introducing an additional 231m^3 within the subject site. Care has been taken in the design of compensatory flood storage to ensure connectivity with the floodplain, maintenance of existing channel banks, and efficacy of the proposed drainage system.
Water quality	1. Support the management of water quality in the receiving surface water and groundwater. 2. Design system resilience to cope with future change.	Refer previous row for SuDS design methodology. As indicated in Chapter 9 (Hydrology and Hydrogeology) of the EIA Report submitted with the planning application to SDCC, the predicted residual operational phase impacts on runoff regimes, surface water quality, groundwater levels and groundwater quality is considered not significant or imperceptible.

Amenity	1. Maximise multi functionality. 2. Enhance visual character. 3. Deliver safe surface water management. 4. Support development resilience/adaptability to climate change. 5. Maximise legibility. 6. Support community environmental learning.	The SuDS design provided for the proposed power plant is aimed at servicing the proposed development site in isolation from other 'plots' within the wider Profile Park campus. It is the responsibility of SDCC through the planning application process to ensure that any neighbouring developments in the future provide the same or similar SuDS initiative on respective development 'plots'. As a good neighbour Greener Ideas Limited would be committed to engaging with other developers and indeed the Profile Park management and SDCC to ensure a coordinated and campus wide solution to effective management of surface water issues.
Biodiversity	1. Support and protect natural habitats and species. 2. Contribute to the delivery of local biodiversity objectives. 3. Contribute to habitat connectivity. 4. Create diverse, self-sustaining and resilient ecosystems.	As indicated in Chapter 12 (Biodiversity) of the EIA Report submitted with the planning application to SDCC, the predicted residual biodiversity impacts during operation of the proposed power plant will not result in likely significant residual effects on any of the key ecological receptors at any geographic scale, with the exception of permanent loss of wet grassland habitat within the proposed development site. This conclusion remains unchanged with the updated SuDS design which will introduce several biodiversity benefits including

7.0 RFI 6: FLOODING

There are some areas within the subject site located within Flood Zone B according to South Dublin County Council's Strategic Flood Risk Assessment 2016-2022 and OPW's (Office of Public Works) CFRAM maps. The applicant is required to provide compensation flood storage for any loss in existing flood plain storage to help ensure there will be no exacerbation of flooding issues upstream or downstream of the subject site. The applicant is therefore requested to submit plans, cross sectional details and design calculations which clearly demonstrates how flood compensation storage is being provided on the site given that it is proposed to build within a Flood zone B area. Note: natural solutions and open attenuation should be provided and investigated.

Site-specific hydraulic modelling of the Baldonnel Stream indicates the subject site is liable to fluvial flooding in an extreme 0.1% AEP MRFS event, with predicted flood extents consistent with the South Dublin County Council's Strategic Flood Risk Assessment 2016-2022 and OPW's (Office of Public Works) CFRAM maps. The site-specific hydraulic model predicts a highwater level of approximately 73.66mODand is used as the design flood level for site layout and compensation storage design.

As per Planning Application Drawing 1069-2011, volumetric compensation flood storage is provided within the subject site through the design of a grassed flood storage area to provide open attenuation on site. Based on existing and proposed site topography and the design flood level of 73.66mOD, approximately 803m^3 of floodplain storage is predicted to be displaced by the proposed development. The proposed storage area provides 1034m^3 of floodplain storage, introducing an additional 231m^3 within the subject site. Care has been taken in the design of compensatory flood storage to ensure connectivity with the floodplain, maintenance of existing channel banks, and efficacy of the proposed drainage system.

Based on the results of the hydraulic analysis, it is predicted that increasing site elevations to restrict flows from entering the subject site is predicted to increase water levels up to 0.005m at the subject site during a 1000-year MRFS event without provision of compensatory storage. Flows from the subject site are limited by the adjacent 1.1m diameter culvert, whereby in conjunction with the provision of compensatory storage, it is therefore predicted the proposed development will not impact flood risk elsewhere in the catchment.

In terms of flood risk to the proposed development, proposed FFLs of 74.8mOD provide more than 1m freeboard above the predicted 0.1% AEP MRFS flood level at the site. While roads within the site boundary are depressed to provide additional flood storage in water-compatible areas, the main site access and route from the car park is elevated to provide safe access/egress during an extreme event.

Based on the result of site-specific modelling and Stage 3 Flood Risk Assessment, and the subsequent design of compensatory flood storage, it is predicted that the development will have an imperceptible impact on flood risk upstream/downstream of the subject site, and the risk of flooding associated with the development will be minimal. The proposed development has been assessed against, and demonstrated to satisfy, the criteria of the Planning System and Flood Risk Management (PSFRM) Justification Test which is set out in Appendix 9.1 of the EIAR submitted with the original planning application.

8.0 RFI 7: NOISE

The proposed application highlights a potential for noise to impact on a number of nearby receivers. The noise levels predict a notable change in the noise level at these receivers during the night time period.

- **The applicant is required to assess and re-evaluate all noise emitting equipment proposed on site in this application.**
- **The applicant must undertake necessary modifications to the proposed structures and operations on site in order to reduce the predicted noise levels at the nearby receivers to an acceptable level during both day and night time.**
- **The development must not give rise to noise levels that exceed the background level for evening and night time periods.**
- **The applicant must demonstrate the development can meet the standards set out by South Dublin County Council as noted below:**
- **Noise due to the normal operation of the proposed development, expressed as Laeq over 15 minutes at the façade of a noise sensitive location, shall not exceed the daytime background level by more than 10 dB(A) and shall not exceed the background level for evening and night time. Clearly audible and impulsive tones at noise sensitive locations during evening and night shall be avoided irrespective of the noise level.**

In response to this RFI, AWN Consulting has prepared a Noise Modelling Briefing Note which is included as Appendix 6. Each of the above requirements are comprehensively assessed both in terms of the original assessment and the updated assessment which was required given the change in design and the overall reduction in scale of the power plant which was made in light of Council statements in the RFI.

The following is noted:

- The adopted noise limits proposed in the EIAR (see Section 12.2.1.7) satisfy the "standards set out by South Dublin Council" as noted in the RFI. The criteria were selected such that predicted noise associated with the site does "*not exceed the daytime background level by more than 10 dB(A)*" and does "*not exceed the background level for evening and night time*".
- As part of the original EIAR the plant was reviewed and selected such that the predicted noise levels satisfy the "*standards set out by South Dublin Council*" as noted in the RFI. Therefore, there is no requirement for "*modifications to the proposed structures and operations on site in order to reduce the predicted noise levels at nearby receivers to acceptable level during both day and night time*". The noise impact presented in the EIAR is directly applicable to the impact presented for the revised layout being proposed as part of the wider RFI response.
- While the predicted noise levels presented in the EIAR did show a change in noise level at nearby noise sensitive locations the impacts were not determined as significant as detailed in the relevant sections of the EIAR (i.e. Table 12.19, Table 12.20 and Table 12.21).
- To reiterate the predicted noise levels presented in the EIAR did not present "*noise levels that exceed the background level for evening and night time periods*".

As part of a wider response to the RFI the site layout has altered with a reduction in the scale of the proposed power plant. The noise modelling presented in the EIAR has been updated and the results of this exercise are presented in Appendix 7. The results of the updated modelling do not change the comments presented in relation to RFI 7.

Review of the predicted increases in noise level at the nearest residential noise sensitive locations conclude that the associated impact is 'Not Significant' at all locations for daytime and evening periods. During night-time periods the predicted impact is Not Significant at all locations with the exception of R01 and R14 where a Slight impact is predicted. This impact is considered acceptable in terms of Environmental Protection Agency (EPA) Draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2017). By contrast, a significant impact is one where there is a 5dB increase in baseline noise and this is clearly not applicable in this case.

It should be noted that this power plant will be subject to an Industrial Emissions Licence (IEL) from the Environmental Protection Agency. As per Section 34(2)(c) of the Planning and Development Act 2000, as amended, the control of emissions arising from licensed facilities is a function of the Agency. Greener Ideas Limited will ensure as that the proposed power plant operates in accordance with the requirements of any future Industrial Emissions Licence.

9.0 RFI 8: ARCHAEOLOGY

The Planning Authority notes the report received from the Department. The development site is located in a historic area adjacent to the site of Recorded Monument DU021-004- Kilbride Castle. In addition, recent archaeological investigations for the site immediately to the West of the proposed site (ref Geophysical Survey 20R0080 for Profile Properties) has identified the remains of a sub-circular enclosure and associated field systems. Archaeological testing has also confirmed the presence of this feature (carried out under licence 21E0061). Having regard to known archaeological features/materials including an enclosure measuring approximately .30m in diameter in proximity to the site the applicant is requested to submit a full Archaeological Assessment of the lands as part of this Additional Information request. The Planning Authority notes the lack of information in the EIAR. The applicant should liaise directly with the Department prior to responding to this AI request and submit all details of this correspondence and agreements.

In response to this RFI, IAC Archaeology has prepared an Archaeological Assessment Report which is included as Appendix 7. The purpose of the assessment was to investigate the archaeological and historical resource on the site of the proposed power plant.

Archaeological testing was carried out over the course of one day on the 4th of November 2021 using a mechanical excavator fitted with a flat grading bucket. The trenches targeted open green space to fully investigate the archaeological potential of the site. Testing revealed one area of archaeological significance which is an oval pit filled by a light grey plastic silty clay-marl with frequent inclusions of charcoal and animal bone. It may represent a waterlogged pit, possibly a well or cistern.

Spoil from a third-party development covered the north and north western area of the site which prevented test trenches from being excavated in this area. The eastern area of the site had around 2.5m of modern backfill consisting of different layers of gravel and concrete blocks and with 0.2m of topsoil, which lead to the scaling back of test trenches.

IAC Archaeology has recommended that the area of impact associated with the oval pit should be preserved by record through full archaeological excavation prior to the construction of the proposed power plant.

IAC Archaeology has also recommended that all ground disturbances associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage.

In relation to the wording of the above mitigations, this is standard wording required by the National Monuments Service (NMS) and is considered typical for archaeological features such as that identified on the proposed power plant site.

In relation to the final point in the RFI and the requirement to liaise directly with the NMS and to provide details of same, all such details are included in Appendix 8. These include:

- The RFI received from South Dublin County Council;
- NMS Application Form (NMS 1 – 2019);
- Method Statement;
- Archaeological Testing Confirmation Letter from Client.
- NMS Licence Approval;

The above information (i.e. NMS application documents), plus NMS approval of Archaeological Assessment Report) and completion (i.e. the submission of the final report to NMS) is the standard engagement process with NMS for such investigations and associated reporting. It should be noted that NM do not normally acknowledge these submissions except in rare circumstances. It is more likely that the NMS will engage with the Planning Authority if a formal request for opinion on same is requested.

Notwithstanding the above, a request for an opinion on the assessment has been made of NMS but at the time of the RFI submission to SDCC no response had been received.

10.0 RFI 9: SITE ACCESS AND MOBILITY

The applicant is requested to submit a revised layout showing the, bicycle parking and pedestrian routes within the development. Please refer to Table 11.22: Minimum Bicycle Parking Rates– SDCC County Development Plan 2016-2022.

a) **The minimum width of footpaths shall be 1.8m wide to aid mobility impaired users.**
b) **All external bicycle parking spaces shall be covered.**
c) **Footpath layout shall provide adequate connectivity around the development and footpaths on the main road.**

Please refer Planning Application Drawings 11069-2003 which has been updated to better illustrate footpaths within the development site. It is proposed that as part of the detailed design of the proposed power plant that an updated pedestrian and cyclist mobility plan is agreed with SDCC. Greener Ideas Limited is happy to accept a planning condition relating to same. It should be noted that bicycle parking will be covered.

Appendix 1 – Design Statement

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BUILT ON KNOWLEDGE

PROFILE PARK POWER PLANT

DESIGN STATEMENT

PROFILE PARK POWER PLANT

DESIGN STATEMENT

Document Control Sheet	
Document Reference	11069
Report Status	Planning Issue
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TABLE OF CONTENTS

1.0 INTRODUCTION

Greener Ideas Limited was originally proposing to develop a gas fired peaker power plant with capacity to generate up to 125MW of electricity at a site located in Profile Park, Dublin 22. Following a Request for Further Information, issued by South Dublin County Council, this proposal has now been reduced to a generating capacity of up to 102MW

Unlike traditional power stations, peaking plants generally run only when there is a high demand for electricity, typically during morning and evening peak usage times. The need for peaking plants on the Irish electricity grid has grown, as renewable forms of power generation increase their penetration onto the system. The variability of renewable power generation increases EirGrid's challenge to operate an efficient, safe, and secure electricity system. This is especially the case in the greater Dublin region, where demand is growing rapidly, and there is expected to be a large increase in offshore wind power generation by 2030. The modular design of the Profile Park peaker power plant, and its fast response capability, means it can react quickly to vary its output. So, mirroring the peaks and troughs of electricity generation, from renewable generators. The proposed plant will also be hydrogen enabled, in preparation for running on renewable gas when it is available. Which is consistent with the policy objectives set out in the Climate Action Plan 2021.

The purpose of this document is to provide an overview of the proposed power plant, it's surrounding context and basis of design. The design statement should be read in conjunction with drawings, plans and other information submitted as part of this planning application.

2.0 PROPOSED DEVELOPMENT

The revised project will involve the development of a gas fired peaker power plant with capacity to generate up to 102MW of electricity and will comprise the following main development components:

- Site Entrance
- Engine Hall comprising up to 5 no. gas engines and 1 no. exhaust stack cluster;
- Electrical Annex Building;
- Workshop Building;
- Security Hut;
- Radiator Coolers;
- 110 kV Electrical Transformer(s);
- Gas AGI;
- Tank Farm comprising:
  - 2 x Fuel Oil Storage Tank;
  - SCR reagent Tank;
  - Lube Oil Storage Tank;
  - Lube Oil Maintenance Tank;
  - Pilot Oil Tank;
  - Fire Water Storage Tank;
  - Cooling Water Run-Down Tank;

  - Surface Water Attenuation Tank;
- Fencing;
- Car Park;
- Landscape planting around perimeter of site.

Access to the site will provided on the north western boundary, which adjoins the existing internal road network of Profile Park.

The proposal includes the adoption of Sustainable Urban Drainage System (SUDS) design measures in order to effectively manage surface water on site.

3.0 EXISTING SITE

3.1 Site Description

The site of the proposed power plant is approximately 1.9 hectares in size and is presently a greenfield. The topography can be described as mostly flat with elevations from c. 73 mAOD to 76 mAOD. Baldonnel Stream is located within the site boundary and flows through the site in a south-north direction. There are currently no land use activities on site.

The north western and eastern boundaries of the site are defined by the internal road network of Profile Park and Digital Realty Trust is located immediately south of the site.

3.2 Site Location

The site of the proposed peaker power plant is located in Profile Park, Dublin 22. This is a 100 acre (40.5 Ha) fully enclosed, private business park which has been developed to the highest of standards. It is easily accessible from the major arterial roads in the city including the M50, M7 and M4, and is served by excellent public transport links.

Within Profile Park the proposed power plant will be located on greenfield lands immediately adjacent to the existing Digital Realty data centre. The site of the proposed power plant has been identified by South Dublin County Council in its County Development Plan 2016-2022 as Zoning Objective 'EE' which is 'To provide for enterprise and employment related uses'. The Profile Park business park is connected directly onto the Dublin metropolitan fibre network called the T50. The T50 is a multi-duct fibre carrying system which extends over 44 km and provides connectivity to 24 business parks, and from these into the global data networks. Existing tenants within Profile Park and the surrounding business and enterprise parks include Google, Microsoft, Digital Realty Trust, Telecity and others.

Immediately adjacent to Profile Park is the Castlebaggot 110/220 kV substation, which provides electrical transmission connectivity to the national electricity transmission grid system. This substation is connected to the Barnakyle 110kV substation, located on the Profile Park Business park, which, in the near future, will be connected to the proposed Kilcarbery 110kV substation, located adjacent to the proposed peaker power plant.

The nearest residential properties are located some 400m to the south of the site and some 450m to the north east. Grange Castle Golf Course is located approximately 120m east of the site and Baldonnel Aerodrome 450m south of the site.

3.3 Site Context

The immediate area is predominantly commercial / industrial in nature.

The proposed power plant will be located within the functional area of South Dublin County Council and the application site is situated within land designated as "Employment and Enterprise" under the South Dublin County Council Development Plan 2016 -2022 (CDP). The objective of 'Enterprise and Employment (EE)" Zoning is to provide for enterprise and employment related uses; specifically:

> *"Enterprise and Employment (EE) zoned lands will accommodate low to medium intensity enterprise and employment uses. Enterprise and Employment zoned lands to the west of the County in the vicinity of the Grange Castle and Citywest economic clusters have the capacity to attract high tech manufacturing and associated strategic investments, due to the availability of large sites that are supported by high quality infrastructure and services."*

The proposed power plant is consistent with EE zoning objectives and furthermore, sympathetic to the overall development strategy of the surrounding environment as envisioned in the CDP.

An Environmental Impact Assessment (EIA) Report has been prepared in order to inform the planning application for the proposed power plant.

4.0 BASIS OF DESIGN

4.1 Design Considerations

The design and layout of the proposed power plant has considered the following:

- Presence of site features and constraints such as Baldonnel Stream;
- Proximity to neighbouring sites such as Digital Realty Trust;
- Potential environmental impacts with respect to noise, air and visual; and
- Integration into the surrounding industrial landscape.

4.2 Design Approach

4.2.1 Massing

The arrangement of buildings and structures seeks to break up and soften the visual impact of the development.

The layout of the proposed power plant is arranged into zones, each area providing a unique function for the overall operation of the development. The principal building, the proposed Engine Hall, is located to the forefront of the site, with additional and ancillary infrastructure placed in the background. The tallest structure on site, the proposed exhaust stack is centrally located and set back from all adjacent buildings and existing public roads. The proposed tank farm is located along the southern boundary of the site, which adjoins the adjacent Digital Reality site.

4.2.2 Materials

The proposed design of the buildings has included a simple palette of materials which is both in keeping with the functionality of the proposed use and cognitive of the site location within an industrial park.

As discussed in pre-application consultation meeting with SDCC it is proposed that a high-quality cladding specification will be agreed with SDCC prior to the commencement of development.

4.2.3 Integration

The application site is situated within land designated as “Employment and Enterprise” by the CDP’s Land Use Zoning Map no. 4.

The objective of ‘Enterprise and Employment” (EE) Zoning is to provide for enterprise and employment related uses; specifically:

“Enterprise and Employment (EE) zoned lands will accommodate low to medium intensity enterprise and employment uses. Enterprise and Employment zoned lands to the west of the County in the vicinity of the Grange Castle and Citywest economic clusters have the capacity to attract high tech manufacturing and associated strategic investments, due to the availability of large sites that are supported by high quality infrastructure and services.”

Land Use Classes identified as 'Permitted in Principle' within EE zones include, Public Services, which is further defined as:

"A building or part thereof or land used for the provision of public services. Public services include all service installations necessarily required by electricity, gas, telephone, radio, telecommunications, television, drainage and other statutory undertakers, it includes: public lavatories, public telephone boxes, bus shelters, bring centres, green waste and composting facilities."

Section 11.2.5 of the CDP states: "Enterprise and employment areas are characterised by a structure that is distinctly different to those of other urban areas. Most industrial estates are characterised by large functional buildings that are set back from the street, extensive areas of hard surfacing and security fences. A number of industrial estates, and in particular newer business parks, incorporate extensive areas of open space to create a more attractive parkland-like setting."

According to Table 11.18 of the CDP, the key principles within Enterprise and Employment Zones entail the three broader categories of 'Access & Movement,' 'Open Space and Landscape" and 'Built Form and Corporate Identity.' The criteria of these categories are as follows:

Access and Movement:

- Major links to and through a site are provided as identified within a local plan, Masterplan and/or as determined by a site analysis process.
- The street network is easy to navigate and a clear a hierarchy is applied, identifying the function of each street.
- Individual streets are designed in accordance with the requirements of the Design Manual for Urban Roads and Streets.
- Large areas of parking (in particular staff parking) are located to the rear of buildings and screened from the street. Smaller areas of parking can be located to the front of buildings provided they are well designed (including areas of planting) and do not result in excessive setbacks from the street.
- The design and layout of new business parks should promote walking, cycling and the use of public transport, including adequate provision of cycle and pedestrian linkages.

Open Space and Landscape:

- Recreation of an open space network with a hierarchy of spaces suited to a variety of functions and activities.
- Development within business parks maintain and promote a parkland-like setting with high quality landscaping.
- Important nature features of the site such as trees, hedgerows and watercourses are retained, integrated within the landscape plan and reinforced with the planting of native species.
- Natural buffer zones and defensive planting are used to define private space and the use of fencing to the front of buildings minimised. Where fences interface with the public domain they should be of a high quality and incorporate elements of landscaping (for screening).

Built Form and Corporate Identity:

- Building heights respond to the surrounding context with transitions provided where necessary and reinforce the urban structure with taller buildings located along key movement corridors, gateways and nodes.
- Individual buildings should be of contemporary architectural design and finish (including use of colour). Various treatments should be employed to reduce the bulk, massing and scale of larger buildings.
- The layout and design of buildings maximise frontages onto the public realm and enclose private external spaces (such as service yards and car parks) and storage areas behind them.
- Signage should be simple in design and designed to integrate with architectural feature and/or the landscape setting (see also Section 11.2.8 Advertising, Corporate Identification and Public Information Signs).

Section 9.2.0 of the CDP pertains to landscape.

Heritage, Conservation and Landscapes (HCL) Policy 7 Landscapes:

" *It is the policy of the Council to preserve and enhance the character of the County's landscapes particularly areas that have been deemed to have a medium to high Landscape Value or medium to high Landscape Sensitivity and to ensure that landscape considerations are an important factor in the management of development.*"

HCL7 Objective 1:

"To protect and enhance the landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, taking full cognisance of the Landscape Character Assessment of South Dublin County (2015)."

HCL7 Objective 2:

"To ensure that development is assessed against Landscape Character, Landscape Values and Landscape Sensitivity as identified in the Landscape Character Assessment for South Dublin County (2015) in accordance with Government guidance on Landscape Character Assessment and the National Landscape Strategy."

According to the South County Dublin Landscape Character Assessment, the study area is located within the 'Newcastle Lowlands' Landscape Character Area. The key characteristics of this Landscape Character Area are:

- Low-lying and gently undulating agricultural lands over limestone
- Established communication corridors include the Grand Canal and railway corridor traverse east to west and two aerodromes at Weston and Baldonnel
- Agricultural land use primarily pasture and tillage
- Increasing influence of urban activities closer to the motorways, national roads and regional roads
- Long history of historic settlement and human activity with medieval landscape complex associated with Newcastle village and surrounds.
- Number of demesnes associated with former country houses and institutions including reuse of older country houses at sites such as Peamount and Baldonnel.

In terms of 'Forces for Change,' these entail:

- Increasing urban influences that impact on the rural landscape character
- Fragmentation of agriculture -related habitats through piecemeal development
- Rural housing pressures
- Loss of separation distance between established urban and rural character
- The relatively flat and open landscape is vulnerable to adverse visual and landscape impacts of development

Designated Scenic Views and Prospects

In terms of visual and scenic amenity, the South County Dublin Development Plan contains designated scenic views and prospects, but none are relevant to the proposed study area.

A Townscape / Landscape Visual Impact Assessment has been undertaken as part of the EIAR for this project and concluded that:

- The vast majority of the study area will not experience any likely visibility of the proposed development, including most areas of residential development;
- The highest likely visibility of the proposed development will be from within Profile Park, and this primarily entails views of the proposed engine building and exhaust stack;
- Aside from treetops, only thin, isolated shards of likely visibility of the proposed development will be attainable from within Grange Castle Golf Club or Corkagh Park;
- The Grand Canal is unlikely to experience any visibility of the proposed development;
- Where likely visibility of the proposed development will be attained from within the grounds of Baldonnel Aerodrome, it almost exclusively pertains to the proposed exhaust stack only.

Mitigation has been embedded into the colour scheme of the proposed structures. This has been partly informed by the colour scheme of large buildings existing within the business park, but also through a form of horizontal stratification of the proposed colour scheme. By adopting a tonal transition, from darker tones to lighter shades from the ground upwards, it will help diminish the perceived height of taller structures such as these. In summary, the lighter shades on the tallest structures (i.e. from about 7m high upwards) help to 'visually merge' with the sky backdrop; mid-layer tones are designed to merge with building and tree tops, while lower down (e.g. the bottom 2-3m of each structure) the darker tones help assimilate to earthy soil tones and/or vegetation. In addition, the proposed tanks will alternate between two different tones, to help deter perceptions of 'massing.'

A Landscape Mitigation Plan has also been prepared for the proposed power plant, which incorporates a buffer of native woodland thicket on the road-facing sides of the site. Along with a proposed native hedgerow and wild grass seeding elsewhere on the site, it will soften the appearance of buildings and to help integrate the site into the surrounding landscape setting.

Overall, the landscape proposals serve to add a high quality landscape finish to the apron of the facility and help to anchor and establish it within its business park setting. However, the site landscaping is mainly apparent within the immediate visual context of the facility and is not intended as screen planting in respect of receptors within the wider area.

Overall, it is considered that the proposed development is an appropriate contribution to both the existing and likely future built fabric of this peri-urban area and it will not result in any significant residual townscape or visual impacts.

4.2.4 Accessibility

An accessibility statement will be prepared as part of the building design and will be in the application to South Dublin County Council for a Disability Access Certificate (DAC). Part M of the B of the Building Regulations will be observed in respect of the works proposed. Dispensation from Sections 1.1 (part) and 1.3 will be south in respect of certain plant areas.

Segregated Pedestrian and Cycle access routes are provided in the Profile Park and along the R134 providing the main access route into Profile Park.

As recommended dropped kerbing and tactile paving slabs will be installed at all crossing points, in accordance with "Guidance on the Use of Tactile Paving Slabs". It is further recommended that disabled parking spaces, in accordance with the South Dublin Development Plan, be provided and located in accordance with the National Disability Authorities "Building for Everyone". The requirement is for5% of the proposed parking provisions to be designated for disabled parking as per Building for Everyone. 20% disabled parking is provided.

4.2.5 Access and Parking Provision

The existing site access from one of the main arteries within Profile Park will be used, this is a T-junction and is located on the north western boundary of the site.

Parking requirements are in accordance with the Design Standards for New Apartments 1998 and South Dublin County Council Development Plan 2016-2022. The car parking provisions at the site have been proposed as follows;

- 10 spaces for Staff;
- 2 Un-abled user spaces.
- Provision for 2 no. electrical charging points are also provided as part of the parking design.

4.2.6 Fire Safety

Part B of the Building Regulations will be observed in respect of the proposed power plant buildings, where relevant. The development will be carried out in compliance with a Fire Safety Certificate.

The fire-fighting protection system philosophy is based on widely recognized National Fire Protection Association (NFPA) standards. Piping and equipment may still follow standards used by the fire protection equipment supplier.

The standpipe system inside the engine hall will follow 'NFPA14 class II standpipe system' requirements. Additionally, mobile foam units will be provided. For immediate action against small local fires, the engine hall will be equipped with a number of powder extinguishers at strategic locations and CO2 extinguishers for electrical fires (spacing as per NFPA10). The fire main will be built using the design guideline 'NFPA24 Private fire service main'.

The firefighting pump will operate on diesel. The pump will be located within the fire pump house. The pump will only be used in an emergency and for short duration testing, a maximum of 30 minutes once a week. The pump will have an electrical output of less than 100 kW.

The firefighting system for the plan will include a prefabricated, insulated fire pump house, firewater storage tank, engine hall water mist system, control and switchgear room suppression system, transformer water deluge system, fire hydrant ring main, fire and gas detection system for the site.

4.2.7 Building Services

Emergency lighting will be provided throughout the building in accordance with BS 5266-1 Emergency lighting Code of practice for the emergency lighting of premises. The escape lighting will be sited to provide an appropriate luminance near each door exit door and where it is necessary to emphasise potential danger or safety equipment.

It should also be noted that a Lighting Plan will be undertaken during the detailed design of the power plant to ensure there are no vertical spill or glare issues on neighbouring residential or commercial properties. This lighting plan will be designed in accordance with the International Standard IS EN 13201-2:2015 (Road Lighting).

With regards to foul wastewater drainage, domestic type wastewater effluent will be generated on site. It is estimated that at any one time, there will be no more than 12 personnel on site, i.e., the maximum number of people on site at any given time for testing, maintenance, site meetings etc. An approximate volume of 0.1157 l/sec of domestic type wastewater was identified as the maximum domestic wastewater flow which may be generated on site. Wastewater will be pumped to the existing foul sewer in Profile Park which is directly adjacent to the site. Irish Water has confirmed via its 'Pre-connections Enquiry' process that the above water wastewater volume can be facilitated through the existing network (IW reference: CDS21002228).

4.2.8 Sustainability

Part L of the building Regulations will be observed in respect of the works proposed. The following information outlines additional measures employed to improve energy efficiency during the operation of the proposed power plant:

- Planned maintenance schedules and plant conditioning monitoring will be employed to ensure optimum operating efficiency;
- Widespread use of insulation will be employed to minimise heat loss;
- Cladding and insulation will be inspected regularly and replaced / repaired as soon as practicable;
- Good housekeeping techniques will be employed to minimise energy wastage;
- Plant warm up procedures will be optimised to minimise supplementary fuel use;
- Heat transfer surfaces will be regularly cleaned;
- Where possible, equipment will be shut off when not in use;
- All employees will be provided with energy awareness and conservation training. Energy usage and opportunities for energy efficiency improvements will be identified and implemented through environmental management systems.
- High efficiency pumps and fans will be employed where practicable;

- High efficiency motors and drives with variable speed will be employed where practicable;
- The design of the main and ancillary buildings will comply with the requirements of the European Union (Energy Performance of Buildings) Regulations 2012;
- An energy efficiency audit will be completed as part of the EMS. The audit will be undertaken in accordance with the Guidance Note on Energy Efficiency Audits, EPA (2003); and
- The EMS will focus on resource and energy use minimisation. Objectives and targets will be developed to ensure continuous improvement as considered practicable.

In addition, an Outline Waste Management Plan (OWMP) has been prepared in accordance with waste management guidance and principles as outlined in Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015) and Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. The requirement to develop, maintain and operate this OWMP to a detailed Construction Waste Management Plan (CWMP) will form part of the contract documents for the project.

The proposal includes the adoption of SUDs design measures in order to effectively manage surface water on site. The following items are included in the surface water design strategy:

- Surface Water Pumps in Duty/Standby Arrangement
- Petrol Interceptor
- Down Pipes/Gullies
- Flow Control Device
- Swale / Bioretention Area
- Permeable Paving
- Detention Basin

5.0 CONCLUSION

The development has been designed in accordance with the following Acts, Regulations and Guidance:

- Planning and Development Acts 2000 (as amended)
- Planning and Development Regulations 2001 (as amended)
- South Dublin County Council Development Plan 2016-2022
- Building Regulations 1997 – 2019
- Building Control Regulations 1997-2018
- Irish/British and European Standards and Codes of Practice.
- International Building Code (IBC) 2018
- Safety, Health and Welfare at Work Act 2005
- Safety, Health and Welfare at Work (General Application) Regulations 2007 as amended
- Safety, Health and Welfare at Work (Construction) Regulations 2013
- Safety, Health and Welfare General Principles of Prevention
- National Disability Authorities “Building for Everyone”

- Design Standards for New Apartments 1998
- National Fire Protection Association (NFPA) standards
- BS 5266-1 Emergency lighting Code of practice for the emergency lighting of premises
- International Standard IS EN 13201-2:2015 (Road Lighting)
- European Union (Energy Performance of Buildings) Regulations 2012
- Guidance Note on Energy Efficiency Audits, EPA (2003)
- Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015)
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006

Overall, it is considered that the proposed development is an appropriate contribution to both the existing and likely future built fabric of this peri-urban area associated with Profile Park and it will not result in any significant residual townscape or visual impacts. The design is considered compatible with the existing built and natural environment and with the provisions of the South Dublin County Development Plan.

Appendix 1: Place Making and Urban Design

Section 11.2.O of the CDP indicates that the Council is committed to ensuring that best practice urban design principles are applied to all new development and that a series of Planning Guidance documents should be adhered to in respect of such development. These documents are identified below and includes analysis providing a commentary on the relevancy of these documents t the proposed power plant development at profile Park.

- **Sustainable Residential Development in Urban Areas, DECLG (2009) and the companion Urban Design Manual – A Best Practice Guide, DECLG (2009)**

The aim of the Sustainable Residential Development in Urban Areas Guidelines is to "*set out the key planning principles which should be reflected in development plans and local area plans, and which should guide the preparation and assessment of planning applications for residential development in urban areas*". The proposed power plant at Profile Park would be located within lands which are zoned for "Employment and Enterprise" by the CDP's Land Use Zoning Map no. 4. The objective of 'Enterprise and Employment" (EE) Zoning is to provide for enterprise and employment related uses; specifically:

"Enterprise and Employment (EE) zoned lands will accommodate low to medium intensity enterprise and employment uses. Enterprise and Employment zoned lands to the west of the County in the vicinity of the Grange Castle and Citywest economic clusters have the capacity to attract high tech manufacturing and associated strategic investments, due to the availability of large sites that are supported by high quality infrastructure and services."

The Sustainable Residential Development in Urban Areas Guidelines are not considered relevant in the context of the proposed power plant development.

- **The Design Manual for Urban Roads and Streets, DTTS and DECLG (2013)**

The DMURS provides guidance relating to the design of urban roads and streets. It presents a series of principles, approaches and standards that are necessary to achieve balanced, best practice design outcomes with regard to street networks and individual streets. In this context it should be noted that the DMURS is directly relevant to the wider Profile Park campus. Its policies, which are relevant to street networks and street design generally, are already evident in the existing design and street configuration of the Profile Park campus which has already been consented by SDCC. However, the DMURS itself is not explicitly relevant to individual 'plot' developments within existing streetscapes, with the exception of forward visibility and visibility splays as provided for in Section 4.4.4 and 4.4.5. In that context it should be noted that these requirements have been considered in the design of the proposed power plant and Planning Application Drawing 11069-2005, provides details of same and demonstrated full compliance with DMURS.

- **Retail Planning Guidelines for Planning Authorities, DECLG (2012) and companion Retail Design Manual, DECLG (2012)**

The aim of the Retail Planning Guidelines for Planning Authorities is to "*ensure that the planning system continues to play a key role in supporting competitiveness in the retail sector for the*

benefit of the consumer in accordance with proper planning and sustainable development". The proposed power plant at Profile Park would be located within lands which are zoned for "Employment and Enterprise" by the CDP's Land Use Zoning Map no. 4. The objective of 'Enterprise and Employment" (EE) Zoning is to provide for enterprise and employment related uses; specifically:

"Enterprise and Employment (EE) zoned lands will accommodate low to medium intensity enterprise and employment uses. Enterprise and Employment zoned lands to the west of the County in the vicinity of the Grange Castle and Citywest economic clusters have the capacity to attract high tech manufacturing and associated strategic investments, due to the availability of large sites that are supported by high quality infrastructure and services."

The Retail Planning Guidelines for Planning Authorities are not considered relevant in the context of the proposed power plant development.

- **Green City Guidelines, UCD Urban Institute, Dun Laoghaire Rathdown County Council and Fingal County Council (2008)**

The Green City Guidelines are designed to provide practical guidance for planners and developers on how to integrate biodiversity into new developments, specifically medium to high-density housing developments in urban areas. Notwithstanding some of the key message in this Guidelines are considered relevant to the proposed power plant development. For example, the need to ensure ecological surveys have been undertaken; avoiding habitats of sensitive value using new technologies such as SuDS etc.

In the context of Biodiversity generally, Greener Ideas Limited would direct SDCC to the Biodiversity chapter of the EIAR previously provided (Chapter No. 12). This chapter provides comprehensive baseline and impact assessment analysis. No significant impacts on ecological reports are identified. It is also important to note that the development proposes to protect and enhance the existing Baldonnel stream which is within the site as well as providing biodiversity corridors. For example, the landscaping plan which is proposed includes a combination of native hedging and woodland, a wetland planting mix and pollinator friendly grass seed mix. In addition, a Screening for Appropriate Assessment concluded the proposed development, either alone or in-combination with other plans and projects, will not result in significant effects on any European site, in view the conservation objectives of the site.

In relation to SuDS this is discussed in detail in the response to Further Information request. In summary, it is proposed to include the following SuDS features:

- Permeable paving;
- Dry swale / bioretention area;
- Detention basin.

Appendix 2 CDP Tables 11.18 and 11.17 Review

CDP Table 11.18 Key Principles for Development within Enterprise and Employment Zones

Key Principles for Development within Enterprise and Employment Zones		
Access and Movement	Major links to and through a site are provided as identified within a local plan,	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. Profile Park has existing major links to road networks outside of the park and within the park has existing trunk road infrastructure servicing multi development sites, including the proposed power plant. All of this road infrastructure has previously been consented by SDCC. The proposed power plant will have an access onto this existing network. The proposed road network within the development consists of both hardstanding and permeable gravel roads which provide full access within the site and are largely screened from external view outside of the site.
	Masterplan and/or as determined by a site analysis process. The street network is easy to navigate and a clear a hierarchy is applied, identifying the function of each street.	As per above, the proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. The existing street network has previously been consented by SDCC. The proposed power plant will have an access onto this existing network.
	Individual streets are designed in accordance with the requirements of the Design Manual for Urban Roads and Streets.	As per above. It should also be noted that the site access will comply fully with DMURS requirements in relation to site entranceways and visibility splays. In this context, Planning Application Drawing 11069-2005 indicating the visibility splays is

		relevant. All other DMURS requirement are indirectly relevant in that they apply to the wider Profile Park campus and not specific 'plots' or 'sites' for individual development within the campus environment.
	Large areas of parking (in particular staff parking) are located to the rear of buildings and screened from the street. Smaller areas of parking can be located to the front of buildings provided they are well designed (including areas of planting) and do not result in excessive setbacks from the street.	This requirement is complied with in respect of the parking proposed as part of the power plant development.
	The design and layout of new business parks should promote walking, cycling and the use of public transport, including adequate provision of cycle and pedestrian linkages.	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park. Profile Park has existing cycle and pedestrian linkages throughout its campus. All of this infrastructure has previously been consented by SDCC. The proposed power plant will access onto this existing network and in that respect form an extension of same.
Open Space and Landscape	Creation of an open space network with a hierarchy of spaces suited to a variety of functions and activities.	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. The requirements over are directly relevant to thew wider Profile Park campus and it is the responsibility of SDCC to ensure that the Park is developed in such a way that incorporates open space networks as part of the master planning for the wider campus. In respect of the proposed power plant development, substantial landscaping and green areas have been introduced within the site. These include native hedgerows a, native woodlands and pollinator friendly wild grass seed mix.

	Development within business parks maintain and promote a parkland-like setting with high quality landscaping.	As above.
	Important nature features of the site such as trees, hedgerows and watercourses are retained, integrated within the landscape plan and reinforced with the planting of native species.	As above.
	Natural buffer zones and defensive planting are used to define private space and the use of fencing to the front of buildings minimised. Where fences interface with the public domain they should be of a high quality and incorporate elements of landscaping (for screening).	As above.
Built Form and Corporate Identify	Building heights respond to the surrounding context with transitions provided where necessary and reinforce the urban structure with taller buildings located along key movement corridors, gateways and nodes.	The layout of the proposed power plant is arranged into zones, each area providing a unique function for the overall operation of the development. The principal building, the proposed Engine Hall, is located to the forefront of the site, with additional and ancillary infrastructure placed in the background. The tallest structure on site, the proposed exhaust stack is centrally located and set back from all adjacent buildings and existing public roads. The proposed tank farm is located close to the southern boundary of the site, which adjoins the adjacent Digital Realty data centre. A circular access road provides access throughout the site to all key buildings and infrastructure and is week screened from external views.
	Individual buildings should be of contemporary architectural design and finish (including use of colour). Various treatments should be employed to reduce the bulk, massing and scale of larger buildings.	The proposed design of the buildings has included a simple palette of materials which is both in keeping with the functionality of the proposed use and cognitive of the site location within lands which are zoned for enterprise and commercial and which have

		previously been considered as acceptable for power plant development. The altered colour scheme proposed with the RFI response introduces a stronger vertical element to the colour scheme to take advantage or perceived solid and void (dark and light) to reduce the perceived bulk of the largest elements and in particular the engine hall. As discussed in pre-application consultation meeting with SDCC it is proposed that a high quality cladding specification will be agreed with SDCC prior to the commencement of development.
	The layout and design of buildings maximise frontages onto the public realm and enclose private external spaces (such as service yards and car parks) and storage areas behind them.	Car parking facilities within the site will be screened from views from outside the site by a proposed native woodland mix of planting.
	Signage should be simple in design and designed to integrate with architectural feature and/or the landscape setting (see also Section 11.2.8 Advertising, Corporate Identification and Public Information Signs).	Signage will be simple in design and designed to integrate with architectural features within the proposed power plant development. All signage will be pre-approved in consultation with SDCC.

CDP Table 11.17 Masterplan Considerations

Key Consideration	Key Outcomes	Commentary
Access and Movement	Identification of the major strategic links throughout the area for different modes, showing key points of access and links between key destinations.	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. Profile Park has existing major links to road networks outside of the park and within the park has existing trunk road infrastructure servicing multi development sites, including the proposed power plant. All of this road infrastructure has previously been consented by SDCC. The proposed power plant will have an access onto this existing network. The proposed road network within the development consists of both hardstanding and permeable gravel roads which provide full access within the site and are largely screened from external view outside of the site.
	Identification of a street hierarchy showing the function of streets and the appropriate design responses.	As per above, the proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. The existing street network has previously been consented by SDCC. The proposed power plant will have an access onto this existing network.
	Creation of a highly walkable and cyclable environment that offers pedestrian and bicycle users direct access and route choice throughout.	As per above, the proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. The existing street network including

		walking and cycling facilities have previously been consented by SDCC. The proposed power plant will access onto this existing network.
Open Space and Landscape	Creation of an open space network with a hierarchy of spaces suited to a variety of functions and activities.	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. The requirements over are directly relevant to the wider Profile Park campus and it is the responsibility of SDCC to ensure that the Park is developed in such a way that incorporates open space networks as part of the master planning for the wider campus. In respect of the proposed power plant development, substantial landscaping and green areas have been introduced within the site. These include native hedgerows a, native woodlands and pollinator friendly wild grass seed mix.
	Retention of significant natural features and Green Infrastructure links, such as trees, hedgerows and watercourses and their integration within the open space network.	The existing habitats / natural features on the site of the proposed power plant include:: • Wet grassland (dominant habitat on site). • Hedgerow (i.e. on fence line associated with neighbouring data centre) • Eroding/Upland river (i.e. Baldonnel Stream). There are no other natural features on site. As indicated in Chapter 12 (Biodiversity) of the EIA Report submitted with the planning application to SDCC, the

		predicted residual biodiversity impacts during operation of the proposed power plant will not result in likely significant residual effects on any of the key ecological receptors at any geographic scale, with the exception of permanent loss of wet grassland habitat within the proposed development site.
	Careful placement of major parks and squares so that they function as focal points and central features within neighbourhoods and centres.	Not relevant. The existing Profile Park campus has already been consented by SDCC in terms of its enabling infrastructure (roads, streets, services, movement corridors, security etc). These lands are also zoned as appropriate for 'Enterprise and Employment'.
Land Use and Density	Distribution of land uses to create a sustainable and efficient urban structure by directing more intensive uses and higher densities towards centres, transport nodes and along key movement corridors.	As above
	Facilitation of a range of uses to promote integrated and active places.	As above
	Provision of a range of dwellings and/or commercial unit types and sizes to support a balanced mix of household types and market choice.	As above
Built Form	Clear definition of streets and spaces (public, semi-private and private) to create a legible and secure environment.	As above
	Distribution of heights to reinforce the urban structure with taller buildings located along key movement corridors and within centres and nodes.	As above

	Use of landmarks, gateways and other changes in built form and landscaping to promote a legible structure.	As above
Phasing	Division of the site/development into manageable sections for detailed design and assessment.	The arrangement of buildings and structures seeks to break up and soften the visual impact of the development. The layout of the proposed power plant is arranged into zones, each area providing a unique function for the overall operation of the development. The principal building, the proposed Engine Hall, is located to the forefront of the site, with additional and ancillary infrastructure placed in the background. The tallest structure on site, the proposed exhaust stack is centrally located and set back from all adjacent buildings and existing public roads. The proposed tank farm is located along the southern boundary of the site, which is located close to neighbouring Digital Reality.
	A logical programme for development that ensures the coordinated and incremental development of the lands.	It is expected that construction will commence in 2023 with design, construction, and commissioning activities lasting for approximately 20 months. The plant is expected to be fully operational in 2024/25 subject to timely receipt of the necessary statutory consents.
	Identification of critical infrastructure (such as streets, parks, schools and community facilities) with delivery linked to the completion of individual phases.	The proposed power plant will be located within Profile Park which is an established enterprise and employment zoned park within the SDCC planning authority area. Profile Park has existing trunk road infrastructure servicing multi development sites, including the proposed power plant.

		The EIA Report submitted with the planning application contains details of the nearby sensitive receptors to the proposed development. No significant impacts on these receptors are predicted.

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Appendix 2 - LVIA Addendum

(refer separate attachment with RFI Response)

Appendix 3 – Air Quality Assessment

TOBIN
CONSULTING ENGINEERS
BUILT ON KNOWLEDGE

Greener Ideas

PROFILE PARK POWER PLANT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 10: AIR QUALITY AND CLIMATE

MARCH 2022

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10.0 AIR QUALITY AND CLIMATE

10.1 INTRODUCTION

AWN Consulting Ltd. were commissioned to undertake an air quality and climate assessment of the proposed power plant at Profile Park. The purpose of the assessment was to determine the air quality and climatic impact, in line with the Industrial Emissions Directive (2010/75/EU) and Best Available Techniques (BAT) Reference Document for Large Combustion Plants (2017), from the proposed plant in isolation and cumulatively with the existing licensed facilities at Profile Park.

The assessment of the emissions to air included other Industrial Emissions (IE) Licenced plants include Pfizer, Takeda and the Grange Castle Power Facility and these have been modelled alongside the proposed plant.

The impact assessment consisted of the following components:

- Review of emission data and other relevant information needed for the modelling study;
- Summary of background NO_2 levels;
- Dispersion modelling of released substances under the following scenarios:
  - A scenario with five individual exhaust flues at the proposed plant;
  - A scenario with one pseudo stack at the proposed station, where physical and emission characteristics of the five individual stacks were combined to produce one pseudo stack emission source;
  - The individual stacks scenario was found to be the more conservative scenario and as such the results are presented in this chapter; and
  - A scenario with mitigation for the individual stacks scenario.
- Cumulative assessment of the Profile Park Power Station and all existing IE Licenced emission points in the region for each scenario;
- Presentation of predicted ground level concentrations of released substances;
- Evaluation of the significance of these predicted concentrations, including consideration of whether these ground level concentrations are likely to exceed the relevant ambient air quality limit values;
- Assessment of the potential greenhouse gas (GHG) emissions associated with the proposed development; and
- Assessment of the potential impact of the plumes associated with the operational phase of the proposed station on aircraft, for both scenarios.

The natural gas engines may also be powered by diesel oil as back-up to the normal gas supply. Testing in this mode is expected to occur for a maximum of 18 hours per annum. Emergency operation and testing of the engines using diesel oil have been scoped out of this air modelling assessment as it is not expected that these operation modes would cause any significant impacts on ambient air quality considering the infrequent and unpredictable usage of this back-up fuel. A pre-heat boiler will also be in operation to prepare the main generators i.e. the boiler and main generators will not operate simultaneously. A worst-case scenario of the main generators operating continuously 24 hours per day, 7 days per week has been modelled.

Information supporting the conclusions has been detailed in the following sections. The assessment methodology and study inputs are presented in Section 10.2. The dispersion modelling results for the worst-case individual stacks scenario and assessment summaries are presented in Section 10.3. The model formulation is detailed in Appendix 10.1 and a review of the meteorological data used is detailed in Appendix 10.2. The dispersion modelling results for the pseudo stack scenario and with mitigation scenario, and assessment summaries are presented in Appendix 10.3. The plume modelling results for both scenarios (individual stacks scenario and the pseudo stack scenario) are presented in Appendix 10.4. For a glossary of terms used in this chapter please refer to Appendix 10-1.

10.1.1 Statement of Competency

This chapter of the EIAR has been prepared by the following staff of AWN Consulting Ltd:

Dr. Jovanna Arndt (Senior Air Quality Consultant) holds a BSc (Hons) in Environmental Science, a PhD in Atmospheric Chemistry and is a member of the Institute of Air Quality Management. Jovanna has specialised in air quality since 2010 and has extensive knowledge of air dispersion modelling of a variety of infrastructure projects, including power stations, and is experienced in monitoring and managing the associated air quality impacts.

Dr. Edward Porter (Director) holds a BSc (Hons) in Chemistry a PhD in Atmospheric Chemistry and is a member of the Institute of Air Quality Management. Edward has specialised in air quality since 1993 and has extensive knowledge of air dispersion modelling air monitoring and climate impact assessments.

10.2 METHODOLOGY

10.2.1 Air Quality Methodology

Emissions from the Profile Park power plant and the existing air emission points at Pfizer, Takeda and the Grange Castle Power Facility have been modelled using the AERMOD dispersion model (Version 19191) which has been developed by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2019) and following guidance issued by the EPA (EPA, 2020a). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources and has replaced ISCST3 (USEPA, 1995) as the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 1998, 2000a, 2017). The model has more advanced algorithms and gives better agreement with monitoring data in extensive validation studies (EPA, 2021; Schulman et al., 1998; Paine & lew, 1997a, 1997b; USEPA, 1999). An overview of the AERMOD dispersion model is outlined in Appendix 10.1.

The air dispersion modelling input data consisted of information on the physical environment (including existing and proposed building dimensions and terrain features), design details and process emissions data for the existing air emissions points and estimated process emissions data for the proposed power plant as well as five years of appropriate hourly meteorological data. Using this input data the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality limit value to assess the significance of impacts associated with the existing and proposed emissions from the site.

The modelling aims to achieve compliance with the guidance outlined within the EPA AG4 Guidance for Air Dispersion Modelling (EPA, 2020a) for the maximum permissible process contribution:

> *"When modelling a facility, the uncertainty in the model should be considered. If the facility is operated continually at close to the maximum licenced mass emission rate (i.e. maximum concentration and maximum volume flow) the process contribution (PC) should be less than 75% of the ambient air quality standard and less than this where background levels account for a significant fraction of the ambient air quality standard based on the formula":*
>
> *Maximum Allowable Process Contribution= 0.75*(AQS-BC)*

This approach allows for inherent uncertainty in air dispersion modelling to be taken into account in order to avoid a risk of exceeding the air quality standards. The modelling assessment has aimed to achieve a process contribution that is less than 75% of the ambient air quality standard at licenced conditions.

Throughout this study a worst-case approach was taken. This will most likely lead to an over-estimation of the levels that will arise in practice. The worst-case assumptions are outlined below:

- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Conservative background concentrations were used;
- The effect of building downwash, due to on-site and any nearby off-site buildings, has been included in the model;
- All emission points were assumed to run continuously, every hour of the day, 365 days per year;
- The Ozone Limiting Method (OLM) was used to model NO_2 concentrations. The OLM is a regulatory option in AERMOD which calculates ambient NO_2 concentrations by applying a background ozone concentration and an in-stack NO_2/NO_X ratio to predicted NO_X concentrations. An in-stack NO_2/NO_X ratio of 0.1 and a background ozone concentration of 55 µg/m^3 were used for modelling the proposed Profile Park Power Station and all existing emission points for the purpose of this study even though the in-stack ratios are likely to be lower in reality;

The contour patterns shown in the figures in this chapter, which are a representation of the variation in ambient ground level pollutant concentrations beyond the site boundary, are a function of several interacting parameters. Wind speed and direction are important in determining offsite ambient concentrations. However, building downwash is also an important consideration and for each emission point the relative position of the stack to the dominant building will be important and will lead to variations in the offsite contour patterns which cannot be intuitively forecast in advance. Thus, the resultant pollutant contour pattern is a function of several parameters and will vary as a result of how all of these parameters interact with each other.

10.2.2 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air

Quality Standards" are health- or environmental-based levels for which additional factors may be considered. The applicable limit values in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC (see Table 10.1).

These limit values have been used in the current assessment to determine the potential impact of NO_X emissions from the proposed facility on air quality. Oxides of nitrogen (NO_X) is a term commonly used to describe a mixture of nitric oxide (NO) and nitrogen dioxide (NO_2), referred to collectively as NO_X. These are primarily formed from atmospheric and fuel nitrogen as a result of high temperature combustion. The major sources in most countries are road traffic and power generation. During the process of combustion, atmospheric and fuel nitrogen is partially oxidised via a series of complex reactions to NO. The process is dependent on the temperature, pressure, oxygen concentration and residence time of the combustion gases in the combustion zone. Most NO_X exhausting from a combustion process is in the form of NO, which is a colourless and tasteless gas. It is readily oxidised to NO_2, a more harmful form of NO_X, by chemical reaction with ozone and other chemicals in the atmosphere.

Modelling for NO_2 was undertaken in detail for the dual fuel gas engines. These engines (as per CRU requirements) are also required to have the capacity to operate on diesel oil in emergency scenarios. These operating scenarios are '*other than normal operating conditions'* (OTNOC) and therefore any emissions during these periods (i.e. NO_2, CO, SO_2 and particulate matter (PM_{10}/$PM_{2.5}$) are not subject to emissions limit values specified in the Industrial Emissions Directive (2010/75/EU) and Best Available Techniques (BAT) Reference Document for Large Combustion Plants (2017). Further detail on OTNOC is provided in Section 10.2.3.6.

No modelling for NO_2 was undertaken for the gas engines using diesel oil to for start up operations as this is also OTNOC and will occur for less than five minutes on start up. In relation to CO, SO_2, PM_{10} and $PM_{2.5}$ no detailed modelling was undertaken. Emissions of these pollutants are significantly lower than the NO_X emissions from the generators relative to their ambient air quality standards and thus ensuring compliance with the NO_2 ambient limit value will ensure compliance for all other pollutants. For example, the emission of CO from the generators is at least eight times lower than NO_X whilst the CO ambient air quality standard is 10,000 µg/m^3 compared to the 1-hour NO_2 standard of 200 µg/m^3. Similarly, levels of PM_{10}/$PM_{2.5}$ emitted from the generators will be 90 times lower whilst the ambient air quality standards are comparable. Emissions of SO_2 are approximately 55 times lower than emissions of NO_X.

Table 10-1: Air Quality Standards 2011 (Based on Directive 2008/50/EC)

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3 NO_2
		Annual limit for protection of human health	40 µg/m^3 NO_2
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2

Note A EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC.

10.2.3 Air Dispersion Modelling Methodology

The United States Environmental Protection Agency (USEPA) approved AERMOD dispersion model has been used to predict the ground level concentrations (GLC) of compounds emitted from the proposed power plant.

The modelling incorporated the following features:

- Three receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised "hot-spots" were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. The inner grid measured 3 km x 3 km with concentrations calculated at 125m intervals. The medium grid measured 10 km x 10 km with concentrations calculated at 250m intervals, whilst the outer grid measured 20 km x 20 km with concentrations calculated at 500m intervals. Boundary receptor locations were also placed along the ownership boundary of the site at 100 m intervals and sensitive receptors were also identified, giving a total of 1,753 calculation points for the model.
- All on-site buildings and significant process structures were mapped into the computer to create a three dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.
- Detailed terrain has been mapped into the model using SRTM data with 30 m resolution. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2018a).
- Hourly-sequenced meteorological information has been used in the model. Meteorological data over a five year period (Casement Airport Meteorological Station, 2016 – 2020) was used in the model (see Figure 10-1).
- The source and emissions data, including stack dimensions, gas velocities, emission temperatures and pollutant emission rates have been incorporated into the model.

- A stack height determination study was also undertaken as part of the air dispersion modelling study to ensure that ambient levels of pollutants beyond the site boundary are below the maximum allowable process contribution (PC) based on the following formula for maximum operations outlined in AG4:

Maximum Allowable PC = 0.75*(AQS)
where there is no significant background concentration

Maximum Allowable PC = 0.75*(AQS – BC)
where there is a significant background concentration

This approach allows for the inherent uncertainty in air dispersion modelling to be taken into account in order to avoid a risk of exceeding the air quality limit values.

10.2.3.1 Terrain

The AERMOD air dispersion model has a terrain pre-processor AERMAP (USEPA, 2018) which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from SRTM. This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, Hcrit, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (Hc). As outlined in the AERMOD model formulation (USEPA, 2019) a plume embedded in the flow below Hc tends to remain horizontal; it might go around the hill or impact on it. A plume above Hc will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model "captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted" (USEPA, 2019).

The modelling domain is an area of generally moderate terrain to the east, north and west with complex terrain rising in the south due to the proximity of the Dublin Mountains within 5-10km of the site boundary.

10.2.3.2 Meteorological Data

The selection of the appropriate meteorological data has followed the guidance issued by the USEPA (USEPA, 2000a). Casement Aerodrome meteorological station, which is located approximately 9.5 km northwest of the site, collects data in the correct format and has data capture collection of greater than 90% for the required parameters. Long-term hourly

observations at Casement Aerodrome meteorological station provide an indication of the prevailing wind conditions for the region (see *Figure 10-1*). Results indicate that the prevailing wind direction is from a westerly to south-westerly direction over the period 2016 - 2020. The mean wind speed is 5.5 m/s over the period 1981 – 2010. The data is provided by Met Éireann (source www.met.ie).

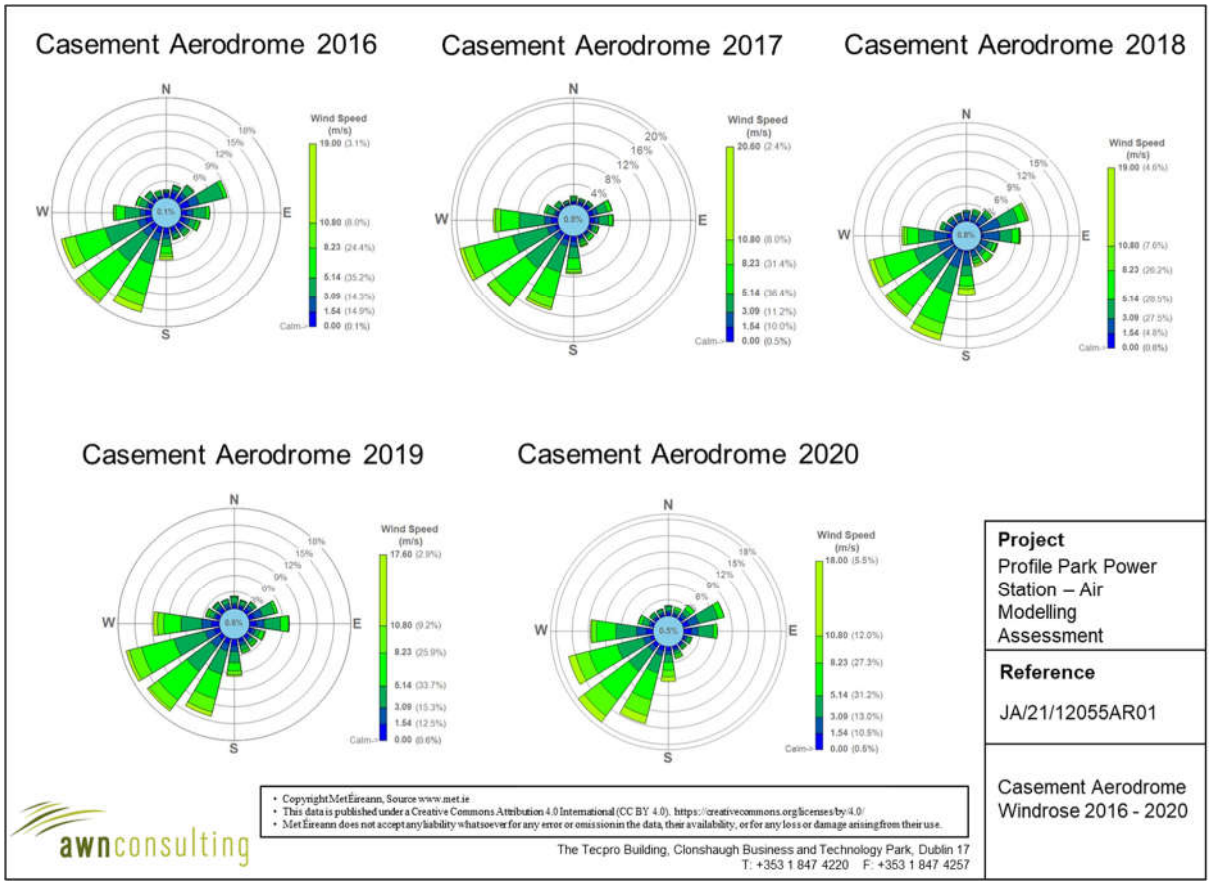

Figure 10-1: Casement Aerodrome Meteorological Station Windrose 2016 to 2020 (Met Éireann 2021)

10.2.3.3 Geophysical Considerations

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2019). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2018) to enable the calculation of the appropriate parameters. The AERMET meteorological pre-processor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc.) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10 km from the meteorological station for Bowen Ratio and albedo and to a distance of 1 km for surface roughness in line with USEPA recommendations (USEPA, 2014, 2018).

In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published (ADEC, 2008). The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Casement Aerodrome Meteorological Station) rather than the installation;
- Surface roughness should use a default 1 km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around the site, the land use should be sub-divided by sectors with a minimum sector size of 30°;
- Bowen ratio and albedo should be based on a 10 km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

AERMOD has an associated pre-processor, AERSURFACE (USEPA, 2014), which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET (ADEC, 2008). This approach has been applied to the current site.

10.2.3.4 Building Downwash

When modelling emissions from an industrial installation, stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800 m).

The USEPA has defined the "Good Engineering Practice" (GEP) stack height as the building height plus 1.5 times the lesser of the building height or maximum projected building width. It is generally considered unlikely that building downwash will occur when stacks are at or greater than GEP (USEPA, 1985).

When stacks are less than this height, building downwash will tend to occur. As the wind approaches a building it is forced upwards and around the building leading to the formation of turbulent eddies. In the lee of the building these eddies will lead to downward mixing (reduced plume centreline and reduced plume rise) and the creation of a cavity zone (near wake) where re-circulation of the air can occur. Plumes released from short stacks may be entrained in this airflow leading to higher ground level concentrations than in the absence of the building.

The Plume Rise Model Enhancements (PRIME) (Paine & Lew, 1997, Schulman et al., 1998) plume rise and building downwash algorithms, which calculates the impact of buildings on plume rise and dispersion, have been incorporated into AERMOD. The building input processor BPIP-PRIME produces the parameters which are required in order to run PRIME. The model takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10° intervals). The model determines the change in plume centreline location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model (Paine & lew, 1997).

10.2.3.5 Process Emissions

Dispersion modelling of NO_2 has been undertaken to determine the following:

- A scenario with five individual stacks from the proposed power plant;
- A scenario with one pseudo stack from the proposed power plant;
- Process contributions from the proposed plant for each scenario; and
- Cumulative impacts (Proposed power plant + Pfizer + Takeda + Grange backup power + background concentrations) for each scenario.

Information on the gas fired engines to be used at the power plant were provided by the engine supplier. Information on the Pfizer, Takeda and Grange backup power IE Licensed facilities in the area has been taken from their IE Licences and from Grange Backup Power Air Dispersion Modelling Report (document ID: IE0311313-22-RP-0005). For the purposes of this assessment all plants were assumed to be operating at full load continuously all year round.

The physical stack information for the proposed power station emission points and existing air emission points is provided in *Table 10-2* and the process emission information used in the dispersion model for the emission points operating on natural gas is shown in Table 10-3.

Table 10-2: Physical Stack Information for the Proposed Profile Park Power Station Emission Points and Existing Air Emission Points

Stack Reference		Stack Co-ordinates (UTM) Note A, B	Height Above Ground Level (m) Note B	Exit Diameter (m) Note B
Profile Park Individual Stacks		670355 E 5910344 N 670359 E 5910346 N 670357 E 5910340 N 670361 E 5910342 N 670359 E 5910367 N 670362 E 5910338 N	28.0	1.704
Profile Park Pseudo Stack		670359 E 5910341 N	28.0	4.17
Takeda Facility		669804 E 5911743 N	15	0.56
Grange Backup Power Stack 1		670173 E 5911957 N	25	2.77
Grange Backup Power Stack 2		670148 E 5911958 N	25	3.2
Pfizer Stack 1		670750 E 5911546 N	45	0.85

Stack Reference		Stack Co-ordinates (UTM) Note A, B	Height Above Ground Level (m) Note B	Exit Diameter (m) Note B
Pfizer Stack 2		670751 E 5911544 N	45	0.85
Pfizer Stack 3		670752 E 5911543 N	45	0.85
Pfizer Stack 4		670753 E 5911543 N	45	0.85
Pfizer Stack 5		670752 E 5911546 N	45	2.0

Note A Stack locations are in UTM Zone 29 and are approximate to nearest 5m.
Note B Taken from IE Licences and Grange Backup Power Air Dispersion Modelling Report (document ID: IE0311313-22-RP-0005).

Table 10-3: Process Emissions Information for the Proposed Profile Park Power Station Emission Points and Existing Air Emission Points

Stack Reference	Temp (K) Note A	Volume Flow (Nm^3/hr)	Exit Velocity (m/sec actual) Note A	NO_X Mass Emission (g/s) Note A, B
Profile Park Individual Stacks	595.2	133,862	29.54	2.79
Profile Park Pseudo Stack	595.2	803,174	29.54	16.73
Takeda Facility	533.15	1,181,880	12.88	0.23
Grange Backup Power Stack 1	663.15	594,360	27.6	6.72
Grange Backup Power Stack 2	663.15	594,360	27.6	6.72
Pfizer Stack 1	441	22,320	10.9	0.29
Pfizer Stack 2	441	22,320	10.9	0.29
Pfizer Stack 3	441	22,320	10.9	0.29
Pfizer Stack 4	441	95,040	9.15	1.33
Pfizer Stack 5	441	95,040	9.15	1.33

Note A Taken from Grange Backup Power Air Dispersion Modelling Report (document ID: IE0311313-22-RP-0005).
Note B Emissions from Profile Park Power Station engines staring-up on diesel oil have been scoped out of modelling as they will occur for 5 minutes or less.

10.2.3.6 Other Than Normal Operating Conditions (OTNOC)

As per Section 3.1.16 of the Best Available Techniques (BAT) Reference Document for Large Combustion Plants (2017), it is important to identify OTNOC as they may affect the level of emissions and can include, among others, periods corresponding to the use of emergency fuels for a very short period due to the lack of availability of normally used fuels (serious shortage or sudden interruption) or to disturbances in fuel feeding.

Dispersion modelling of OTNOC has been scoped out of this assessment due to their infrequent occurrence. However, for the emissions that do occur a management plan as part of the environmental management system may be implemented to reduce these emissions, and can include measures such as:

- appropriate design of systems considered to cause OTNOC and that may have an impact on emissions (e.g. low load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines);
- drawing up of specific preventive maintenance plans for these relevant systems, where needed;
- review and recording of emissions caused by OTNOC;
- implementation of corrective actions to return to normal operating conditions (NOC);
- periodic assessment of overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.

10.2.4 Climate Methodology

The impact of the construction phase of the development on climate is determined by a qualitative assessment of the nature, scale and duration of greenhouse gas generating construction activities associated with the proposed development.

The proposed facility, as an electricity provider, forms part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emission from this electricity generator is not included when determining compliance with Ireland's targeted 20% reduction in the non-ETS sector by 2020 i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision (406/2009/EC) target (European Parliament and Council of Europe, 2009).

In terms of future obligations under the "*2030 Climate and Energy Policy Framework*", the European Council (EC, 2014) endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS sector amounting to 43% by 2030 compared to 2005. Thus, the EU policy of operating the ETS (on an EU-wide basis) for large industrial emitters including electricity generators will continue up to 2030 as a minimum and thus electricity generation will have no impact on the non-ETS targets up to 2030.

10.2.5 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%,

respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland *'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050'*(3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'.

The Act makes provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland, 2020a). The General Scheme was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP. The Climate Action and Low Carbon Development (Amendment) Bill 2021 (the Bill) was published in March 2021.

The purpose of the 2021 Climate Bill is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient and climate neutral economy by the end of the year 2050'*. The 2021 Climate Bill will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'*. The 2021 Climate Bill removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The Bill has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Bill defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'.

Individual county councils in Ireland have also published their own Climate Change Strategies which outline the specific climate objectives for that local authority and associated actions to achieve the objectives. South Dublin's County Council's Climate Change Action Plan 2019 - 2024 was published by South Dublin County Council in 2019 and includes the following actions which relate to the Energy and Buildings:

- Energy Planning – E1: "Create Energy Master Plan for the Dublin Region.";

- Energy Planning – E4: "Evidence-based Climate Change Chapter in County Development Plan 2022-2028."; and
- Research & Innovation – E20: "Identify sites for trialling renewable energy projects, including solar PV and geothermal technologies."

10.3 BASELINE ENVIRONMENT

10.3.1 Background Concentrations of Pollutants

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities (EPA, 2020, 2021). The most recent annual report on air quality "Air Quality in Ireland 2019" (EPA, 2020), details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2020). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Profile Park is categorised as Zone A (EPA, 2020).

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2020), at suburban (non-road) Zone A locations in Rathmines, Ringsend, Dun Laoghaire, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 – 24 µg/m^3 in 2019 (see *Table 10-4*). Sufficient data is available for the stations in Rathmines, Dún Laoghaire, Swords, Ballyfermot and Ringsend and to observe the long-term trend since 2015 (EPA, 2020) (see *Table 10-4*), with results ranging from 14 – 24 µg/m^3 and few exceedances of the one-hour limit value, normally transport related, and with an average annual mean for Swords for this period (2015 - 2019) of 14.7 µg/m^3. Based on these results, and the highest concentration recorded at Swords between 2015 – 2019, a conservative estimate of the background NO_2 concentration in the region of the proposed development in 2019 is 16 µg/m^3.

Table 10-4: Annual Mean NO_2 Concentrations In Representative Zone A Locations 2015 - 2019 (µg/m^3)

Year	Rathmines	Dún Laoghaire	Swords	Ballyfermot	Ringsend
2015	18	16	13	16	-
2016	20	19	16	17	-
2017	17	17	14	17	22
2018	20	19	16	17	27
2019	22	15	15	20	24
Average	**19.4**	**17.1**	**14.7**	**17.4**	**24.3**

In summary, existing baseline levels of the pollutants based on extensive long-term data from the EPA are expected to be below ambient air quality limit values in the vicinity of the proposed development.

The Ozone Limiting Method (OLM) was used to model NO_2 concentrations. The OLM is a regulatory option in AERMOD which calculates ambient NO_2 concentrations by applying a background ozone concentration and an in-stack NO_2/NOX ratio to predicted NO_X

concentrations. An in-stack NO_2/NO_X ratio of 0.1 and a conservative ozone value of 55 µg/m^3 was used in the assessment based on the maximum annual average levels recorded over a 5-year period (2015 – 2019) at EPA Zone A locations.

In relation to the annual averages, the ambient background concentration was added directly to the process concentration.

In relation to the short-term peak concentrations, for NO_2 these were assumed to have an ambient background concentration of twice the annual mean background concentration.

10.4 POTENTIAL IMPACTS

10.4.1.1 Construction Phase – Air Quality

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions as a result of excavation works, infilling and landscaping activities and storage of soil in stockpiles. This leads to the potential for nuisance dust. While construction dust tends to be deposited within 350 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2014). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

Initial commissioning activities will involve testing of the power plant engines with low sulphur diesel oil on site i.e. the first testing sequence will be commissioning of the standby generators.

10.4.1.2 Construction Phase – Climate

Construction traffic is be expected to be the dominant source of greenhouse gas emissions as a result of the Proposed Development. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management document 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate.

10.4.1.3 Operational Phase – Air Quality

The potential impact to air quality during the operational phase of the proposed power plant is a breach of the ambient air quality standards as a result of air emissions from the power plant engines. However, as outlined in Section 10.5.3, an iterative stack height determination was undertaken as part of the air dispersion modelling study to ensure that an adequate release height was selected for all emission points to aid dispersion of the plume and ensure compliance with the ambient air quality limit values beyond the site boundary.

The back-up diesel oil will only be used in the event of a power failure at the site. During normal operations at the facility, the electricity will be supplied from the national grid. Electricity to operate the facility will be purchased from the available energy suppliers including power stations and renewable generation sources such as wind power. The Electricity Supplier for the site currently holds a Commission for Regulation of Utilities (CRU) certified fuel mix disclosure, guaranteeing every megawatt-hour (MWh) that they supply in the market is generated from renewable sources.

10.4.1.4 Operational Phase – Climate

The potential impact to climate during the operational phase of the proposed power plant is an increase in GHG emissions associated with the generation of electricity.

10.5 PREDICTED IMPACTS

10.5.1 Construction Phase

10.5.1.1 Air Quality

It is important to note that the potential impacts associated with the construction phase of the proposed power plant are short-term in nature. When the dust mitigation measures detailed in the mitigation section (Section 10.5.3.1) of this report are implemented, fugitive emissions of dust and particulate matter from the site will be ***negative***, ***short-term*** and ***imperceptible*** in nature, posing no nuisance at nearby receptors.

10.5.1.2 Climate

The Institute of Air Quality Management document 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the potential impact on climate change and transboundary pollution from the Proposed Development is deemed to be ***short-term***, ***negative*** and ***imperceptible*** in relation to Ireland's obligations under the EU 2030 target.

10.5.1.3 Human Health

Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be ***neutral***, ***short-term*** and ***imperceptible*** with respect to human health.

10.5.2 Operational Phase

10.5.2.1 Air Quality

The NO_2 modelling results for the power plant individual stacks scenario are detailed in Table 10-5. The NO_2 modelling results for the pseudo stack scenario can be found in Appendix 10.3. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO_2. Emissions from the facility including background lead to an ambient NO_2 concentration which is 47% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2020) and 48% of the annual limit value at the worst affected sensitive receptor (residential property on Kishoge Road) for the worst-case year modelled (2020). Concentrations at the worst affected site boundary receptor are shown in Appendix 10.3.

Table 10-5: Modelled NO_2 ($\mu g/m^3$) Concentrations for the Profile Park Power Station

Pollutant/ Year	Averaging Period	Process Contribution NO_2 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)Note A	Predicted Emission Concentration - PEC NO_2 ($\mu g/Nm^3$)	Limit Values ($\mu g/Nm^3$)Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	2.8	16	18.8	40	47%
	99.8th%ile of 1-hr means	62.6	32	94.6	200	47%
NO_2/2017	Annual Mean	2.7	16	18.7	40	47%
	99.8th%ile of 1-hr means	62.3	32	94.3	200	47%
NO_2/2018	Annual Mean	2.6	16	18.6	40	46%
	99.8th%ile of 1-hr means	62.0	32	94.0	200	47%
NO_2/2019	Annual Mean	2.6	16	18.6	40	47%
	99.8th%ile of 1-hr means	62.5	32	94.5	200	47%
NO_2/2020	Annual Mean	3.2	16	19.2	40	48%
	99.8th%ile of 1-hr means	62.8	32	94.8	200	47%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

The geographical variations in ground level NO_2 concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in *Figure 10-2* and *Figure 10-3*. The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility.

The operational phase impact of the Proposed Development is considered ***long-term***, ***localised***, ***negative*** and ***slight***.

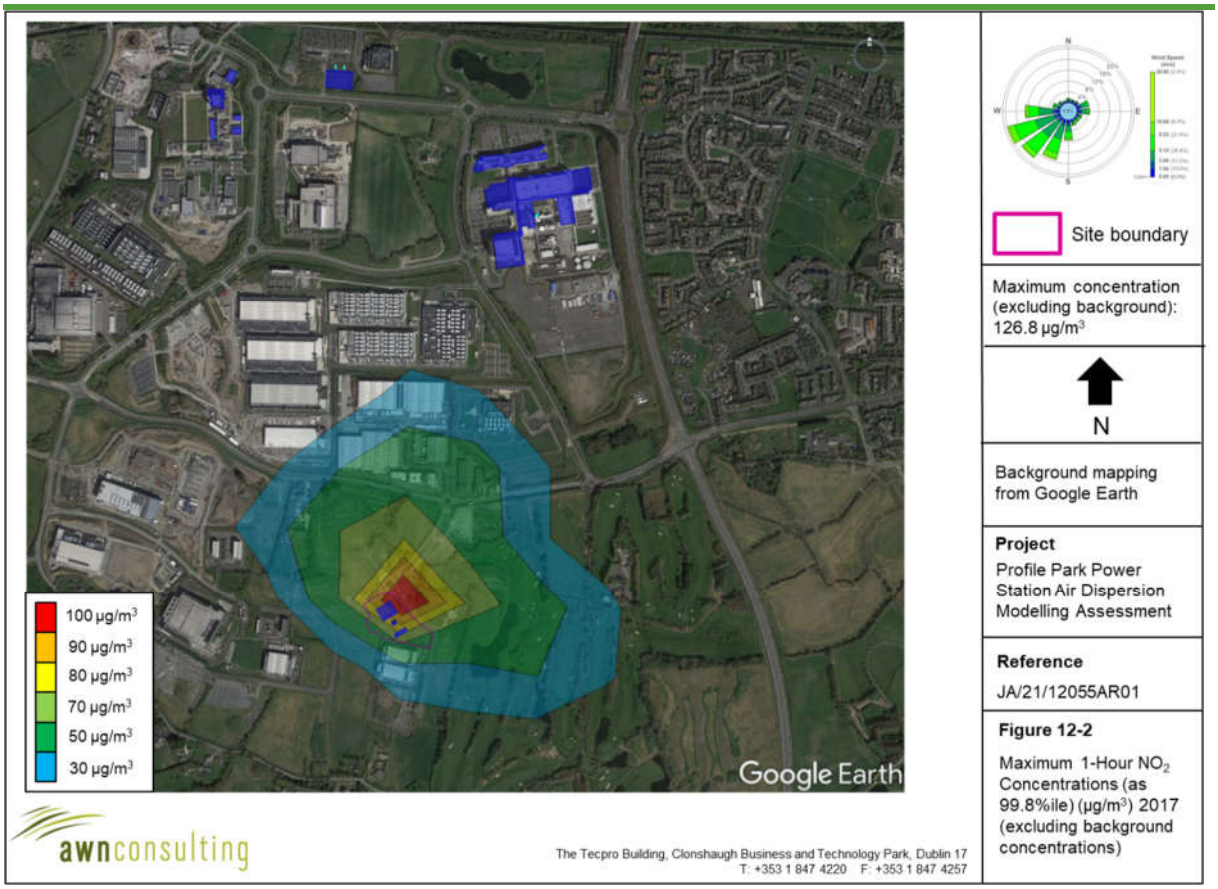

Figure 10-2: Profile Park Power Station Individual Stacks Scenario: Predicted NO_2 99.8th Percentile of Hourly Concentrations (2017)

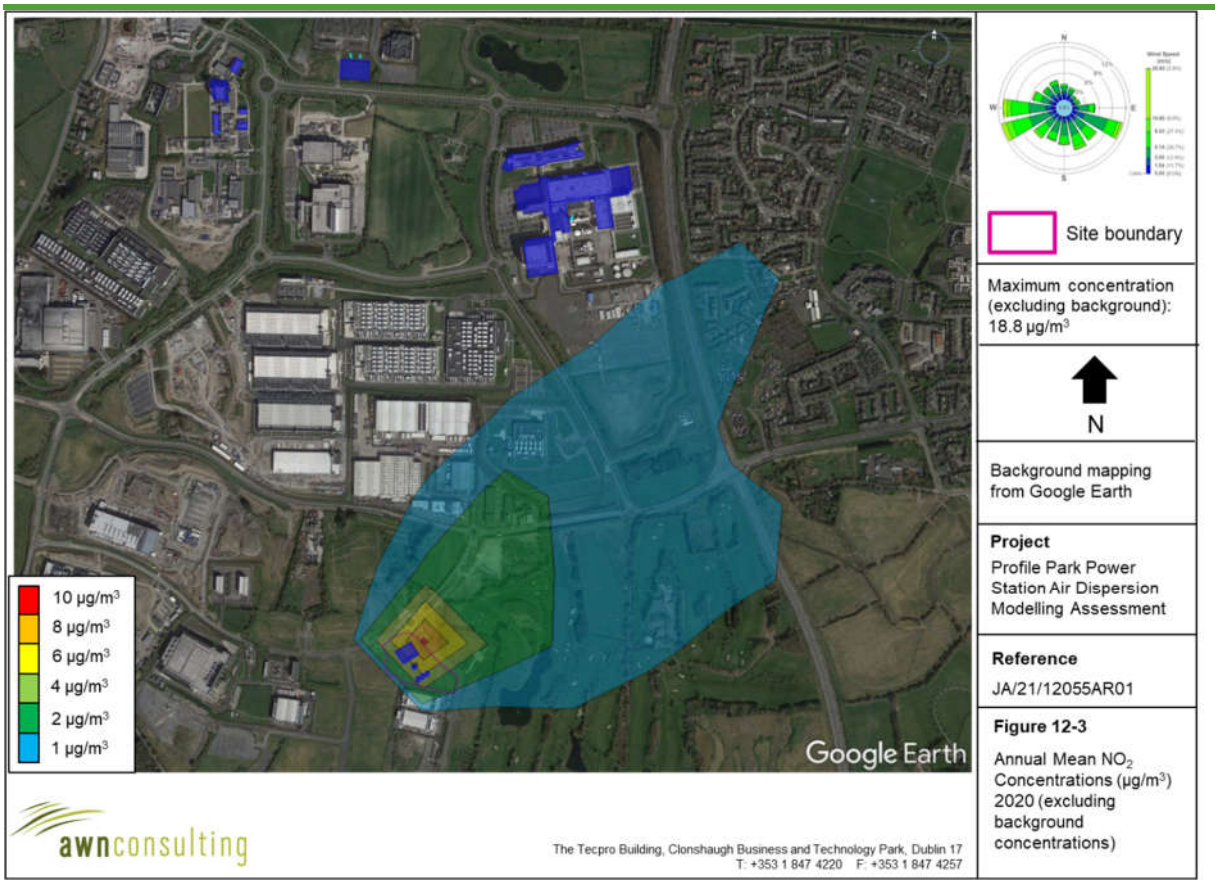

Figure 10-3: Profile Park Power Plant Individual Stacks Scenario: Predicted Annual Mean NO_2 Concentrations (2020)

10.5.2.2 Climate

Electricity providers form part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emissions from these electricity generators are not included when determining compliance with the targeted 30% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision target. Thus, any necessary increase in electricity generation will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision. Under this scenario, as outlined in the Regulation, the new electricity provider will be treated as a "new entrant" under Phase IV of the ETS (i.e. an electricity generator obtaining a greenhouse gas emissions permit for the first time after 30th June 2018). The new electricity provider will be required to purchase allocations in the same manner as existing players in the market using the European Energy Exchange. EU leaders have also decided that during Phase IV (2021-2030) 90% of the revenue from the auctions will be allocated to the Member States on the basis of their share of verified emissions with 10% allocated to the least wealthy EU member states. The revised EU ETS Directive has enshrined in law the requirement that at least 50% of the auctioning revenues or the equivalent in financial value should be used for climate and energy related purposes.

In 2018, the market reported a fall of 4.1% (73 million tones CO2eq) from 2017, the EU noted that much of the revenue raised by the cap and trade scheme is going towards climate and energy objectives (European Commission, 2019):

> *"In 2018, a strengthened carbon price signal led to a record amount of revenues for Member States from the selling of ETS allowances. The generated amount equalled some EUR 14 billion - more than doubling the revenues generated in 2017. Member States spent or planned to spend close to 70% of these revenues on advancing climate and energy objectives - well above the 50% required in the legislation"*

In terms of the current project, as the facility is over 20 MW, a greenhouse gas emission permit will be required which will be regulated under the ETS scheme also. Thus the emissions are not included when determining compliance with the targeted 30% reduction in the non-ETS sector. In addition, on an EU-wide basis, where the ETS market in 2018 is approximately 1,655 million tonnes CO2eq, the impact of the emissions associated with the proposed development will be less than 0.03% of the total EU-wide ETS market which is imperceptible.

In terms of wider energy policy, as outlined in the EPA publication *"Ireland's Greenhouse Gas Projections 2019-2040"*(EPA, 2020e) under the With Additional Measures scenario, emissions from the energy industries sector are projected to decrease by 34% to 7 Mt CO2eq over the period 2019 to 2030 including the proposed increase in renewable energy generation to approximately 70% of electricity consumption:

- "In this scenario it is assumed that for 2020 there is a 36.3% share of renewable energy in electricity generation. In 2030 it is estimated that renewable energy generation increases to approximately 70% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 3.5 GW offshore and approximately 8.2 GW onshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario;
- Under the With Additional Measures scenario two peat stations are assumed to run on 100% peat to the end of 2020 but PSO support finishes at the end of 2019. For 2020 the operation of the peat plants is determined by the electricity market. The third peat station operates to the end of 2023 with 30% co-firing;
- In this scenario the Moneypoint power station is assumed to operate in the market up to end 2024 at which point it no longer generates electricity from coal as set out in the Climate Action Plan; and
- In terms of inter-connection, it is assumed that the Greenlink 500MW interconnector to the UK to come on stream in 2025 and the Celtic 700MW interconnector to France to come on stream in 2026". (EPA, 2020e)

As emissions from the proposed power plant will form part of the EU-wide ETS scheme, the relevant cumulative impact would be the EU as a whole rather than Ireland. However, as highlighted above, the facility's impact will be less than 0.03% of the total EU-wide ETS market which is not significant and thus an EU-wide cumulative assessment is not merited.

The direct CO_2 emissions from electricity to operate the facility will not be significant in relation to Ireland's national annual CO_2 emissions. A Report titled 'Energy Related CO_2 Emissions In Ireland 2005 – 2018 (2019 Report)' published by the Sustainable Energy Authority of Ireland (SEAI, 2020) states the average CO_2 emission factor for electricity generated from natural gas in Ireland was 366 gCO_2/kWh in 2018. On the basis that the proposed power station will generate 125 MW of power this equates to 1,095 GWh annually. This translates to approximately 400,000 tonnes of CO_2eq per year. This will have a ***direct***, ***long-term***, ***negative*** and ***slight*** impact on climate.

10.5.2.3 Regional Air Quality

Directive (EU) 2016/2284 *"On The Reduction Of National Emissions Of Certain Atmospheric Pollutants And Amending Directive 2003/35/EC And Repealing Directive 2001/81/EC"* was published in December 2016. The Directive will apply the 2010 National Emission Ceiling Directive limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$ as detailed in Section **Error! Reference source not found.**.

Natural gas will be used to generate 125 MW by the power plant. The NO_X emissions associated with this electricity over the course of one year (i.e. 1,095 GWh based on 125 MW for 8,760 hours per annum) will equate to 365 tonnes per annum which is 0.56% of the National Emission Ceiling limit for Ireland from 2020 onwards. Similarly, SO_2 emissions associated this electricity over the course of one year (1,095 GWh) will equate to 138 tonnes per annum which is 0.33% of the National Emission Ceiling limit for Ireland from 2020. Additionally, NMVOC emissions associated this electricity over the course of one year (1,095 GWh) will equate to 415 tonnes per annum which is 0.75% of the National Emission Ceiling limit for Ireland from 2020. Thus, the NO_X, SO_2 and NMVOC direct emissions associated with the operation of the proposed power plant are ***direct***, ***long-term***, ***negative*** and ***not significant*** with regards to regional air quality.

10.5.2.4 Human Health

Air dispersion modelling was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, emissions from the site are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health. In relation to the spatial extent of air quality impacts from the site, ambient concentrations will decrease significantly with distance from the site boundary. Further details of the potential impacts on human health associated with the proposed power plant are discussed in Chapter 7 of this EIA Report.

10.5.2.5 Impact of NO_X on Sensitive Ecosystems

The impact of emissions of NO_X from the proposed plant and existing emission points on ambient ground level concentrations within the Dodder Valley pNHA, Glenasmole Valley SAC/pNHA, Grand Canal pNHA, Kilteel Wood pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Royal Canal pNHA, Rye Water Valley/Carton SAC/pNHA, Slade of Saggart and Crooksling Glen pNHA and Wicklow Mountains SPA/SAC was assessed using AERMOD. An annual limit value of 30 µg/m^3 for NO_X is specified within EU Directive 2008/50/EC for the protection of ecosystems. The NO_X limit value is applicable only in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex III of EU Directive 2008/50/EC identifies that monitoring to demonstrate compliance with the NO_X limit value for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway;
- 5 km from the nearest major industrial installation;
- 20 km from a major urban conurbation.

As the sections of the designated sites which are near the power plant are within an urban setting and, more specifically, an industrial area, the limit value for NO_X for the protection of ecosystems is not technically applicable. Regardless, the annual average concentrations for

NO_X from all emission points from the power plant were predicted at receptors within the designated sites for all five years of meteorological data modelled (2016 – 2020). The receptor spacing ranged from 25 m to 100 m with 8,360 discrete receptors modelled in total within the sensitive ecosystems.

The Profile Park Power Station NO_X modelling results are detailed in *Table 10-6*. Emissions from the facility lead to an ambient NO_X concentration (excluding background) which ranges from 2 – 3% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. No background value has been added to the results as the background concentration of NO_X exceeds the limit value for the protection of ecosystems at most urban and suburban locations in Dublin based on a review of the EPA NO_X monitoring data (EPA, 2019 and 2020). As previously discussed, the NO_X limit value is applicable only in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Therefore, the NO_X limit value is not applicable at Profile Park due to the urban and industrial nature of the environs of the proposed site. In addition, modelling results based on conservative assumptions indicate that the proposed power plant in isolation will have an imperceptible impact on NO_X concentrations within the sensitive ecosystems contributing at most 3% of the limit value at the worst-case location in the worst-case year modelled.

Table 10-6: Modelled NO_X Concentrations (µg/m^3) excluding background within the Dodder Valley pNHA, Glenasmole Valley SAC/pNHA, Grand Canal pNHA, Kilteel Wood pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Royal Canal pNHA, Rye Water Valley/Carton SAC/pNHA, Slade of Saggart and Crooksling Glen pNHA and Wicklow Mountains SPA/SAC for all Emission Points at Profile Park Power Station

Pollutant/ Year	Averaging Period	Process Contribution (µg/m^3)	Limit Value (µg/Nm^3) Note A	Process Contribution as a % of Limit Value
NO_x/2016	Annual Mean	0.65	30	2%
NO_x/2017	Annual Mean	0.71	30	2%
NO_x/2018	Annual Mean	0.59	30	2%
NO_x/2019	Annual Mean	0.64	30	2%
NO_x/2020	Annual Mean	0.86	30	3%

Note A: Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.5.3 Mitigation Measures

10.5.3.1 Construction Phase

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);

- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' (USEPA, 1997); and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

The construction phase is predicted to have a 'Negligible to Low Risk' in terms of dust soiling and PM_{10} effects with no mitigation in place. Best practice mitigation measures for the proposed power plant as outlined in guidance from the IAQM are presented below. These mitigation measures should be incorporated into the proposed development's Construction Environment Management Plan (CEMP).

- Communication and Site Management
  - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary;
  - Display the head or regional office contact information; and
  - It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents.
  - Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken;
  - Make a complaint log available to the local authority, when requested; and
  - Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book.
- Monitoring
  - Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make an inspection log available to the local authority, when requested; and
  - Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
- Preparing and maintaining the site
  - Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible;
  - Erect solid screens or barriers around dusty activities or the construction site boundary that are at least as high as any stockpiles;
  - Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
  - Avoid site runoff of water or mud;
  - Keep site fencing, barriers and scaffolding clean using wet methods;
  - Remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site; if they are being reused on site, cover as described below;
  - Cover seed or fence stockpiles to prevent wind whipping;
  - Ensure all vehicles switch off engines when stationary – no idling vehicles;

  - Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment, where practicable; and
  - Impose and signpost a maximum-speed limit of 15mph on surfaced and 10mph on unpaved surface haul roads and work areas
- Operations
  - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction;
  - Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water, where possible and appropriate;
  - Use enclosed chutes and conveyors and covered skips;
  - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever available; and
  - Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
  - Measures specific to construction
  - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process in which case ensure that appropriate additional controls measures are in place
- Measures specific to trackout;
  - Use water-assisted dust sweepers on the access and local roads to remove as necessary any material tracked out of site;
  - Avoid dry sweeping of large areas;
  - Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
  - Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
  - Record all inspections of haul routes; and
  - Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)

10.5.3.2 Operational Phase

For the operational scenarios associated with the proposed power plant (either operating on natural gas or oil backup), no mitigation measures in addition to those already inherent to the design of the proposed plant are required. These inherent design features are considered within the dispersion modelling which demonstrates compliance with BAT associated emission levels, IED emission limits and appropriate stack height. The stack heights of the proposed power plant emission points have been designed in an iterative fashion to ensure that an adequate height has been selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards beyond the site boundary (including background concentrations). It should be noted that the proposed power plant will be licensed by the EPA under the industrial emissions licensing process. The licence will state the limits for atmospheric emissions that the proposed power plant will be required to comply with.

10.5.4 Cumulative Impacts

10.5.4.1 Air Quality

The cumulative impact of NO_2 emissions from the power plant and emissions from Pfizer, Takeda and the Grange Castle Power Facility are detailed in *Table 10-7* below. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO_2. For the worst-case year, emissions from the sites lead to an ambient NO_2 concentration (including background) which is 47% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2020) and 49% of the annual limit value at the worst affected sensitive receptor (residential property on Kishoge Road) for the worst-case year modelled (2020). Concentrations at the worst affected site boundary receptor are shown in Appendix 10.3.

Table 10-7: Modelled NO_2 ($\mu g/m^3$) Concentrations for the Cumulative Assessment

Pollutant/ Year	Averaging Period	Process Contribution NO_2 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)Note A	Predicted Emission Concentration - PEC NO_2 ($\mu g/Nm^3$)	Limit Values ($\mu g/Nm^3$)Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	3.4	16	19.4	40	49%
	99.8th%ile of 1-hr means	62.6	32	94.6	200	47%
NO_2/2017	Annual Mean	3.1	16	19.1	40	48%
	99.8th%ile of 1-hr means	62.3	32	94.3	200	47%
NO_2/2018	Annual Mean	3.1	16	19.1	40	48%
	99.8th%ile of 1-hr means	62.0	32	94.0	200	47%
NO_2/2019	Annual Mean	3.1	16	19.1	40	48%
	99.8th%ile of 1-hr means	62.5	32	94.5	200	47%
NO_2/2020	Annual Mean	3.7	16	19.7	40	49%
	99.8th%ile of 1-hr means	62.8	32	94.8	200	47%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.5.4.2 Impact of NO_X on Sensitive Ecosystems

The NO_X modelling results for the cumulative assessment are detailed in *Table 10-8*. Emissions from the facility lead to an ambient NO_X concentration (excluding background) which ranges from 16 – 18% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the proposed power plant in isolation will have a small impact on NO_X concentrations within the sensitive ecosystems contributing at most 19% of the limit value at the worst-case location in the worst-case year modelled.

Table 10-8: Modelled NO_X Concentrations (µg/m³) excluding background within the Dodder Valley pNHA, Glenasmole Valley SAC/pNHA, Grand Canal pNHA, Kilteel Wood pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Royal Canal pNHA, Rye Water Valley/Carton SAC/pNHA, Slade of Saggart and Crooksling Glen pNHA and Wicklow Mountains SPA/SAC for the Cumulative Assessment

Pollutant/ Year	Averaging Period	Process Contribution (µg/m³)	Limit Value (µg/Nm³) Note A	Process Contribution as a % of Limit Value
NO_x/2016	Annual Mean	4.74	30	16%
NO_x/2017	Annual Mean	5.57	30	19%
NO_x/2018	Annual Mean	4.84	30	16%
NO_x/2019	Annual Mean	5.13	30	17%
NO_x/2020	Annual Mean	5.75	30	19%

Note A Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.5.4.3 Climate

Cumulative climatic impacts due to the Proposed Development and nearby facilities are considered to be not significant.

10.5.5 Residual Impacts

Once the mitigation measures outlined in Section 10.5.3 are implemented, the residual impact on air quality from the construction of the Proposed Development will be ***short-term*** and ***imperceptible*** and for the operational phases of the Proposed Development will be ***long-term***, ***negative*** and ***slight***.

The residual impact on climate from the construction of the Proposed Development will be ***short-term*** and ***imperceptible*** and for the operational phases of the Proposed Development will be ***long-term***, ***negative*** and ***slight***.

10.5.6 Summary of Modelling Results

With regard to NO_2, emissions from the facility will result in ambient NO_2 concentrations (including background) which are in compliance with the relevant limit values, reaching at most 47% of the 1-hour limit value (measured as a 99.8th%ile) and 48% of the annual limit value at the worst affected sensitive receptor (residential property on Kishoge Road). NO_X concentrations at the worst-case ecological receptor in the worst-case year modelled were at most 3% of the limit value.

The cumulative assessment with Pfizer, Takeda and the Grange Castle Power Facility also found results to be in compliance with the relevant ambient air quality limit values. Emissions from both facilities lead to an ambient NO_2 concentration (including background) which is 47% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 49% of the annual mean limit value at the worst affected sensitive receptor (residential property on Kishoge Road). NO_X concentrations at the worst-case ecological receptor in the worst-case year modelled were at most 19% of the limit value.

NO_2 and NO_x concentrations were higher in the individual stacks scenario compared to the one pseudo stack scenario (results for this in Appendix 10.3), confirming that the worst-case scenario has been presented here.

In conclusion, ambient levels of nitrogen oxides (as NO_2, including background) from the proposed power plant as well as the cumulative emissions from Pfizer, Takeda and the Grange Castle Power Facilities are in compliance with the air quality limit values for the protection of human health and it is predicted that air emissions from the installation will not have a significant impact on the local environment.

As emissions from the Proposed Development will form part of the EU-wide ETS scheme, the facility's impact will be less than 0.03% of the total EU-wide ETS market which is not significant.

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CHAPTER 10: AIR QUALITY AND CLIMATE (APPENDICES)

MARCH 2022

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10.1 DESCRIPTION OF THE AERMOD MODEL

The AERMOD dispersion model has been recently developed in part by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2019). The model is a steady-state Gaussian model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement on the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources.

Improvements over the ISCST3 model include the treatment of the vertical distribution of concentration within the plume. ISCST3 assumes a Gaussian distribution in both the horizontal and vertical direction under all weather conditions. AERMOD with PRIME, however, treats the vertical distribution as non-Gaussian under convective (unstable) conditions while maintaining a Gaussian distribution in both the horizontal and vertical direction during stable conditions. This treatment reflects the fact that the plume is skewed upwards under convective conditions due to the greater intensity of turbulence above the plume than below. The result is a more accurate portrayal of actual conditions using the AERMOD model. AERMOD also enhances the turbulence of night-time urban boundary layers thus simulating the influence of the urban heat island.

In contrast to ISCST3, AERMOD is widely applicable in all types of terrain. Differentiation of the simple versus complex terrain is unnecessary with AERMOD. In complex terrain, AERMOD employs the dividing-streamline concept in a simplified simulation of the effects of plume-terrain interactions. In the dividing-streamline concept, flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. Extensive validation studies have found that AERMOD (precursor to AERMOD with PRIME) performs better than ISCST3 for many applications and as well or better than CTDMPLUS for several complex terrain data sets (USEPA, 1998).

Due to the proximity to surrounding buildings, the PRIME (Plume Rise Model Enhancements) building downwash algorithm has been incorporated into the model to determine the influence (wake effects) of these buildings on dispersion in each direction considered. The PRIME algorithm takes into account the position of the stack relative to the building in calculating building downwash. In the absence of the building, the plume from the stack will rise due to momentum and/or buoyancy forces. Wind streamlines act on the plume leads to the bending over of the plume as it disperses. However, due to the presence of the building, wind streamlines are disrupted leading to a lowering of the plume centreline.

When there are multiple buildings, the building tier leading to the largest cavity height is used to determine building downwash. The cavity height calculation is an empirical formula based on building height, the length scale (which is a factor of building height & width) and the cavity length (which is based on building width, length and height). As the direction of the wind will lead to the identification of differing dominant tiers, calculations are carried out in intervals of 10 degrees.

In PRIME, the nature of the wind streamline disruption as it passes over the dominant building tier is a function of the exact dimensions of the building and the angle at which the wind approaches the building. Once the streamline encounters the zone of influence of the building, two forces act on the plume. Firstly, the disruption caused by the building leads to increased turbulence and enhances horizontal and vertical dispersion. Secondly, the streamline descends in the lee of the building due to the reduced pressure and drags the plume (or part of) nearer to

the ground, leading to higher ground level concentrations. The model calculates the descent of the plume as a function of the building shape and, using a numerical plume rise model, calculates the change in the plume centreline location with distance downwind.

The immediate zone in the lee of the building is termed the cavity or near wake and is characterised by high intensity turbulence and an area of uniform low pressure. Plume mass captured by the cavity region is re-emitted to the far wake as a ground-level volume source. The volume source is located at the base of the lee wall of the building, but is only evaluated near the end of the near wake and beyond. In this region, the disruption caused by the building downwash gradually fades with distance to ambient values downwind of the building.

AERMOD has made substantial improvements in the area of plume growth rates in comparison to ISCST3 (USEPA, 2019). ISCST3 approximates turbulence using six Pasquill-Gifford-Turner Stability Classes and bases the resulting dispersion curves upon surface release experiments. This treatment, however, cannot explicitly account for turbulence in the formulation. AERMOD is based on the more realistic modern planetary boundary layer (PBL) theory which allows turbulence to vary with height. This use of turbulence-based plume growth with height leads to a substantial advancement over the ISCST3 treatment.

Improvements have also been made in relation to mixing height (USEPA, 2019). The treatment of mixing height by ISCST3 is based on a single morning upper air sounding each day. AERMOD, however, calculates mixing height on an hourly basis based on the morning upper air sounding and the surface energy balance, accounting for the solar radiation, cloud cover, reflectivity of the ground and the latent heat due to evaporation from the ground cover. This more advanced formulation provides a more realistic sequence of the diurnal mixing height changes.

AERMOD also contains improved algorithms for dealing with low wind speed (near calm) conditions. As a result, AERMOD can produce model estimates for conditions when the wind speed may be less than 1 m/s, but still greater than the instrument threshold.

10.2 METEOROLOGICAL DATA - AERMET

AERMOD incorporates a meteorological pre-processor AERMET (version 19191) (USEPA, 2018b). AERMET allows AERMOD to account for changes in the plume behaviour with height. AERMET calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, convective (CBL) and stable boundary layer (SBL) height and surface heat flux. AERMOD uses this information to calculate concentrations in a manner that accounts for changes in dispersion rate with height, allows for a non-Gaussian plume in convective conditions, and accounts for a dispersion rate that is a continuous function of meteorology.

The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. A morning sounding from a representative upper air station, latitude, longitude, time zone, and wind speed threshold are also required.

Two files are produced by AERMET for input to the AERMOD dispersion model. The surface file contains observed and calculated surface variables, one record per hour. The profile file contains the observations made at each level of a meteorological tower, if available, or the one-level observations taken from other representative data, one record level per hour.

From the surface characteristics (i.e. surface roughness, albedo and amount of moisture available (Bowen Ratio)) AERMET calculates several boundary layer parameters that are important in the evolution of the boundary layer, which, in turn, influences the dispersion of pollutants. These parameters include the surface friction velocity, which is a measure of the vertical transport of horizontal momentum; the sensible heat flux, which is the vertical transport of heat to/from the surface; the Monin-Obukhov length which is a stability parameter relating the surface friction velocity to the sensible heat flux; the daytime mixed layer height; the nocturnal surface layer height and the convective velocity scale which combines the daytime mixed layer height and the sensible heat flux. These parameters all depend on the underlying surface.

The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use types was carried out in line with USEPA recommendations[4] and using the detailed methodology outlined by the Alaska Department of Environmental Conservation[17]. AERMET has also been updated to allow for an adjustment of the surface friction velocity (u*) for low wind speed stable conditions based on the work of Qian and Venkatram (BLM, 2011). Previously, the model had a tendency to over-predict concentrations produced by near-ground sources in stable conditions.

SURFACE ROUGHNESS

Surface roughness length is the height above the ground at which the wind speed goes to zero. Surface roughness length is defined by the individual elements on the landscape such as trees and buildings. In order to determine surface roughness length, the USEPA recommends that a representative length be defined for each sector, based on an upwind area-weighted average of the land use within the sector, by using the eight land use categories outlined by the USEPA. The

inverse-distance weighted surface roughness length derived from the land use classification within a radius of 1km from Shannon Airport Meteorological Station is shown in Table 1.

Table 1: Surface Roughness based on an inverse distance weighted average of the land use within a 1km radius of Casement Airport Meteorological Station

Sector	Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter[Note A]
270-180	100% Grassland	0.05	0.10	0.01	0.01
180-270	100% Urban	1	1	1	1

Note A Winter defined as periods when surfaces covered permanently by snow whereas autumn is defined as periods when freezing conditions are common, deciduous trees are leafless and no snow is present (Iqbal (1983)). Thus for the current location autumn more accurately defines "winter" conditions in Ireland.

ALBEDO

Noon-time albedo is the fraction of the incoming solar radiation that is reflected from the ground when the sun is directly overhead. Albedo is used in calculating the hourly net heat balance at the surface for calculating hourly values of Monin-Obuklov length. A 10km x 10km square area is drawn around the meteorological station to determine the albedo based on a simple average for the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Airport Meteorological Station is shown in Table 2.

Table 2: Albedo based on a simple average of the land use within a 10km × 10km grid centred on Casement Airport Meteorological Station

Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter[Note A]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.155	0.180	0.187	0.187

Note A For the current location autumn more accurately defines "winter" conditions in Ireland.

BOWEN RATIO

The Bowen ratio is a measure of the amount of moisture at the surface of the earth. The presence of moisture affects the heat balance resulting from evaporative cooling which, in turn, affects the Monin-Obukhov length which is used in the formulation of the boundary layer. A 10km x 10km square area is drawn around the meteorological station to determine the Bowen Ratio based on geometric mean of the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Airport Meteorological Station is shown in Table 3.

Table 3: Bowen Ratio based on a geometric mean of the land use within a 10km × 10km grid centred on Casement Airport Meteorological Station.

Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter[Note A]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.549	1.06	1.202	1.202

Note A For the current location autumn more accurately defines "winter" conditions in Ireland.

10.3 AIR DISPERSION MODELLING RESULTS FOR PSEUDO STACK SCENARIO

PROCESS CONTRIBUTIONS

NO_2 Emissions

The NO_2 modelling results for the Profile Park Power Station pseudo stack scenario are detailed in Table 1. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO_2. Emissions from the facility including background lead to an ambient NO_2 concentration which is 33% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2016) and 41% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2017).

Table 1: Pseudo Stack – Modelled NO_2 ($\mu g/m^3$) Concentrations for the Profile Park Power Station

Pollutant/ Year	Averaging Period	Process Contribution NO_2 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[Note A]	Predicted Emission Concentration - PEC NO_2 ($\mu g/Nm^3$)	Limit Values ($\mu g/Nm^3$)[Note B]	PEC as a % of Limit Value
NO_2/2016	Annual Mean	0.4	16	16.4	40	41%
	99.8th%ile of 1-hr means	34.7	32	66.7	200	33%
NO_2/2017	Annual Mean	0.4	16	16.4	40	41%
	99.8th%ile of 1-hr means	21.2	32	53.2	200	27%
NO_2/2018	Annual Mean	0.4	16	16.4	40	41%
	99.8th%ile of 1-hr means	29.3	32	61.3	200	31%
NO_2/2019	Annual Mean	0.4	16	16.4	40	41%
	99.8th%ile of 1-hr means	25.2	32	57.2	200	29%
NO_2/2020	Annual Mean	0.4	16	16.4	40	41%
	99.8th%ile of 1-hr means	28.7	32	60.7	200	30%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

The geographical variations in ground level NO_2 concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in Figure 1 and

Figure 2. The location of the maximum annual mean concentration for NO_2 are approx. 500 m north east of the site boundary, while the maximum hourly NO_2 concentration is likely to occur approx. 5 km southwest of the site boundary.

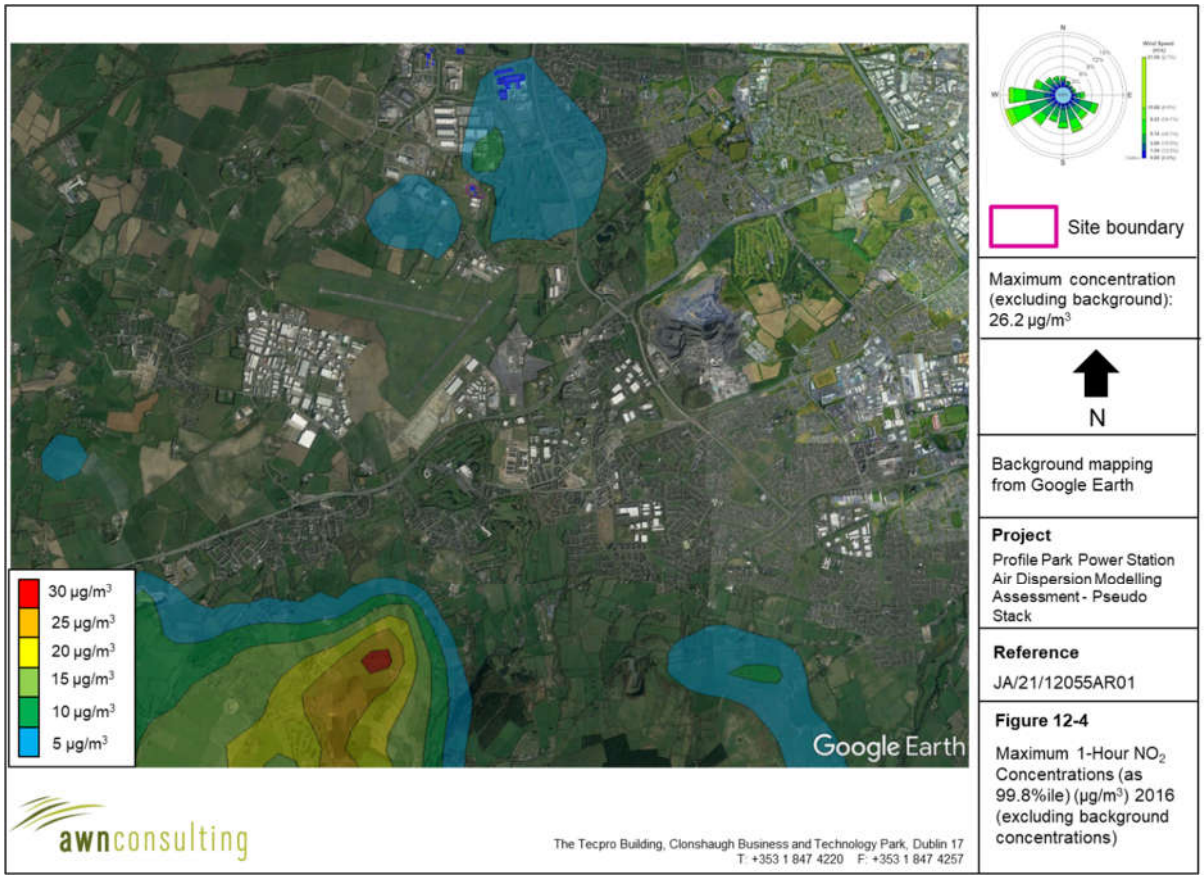

Figure 1: Profile Park Power Station Pseudo Stack Scenario: Predicted NO_2 99.8th Percentile of Hourly Concentrations (2016)

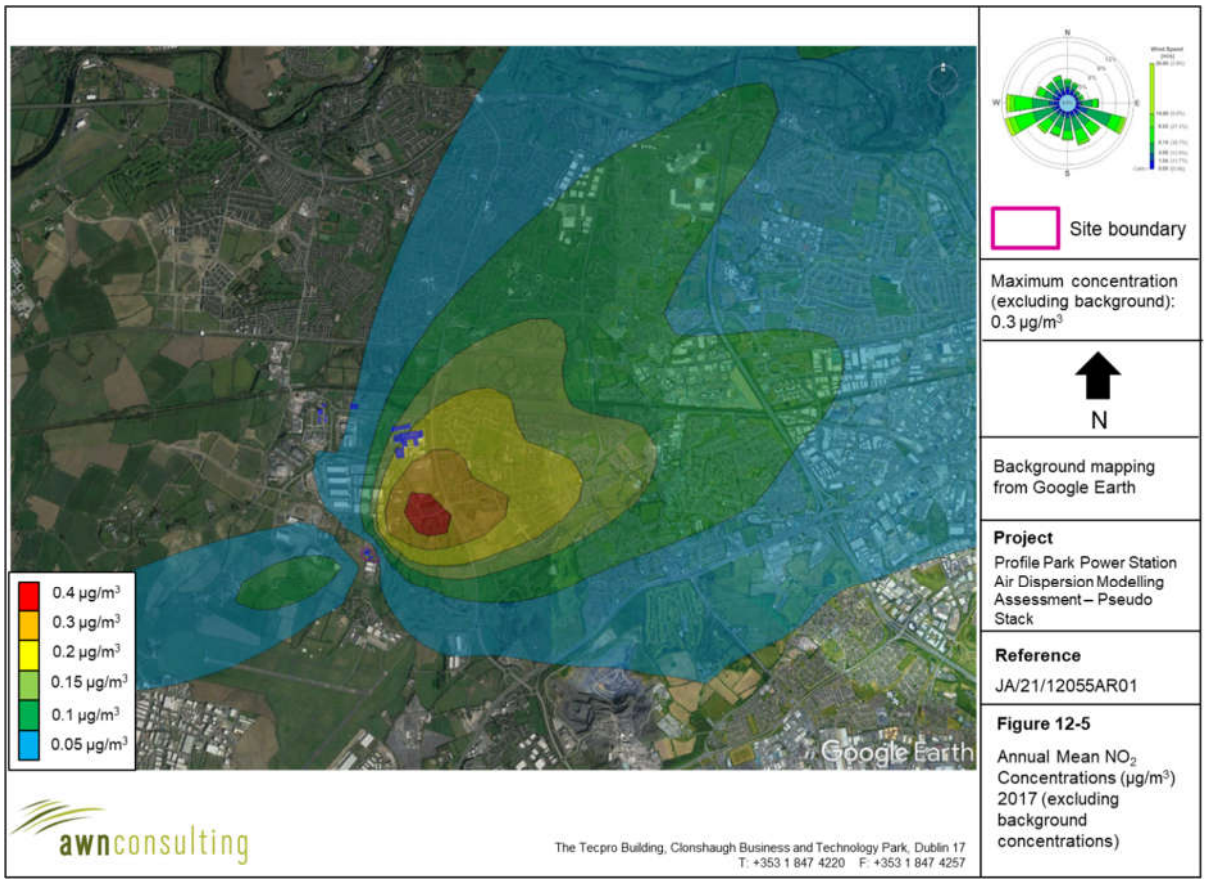

Figure 2: Profile Park Power Station Pseudo Stack Scenario: Predicted Annual Mean NO_2 Concentrations (2017)

Impact of NO_X on Sensitive Ecosystems

The Profile Park Power Station NO_X modelling results for the pseudo stack scenario are detailed in Table 2. Emissions from the facility lead to an ambient NO_X concentration (excluding background) which are approx. 1% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the proposed Profile Park Power Station in isolation will have an imperceptible impact on NO_X concentrations within the sensitive ecosystems contributing at most 1% of the limit value at the worst-case location in the worst-case year modelled.

Table 2: Pseudo Stack – Modelled NO_X Concentrations (µg/m³) excluding background within the Dodder Valley pNHA, Glenasmole Valley SAC/pNHA, Grand Canal pNHA, Kilteel Wood pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Royal Canal pNHA, Rye Water Valley/Carton SAC/pNHA, Slade of Saggart and Crooksling Glen pNHA and Wicklow Mountains SPA/SAC for all Emission Points at Profile Park Power Station

Pollutant/ Year	Averaging Period	Process Contribution (µg/m³)	Limit Value (µg/Nm³) Note A	Process Contribution as a % of Limit Value
NO_x/2016	Annual Mean	0.23	30	1%
NO_x/2017	Annual Mean	0.24	30	1%

Pollutant/ Year	Averaging Period	Process Contribution (µg/m³)	Limit Value (µg/Nm³) Note A	Process Contribution as a % of Limit Value
NO_x/2018	Annual Mean	0.22	30	1%
NO_x/2019	Annual Mean	0.23	30	1%
NO_x/2020	Annual Mean	0.25	30	1%

Note A Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

CUMULATIVE ASSESSMENT

NO_2 Emissions

The pseudo stack scenario cumulative impact of NO_2 emissions from Profile Park Power Station and emissions from Pfizer, Takeda and the Grange Castle Power Facility are detailed in Table 3 below. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for NO_2. For the worst-case year, emissions from the sites lead to an ambient NO_2 concentration (including background) which is 56% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 54% of the annual limit value at the worst-case off-site receptor for the worst-case years modelled.

Table 3: Pseudo Stack – Modelled NO_2 (µg/m³) Concentrations for the Cumulative Assessment

Pollutant/ Year	Averaging Period	Process Contribution NO_2 (µg/m³)	Background Concentration (µg/m³) Note A	Predicted Emission Concentration - PEC NO_2 (µg/Nm³)	Limit Values (µg/Nm³) Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	5.7	16	21.7	40	54%
	99.8th%ile of 1-hr means	72.1	32	104.1	200	52%
NO_2/2017	Annual Mean	5.5	16	21.5	40	54%
	99.8th%ile of 1-hr means	71.6	32	103.6	200	52%
NO_2/2018	Annual Mean	5.7	16	21.7	40	54%
	99.8th%ile of 1-hr means	75.3	32	107.3	200	54%
NO_2/2019	Annual Mean	5.7	16	21.7	40	54%
	99.8th%ile of 1-hr means	71.1	32	103.1	200	52%
NO_2/2020	Annual Mean	5.3	16	21.3	40	53%
	99.8th%ile of 1-hr means	79.1	32	111.1	200	56%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.
Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

Impact of NO_X on Sensitive Ecosystems

The NO_X modelling results for the cumulative assessment are detailed in Table 4. Emissions from the facility lead to an ambient NO_X concentration (excluding background) which ranges from 15 – 19% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the proposed Profile Park Power Station in isolation will have a small impact on NO_X concentrations within the sensitive ecosystems contributing at most 19% of the limit value at the worst-case location in the worst-case year modelled.

Table 4: Modelled NO_X Concentrations ($\mu g/m^3$) excluding background within the Dodder Valley pNHA, Glenasmole Valley SAC/pNHA, Grand Canal pNHA, Kilteel Wood pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Royal Canal pNHA, Rye Water Valley/Carton SAC/pNHA, Slade of Saggart and Crooksling Glen pNHA and Wicklow Mountains SPA/SAC for the Cumulative Assessment

Pollutant/ Year	Averaging Period	Process Contribution ($\mu g/m^3$)	Limit Value ($\mu g/Nm^3$) Note A	Process Contribution as a % of Limit Value
NO_x/2016	Annual Mean	4.58	30	15%
NO_x/2017	Annual Mean	5.45	30	18%
NO_x/2018	Annual Mean	4.70	30	16%
NO_x/2019	Annual Mean	5.02	30	17%
NO_x/2020	Annual Mean	5.61	30	19%

Note A Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.3 AIR DISPERSION MODELLING RESULTS FOR INDIVIDUAL STACKS SCENARIO – BOUNDARY RECEPTORS

PROCESS CONTRIBUTIONS

NO_2 Emissions

The NO_2 modelling results for the Profile Park Power Station individual stack scenario are detailed in Table 5. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO_2. Emissions from the facility including background lead to an ambient NO_2 concentration which is 79% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2017) and 87% of the annual limit value at the worst-case off-site boundary receptor for the worst-case year modelled (2020).

Table 5: Individual Stacks Boundary Receptors – Modelled NO_2 ($\mu g/m^3$) Concentrations for the Profile Park Power Station

Pollutant/ Year	Averaging Period	Process Contribution NO_2 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$) Note A	Predicted Emission Concentration - PEC NO_2 ($\mu g/Nm^3$)	Limit Values ($\mu g/Nm^3$) Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	14.9	16	30.9	40	77%
	99.8th%ile of 1-hr means	124.0	32	156.0	200	78%
NO_2/2017	Annual Mean	14.8	16	30.8	40	77%
	99.8th%ile of 1-hr means	126.8	32	158.8	200	79%
NO_2/2018	Annual Mean	15.1	16	31.1	40	78%
	99.8th%ile of 1-hr means	123.7	32	155.7	200	78%
NO_2/2019	Annual Mean	13.9	16	29.9	40	75%
	99.8th%ile of 1-hr means	125.3	32	157.3	200	79%
NO_2/2020	Annual Mean	18.8	16	34.8	40	87%
	99.8th%ile of 1-hr means	124.1	32	156.1	200	78%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

CUMULATIVE ASSESSMENT

NO_2 Emissions

The individual stacks scenario cumulative impact of NO_2 emissions from Profile Park Power Station and emissions from Pfizer, Takeda and the Grange Castle Power Facility are detailed in Table 6 below. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for NO_2. For the worst-case year, emissions from the sites lead to an ambient NO_2 concentration (including background) which is 79% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 88% of the annual limit value at the worst-case off-site boundary receptor for the worst-case years modelled.

Table 6: Individual Stacks Boundary Receptors – Modelled NO_2 ($\mu g/m^3$) Concentrations for the Cumulative Assessment

Pollutant/ Year	Averaging Period	Process Contribution NO_2 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$) Note A	Predicted Emission Concentration - PEC NO_2 ($\mu g/Nm^3$)	Limit Values ($\mu g/Nm^3$) Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	15.4	16	31.4	40	79%
	99.8th%ile of 1-hr means	124.0	32	156.0	200	78%
NO_2/2017	Annual Mean	15.0	16	31.0	40	78%
	99.8th%ile of 1-hr means	126.8	32	158.8	200	79%
NO_2/2018	Annual Mean	15.4	16	31.4	40	79%
	99.8th%ile of 1-hr means	123.7	32	155.7	200	78%
NO_2/2019	Annual Mean	14.2	16	30.2	40	75%
	99.8th%ile of 1-hr means	125.3	32	157.3	200	79%
NO_2/2020	Annual Mean	19.1	16	35.1	40	88%
	99.8th%ile of 1-hr means	124.1	32	156.1	200	78%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.3 AIR DISPERSION MODELLING RESULTS FOR INDIVIDUAL STACKS WITH MITIGIATION SCENARIO

PROCESS CONTRIBUTIONS

NO_2 Emissions

The NO_2 modelling results for the Profile Park Power Station individual stacks with mitigation scenario are detailed in Table 7. A reduction in NO_X emission from 75 mg/Nm^3 to 50 mg/Nm^3 and a reduction in operating hours from 8760 to 5624 was modelled. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO_2. Emissions from the facility including background lead to an ambient NO_2 concentration which is 58% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2019) and 74% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2020).

Table 7: With Mitigation – Modelled NO_2 (µg/m^3) Concentrations for the Profile Park Power Station

Pollutant / Year	Averaging Period	Process Contribution NO_2 (µg/m^3)	Background Concentration (µg/m^3) Note A	Predicted Emission Concentration - PEC NO_2 (µg/Nm^3)	Limit Values (µg/Nm^3) Note B	PEC as a % of Limit Value
NO_2/2016	Annual Mean	10.9	16	26.9	40	67%
	99.8th%ile of 1-hr means	83.2	32	115.2	200	58%
NO_2/2017	Annual Mean	10.8	16	26.8	40	67%
	99.8th%ile of 1-hr means	84.4	32	116.4	200	58%
NO_2/2018	Annual Mean	11.0	16	27.0	40	67%
	99.8th%ile of 1-hr means	83.1	32	115.1	200	58%
NO_2/2019	Annual Mean	10.1	16	26.1	40	65%
	99.8th%ile of 1-hr means	83.8	32	115.8	200	58%
NO_2/2020	Annual Mean	13.7	16	29.7	40	74%
	99.8th%ile of 1-hr means	83.3	32	115.3	200	58%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

CUMULATIVE ASSESSMENT

NO_2 Emissions

The individual stack with mitigation scenario cumulative impact of NO_2 emissions from Profile Park Power Station and emissions from Pfizer, Takeda and the Grange Castle Power Facility are detailed in Table 8 below. A reduction in NO_X emission from 75 mg/Nm^3 to 50 mg/Nm^3 and a reduction in operating hours from 8760 to 5624 was modelled. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for NO_2. For the worst-case year, emissions from the sites lead to an ambient NO_2 concentration (including background) which is 58% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 75% of the annual limit value at the worst-case off-site receptor for the worst-case years modelled.

Table 8: With Mitigation – Modelled NO_2 (µg/m^3) Concentrations for the Cumulative Assessment

Pollutant / Year	Averaging Period	Process Contribution NO_2 (µg/m^3)	Background Concentration (µg/m^3)[Note A]	Predicted Emission Concentration - PEC NO_2 (µg/Nm^3)	Limit Values (µg/Nm^3) [Note B]	PEC as a % of Limit Value
NO_2/2016	Annual Mean	11.3	16	27.3	40	68%
	99.8th%ile of 1-hr means	83.3	32	115.3	200	58%
NO_2/2017	Annual Mean	11.1	16	27.1	40	68%
	99.8th%ile of 1-hr means	84.4	32	116.4	200	58%
NO_2/2018	Annual Mean	11.3	16	27.3	40	68%
	99.8th%ile of 1-hr means	83.1	32	115.1	200	58%
NO_2/2019	Annual Mean	10.4	16	26.4	40	66%
	99.8th%ile of 1-hr means	83.8	32	115.8	200	58%
NO_2/2020	Annual Mean	13.9	16	29.9	40	75%
	99.8th%ile of 1-hr means	83.2	32	115.2	200	58%

Note A The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration.

Note B Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

10.4 THERMAL PLUME MODELLING

INTRODUCTION

This appendix provides an assessment of the potential impact of the plumes associated with the operational phase of the Profile Park Power Station on aircraft, and in particular helicopters, in the region.

The issue of plume characteristics and the effect on the operation of helicopters in the region of the site has been assessed below. An assessment has been undertaken to determine the region surrounding the facility where levels of excess temperature, turbulence (vertical velocity) and reduced oxygen could potentially be encountered. Studies undertaken by the MITRE Corporation (MITRE, 2012) and outlined in the user manual for the "Exhaust-Plume-Analyzer" model detail the likely impact of an exhaust plume on aircraft based on a range of parameters / criteria including the thermal buoyancy and temperature of the plume.

The current study is based on detailed site-specific information. The site-specific study, using the Cambridge Environmental Research Consultants (CERC) AMDS-5 model for oxygen, temperature and vertical velocity, allows the actual emission data for the facility to be used as input into the model. In addition, meteorological data for the region, based on three full years of data from Casement Aerodrome (2018-2020) and building data also forms part of the inputs to the model to allow an accurate representation of the impact of the facility in the surrounding environment.

METHODOLOGY

The parameters of the plume which are most relevant to helicopters has been investigated by the Mitre Corporation as part of the development of the "Expanded Model For Determining The Effects Of Vertical Plumes On Aviation Safety" (MITRE, 2012). These parameters have been reviewed below.

Oxygen

The Mitre Corporation report confirms that oxygen levels below 12% are potentially hazardous to helicopters (MITRE, 2012) and thus the oxygen content of the plume with distance from the stack has been investigated.

In relation to the gas generator, the oxygen content of the plume at stack top will typically be 13%.

Temperature

The Mitre Corporation report confirms that temperatures in excess of 50°C are potentially hazardous to helicopters (MITRE, 2012) and thus the temperature of the plume with distance from the stack has been investigated.

In relation to the gas generator, the temperature of the plume at stack top is 592.2K (319°C).

Vertical Velocity

High vertical velocities are also a concern when considering helicopter / plume interactions as they can lead to increased turbulence in the atmosphere. The literature (CASA, 2012) suggests

that the critical level for vertical velocities is 4.3 m/s. Thus, modelling has been undertaken to understand the worst-case vertical velocities of the gas generator plume with distance from the stacks.

The change in each of these parameters with distance from the stack has been reviewed below. For each of these parameters, three full years of meteorological conditions has been used in the analysis including periods of atmospheric pressure / temperature inversions. Meteorological data for the years 2018-2020 for Casement Aerodrome have been used in the analysis for all scenarios outlined, with results for the worst case year reported. The ADMS-5 model has the capability to process calm conditions by setting the wind speed to 0.3 m/s and allowing an equal probability for all wind directions. This option has been used in this assessment for both the temperature assessment and the vertical velocity assessment.

The model was also run with a high density receptor grid based on 5m horizontal spacing and 0.5m vertical spacing in the region of the stack top to determine the changes in the parameters above over very short distances. The receptor spacing of 0.5m was selected as the change with vertical distance in oxygen, temperature and vertical velocity from the stack top is rapid and would be difficult to determine with a coarser grid resolution.

PROCESS EMISSIONS

The proposed Profile Park Power Station gas generator stacks were modelled at a height of 31.8m (~75m OD) which was the original stack height indicated in the EIAR. The stack height has reduced to 28m but the modelling at 31.8m has been retained as impacts at this height have been demonstrated to be acceptable in terms of aviation risk (refer to EIAR Appendix 16.1). The source information for the modelled emission points has been summarised in *Table* 1.

Table 1: Summary of Source Information

Scenario	Height Above Ground Level (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temp (K)	Max Volume Flow (Nm^3/hr)	Exit Velocity (m/sec actual)	NO_2	
							Conc. (mg/Nm^3)	Mass Emission (g/s)
Individual stacks	31.8m (75m OD)	1.704	2.28	592.2	133,862	29.54	75.0	2.79

RESULTS & DISCUSSION

Oxygen / Plume Interaction

The Mitre Corporation report (MITRE, 2012) confirms that depleted oxygen is generally of greatest concern when considering helicopter/plume interactions. The Mitre Corporation report confirms that at an oxygen content below 12% oxygen there is a risk of engine cut-out whilst above this level there is no risk to helicopter engines. Thus, modelling has been undertaken to determine the oxygen percentage of operations both on natural gas and diesel oil.

The following equation is used to model the % of oxygen in the plume with distance from the stack top. For a given emission concentration of any pollutant e (in µg/m^3), the oxygen content O (%), is related to the plume concentration c (in µg/m^3) by the following relationship (13% is the plume oxygen percentage at release for gas generators):

$$c / e = (20.95-O) / (20.95-13)$$

Thus, the calculation can be re-arranged to determine the oxygen content (%) of the plume as a function of distance from the stack top. The re-arranged equation is:

$$O (\%) = 20.95- [(c/e) * (7.65)]$$

AERMOD was thus run to calculate the pollutant concentration and identify the distance from the plume centreline where the 12% oxygen level was exceeded. Modelling was undertaken using Casement Aerodrome data for 2018-2020. Shown in

Figures 1 and 2 show the results for the full worst-case year of 2020.

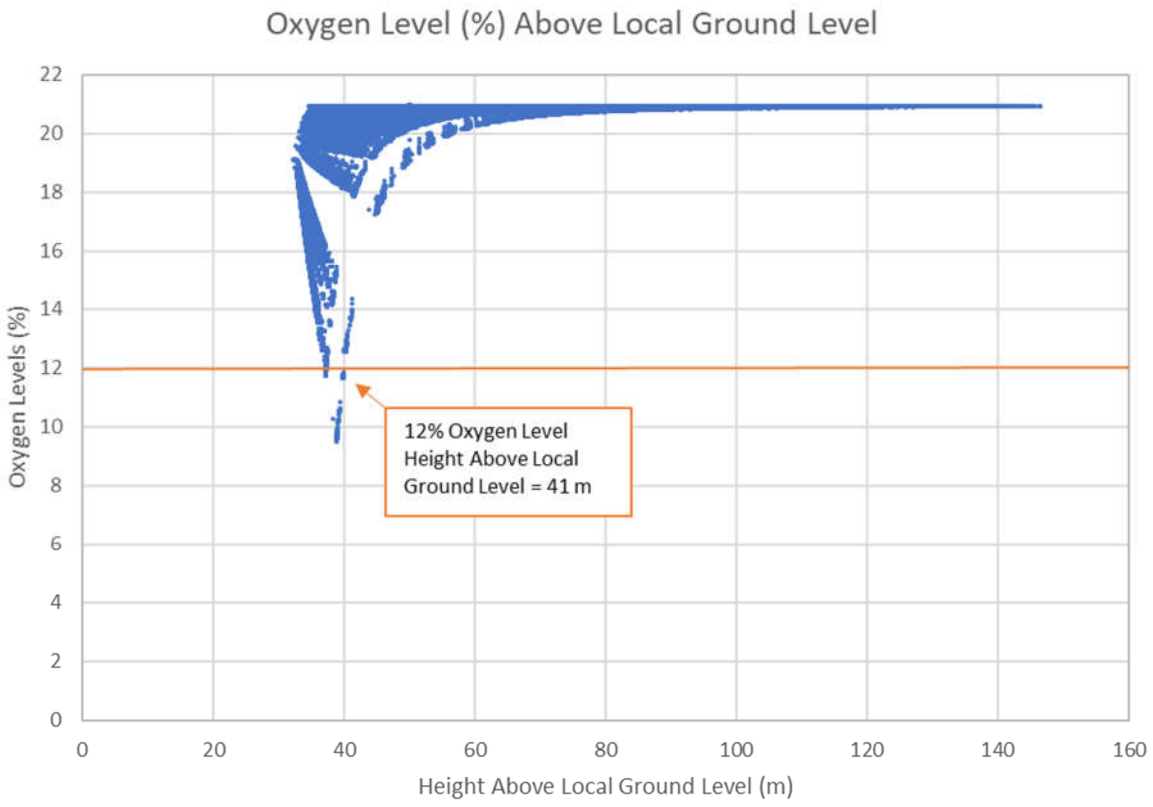

Figure 1: Oxygen Content Of The Plume (%) With Distance Above Ground Level

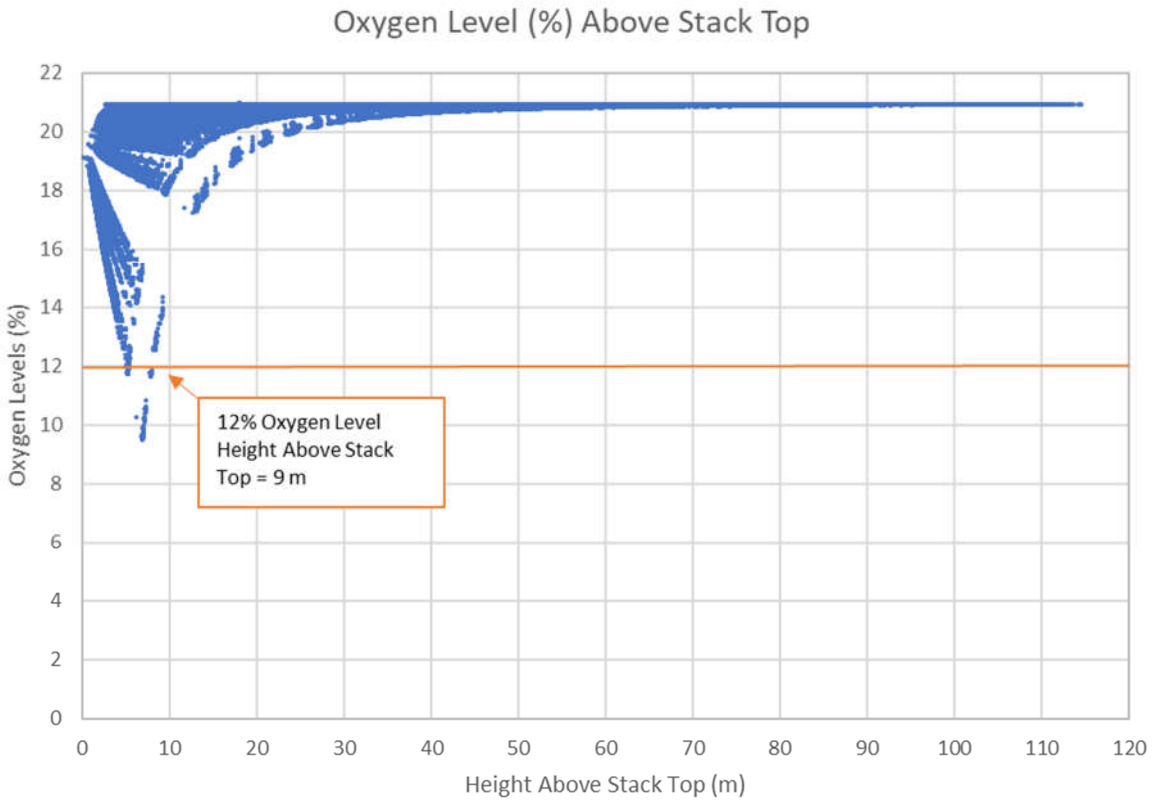

Figure 2: Oxygen Content Of The Plume (%) With Distance From Stack Top

The modelling results confirm that within a distance of 9 m from the stack top (41 m above local ground level) the oxygen content of the stacks plume will be 12% or greater. This analysis is based on every hour of the worst case year 2020 and includes all meteorological conditions including pressure / temperature inversions.

Temperature / Plume Interactions

Temperatures in excess of 50°C are potentially hazardous to helicopters and thus the decrease in the initial temperature of stack plumes (319°C) with distance from the stack has been investigated. Modelling of the temperature of the plume with distance from the stack has been undertaken using the CERC ADMS-5 model for every hour of the year based on Casement Aerodrome 2018-2020 meteorological data. The model has a specific temperature module which can, as part of the model output, give the temperature of the plume centreline with distance from the stack top.

The results are outlined below in Figure 3 and 4 for the worst case year of 2020.

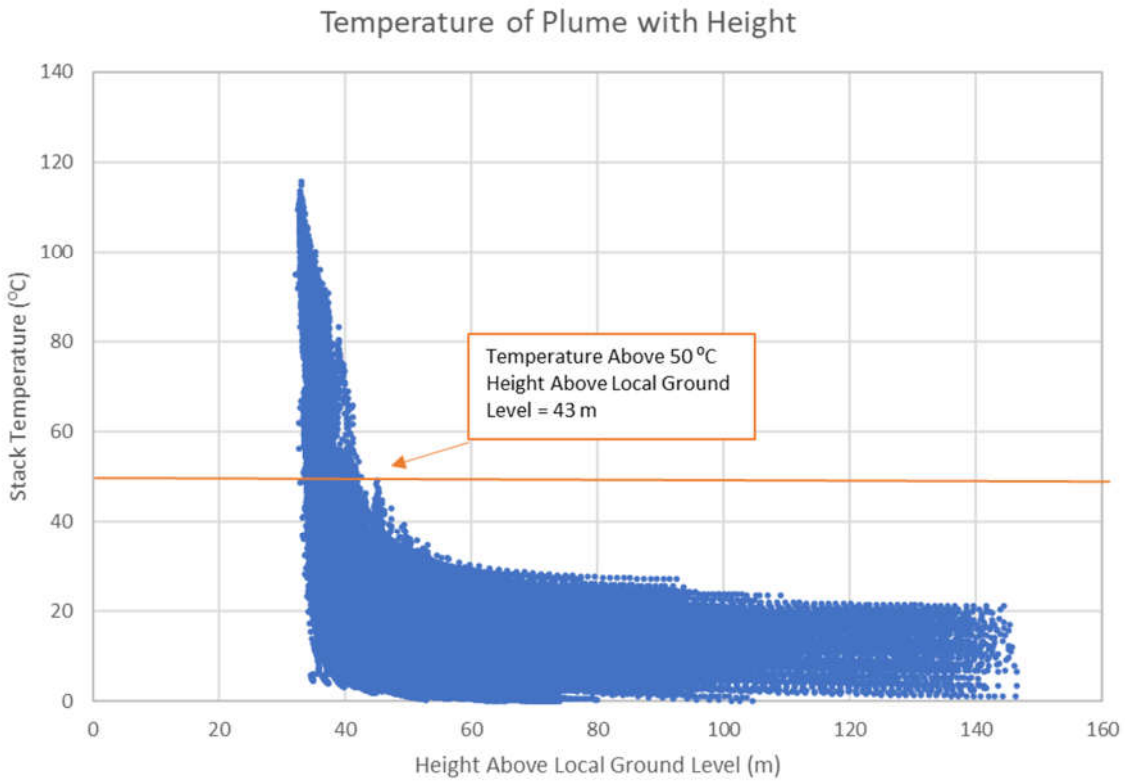

Figure 3: Temperature Of The Plume (°C) With Distance Above Ground Level

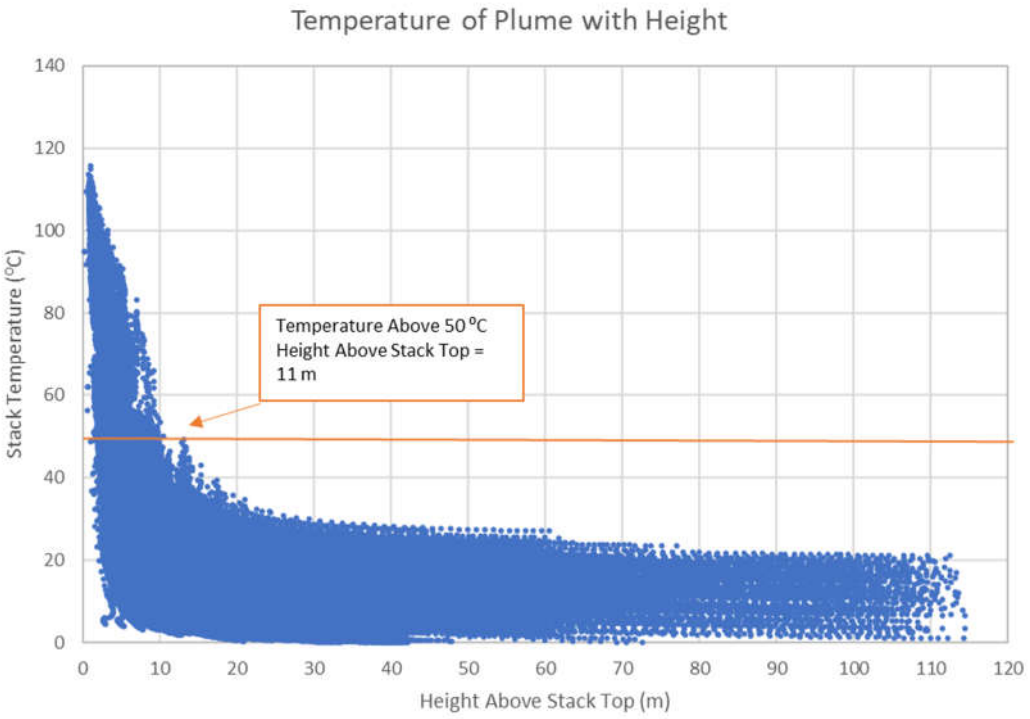

Figure 4: Temperature Of The Plume (°C) With Distance From Stack Top

The results confirm that the plume will be below 50°C within 11 m of the stack top (43 m above ground level) for every hour over the year for the stack including all meteorological conditions including pressure / temperature inversions.

Vertical Velocity / Plume Interactions

High vertical velocities are also relevant when considering helicopter/plume interactions. The Australian CASA (CASA, 2012) consider that the critical level for vertical velocity is 4.3 m/s. Thus, modelling has been undertaken to understand the vertical velocity of the plume with distance from the stack.

Cambridge Environmental Research Consultants (CERC), the developers of the EPA approved AMDS-5 model, were contacted to determine whether vertical velocity could be derived indirectly from the travel time of the plume with distance from the stack. CERC confirmed that the vertical velocity (in m/s) could be derived from an analysis of the plume centreline height (in metres) and the plume travel time (in seconds). The vertical velocity has been calculated for every hour of the year using Casement Aerodrome 2018-2020. The results are outlined below in Figures 5 and 6 for the worst case year of 2020.

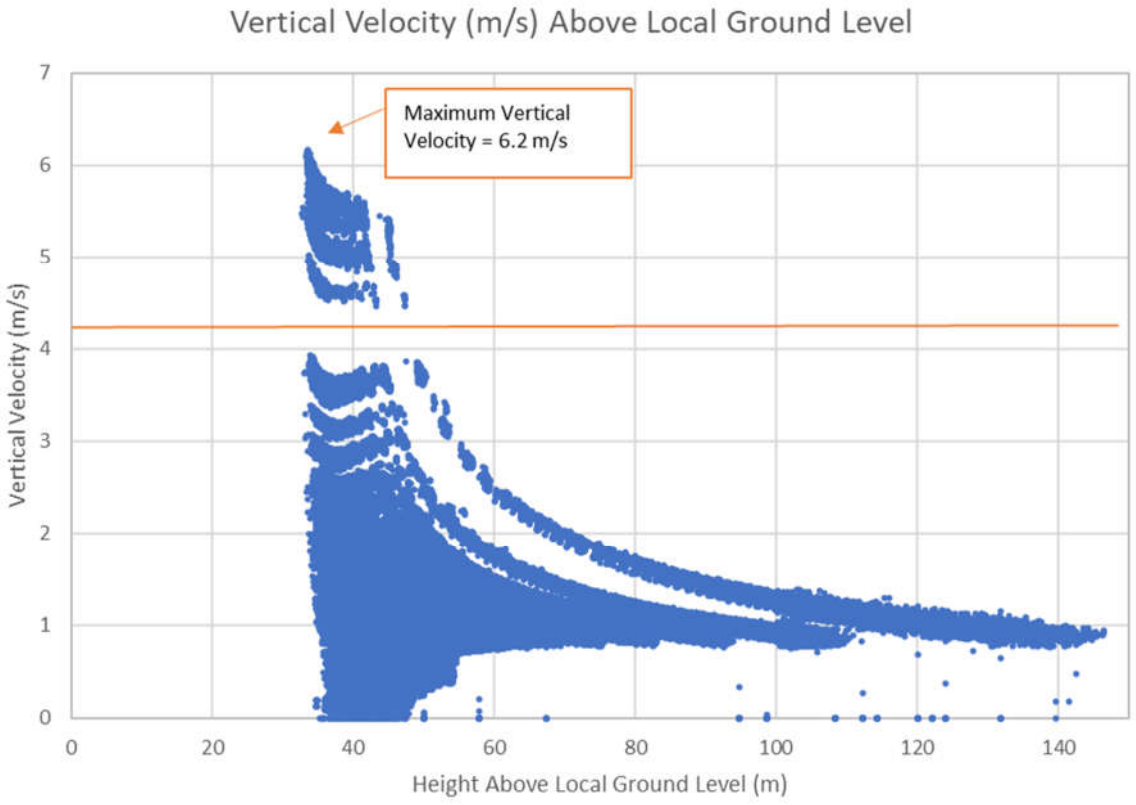

Figure 5: Vertical Velocity Of The Plume (m/s) With Distance Above Ground Level

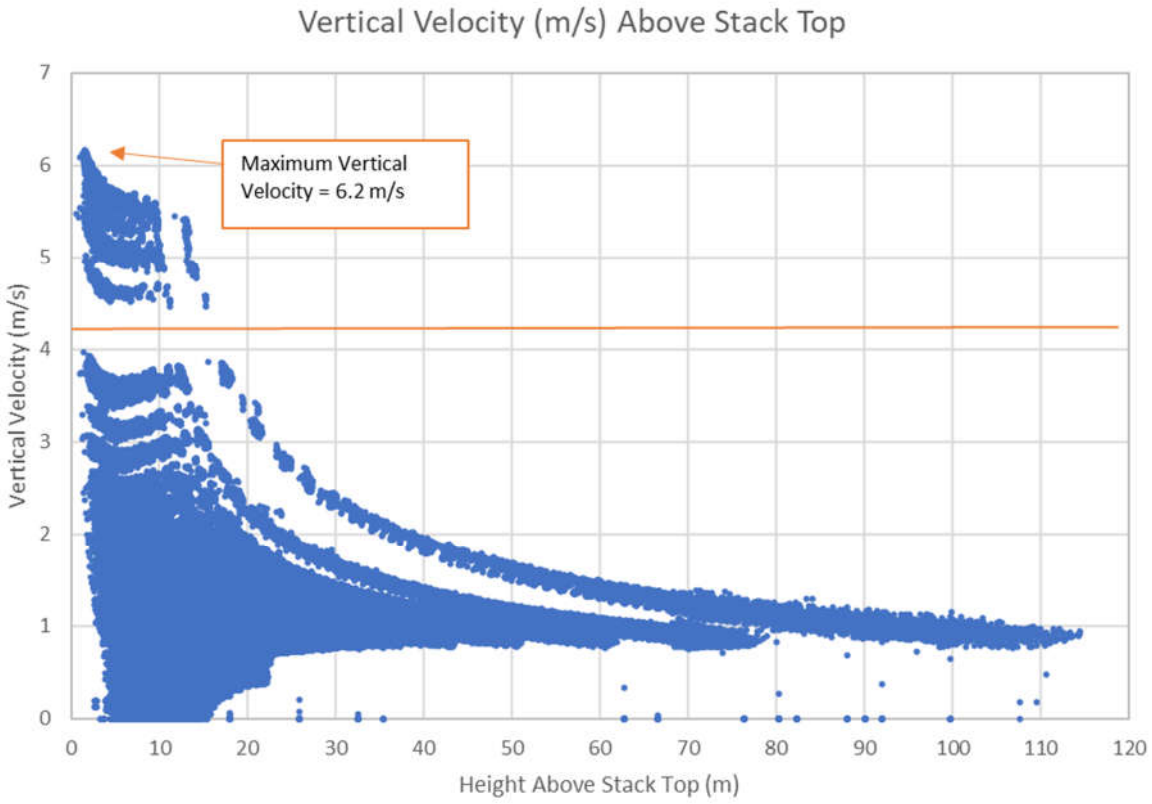

Figure 6: Vertical Velocity Of The Plume (m/s) With Distance From Stack Top

The results confirm that the velocity of the plume will be below 4.3 m/s within 15 m of the stack top (47 m above ground level) of the stack including all meteorological conditions including pressure / temperature inversions.

SUMMARY

Thus, in summary the results of the analysis are as follows.

- **Oxygen Content** – within 9 metres of the stack top the oxygen concentration will increase above the 12% risk level for oxygen.
- **Temperature** – the temperature of the plume will drop to less than 50°C within 11 metres of the stack.
- **Vertical Velocity** – the critical vertical velocity of 4.3 m/s will not be exceeded within 15 metre from the stack top.

Thus, the maximum extent of the risk zone of the plume for each parameter is shown below based on three full years of meteorological data covering all meteorological conditions including pressure / temperature inversions:

- Risk Zone for Oxygen – 9 metres
- Risk Zone for Temperature – 11 metres
- Risk Zone for Vertical Velocity – 15 metres

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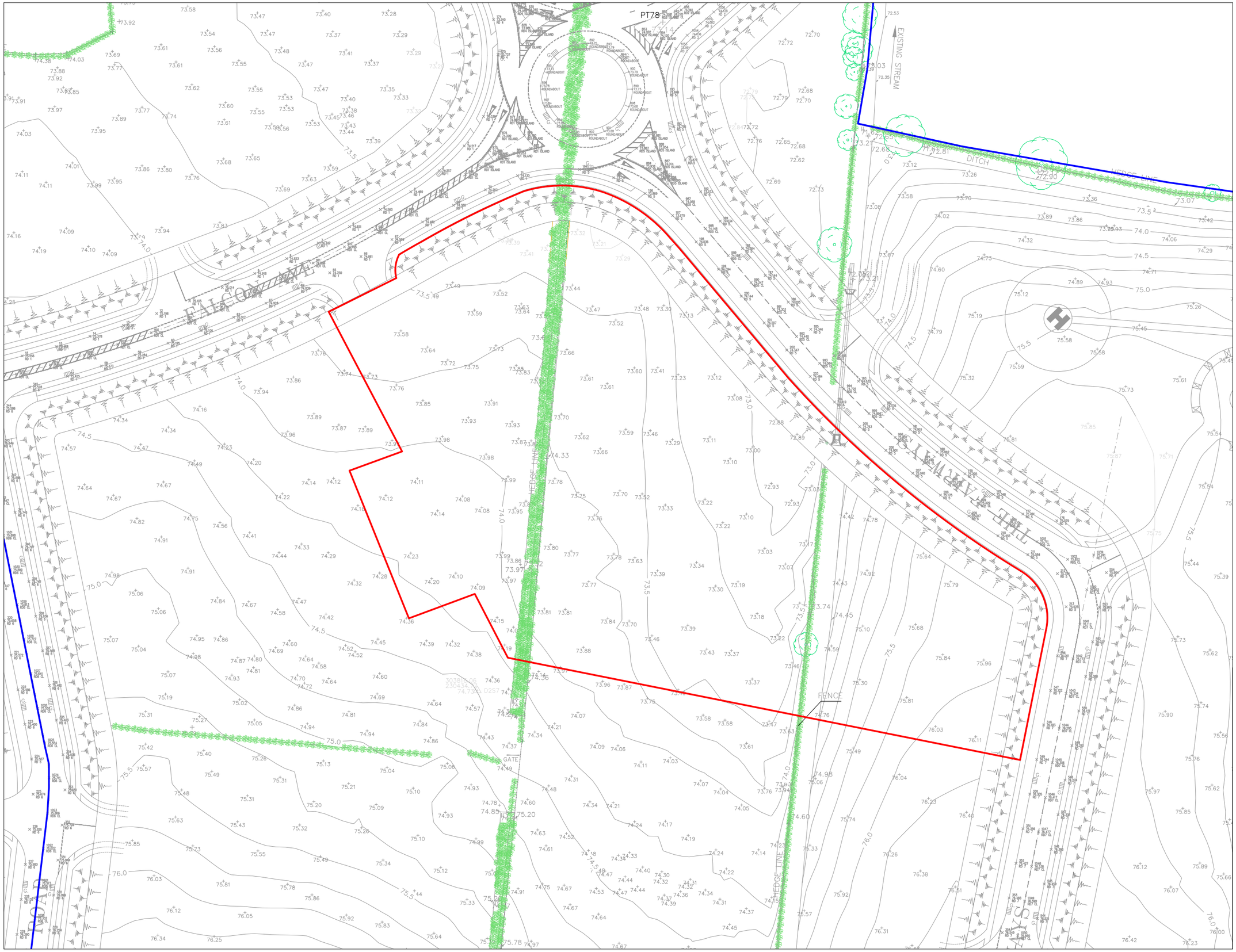
Appendix 4 – Natural Features



GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

APPLICANT'S LANDHOLDING

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

CO. DUBLIN

OSI 1:2,500 Sheet No's: 3325-B, 3325-D, 3326-A & 3326-C.

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Rev	Date	Description	By	Chkd.
A	13.12.21	PLANNING ISSUE	MN	MMcC

Client: Greener Ideas

Project:

PROFILE PARK
POWER PLANT

Title:

EXISTING SITE TOPOGRAPHY & NATURAL FEATURES

Scale @ A3:	1:1,000	
Prepared by: M. Nolan	Checked: M. McCarthy	Date: December 2021
Project Director:	S. Tinnelly	
Drawing Status:	Planning	

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Drawing No.: Figure 1

Revision: A

Legend

- Site Location

Habitats/Fossitt Codes

- FW1 Eroding/upland rivers
- WL1 Hedgerows
- BL3 Buildings and artificial surfaces
- GS1 Dry calcareous and neutral grassland
- GS4 Wet grassland

0 0.03 0.06 Km

Issue	Date	Description	By	Chkd.
A	20/04/2021	Habitats	S.P	A.S

Client: Greener Ideas

Project: Profile Park Power Plant

Title: Figure 12.2 Habitat Map

Scale @ A3: 1:1,500

Prepared by:	Checked:	Date:
S. Pezzetta	A. Sands	April 2021

Project Director: D. Grehan

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Drawing No.: Figure 12.2 Issue: A

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Appendix 5 – Surface Water Drainage Calculations

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 303898, Northing: 230475,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.3,	3.4,	4.1,	5.0,	5.7,	6.2,	8.0,	10.1,	11.5,	13.5,	15.3,	16.7,	18.9,	20.7,	22.2,	N/A ,
10 mins	3.2,	4.8,	5.7,	7.0,	8.0,	8.7,	11.1,	14.0,	16.0,	18.7,	21.3,	23.3,	26.4,	28.8,	30.9,	N/A ,
15 mins	3.8,	5.6,	6.7,	8.3,	9.4,	10.2,	13.1,	16.5,	18.8,	22.1,	25.0,	27.4,	31.0,	33.9,	36.3,	N/A ,
30 mins	5.0,	7.4,	8.7,	10.7,	12.0,	13.1,	16.7,	21.0,	23.8,	27.8,	31.5,	34.4,	38.9,	42.4,	45.4,	N/A ,
1 hours	6.6,	9.6,	11.2,	13.8,	15.5,	16.9,	21.4,	26.6,	30.1,	35.1,	39.7,	43.2,	48.7,	53.0,	56.6,	N/A ,
2 hours	8.6,	12.5,	14.6,	17.8,	19.9,	21.7,	27.3,	33.8,	38.2,	44.4,	49.9,	54.3,	61.0,	66.3,	70.7,	N/A ,
3 hours	10.1,	14.5,	17.0,	20.6,	23.1,	25.1,	31.5,	38.9,	43.8,	50.8,	57.1,	62.0,	69.6,	75.5,	80.4,	N/A ,
4 hours	11.3,	16.2,	18.9,	22.9,	25.7,	27.8,	34.9,	43.0,	48.4,	56.0,	62.8,	68.2,	76.4,	82.8,	88.2,	N/A ,
6 hours	13.3,	18.9,	22.0,	26.6,	29.7,	32.2,	40.3,	49.4,	55.5,	64.2,	71.9,	77.9,	87.2,	94.4,	100.4,	N/A ,
9 hours	15.6,	22.1,	25.6,	30.9,	34.5,	37.3,	46.4,	56.9,	63.8,	73.5,	82.2,	89.0,	99.4,	107.6,	114.3,	N/A ,
12 hours	17.4,	24.6,	28.5,	34.3,	38.3,	41.4,	51.4,	62.8,	70.4,	81.0,	90.5,	97.8,	109.2,	118.0,	125.3,	N/A ,
18 hours	20.4,	28.7,	33.2,	39.9,	44.4,	47.9,	59.3,	72.3,	80.8,	92.8,	103.5,	111.8,	124.6,	134.5,	142.7,	N/A ,
24 hours	22.9,	32.1,	37.0,	44.3,	49.3,	53.1,	65.7,	79.8,	89.2,	102.3,	113.9,	122.9,	136.8,	147.5,	156.4,	187.6,
2 days	28.7,	39.1,	44.6,	52.6,	58.0,	62.1,	75.4,	90.2,	99.8,	113.1,	124.8,	133.8,	147.6,	158.2,	166.9,	197.1,
3 days	33.5,	44.8,	50.7,	59.3,	65.0,	69.4,	83.4,	98.7,	108.7,	122.4,	134.3,	143.5,	157.4,	168.0,	176.8,	206.9,
4 days	37.6,	49.8,	56.0,	65.2,	71.2,	75.7,	90.3,	106.2,	116.5,	130.5,	142.7,	152.0,	166.2,	176.9,	185.8,	216.0,
6 days	45.0,	58.5,	65.4,	75.3,	81.8,	86.7,	102.4,	119.3,	130.0,	144.7,	157.4,	167.1,	181.6,	192.7,	201.7,	232.5,
8 days	51.4,	66.1,	73.5,	84.2,	91.1,	96.4,	112.9,	130.6,	141.8,	157.1,	170.2,	180.2,	195.1,	206.5,	215.7,	247.0,
10 days	57.4,	73.1,	81.0,	92.2,	99.5,	105.1,	122.4,	140.8,	152.5,	168.3,	181.8,	192.0,	207.4,	219.0,	228.4,	260.2,
12 days	62.9,	79.6,	87.9,	99.7,	107.4,	113.1,	131.1,	150.2,	162.3,	178.5,	192.5,	202.9,	218.6,	230.5,	240.1,	272.5,
16 days	73.3,	91.6,	100.6,	113.4,	121.7,	127.9,	147.1,	167.4,	180.1,	197.2,	211.8,	222.8,	239.1,	251.3,	261.3,	294.6,
20 days	82.9,	102.6,	112.3,	126.0,	134.8,	141.4,	161.7,	183.0,	196.3,	214.2,	229.3,	240.6,	257.5,	270.2,	280.4,	314.7,
25 days	94.2,	115.5,	125.9,	140.6,	149.9,	156.9,	178.5,	200.9,	214.9,	233.5,	249.3,	261.1,	278.6,	291.7,	302.3,	337.5,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 20.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.900 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.272 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	1	960 Winter	100	+0%	30/15 Summer				74.717	0.658	0.000	0.12		7.3
1.001	2	960 Winter	100	+0%	30/15 Summer				74.717	0.927	0.000	0.19		11.6
2.000	3	960 Winter	100	+0%	30/15 Summer				74.716	0.841	0.000	0.09		2.4
2.001	4	960 Winter	100	+0%	30/15 Summer				74.716	0.891	0.000	0.22		6.1
2.002	5	960 Winter	100	+0%	30/15 Summer				74.715	0.982	0.000	0.12		6.9
2.003	6	960 Winter	100	+0%	30/15 Summer				74.715	1.105	0.000	0.16		8.2
1.002	7	960 Winter	100	+0%	30/15 Summer				74.714	1.150	0.000	0.22		22.4
1.003	8	960 Winter	100	+0%	30/360 Winter				74.711	1.264	0.000	0.26		31.6
1.004	9	960 Winter	100	+0%	30/360 Winter				74.710	1.288	0.000	0.14		24.3
1.005	10	960 Winter	100	+0%	30/30 Summer				74.721	1.465	0.000	0.20		26.4
1.006	11	960 Winter	100	+0%	30/120 Winter				74.727	1.506	0.000	0.22		27.5
1.007	12	960 Winter	100	+0%	30/120 Summer				74.732	1.542	0.000	0.17		28.6
1.008	13	960 Winter	100	+0%	30/30 Winter				74.738	1.732	0.000	0.08		9.6
1.009	14	960 Winter	100	+0%	1/360 Winter				74.737	1.762	0.000	0.06		6.4

PN	US/MH Name	Status	Level Exceeded
1.000	1	FLOOD RISK	
1.001	2	FLOOD RISK	
2.000	3	FLOOD RISK	
2.001	4	FLOOD RISK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes GDSDS Manhole Sizes IW Foul

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.900	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.272	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	80.839	0.269	300.5	0.209	4.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.49	73.759	0.209	0.0	0.0	5.7	0.90	63.7	34.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	67.864	0.226	300.0	0.121	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	15.091	0.050	301.8	0.070	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	27.450	0.092	300.0	0.106	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	37.114	0.124	300.0	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.003	11.756	0.039	300.0	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	34.973	0.117	300.0	0.082	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.003	7.798	0.026	300.0	0.092	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	49.396	0.165	300.0	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.001	50.00	6.75	73.490	0.331	0.0	0.0	9.0	0.90	63.8	53.7
2.000	50.00	4.34	73.650	0.070	0.0	0.0	1.9	0.75	29.7	11.3
2.001	50.00	4.95	73.600	0.175	0.0	0.0	4.7	0.75	29.8	28.5
2.002	50.00	5.63	73.434	0.197	0.0	0.0	5.3	0.90	63.8	32.0
2.003	50.00	5.85	73.310	0.235	0.0	0.0	6.4	0.90	63.8	38.1
1.002	50.00	7.31	73.189	0.647	0.0	0.0	17.5	1.04	115.0	105.1
1.003	50.00	7.42	72.997	0.739	0.0	0.0	20.0	1.17	185.8	120.1
1.004	50.00	8.12	72.971	0.794	0.0	0.0	21.5	1.17	185.8	129.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.005	10.425	0.035	300.0	0.092	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	9.542	0.032	300.0	0.039	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	55.406	0.185	300.0	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	9.112	0.030	300.0	0.008	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	8.957	0.025	358.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	8.27	72.807	0.886	0.0	0.0	24.0	1.17	185.8	144.0
1.006	50.00	8.41	72.772	0.926	0.0	0.0	25.1	1.17	185.8	150.4
1.007	48.97	9.20	72.740	0.970	0.0	0.0	25.7	1.17	185.8	154.4
1.008	48.66	9.33	72.555	0.978	0.0	0.0	25.8	1.17	185.8	154.6
1.009	48.33	9.47	72.525	0.978	0.0	0.0	25.8	1.07	169.9	154.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	74.800	1.041	Open Manhole	1200	1.000	73.759	300				
2	74.800	1.310	Open Manhole	1200	1.001	73.490	300	1.000	73.490	300	
3	74.800	1.150	Open Manhole	1200	2.000	73.650	225				
4	74.800	1.200	Open Manhole	1200	2.001	73.600	225	2.000	73.600	225	
5	74.800	1.366	Open Manhole	1200	2.002	73.434	300	2.001	73.509	225	
6	74.800	1.490	Open Manhole	1200	2.003	73.310	300	2.002	73.310	300	
7	74.800	1.611	Open Manhole	1350	1.002	73.189	375	1.001	73.264	300	
								2.003	73.271	300	7
8	74.800	1.803	Open Manhole	1350	1.003	72.997	450	1.002	73.072	375	
9	74.800	1.829	Open Manhole	1350	1.004	72.971	450	1.003	72.971	450	
10	74.800	1.993	Open Manhole	1350	1.005	72.807	450	1.004	72.807	450	
11	74.800	2.028	Open Manhole	1350	1.006	72.772	450	1.005	72.772	450	
12	74.800	2.060	Open Manhole	1350	1.007	72.740	450	1.006	72.740	450	
13	74.800	2.245	Open Manhole	1350	1.008	72.555	450	1.007	72.555	450	
14	74.800	2.275	Open Manhole	1350	1.009	72.525	450	1.008	72.525	450	
	74.800	2.300	Open Manhole	0		OUTFALL		1.009	72.500	450	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	1	74.800	73.759	0.741	Open Manhole	1200
1.001	o	300	2	74.800	73.490	1.010	Open Manhole	1200
2.000	o	225	3	74.800	73.650	0.925	Open Manhole	1200
2.001	o	225	4	74.800	73.600	0.975	Open Manhole	1200
2.002	o	300	5	74.800	73.434	1.066	Open Manhole	1200
2.003	o	300	6	74.800	73.310	1.190	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	80.839	300.5	2	74.800	73.490	1.010	Open Manhole	1200
1.001	67.864	300.0	7	74.800	73.264	1.236	Open Manhole	1350
2.000	15.091	301.8	4	74.800	73.600	0.975	Open Manhole	1200
2.001	27.450	300.0	5	74.800	73.509	1.066	Open Manhole	1200
2.002	37.114	300.0	6	74.800	73.310	1.190	Open Manhole	1200
2.003	11.756	300.0	7	74.800	73.271	1.229	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.002	o	375	7	74.800	73.189	1.236	Open Manhole	1350
1.003	o	450	8	74.800	72.997	1.353	Open Manhole	1350
1.004	o	450	9	74.800	72.971	1.379	Open Manhole	1350
1.005	o	450	10	74.800	72.807	1.543	Open Manhole	1350
1.006	o	450	11	74.800	72.772	1.578	Open Manhole	1350
1.007	o	450	12	74.800	72.740	1.610	Open Manhole	1350
1.008	o	450	13	74.800	72.555	1.795	Open Manhole	1350
1.009	o	450	14	74.800	72.525	1.825	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.002	34.973	300.0	8	74.800	73.072	1.353	Open Manhole	1350
1.003	7.798	300.0	9	74.800	72.971	1.379	Open Manhole	1350
1.004	49.396	300.0	10	74.800	72.807	1.543	Open Manhole	1350
1.005	10.425	300.0	11	74.800	72.772	1.578	Open Manhole	1350
1.006	9.542	300.0	12	74.800	72.740	1.610	Open Manhole	1350
1.007	55.406	300.0	13	74.800	72.555	1.795	Open Manhole	1350
1.008	9.112	300.0	14	74.800	72.525	1.825	Open Manhole	1350
1.009	8.957	358.3		74.800	72.500	1.850	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	90	0.078	0.070	0.070
	User	-	90	0.085	0.076	0.147
	User	-	60	0.022	0.013	0.160
	User	-	60	0.083	0.050	0.209
1.001	User	-	100	0.005	0.005	0.005
	User	-	75	0.034	0.026	0.031
	User	-	100	0.002	0.002	0.033
	User	-	100	0.010	0.010	0.044
	User	-	90	0.020	0.018	0.061
	User	-	60	0.080	0.048	0.109
	User	-	60	0.017	0.010	0.119
	User	-	80	0.002	0.002	0.121
2.000	User	-	100	0.004	0.004	0.004
	User	-	75	0.013	0.010	0.014
	User	-	90	0.020	0.018	0.032
	User	-	80	0.001	0.001	0.033
	User	-	60	0.062	0.037	0.070
2.001	User	-	75	0.022	0.017	0.017
	User	-	100	0.001	0.001	0.017
	User	-	90	0.012	0.011	0.028
	User	-	60	0.013	0.008	0.036
	User	-	60	0.117	0.070	0.106
2.002	User	-	75	0.016	0.012	0.012
	User	-	100	0.002	0.002	0.014
	User	-	60	0.013	0.008	0.022
2.003	User	-	100	0.006	0.006	0.006

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.001	0.001	0.007
	User	-	90	0.034	0.031	0.038
1.002	User	-	100	0.010	0.010	0.010
	User	-	75	0.009	0.007	0.017
	User	-	90	0.037	0.033	0.050
	User	-	100	0.006	0.006	0.056
	User	-	90	0.023	0.020	0.076
	User	-	80	0.007	0.006	0.082
1.003	User	-	75	0.009	0.007	0.007
	User	-	80	0.011	0.009	0.016
	User	-	100	0.003	0.003	0.018
	User	-	60	0.123	0.074	0.092
1.004	User	-	90	0.030	0.027	0.027
	User	-	100	0.004	0.004	0.032
	User	-	100	0.007	0.007	0.039
	User	-	90	0.018	0.016	0.055
1.005	User	-	90	0.103	0.092	0.092
1.006	User	-	90	0.026	0.024	0.024
	User	-	75	0.021	0.015	0.039
1.007	User	-	60	0.033	0.020	0.020
	User	-	90	0.027	0.025	0.044
1.008	User	-	90	0.009	0.008	0.008
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.290	0.978	0.978

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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009		74.800	72.500	72.500	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	20.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.900	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.272	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 14, DS/PN: 1.009, Volume (m³): 4.5

Unit Reference	MD-SHE-0102-5300-1425-5300	Sump Available	Yes
Design Head (m)	1.425	Diameter (mm)	102
Design Flow (l/s)	5.3	Invert Level (m)	72.525
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.425	5.3	Kick-Flo®	0.871	4.2
Flush-Flo™	0.423	5.3	Mean Flow over Head Range	-	4.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	0.600	5.2	1.600	5.6	2.600	7.0	5.000	9.6	7.500	11.6
0.200	4.8	0.800	4.6	1.800	5.9	3.000	7.5	5.500	10.0	8.000	12.0
0.300	5.2	1.000	4.5	2.000	6.2	3.500	8.1	6.000	10.4	8.500	12.3
0.400	5.3	1.200	4.9	2.200	6.5	4.000	8.6	6.500	10.8	9.000	12.6
0.500	5.3	1.400	5.3	2.400	6.8	4.500	9.1	7.000	11.2	9.500	13.0

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Storage Structures for Storm

Tank or Pond Manhole: 8, DS/PN: 1.003

Invert Level (m) 72.997

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	45.0	1.700	45.0	1.701	0.0

Tank or Pond Manhole: 13, DS/PN: 1.008

Invert Level (m) 72.555

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	355.0	1.000	355.0	1.001	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
2.002	5	FLOOD RISK	
2.003	6	FLOOD RISK	
1.002	7	FLOOD RISK	
1.003	8	FLOOD RISK	
1.004	9	FLOOD RISK	
1.005	10	FLOOD RISK	
1.006	11	FLOOD RISK	
1.007	12	FLOOD RISK	
1.008	13	FLOOD RISK	
1.009	14	FLOOD RISK	

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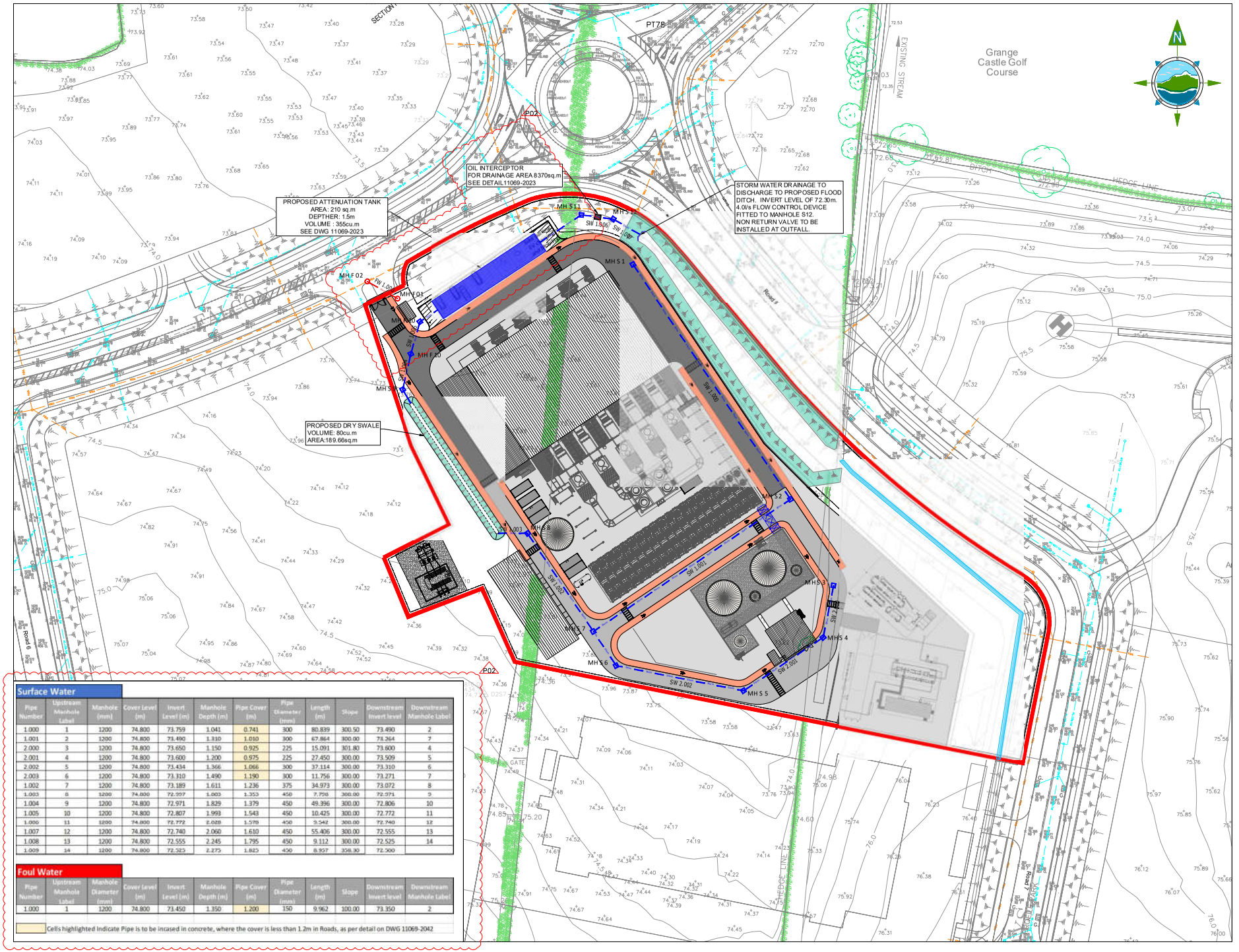

Surface Water

Pipe Number	Upstream Manhole Label	Manhole (mm)	Cover Level (m)	Invert Level (m)	Manhole Depth (m)	Pipe Cover (m)	Pipe Diameter (mm)	Length (m)	Slope	Downstream Invert level	Downstream Manhole Label
1.000	1	1200	74.800	73.759	1.041	0.741	300	80.839	300.50	73.490	2
1.001	2	1200	74.800	73.490	1.310	1.010	300	67.864	300.00	73.264	7
2.000	3	1200	74.800	73.650	1.150	0.925	225	15.091	301.80	73.600	4
2.001	4	1200	74.800	73.600	1.200	0.975	225	27.450	300.00	73.509	5
2.002	5	1200	74.800	73.434	1.366	1.066	300	37.114	300.00	73.310	6
2.003	6	1200	74.800	73.310	1.490	1.190	300	11.756	300.00	73.271	7
1.002	7	1200	74.800	73.189	1.611	1.236	375	34.973	300.00	73.072	8
1.003	8	1200	74.800	72.997	1.803	1.353	450	7.796	300.00	72.971	9
1.004	9	1200	74.800	72.971	1.829	1.379	450	49.396	300.00	72.806	10
1.005	10	1200	74.800	72.807	1.993	1.543	450	10.425	300.00	72.772	11
1.006	11	1200	74.800	72.772	2.028	1.578	450	9.542	300.00	72.740	12
1.007	12	1200	74.800	72.740	2.060	1.610	450	55.406	300.00	72.555	13
1.008	13	1200	74.800	72.555	2.245	1.795	450	9.112	300.00	72.525	14
1.009	14	1200	74.800	72.525	2.275	1.825	450	8.957	358.30	72.500	

Foul Water

Pipe Number	Upstream Manhole Label	Manhole Diameter (mm)	Cover Level (m)	Invert Level (m)	Manhole Depth (m)	Pipe Cover (m)	Pipe Diameter (mm)	Length (m)	Slope	Downstream Invert level	Downstream Manhole Label
1.000	1	1200	74.800	73.450	1.350	1.200	150	9.962	100.00	73.350	2

Cells highlighted Indicate Pipe is to be incased in concrete, where the cover is less than 1.2m in Roads, as per detail on DWG 11069-2042

LEGEND:

- PLANNING BOUNDARY
- PROPOSED FOUL PIPE
- PROPOSED FOUL MH
- PROPOSED STORM PIPE
- PROPOSED STORM MANHOLE
- PERMEABLE GRASSCRETE PAVEMENT
- PROPOSED SWALE
- PROPOSED ATTENUATION TANK
- PROPOSED PETROL INTERCEPTOR
- PROPOSED ROAD GULLY
- PROPOSED FILTER SUMP PUMP
- SWALES

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
P02	05/12/2021	ISSUED FOR INFORMATION	PF	McC
P01	16/02/2021	ISSUED FOR PLANNING	PF	McC

Client: centrica

Project: PROFILE PARK POWER PLANT

Title: PROPOSED SITE DRAINAGE

Scale @ A1: 1:500

Prepared by:	Checked:	Date:
PK	MMcC	Feb' 2021

Project Director: BRIAN CARROLL

Drawing Status: PLANNING

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Drawing No.: 11069-2010 Revision: P02

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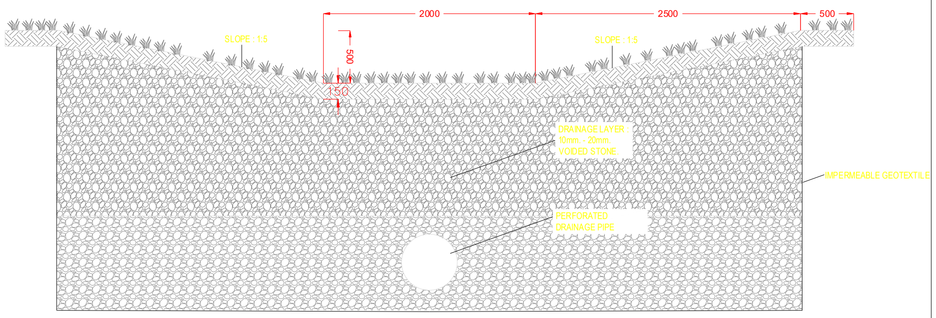
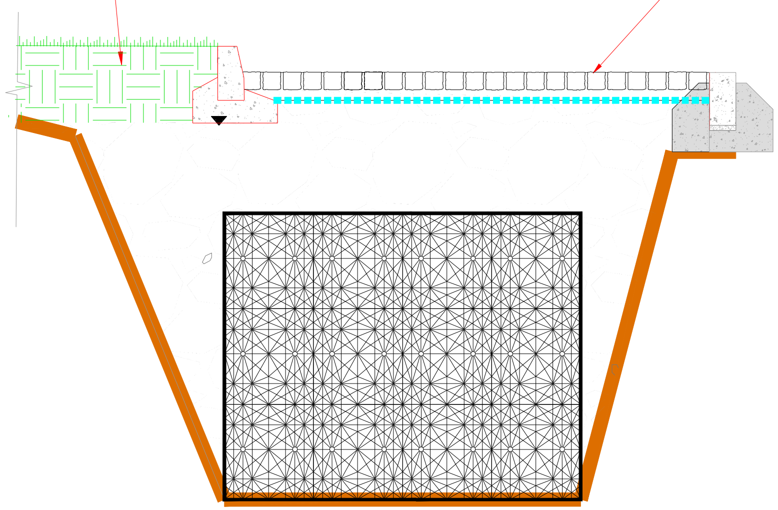


TYPICAL SECTION THROUGH DRY SWALE
SCALE 1:25 @ A1



TYPICAL SECTION TRHOUGH CAR PARK STORAGE

SCALE 1:20

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
P03	23/03/2022	CARP PARKING SECTION ADDED	PF	McC
P02	09/12/2021	DETENTION BASIN AND SWALE ADDED	PF	McC
P01	16/02/2021	ISSUED FOR PLANNING	PF	McC

Client: centrica

Project: PROFILE PARK POWER PLANT

Title: PROPOSED SUDs DETAILS

Scale @ A1: AS SHOWN
Prepared by: PF | Checked: MMcC | Date: Feb' 2021
Project Director: BRIAN CARROLL
Drawing Status: PLANNING

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Drawing No.: 11069-2036 | Revision: P03

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Appendix 6 – Noise and Vibration Assessment

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TECHNICAL NOTE

Project	**Profile Park Gas Generation**
Subject	**RFI Noise Modeling & Comment**
Author	**Damian Kelly**
Date	**27 November 2021**
Ref.	**DK/21/12055/NT04**

This note has been prepared to present comment on the Profile Park Gas Generation development in response to a request for further information (RFI) received from South Dublin County Council (SDCC).

1.0 RESPONSE TO ITEM 7

Item 7 of the RFI states the following:

"7. The proposed application highlights a potential for noise to impact a number of nearly receivers. The noise levels predict a notable change in the noise at these receivers during the night time period.

- *The applicant is required to assess and re-evaluate all noise emitting equipment proposed on site in this application.*
- *The applicant must undertake necessary modifications to the proposed structures and operations on site in order to reduce the predicted noise levels at nearby receivers to acceptable level during both day and night time.*
- *The development must not give rise to noise levels that exceed the background level for evening and night time periods.*
- *The applicant must demonstrate the development can meet the standards set out by South Dublin County Council as noted below:*

Noise due the normal operation of the proposed development expressed as L_{Aeq} over 15 minutes at the façade of a noise sensitive location, shall not exceed the daytime background level by more than 10 dB(A) and should not exceed the background level for evening and night time. Clearly audible and impulsive tones at noise sensitive locations during evening and night shall be avoided irrespective of noise level."

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The following is noted:

- The adopted noise limits proposed in the EIAR (see Section 12.2.1.7) satisfy the "*standards set out by South Dublin Council*" as noted in the RFI. The criteria were selected such that predicted noise associated with the site does "*not exceed the daytime background level by more than 10 dB(A)*" and does "*not exceed the background level for evening and night time*".
- As part of the original EIAR the plant was reviewed and selected such that the predicted noise levels satisfy the "*standards set out by South Dublin Council*" as noted in the RFI. Therefore there is no requirement for "*modifications to the proposed structures and operations on site in order to reduce the predicted noise levels at nearby receivers to acceptable level during both day and nighttime".* The noise impact presented in the EIAR is directly applicable to the impact presented for the revised layout being proposed as part of the wider RFI response and outlined in the later sections of this document.
- While the predicted noise levels presented in the EIAR did show a change in noise level at nearby noise sensitive locations the impacts were not determined as significant as detailed in the relevant sections of the EIAR (i.e. Table 12.19, Table 12.20 and Table 12.21).
- To reiterate the predicted noise levels presented in the EIAR did not present "*noise levels that exceed the background level for evening and night time periods".*

As part of a wider response to the RFI the site layout has altered with a reduction in the size of the building and one less generator unit being proposed. The noise modelling presented in the EIAR has been updated and the results of this exercise are presented in the following sections. The results of the updated modelling do not change the comments presented in relation to Item 7 of the RFI above.

2.0 MODEL ASSUMPTIONS

Table 12-1 presents the noise data assumed for the various buildings. Data has been supplied by Greener Ideas Limited unless otherwise stated. The noise predictions showthat the selected plant items and building structure result in "*predicted noise levels atnearby receivers to acceptable level during both day and night time".*

Table 12-1: Summary of Noise Data for EIAR Noise Model

Item	Octave Band Sound Power Level dB L_w									dB(A)
	31.5	63	125	250	500	1000	2000	4000	8000	
A – Intake Air (Opening) [1]	103	97	94	86	80	90	89	86	84	95
B – Exhaust Stack Outlet [1]	107	100	94	92	86	83	81	82	84	91
C – Radiator Coolers [1]	--	103	97	93	92	91	86	81	83	95
D – Air Exhaust Roof [2]	108	98	78	63	61	59	59	52	57	74
E – Roof [3]	79	72	70	66	59	51	46	34	31	61
F – Walls [3]	77	70	67	64	57	48	43	31	28	59
G – Ventilation Unit [4]	--	--	--	--	--	84	--	--	--	84
H – Gas AGI [5]	--	--	--	--	--	80	--	--	--	80
I – Gas PRS [6]	--	--	--	--	--	80	--	--	--	80
J – Transformer [7]	--	--	--	--	--	82	--	--	--	80

Note 1 6 in number. Data as supplied.
Note 2 Based on assumption of a 25m^2 opening. 6 openings in the roof in total. Internal noise level within the building estimated as follows:

	Lp - Octave Band Centre Frequency (Hx) - Linear										
	31.5	63	125	250	500	1000	2000	4000	8000	dB	dB(A)
Total Lp Level in Hall	112	111	107	107	108	106	106	99	96	117	112

Attenuation for hall exhaust assumed to be as follows as supplied from a similar project:

Description	Insertion Loss (dB) per Octave Band (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000
Attenuator Performance 3 m Length, 25 % Free Area[1]	12	21	37	52	55	55	55	55	47

[1] Data taken from an alternative supplier on a similar project.

Note 3 L_w level per m^2. Based on the 'L_p Level in Hall' stated in Note 2 and the assumption that the roof offers the following sound reduction performance (as advised from a similar project).

Description	Insertion Loss (dB) per Octave Band (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000
Walls	37	43	42	45	53	60	65	70	70
Roof	35	41	39	43	51	57	62	67	67

Example wall and roof constructions capable of achieving the performance specifications outlined in **Table 3** are:

- Walls: 215 mm thick solid concrete block
- Roof: 250 mm thick hollowcore concrete planks

Note 4 12 units in total. Overall L_w level supplied.
Note 5 80dB(A) at 1m advised for building. This level has been assumed and L_w estimated for walls/roof of building based on areas obtained from drawings to hand.
Note 6 Overall L_w level supplied.
Note 7 2 units in total. Overall L_w level supplied.

Figure 12-1 presents a 3D render of the developed noise model.

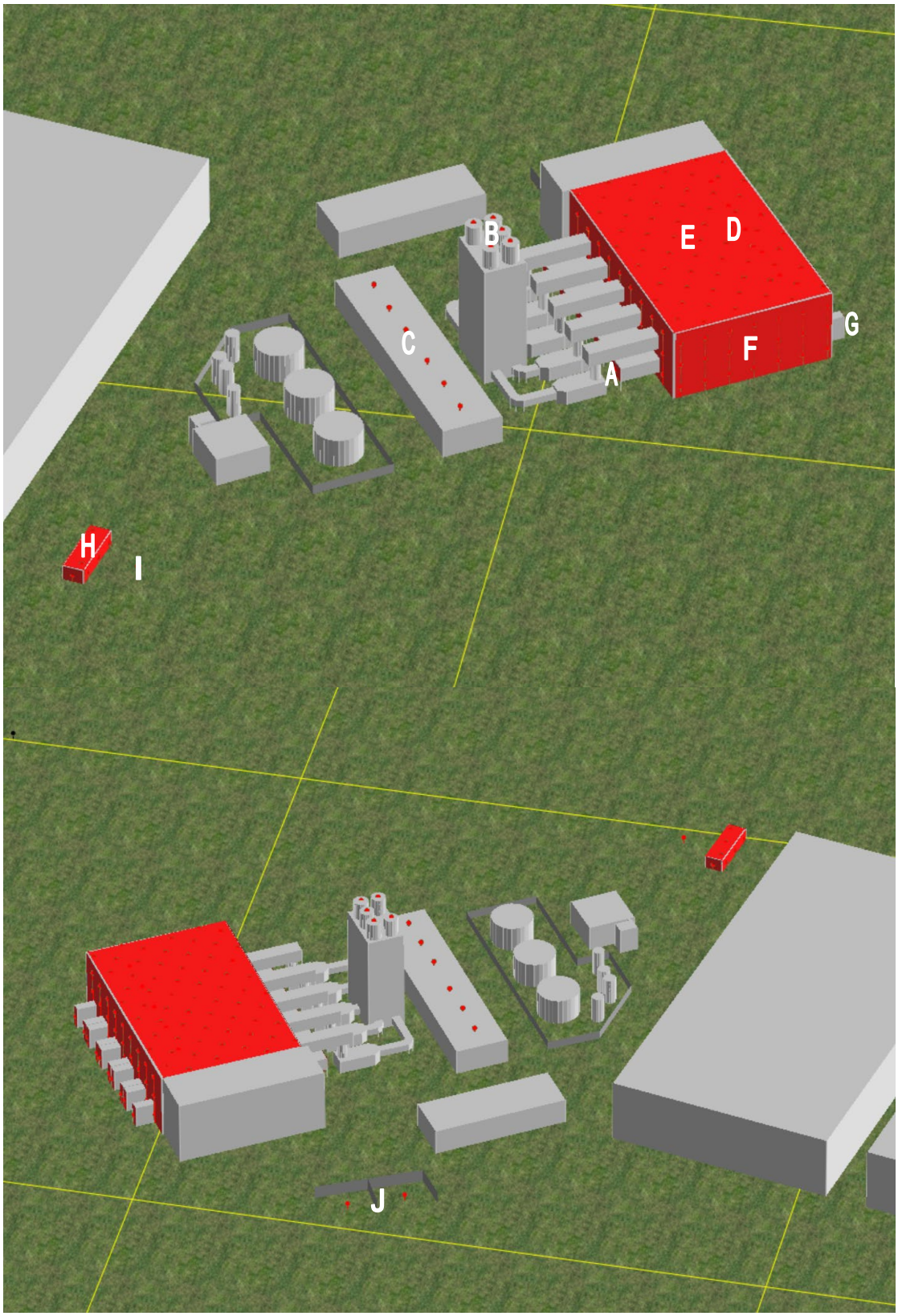


Figure 12-1: 3D Render of Developed Noise Model

5.0 UPDATED ASSESSMENT

Table 12-2 presents the predicted noise at all assessment locations considering the impact of the proposed development.

Table 12-2: Predicted Noise Levels

Ref.	Sound Pressure (dB) per Octave Band Centre Freq (Hz)									dB(A)
	31.5	63	125	250	500	1k	2k	4k	8k	
R01	53	48	37	32	26	27	20	7	--	31
R02	52	47	36	31	27	30	24	5	--	33
R03	52	47	36	31	27	31	24	5	--	33
R04	52	48	35	30	27	32	26	7	--	34
R05	50	45	34	28	25	27	17	--	--	30
R06	56	50	39	35	30	35	17	5	--	37
R07	55	46	33	28	21	21	11	--	--	27
R08	57	51	40	36	31	36	20	6	--	38
R09	61	55	46	42	38	43	33	23	3	45
R10	57	51	41	37	33	37	28	14	--	39
R11	57	51	41	37	33	37	27	12	--	39
R12	56	51	41	37	33	37	28	12	--	39
R13	56	51	40	36	33	37	27	12	--	39
R14	55	50	39	36	32	36	27	10	--	38
R15	66	61	53	44	41	45	40	32	--	48
R16	54	51	38	31	28	51	25	18	8	51

A noise contour for day to day operation of the proposed development has been presented in Figure 12-2. Table 12-3 compares the predicted noise at all assessment locations against the adopted criteria.

Table 12-3: Review of Overall Noise Levels

Ref.	Predicted Noise Level dB(A)	Criterion dB $L_{Aeq,15min}$	Excess (dB)
R01	31	37	--
R02	33	37	--
R03	33	37	--
R04	34	37	--
R05	30	37	--
R06	37	55	--
R07	27	55	--
R08	38	55	--
R09	45	55	--
R10	39	55	--
R11	39	55	--
R12	39	55	--
R13	39	55	--
R14	38	39	--
R15	48	55	--

Ref.	Predicted Noise Level dB(A)	Criterion dB $L_{Aeq,15min}$	Excess (dB)
R16	51	55	--

The updated predicted noise levels satisfy the relevant noise criteria adopted in this assessment.

Table 12-4 reviews the predicted low-frequency noise at each location vs. the nominal limits recommended in relation to this issue in Table 12-6. Review of the predictions indicate that the proposed low frequency noise limits are substantively complied with.

Table 12-4: Review of Low Frequency Noise

Ref.	Predicted Noise Level dB(A)	Criterion dB $L_{Aeq,15min}$	Excess (dB)
Limit	*56*	*50*	*40*
R01	53	48	37
Excess	--	--	--
R02	52	47	36
Excess	--	--	--
R03	52	47	36
Excess	--	--	--
R04	52	48	35
Excess	--	--	--
R05	50	45	34
Excess	--	--	--
R14	55	50	39
Excess	--	--	--

Table 12-5, 12-6 and 12-7 present the predicted changes in noise level associated withthe development at the nearest residential noise sensitive locations to the site.

Table 12-5: Review of Predicted Changes in Existing Noise Levels – Day

Ref.	Daytime (07:00 – 19:00 hrs)				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	31	*43*	43	0	Not Significant
R02	33	52	52	0	Not Significant
R03	33	52	52	0	Not Significant
R04	34	52	52	0	Not Significant
R05	30	52	52	0	Not Significant
R14	38	52	52	0	Not Significant

Table 12-6: Review of Predicted Changes in Existing Noise Levels – Evening

Ref.	Evening (19:00 – 23:00 hrs)				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	31	38	39	1	Not Significant
R02	33	42	43	1	Not Significant
R03	33	42	43	1	Not Significant
R04	34	42	43	1	Not Significant
R05	30	42	42	0	Not Significant
R14	38	42	44	2	Not Significant

Table 12-7: Review of Predicted Changes in Existing Noise Levels – Night

Ref.	Night (23:00 – 07:00 hrs)				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	31	37	38	1	Not Significant
R02	33	39	40	1	Not Significant
R03	33	39	40	1	Not Significant
R04	34	39	40	1	Not Significant
R05	30	39	40	1	Not Significant
R14	38	39	42	3	Slight

Review of the predicted increases in noise level at the nearest residential noise sensitive locations conclude that the associated impact is 'Not Significant' at all locations for daytime and evening periods. During night-time periods the predicted impact is Not Significant at all locations with the exception of R14 where a Slight impact is predicted.

Description of Effects

With respect to the EPA's criteria for description of effects, the potential worst-case associated effects at the nearest noise sensitive locations associated with operation of the wind farm is described below.

Quality	*Significance*	*Duration*
Negative	Slight	Long-term

The above effects should be considered in terms that the effect is variable and that this assessment considers the locations of the greatest potential impact.

For the majority of locations assessed here the effect of the operational engines can be considered to be as follows:

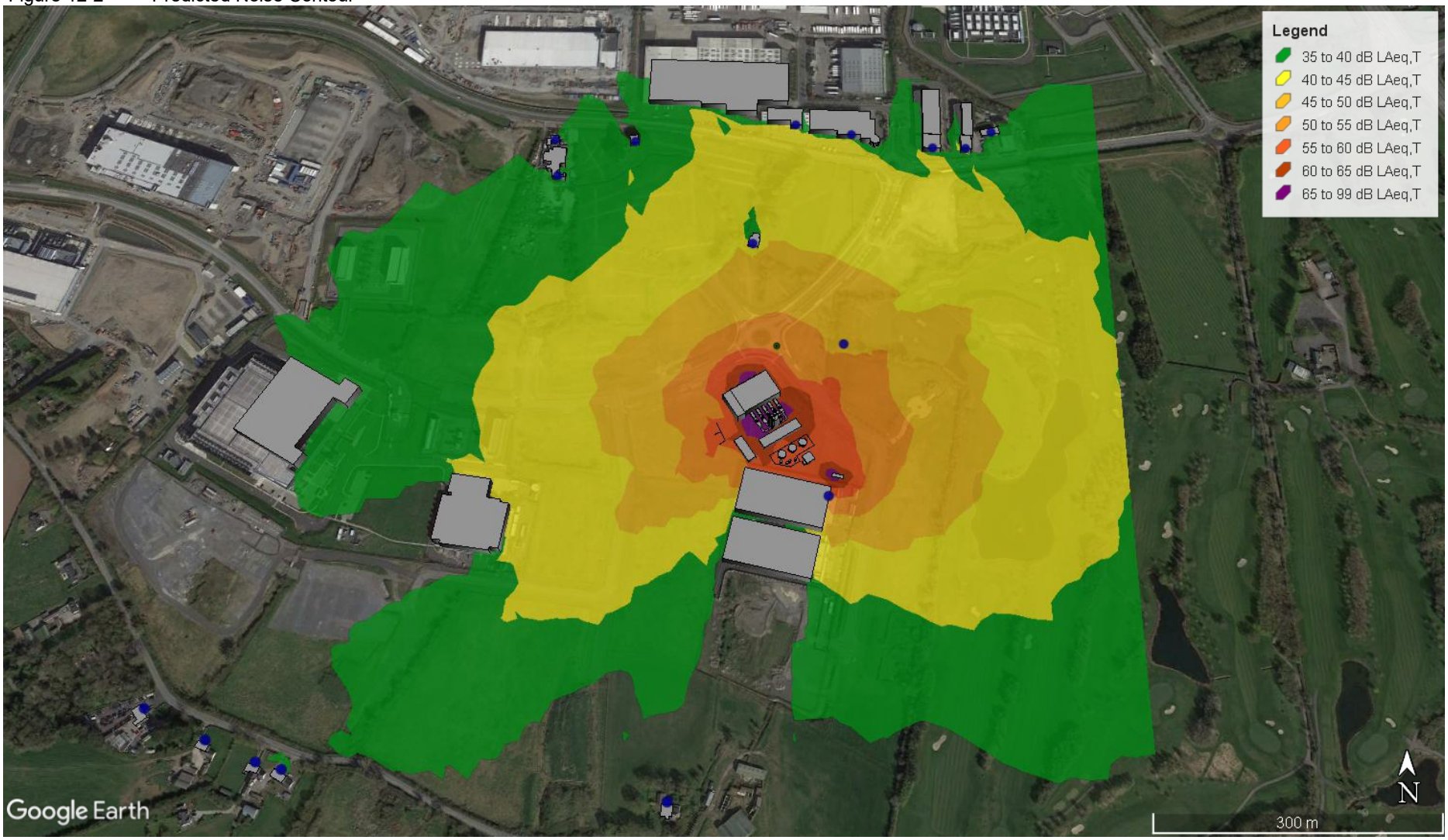
Quality	*Significance*	*Duration*
Negative	Not Significant	Long-term

There are no expected sources of vibration associated with the operational phase of the proposed development. In relation to vibration the associated effect is summarised as follows:

Quality	*Significance*	*Duration*
Negative	Imperceptible	Long-term

It should be noted that this power plant will be subject to an Industrial Emissions Licence (IEL) from the Environmental Protection Agency. As per Section 34(2)(c)of the Planning and Development Act 2000, as amended, the control of emissions arising from licensed facilities is a function of the Agency. Greener Ideas Limited will ensure as that the proposed power plant operates in accordance with the requirements of any future Industrial Emissions Licence.

Figure 12-2 Predicted Noise Contour



APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
background noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
broadband	Sounds that contain energy distributed across a wide range of frequencies.
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
dB L_{pA}	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz (Hz)	The unit of sound frequency in cycles per second.
impulsive noise	A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{AFmax}	is the instantaneous slow time weighted maximum sound level measured during the sample period (usually referred to in relation to construction noise levels).
$L_{Ar,T}$	The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and impulsiveness of the sound.
L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.

L_{AT}(DW)	equivalent continuous downwind sound pressure level.
L_{fT}(DW)	equivalent continuous downwind octave-band sound pressure level.
L_{day}	L_{day} is the average noise level during the daytime period of 07:00hrs to 19:00hrs
L_{night}	L_{night} is the average noise level during the night-time period of 23:00hrs to 07:00hrs.
low frequency noise	LFN - noise which is dominated by frequency components towards the lower end of the frequency spectrum.
noise	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.
noise sensitive location	NSL – Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
octave band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
rating level	See $L_{Ar,T}$.
sound power level	The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m^2 where: $$Lw = 10Log\frac{P}{P_0}\ \text{dB}$$ Where: p is the rms value of sound power in pascals; and P_0 is 1 pW.
sound pressure level	The sound pressure level at a point is defined as: $$Lp = 20Log\frac{P}{P_0}\ \text{dB}$$
specific noise level	A component of the ambient noise which can be specifically identified by acoustical means and may be associated with a specific source. In BS 4142, there is a more precise definition as follows: 'the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval ($L_{Aeq,T}$)'.

tonal	Sounds which cover a range of only a few Hz which contains a clearly audible tone i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being ‘tonal’.

Appendix 7 – Archaeological Assessment Report

IAC Archaeology

ARCHAEOLOGICAL ASSESSMENT
AT
PROFILE PARK,
TOWNLAND OF KILBRIDE
COUNTY DUBLIN

LICENCE: 21E0692

ON BEHALF OF: TOBIN CONSULTING ENGINEERS

I.T.M.: 703681, 730561

LICENCEE: MARC PIERA
AUTHORS: MARC PIERA AND DEANNA LEE

REPORT STATUS: FINAL
DECEMBER 2021

IAC PROJECT REF.: J3750

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DOCUMENT CONTROL SHEET

DATE	DOCUMENT TITLE	REV.	PREPARED BY	REVIEWED BY	APPROVED BY
16.11.21	Archaeological Assessment at Profile Park, Kilbride, Co. Dublin	0	M. Piera and D. Lee		
02.12.21	Archaeological Assessment at Profile Park, Kilbride, Co. Dublin	1	M. Piera and D. Lee	T Coughlan	T Coughlan

ABSTRACT

IAC Archaeology has prepared this report on behalf of Tobin Consulting Engineers, to study the impact, if any, on the archaeological and historical resource of the proposed power plant development located at Profile Park, Kilbride, County Dublin (ITM 703681, 730561). The report was undertaken by Marc Piera and Deanna Lee of IAC Archaeology under licence 21E0692 and in response to a Request of Further Information by South Dublin County Council (Planning Ref: SD21A/0167). It follows an archaeological impact assessment carried out by Faith Bailey and Jacqui Anderson of IAC Archaeology (2019); and from a geophysical survey by ACSU (July 2020; Licence Ref.: 20R00080).

Archaeological testing was carried out over the course of one day on the 4th of November 2021 using a mechanical excavator fitted with a flat grading bucket. The trenches targeted open green space to fully investigate the archaeological potential of the site. Testing revealed one area of archaeological significance, which has been designated as Archaeological Area 1. It consists of an oval pit filled by a light grey plastic silty clay-marl with frequent inclusions of charcoal and animal bone. It may represent a waterlogged pit, possibly a well or cistern.

Spoil from a third party covered the north and northwestern area of the site which prevented test trenches from being excavated in this area. The eastern area of the site had around 2.5m of modern backfill consisting of different layers of gravel and concrete blocks and with 0.2m of topsoil, which lead to the scaling back of test trenches.

It is recommended that the area of impact in AA1 should be preserved by record through full archaeological excavation. It is recommended that all ground disturbances associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.

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1 INTRODUCTION

1.1 GENERAL

The following report details the results of a programme of archaeological testing undertaken at Profile Park, Kilbride, County Dublin, prior to a proposed power plant development. This assessment has been carried out to ascertain the potential impact of the proposed development on the archaeological resource that may exist within the proposed development area. The assessment was undertaken by Marc Piera and Deanna Lee of IAC Archaeology (IAC), on behalf of Tobin Consulting Engineers and under licence 21E0692, as issued by the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH).

Test trenching commenced at the site on the 4th of November 2021 and continued for one day. Test trenching was carried out using a 13 tonne 360 degree tracked excavator, with a flat, toothless bucket, under strict archaeological supervision. This report follows on from an archaeological impact assessment carried out by Faith Bailey and Jacqui Anderson of IAC Archaeology (2019); and from a geophysical survey by ACSU (July 2020, Licence Ref.: 20R00080).

It was originally proposed to excavate a total of 8 trenches across the site measuring 560 linear metres as per Figure 6. However, after adapting to site constraints, a total of 6 trenches and 6 trail pits were excavated across the site measuring 382 linear metres (Figure 7, Plates 1-12).

The western and northwestern area of site was not included in test trenching as recently deposited construction spoil from a third-party development prevented access to this area of the site. Trenches 1 and 2 were excavated by means of trial pits due to the modern backfill identified in the area. Three trial pits were excavated in each proposed trench. Total depth of the trial pits was around 3m. The remaining six trenches were excavated in the central area of the site.

1.2 THE DEVELOPMENT

The proposed development will consist of the construction of a Power Plant. A comprehensive description of the power plant is contained in the EIA Report submitted as part of the planning application to South Dublin County Council.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 SUMMARY OF DESKTOP ASSESSMENT (BAILEY & ANDERSON 2019)

The proposed development area is located in the townland of Kilbride, Parish of Kilbride and Barony of Newcastle. There are two groups or individual recorded monuments within 500m of the proposed development area. These comprise a castle (DU0021-004) and a church, as well as a graveyard and ecclesiastical enclosure group (DU0021-005001-3) (Figure 1), located over 300m to the south.

Prehistoric Period

Mesolithic Period (6000–4000 BC)

Although recent discoveries have suggested the possibility of human activity in the southwest of Ireland as early as the Upper Palaeolithic (Dowd and Carden 2016), the Mesolithic period is the first time for which there is widespread evidence of human occupation on the island of Ireland. Mesolithic people led a mobile lifestyle, hunting, foraging and fishing for sustenance and migrating to exploit seasonal resources. As a result, coastal and riverine resources were of particular importance to these communities. Such transient ways of life leave little trace in the archaeological record. Often the only indication of Mesolithic activity are scatters of flint implements and debitage. Occasionally shell middens have been found to date to this period. Although Mesolithic activity has been identified in County Dublin, there are no recorded sites of Mesolithic date within the vicinity of the proposed development area.

Neolithic Period (4000–2500 BC)

The Neolithic period began with the introduction and adoption of agriculture to Ireland. This period was revolutionary. Neolithic groups turned to cereal cultivation and the rearing of stock for sustenance. There was no longer a need to move frequently and as a result settlement became more permanent. Pottery was being produced possibly for the first time. A new preoccupation with claiming territory to farm contributed to the megalithic tomb tradition that emerged in the Neolithic. There are four main types of megalithic tombs; court cairns, portal tombs, passage tombs and the later wedge tombs of the early Bronze Age. These monuments served as tombs for the dead, ceremonial centres for the living and territorial markers in the landscape. They would have required significant organisation and cooperation to construct. The proposed development area would have remained favourable for settlement into the Neolithic period although there are no recorded Neolithic sites in the vicinity of the site.

Bronze Age (2500–800 BC)

The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic, the transition into the early Bronze Age was accompanied by changes in society. The megalithic tomb tradition went into decline and ended by the middle Bronze Age and the burial of the individual became typical. Cremated or inhumed individuals were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like

construction and capped by a large slab or several smaller lintels (Buckley and Sweetman 1991). Barrows and pit burials are also funerary monuments associated with this period.

Another site type thought to reveal of glimpse of domestic life at this time is the burnt mound or *fulacht fia*. A common site within the archaeological record, they are traditionally interpreted as temporary cooking sites but it has been suggested that they may have had other functions such as brewing, dyeing and bathing. They survive as low mounds of charcoal-enriched soil mixed with an abundance of heat-shattered stones. They are usually horseshoe-shaped and located in low-lying areas near a water source and are often found in clusters. Even when levelled by an activity such as ploughing, they are identifiable as burnt spreads in the landscape (Brindley and Lanting, 1990).

No Bronze Age site has been recorded within the study area of the proposed development area to date.

Iron Age (800 BC–AD 500)

Compared to the rest of Irish prehistory, there is very little evidence in Ireland, as a whole, representing the Iron Age. As in Europe, there are two phases of the Iron Age in Ireland; the Hallstatt and the La Tène. The Hallstatt period generally dates from 700BC onwards and spreads rapidly from Austria, across Europe, and then into Ireland. The later Iron Age or La Tène also originated in Europe during the middle of the 5th century BC. While in Ireland, evidence of a Hallstatt phase is rare, La Tene influences are reflected strongly in the style of metalwork of this period. It is clear that there was significant contact and interaction between the Continental Europe, Britain and Ireland at this time. There are no recorded sites of Iron Age date in the vicinity of or within the proposed development area.

Early Medieval Period (AD 500–1100)

Ireland, as depicted in the surviving sources, was entirely rural in the early medieval period. Ireland at this time was a patchwork of larger and smaller kingdoms known as *túath* and *trícha cét* respectively. Byrne (1973) estimates that there were as many as 150 kings in Ireland at the time, each ruling over a basic territorial unit known as the *túath*. If estimates placing the population of Ireland in the early medieval period at quarter to half a million people are accurate, then each king would have ruled over between 1,700 and 3,300 subjects within his *túath* (Stout 2017). From the 6th century, many of these subjects would have lived in enclosed settlements known as ringforts.

Secular habitation sites in the early medieval period include *crannógs*, cashels and ringforts, which are largely defined as circular enclosures surrounded by banks and ditches. In addition to these, there is some evidence for unenclosed settlements which are more difficult to identify in the archaeological record. The ringfort or *ráth* is considered to be the most common indicator of settlement during the early medieval period. Ringforts are strongly associated with agricultural land and, as such, are rarely situated at higher altitudes. Ringforts and potential ringforts (enclosures) are the

most common archaeological sites recorded across the Irish landscape. Enclosures, in many cases, represent damaged or denuded ringforts.

This period was also characterised by the introduction of Christianity to Ireland. Early churches tended to be constructed of wood or post-and-wattle. Between the late 8th and 10th centuries, mortared stone churches gradually replaced these earlier structures. Many of the sites, some of which were monastic foundations, were probably originally defined by an enclosing wall or bank similar to that found at the coeval secular sites. This enclosing feature was probably built more to define the sacred character of the area of the church than as a defence against aggression. An inner and outer enclosure can be seen at some of the more important sites; the inner enclosure surrounding the sacred area of church and burial ground and the outer enclosure providing a boundary around living quarters and craft areas. Where remains of an enclosure survive, it is often the only evidence that the site was an early Christian foundation. An ecclesiastical enclosure (DU021-005003) is recorded c. 393m south of the proposed development area. The sub-circular raised area contains a graveyard (DU021-005002) and a medieval stone church (DU021-005001). Although the surviving church is of medieval date it may stand on the site of an early medieval ecclesiastical site.

Medieval Period (AD 1100–1600)

This period began with the arrival of the Anglo-Normans in Ireland in support of the deposed King of Leinster, Diarmait MacMurchadha. By the end of the 12th century the Normans had succeeded in conquering much of the country (Stout and Stout 1997). Leinster, including Dublin and Meath, was 'sub-infeudated', meaning that great swathes of land were parcelled out among the Anglo-Norman elites. The Anglo-Norman tenurial system more or less appropriated the older established land units known as *túaths* in the early medieval period but described the territories as manors (MacCotter 2008). The initial stage of the invasion of the country was marked by the construction of motte and bailey castles, which were later replaced with stone castles.

In the later medieval period, a total of seven tower houses were constructed in the wider environs of the proposed development area. These include Grange Castle (DU017-034), from which the wider area takes its name, Kilbride Castle (DU021-004), c. 391m south of the proposed development area and Nangor Castle (DU017-037), c. 925m to the northeast. Kilbride Castle (DU021-004) is no longer extant with its location now occupied by a farm complex. Some of the farm buildings may have been built from the reclaimed fabric of the castle. The castle appears to have survived until 1871-5, when it was depicted on the historic OS mapping. By the time of the 1906-9 OS map, it is annotated as 'site of', indicating it has been demolished.

The existing Kilbride Church (DU021-005001) dates to the medieval period, though stands in ruins today. It was described at the dissolution in 1547 as an old chapel-indicating it was considered old even in the mid-16th century and described as ruinous as early as 1630 (SMR file). The church was dedicated to St. Bridget, giving the townland its name, Kilbride, deriving from *Cill Bhríde*.

Post-Medieval Period (AD 1600–1900)

The 17th century witnessed the systematic reduction of all of Ireland to English authority, largely through conflicts and the forced settlements, 'The Plantations'. With the onset of the 18th century, the political climate settled and this saw a dramatic rise in the establishment of large residential houses around the country. This was largely due to the fact that after the turbulence of the preceding centuries, the success of the Protestant cause and effective removal of any political opposition, the country was at peace. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be dispersed nationally. During the latter part of the 18th century, the establishment of a parkland context (or demesnes) for large houses was the fashion. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable construction effort went into their creation. Major topographical features like rivers and mountains were desirable features for inclusion into, and as a setting, for the large house and parkland. The closest former parklands to the proposed development area, is a modest demesne associated with Kilcarbury House, c. 490m to the east and the much larger Castle Baggot, c. 575m to the southwest.

2.2 SUMMARY OF PREVIOUS ARCHAEOLOGICAL FIELDWORK

A review of the Excavations Bulletin (1970–2021) revealed that no previous archaeological investigations have been carried out within the proposed development area. Just two archaeological investigations have taken place within 500m of the development area.

Archaeological monitoring was carried out during the construction of the development to the immediate south under licence 12E067. Nothing of archaeological significance was uncovered (Bennett 2012:188).

Archaeological monitoring was also carried out prior to industrial development to the north of the proposed development area, within the 'Kilcarbery Distribution Park' (Licence 98E0572, Bennett 1999:170). No features or deposits of archaeological potential were identified during these works. Post-medieval and modern pottery was recovered from the topsoil.

2.3 CARTOGRAPHIC ANALYSIS

Down Survey Maps of the Barony of Newcastle, c. 1655

There is little detail provided for the proposed development area in these early maps. It would appear that the proposed development area is located within an area noted as 'unforfeited lands' and it is, therefore, not shown in any detail as the primary purpose of these early maps was to detail land to be forfeited. It is likely the proposed development area was in use as agricultural land at this time.

John Rocque, *Map of County Dublin*, 1760 (Figure 3)

By the time of this mapping in 1760, the proposed development area is depicted as open agricultural land. Kilbride church (DU021-005001), annotated as in ruins, is shown to the south. A structure is shown in the approximate location of Kilbride castle (DU021-004) but is unlabelled. In the wider landscape, Grange Castle (DU017-034) and Nangor (DU017-037) are also shown.

John Taylor, *Map of Dublin City and its Environs*, 1816 (Figure 3)

The proposed development area is depicted in an undeveloped location on this map, within an area labelled 'lands of Kilbride'. Kilbride church (DU021-005001) is again shown and labelled as in ruins. A small structure is depicted to the west of the site's approximate location, and labelled 'Kilcarbery'.

First Edition Ordnance Survey Map, 1843, scale 1:10,056 (Figure 3)

This is the first accurate historic mapping coverage of the area containing the proposed development. The proposed development area forms part of an agricultural landscape, comprising parts of three fields. A laneway passes north-south through the proposed development area leading to Kilbride Castle (DU021-004) to the south. Kilbride Church (DU021-005001) is also shown within a sub-circular graveyard.

Second Edition Ordnance Survey Map, 1871-5, scale 1:10,056 (Figure 3)

There is no change to the proposed development area by the time of this map. To the south, Kilbride House has been constructed immediately to the west of Kilbride Castle (DU021-004).

Ordnance Survey Map, 1906–9, scale 1:2500

There is no significant change to the proposed development area shown on this map. Kilbride Castle (DU021-004) is now annotated as 'site of' indicating that the castle is no longer extant by this time. While Kilbride Church (DU021-005001) is marked as 'in ruins' for the first time.

Third Edition Ordnance Survey Map, 1935-8, scale 1:10,056

There are no significant changes to the proposed development area on this map.

2.4 SUMMARY OF GEOPHYSICAL RESULTS (ACSU; LICENCE 20R0080)

Geophysical survey (Figure 4) within the boundary of the proposed Grange Castle Business Park West development has been successful in defining the location and extent of potential archaeological remains associated with enclosure site DU017-095, which lies to the south of the proposed development area.

Multiple responses of probable archaeological significance have also been identified from this geophysical survey. These include a concentration of strongly magnetic responses, small-scale positives and increased response at survey centre in M1 (within the proposed development area); a possible building to the west in M2; a possible ring ditch to the northwest in M5; a discrete cluster of positive responses to the north in M6; small-scale positives and increased response to the northeast in M8;

and possible enclosure remains north of the survey centre in M9, to the west in M11, and south in M12. The potential archaeological significance of a complex of linear responses which occupy the south-eastern corner of M11, adjacent to existing farm buildings has also been highlighted.

Remnants of early field systems have been recorded in M4-M6 and M11 and numerous small-scale responses and poorly defined linear anomalies of potential archaeological origin have also been recorded in M1-M9 and M11-M12. An archaeological interpretation for these cannot not be entirely dismissed. However, a natural soil/geological, recent land use or modern ferrous explanation is expected for the majority. The results from M1-M12 also highlight changing patterns of land use, including former cultivation regimes, disused field boundaries, buried services, and magnetic disturbance from modern sources of interference. Throughout most survey locations low-level variations in response associated with natural soil/geological variation are also apparent.

2.5 AERIAL PHOTOGRAPHIC ANALYSIS

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995–2013), Google Earth (2008–2020) and Bing Maps (2021) revealed the proposed development area has been subject to topsoil disturbance in recent years during the construction of the roadway to the north and east (Google Earth 2009, Figure 5). No previously unknown archaeological sites were noted during the analysis.

2.6 TOPOGRAPHICAL FILES

Information on artefact finds from the study area in County Dublin have been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area.

A review of the topographical files revealed that no stray finds have been recovered from within the study area of the proposed development to date.

3 ARCHAEOLOGICAL TESTING

3.1 GENERAL

Test trenching took place on the 4th of November 2021 using a 13 tonne 360 degree tracked excavator equipped with a flat, toothless bucket under strict archaeological supervision. Any investigated deposits were preserved by record. This was by means of written, drawn and photographic records.

It was originally proposed to excavate a total of 8 trenches across the site measuring 560 linear metres, as per Figure 6. However, after adapting to site constraints, a total of 6 trenches and 6 trail pits were excavated across the site measuring 382 linear metres (Figure 7, Plates 1-12).

The western and northwestern area of site was not included in test trenching as recently deposited construction spoil from a third-party development prevented access to this area of the site (Plate 11 & 12). Trenches 1 and 2 were excavated by means of trial pit due to the modern backfill identified in the area. Three trial pits were excavated in each proposed trench. Total depth of the trial pits was around 3m. The remaining six trenches were excavated in the central area of the site.

The test trenches were excavated to determine, as far as reasonably possible, the location, extent, date, character, condition, significance and quality of any surviving archaeological remains threatened by the proposed development. Test trenching was also carried out to clarify the nature and extent of existing disturbance and intrusions and to assess the degree of archaeological survival in order to formulate further mitigation strategies. These are designed to reduce or offset the impact of the proposed development scheme.

3.2 TESTING RESULTS

Topsoil consisted of a dark brown sandy clay reaching usually 0.5-0.6m in depth, but some variations in depths were also recorded in each trench (see appendix 1).

Natural subsoil varies slightly across the site and from trench to trench, but it generally consisted of a light grey clay (Dublin Boulder Clay).

The eastern area of the site had around 2.5m of modern backfill; consisting of different layers of gravel, concrete blocks and with 0.2m of topsoil. Trenches 1 and 2 were excavated in that area. Three trial pits were excavated in each proposed trench (Plate 1-4). Total depth of the trial pits was 3.3m.

The central area of the site appeared to have been stripped in previous years, with the original ground level reduced (Plate 5-6). The base of some stony drains were identified (T4 and T5) suggesting the stripping of the site wasn't too deep in some areas. The western extent of the central area, where Trench 7 was located, showed that the ground wasn't reduced as noted in the remaining central area of the site.

The full details of each trench are presented in Appendix 1 and the details of each feature/context are presented in Appendix 2.

Archaeological Features

Testing has identified one area of archaeological activity within the proposed development area – Archaeological Area 1 (AA1). AA1 is located in centre of the site, identified in Trench 7 (T7).

Archaeological Area 1

This area comprises a spread of an oval pit feature. It consists of an oval pit filled by a light grey, plastic, silty clay-marl with frequent inclusions of charcoal and animal bone. It may represent a waterlogged pit, probably a well or cistern (Plate 9 & 10).

Non-archaeological features

A total of three stone drains were recorded across the site. Some of them may represent the same drainage features running across several trenches. A stone drain was recorded in two trenches (T5, T4 and T7). One ditch was observed along the site, at the southern end of Trench 7. This ditch is interpreted as being made for agricultural purpose, and may represent old field boundaries or drainage ditches.

3.3 CONCLUSIONS

Spoil covered the north western area of the site which prevented test trenches from being excavated in this area. The eastern area of the site had circa 2.5m of modern backfill, consisting of different layers of gravel and concrete blocks, beneath 0.2m of topsoil; the disturbed nature and density of these layers led to the scaling back of test trenches. T 1 & 2 were excavated by trial pit.

The testing has identified one area with archaeological significance in the centre of the site. It has been identified as Archaeological Area 1 (AA1). It consists of an oval pit filled by a light grey, plastic, silty clay-marl with frequent inclusions of charcoal and animal bone. It may represent a waterlogged pit, possibly a well or cistern.

4 IMPACT ASSESSMENT AND MITIGATION STRATEGY

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological resources potentially affected. Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping; disturbance by vehicles working in unsuitable conditions; and burial of sites, limiting access for future archaeological investigation.

4.1 IMPACT ASSESSMENT

- There will be an adverse impact on the identified archaeological pit feature in AA1. This will be caused by ground disturbances associated with the proposed development, which will act to truncate or remove the archaeological remains.

- Given the nature of the pit feature identified during testing, there is potential for other similar localised features on the site. There may be an adverse impact on previously unrecorded archaeological features or deposits that have the potential to survive beneath the current ground level. This will be caused by ground disturbances associated with the proposed development.

4.2 MITIGATION

We recommend the following actions in mitigation of the impacts above.

- It is recommended that the areas of impact in AA1 should be preserved by record through full archaeological excavation. The work should be carried out under licence to the National Monuments Service of the DoHLGH.

- It is recommended that all ground disturbances associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Housing, Local Government and Heritage.

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www.bing.com – Satellite imagery of the proposed development area.

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www.logainm.ie – Database of townlands in Ireland.

APPENDICES

APPENDIX 1 TRENCH RESULTS

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
1	N/A	1.8	0.3-3.3	North-South	No Archaeology found. Trench 1 was excavated through 3 trail pits as the site had around 2.5m of modern backfilled consist by different layers of gravel and concrete blocks and with 0.2m of topsoil. Trial pit 1, 2 and 3 ranged from 1.7m in depth to 3.3m. Topsoil consisting of a dark brown sandy clay was identified with gravel layers directly below and above the natural subsoil of a light grey clay (Dublin boulder clay)
2	90	1.8	0.6-0.8	North-South	No Archaeology found. Trench 2 was excavated through 3 trail pits as the site had around 2.5m of modern backfilled consist by different layers of gravel and concrete blocks and with 0.2m of topsoil. Trial pit 1, 2 and 3 ranged from 1.7m in depth to 3.3m. Topsoil consisting of a dark brown sandy clay was identified with gravel layers directly below and above the natural subsoil of a light grey clay (Dublin boulder clay)
3	62	1.8	0.4-0.55	North-South	No Archaeology found. This area of the site was discovered to have been previously stripped of topsoil. The natural subsoil consists of a light grey clay (Dublin boulder clay)
4	72	1.8	0.4-0.3	North-South	No Archaeology found. This area of the site was discovered to have been previously stripped of topsoil. The base of a stone lined drain was identified in the southern end of the trench. The natural subsoil consists of a light grey clay (Dublin boulder clay)
5	62	1.8	0.3-0.4	North-South	No Archaeology found. The base of a stone drain crossed the near middle of the trench. This area of the site was discovered to have been previously stripped of topsoil. The natural subsoil consists of a light brown silty clay with inclusions of occasional stone
6	60	1.8	0.4	North-South	No Archaeology found. The natural subsoil consists of a light brown silty clay with inclusions of occasional stone
7	86	1.8	0.3-0.6	North–South	No Archaeology found. Three features were discovered in T7. An agricultural ditch (C7.1) measuring 23m in length by 1m in width and filled by a light brown silty clay. C7.2 was a stone lined drain measuring 2m by 0.7m, filled by a light brown silty clay. An oval pit (C7.3) containing a fill of a light grey plastic silty clay-marl with frequent inclusions of charcoal and animal bone, possibly a well or cistern. The natural subsoil consists of a light grey clay (Dublin boulder clay)

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
8	40	1.8	0.45	North–South	No Archaeology found. The natural subsoil consists of a light grey clay (Dublin boulder clay)

APPENDIX 2 CONTEXTS

CONTEXT NO.	TRENCH NO.	DESCRIPTION
C1	1-8	Dark brown Sandy clay
C2	1-8	Light grey clay (Dublin Boulder Clay)
C7.1	7	An agricultural ditch, 23m in length by 1m in width by 0.2m in depth. Filled by a light brown silty clay.
C7.2	7	A stone drain, 2m in length by 0.7m in width by 0.09m in depth. Filled by a light brown silty clay with slopping sides.
C7.3	7	An oval pit filled by a light grey plastic silty clay-marl with frequent inclusions of charcoal and animal bone. The pit measures 2.4m in length and 1.6m in width and 0.35m in depth. It may represent a waterlogged pit possibly a well or cistern.

APPENDIX 3 RMP SITES WITHIN THE SURROUNDING AREA

SMR NO.	DU021-004
RMP STATUS	Scheduled for inclusion in the next revision of the RMP
TOWNLAND	Kilbride
PARISH	Kilbride
BARONY	Newcastle
I.T.M.	703754,730071
CLASSIFICATION	Castle - unclassified
DIST. FROM DEVELOPMENT	391m south
DESCRIPTION	Situated in a narrow valley. There are farm buildings on the site. There is no visible trace above ground (Ball 1906, 66).
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU021-005002
RMP STATUS	Scheduled for inclusion in the next revision of the RMP
TOWNLAND	Kilbride
PARISH	Kilbride
BARONY	Newcastle
I.T.M.	703865,730030
CLASSIFICATION	Graveyard
DIST. FROM DEVELOPMENT	393m south
DESCRIPTION	Located in a circular raised graveyard (L 42m, Wth 30) on the edge of a valley. Encloses the remains of a medieval church (DU021-005001-).
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU021-005003
RMP STATUS	Scheduled for inclusion in the next revision of the RMP
TOWNLAND	Kilbride
PARISH	Kilbride
BARONY	Newcastle
I.T.M.	703865,730030
CLASSIFICATION	Ecclesiastical enclosure
DIST. FROM DEVELOPMENT	393m south
DESCRIPTION	The church of Kilbride is located in a circular raised graveyard (L 42m, Wth 30) on the edge of a valley. This may be the remains of an early ecclesiastical enclosure.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU021-005001
RMP STATUS	Scheduled for inclusion in the next revision of the RMP
TOWNLAND	Kilbride
PARISH	Kilbride
BARONY	Newcastle

I.T.M.	703864,730032
CLASSIFICATION	Church
DIST. FROM DEVELOPMENT	412m south
DESCRIPTION	Located in a circular raised graveyard (L 42m, Wth 30) on the edge of a valley (DU021-005002-). This may be the remains of an early ecclesiastical enclosure (DU021-005003-). In 1228 the archbishop of Dublin granted the church of Kilbride to Andrew de Monevea as a prebend and later conferred it on the Canons of St Patrick's Cathedral (Mc Neill 1950, 75). In 1630 it was described as ruinous (Ronan 1941, 80). This church was attached to St. Patrick's Cathedral and was described at the dissolution in 1547 as an old chapel (Ball 1906, 68-70). Consists of a small rectangular building (int. dims L5.8m, Wth 3.63m, T 0.85m) with a NW turret in ruinous condition. Formerly entered through an opening in the W end (now damaged). Built of randomly coursed masonry. There is an aumbry in the E end of the N wall of the church. The E window has a S jamb of tufa. There are remnants of another window in the W end of the S wall. The NW turret (L1.35m, Wth 0.77m, H1.78m) is entered through a lintelled doorway off the church. It has a corbelled roof. There are traces of a stairwell on the S side of the turret (Ni Mharcaigh, 1997, 268-269).
REFERENCE	www.archaeology.ie/ SMR file

APPENDIX 4 LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

PROTECTION OF CULTURAL HERITAGE

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the *European Convention on the Protection of the Archaeological Heritage* (Valletta Convention), ratified by Ireland in 1997.

THE ARCHAEOLOGICAL RESOURCE

The *National Monuments Act 1930 to 2014* and relevant provisions of the *National Cultural Institutions Act 1997* are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930 Section 2). A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

OWNERSHIP AND GUARDIANSHIP OF NATIONAL MONUMENTS

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

REGISTER OF HISTORIC MONUMENTS

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months' notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

PRESERVATION ORDERS AND TEMPORARY PRESERVATION ORDERS

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site

illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

RECORD OF MONUMENTS AND PLACES

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for Housing, Local Government and Heritage) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that 'where the owner or occupier (other than the Minister for Housing, Local Government and Heritage) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Housing, Local Government and Heritage to carry out work and shall not, except in case of urgent necessity and with the consent of the Minister, commence the work until two months after giving of notice'.

Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition, they are liable for costs for the repair of the damage caused.

In addition to this, under the *European Communities (Environmental Impact Assessment) Regulations 1989,* Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document's recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

THE PLANNING AND DEVELOPMENT ACT 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning

and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.

South Dublin County Council Development Plan, 2016–2022

It is the policy of the Council to manage development in a manner that protects and conserves the Archaeological Heritage of the County and avoids adverse impacts on sites, monuments, features or objects of significant historical or archaeological interest.

HCL2 Objective 1:
To favour the preservation in-situ of all sites, monuments and features of significant historical or archaeological interest in accordance with the recommendations of the Framework and Principles for the Protection of Archaeological Heritage, DAHGI (1999), or any superseding national policy document.

HCL2 Objective 2:
To ensure that development is designed to avoid impacting on archaeological heritage that is of significant interest including previously unknown sites, features and objects.

HCL2 Objective 3:
To protect and enhance sites listed in the Record of Monuments and Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately.

HCL2 Objective 4:
To protect and preserve the archaeological value of underwater archaeological sites including associated features and any discovered battlefield sites of significant archaeological potential within the County.

HCL2 Objective 5:
To protect historical burial grounds within South Dublin County and encourage their maintenance in accordance with conservation principles.

APPENDIX 5 IMPACT ASSESSMENT & THE CULTURAL HERITAGE RESOURCE

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORICAL REMAINS

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2003: 31). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.

- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.

- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.

- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.

- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.

- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.

- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

PREDICTED IMPACTS

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
- Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
- Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.

APPENDIX 6 MITIGATION MEASURES & THE CULTURAL HERITAGE RESOURCE

POTENTIAL MITIGATION STRATEGIES FOR CULTURAL HERITAGE REMAINS

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

DEFINITION OF MITIGATION STRATEGIES

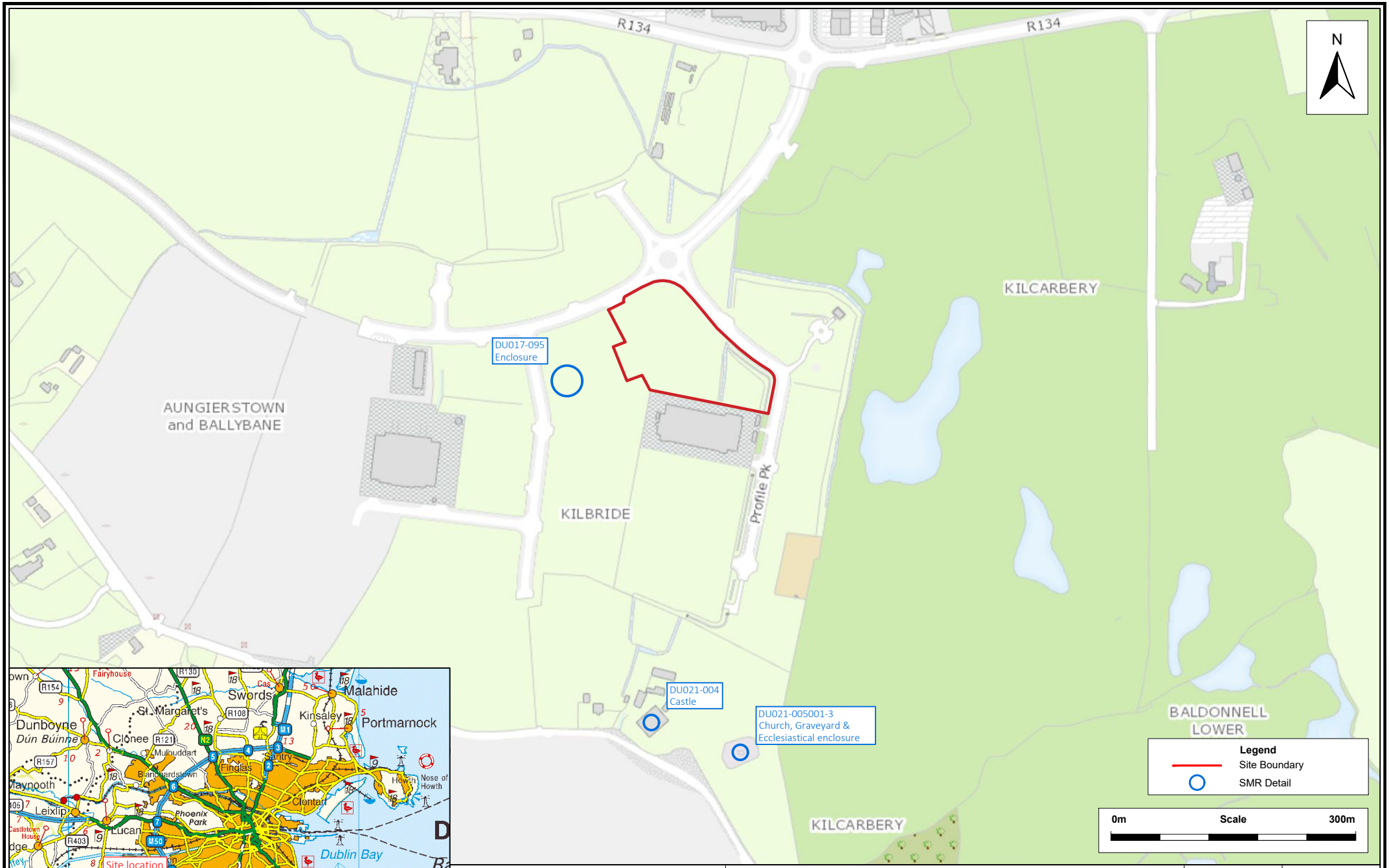
ARCHAEOLOGICAL RESOURCE

The ideal mitigation for all archaeological sites is preservation *in situ*. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Full Archaeological Excavation involves the scientific removal and recording of all archaeological features, deposits and objects to the level of geological strata or the base level of any given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material or structures and where avoidance of the site is not possible. (CIfA 2020b)

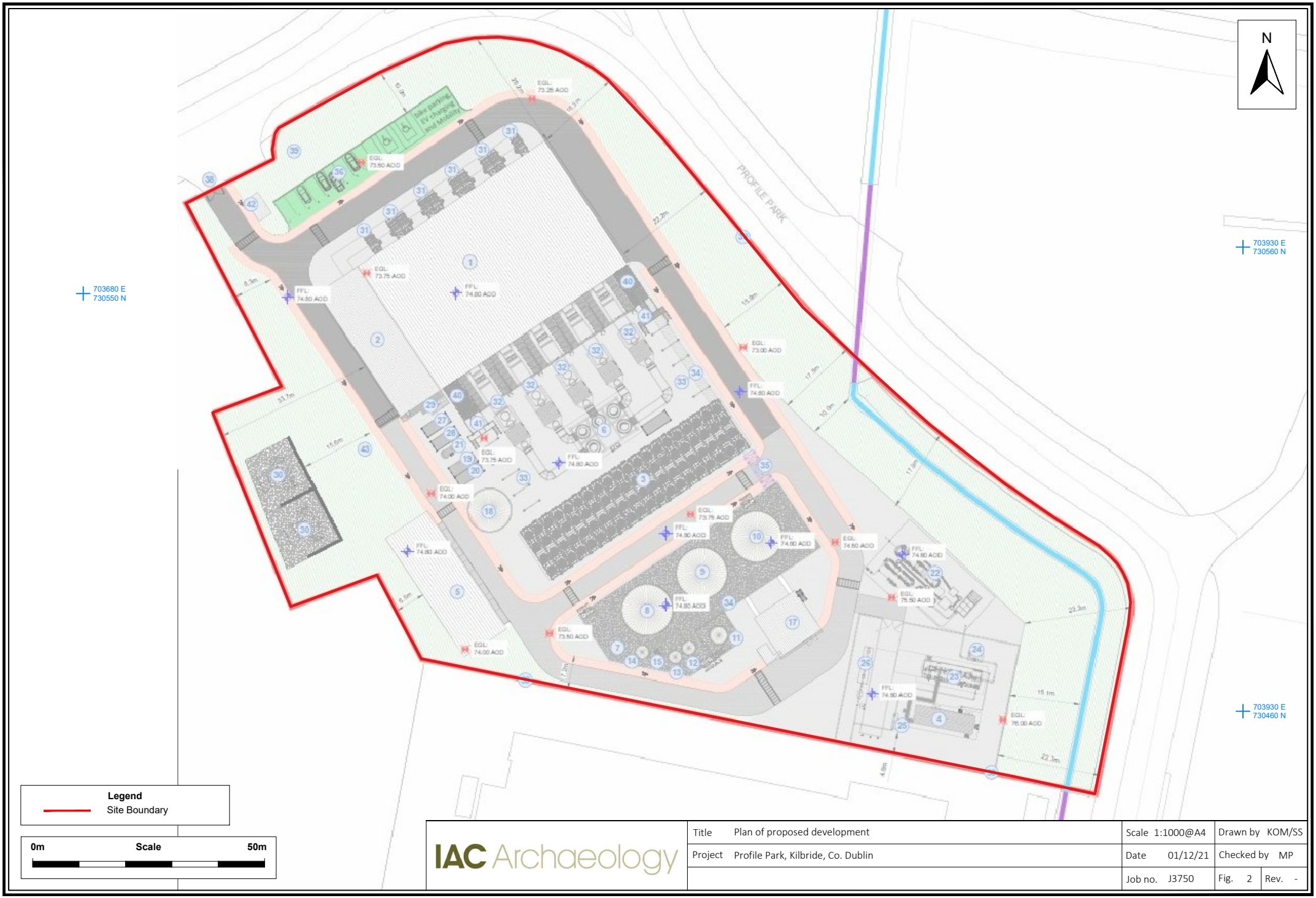
Archaeological Test Trenching can be defined as 'a limited programme... of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality.' (CIfA 2020a)

Archaeological Monitoring can be defined as a 'formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons within a specified area or site on land or underwater, where there is possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.' (CIfA 2020c)



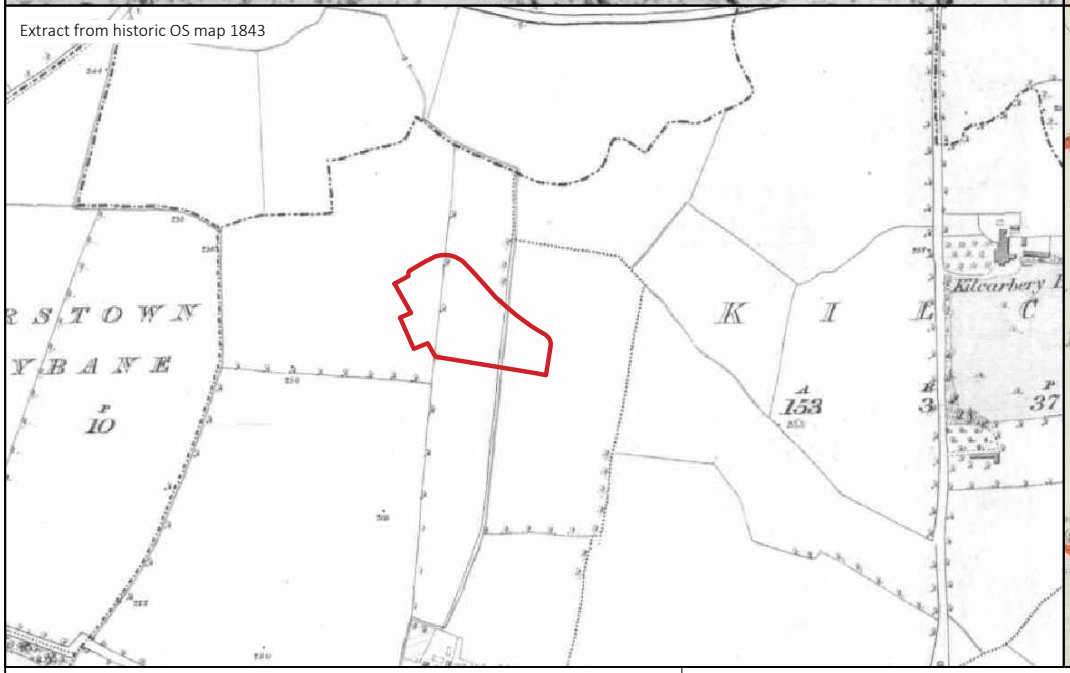
IAC Archaeology

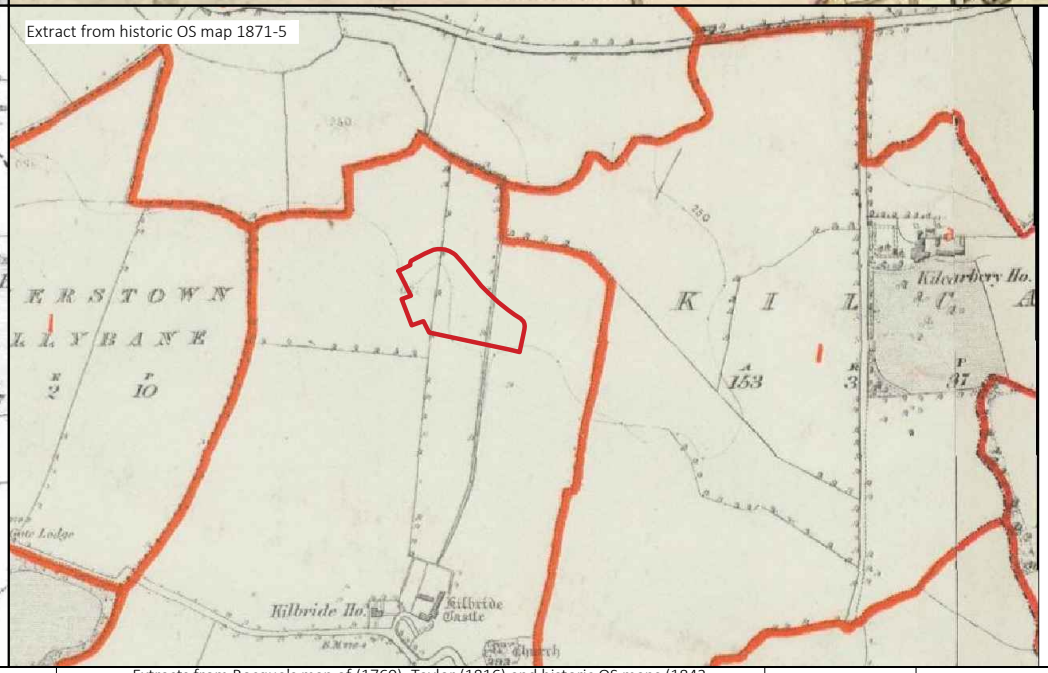
Title	Site location showing nearby recorded monuments	Scale 1:6,000@A4	Drawn by KOM/SS
Project	Profile Park, Kilbride, Co. Dublin	Date 01/12/21	Checked by MP
		Job no. J3750	Fig. 1 Rev. -



IAC Archaeology

Title	Plan of proposed development	Scale 1:1000@A4	Drawn by KOM/SS
Project	Profile Park, Kilbride, Co. Dublin	Date 01/12/21	Checked by MP
		Job no. J3750	Fig. 2 Rev. -

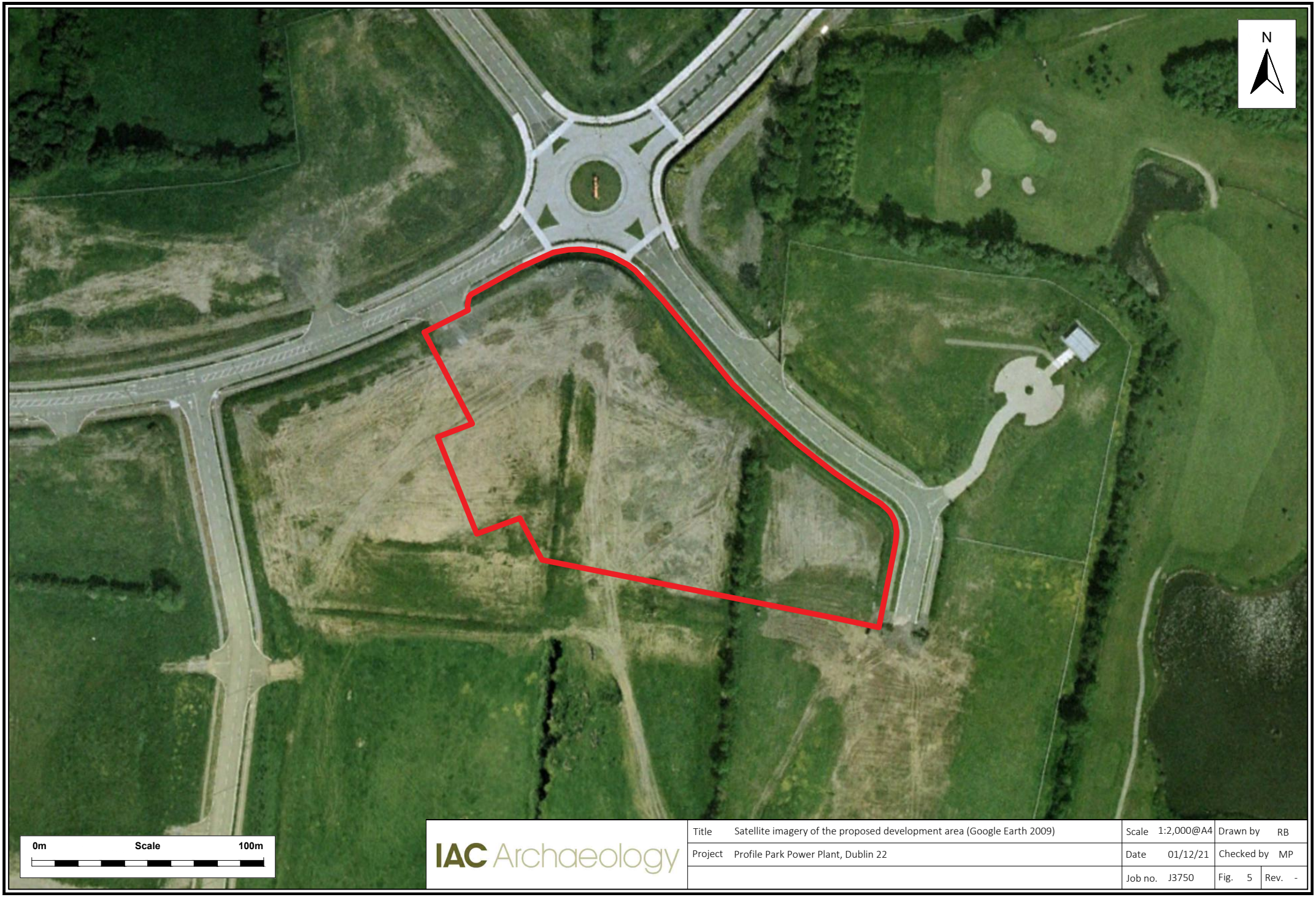




IAC Archaeology

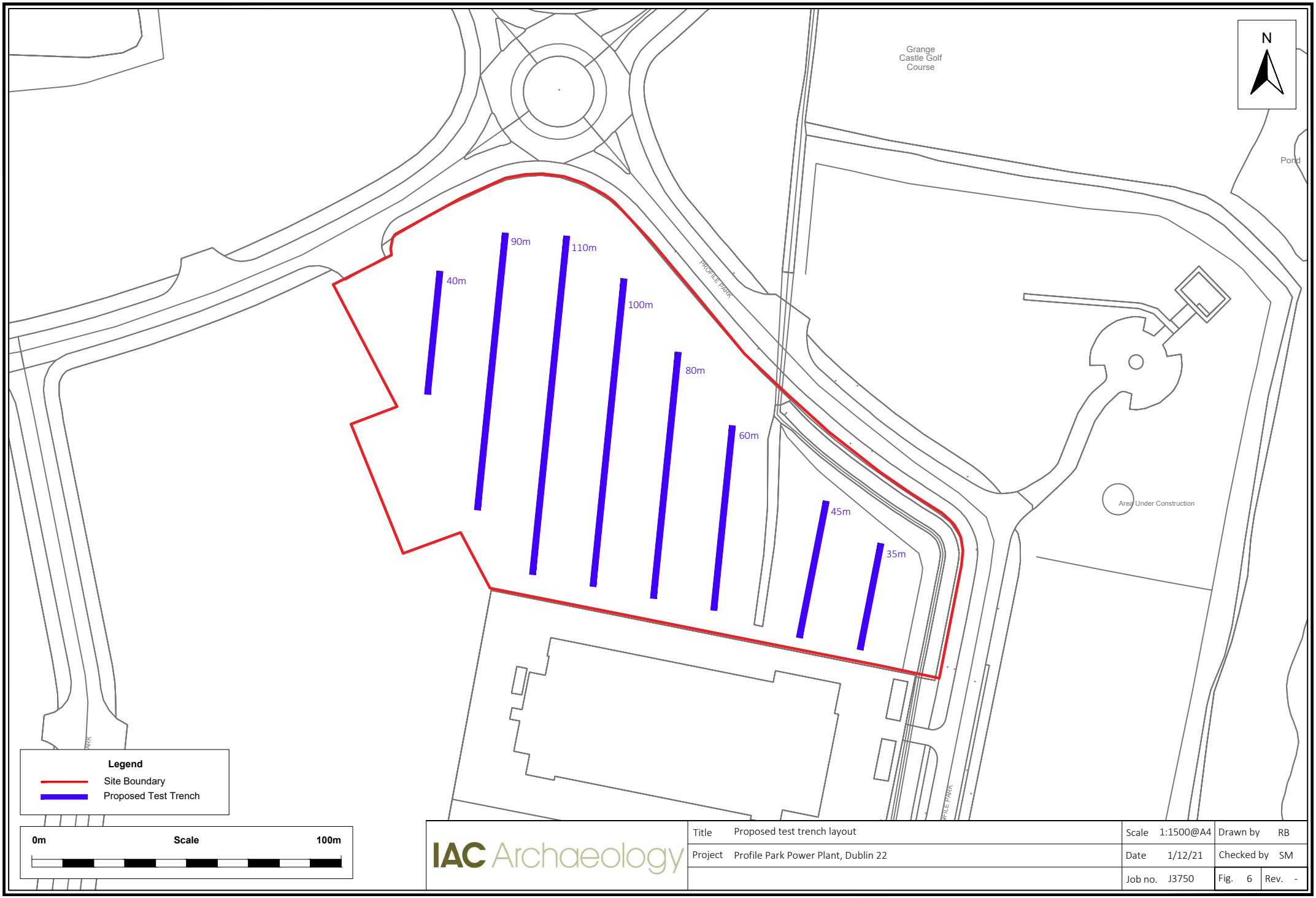
Title	Extracts from Rocque's map of (1760), Taylor (1816) and historic OS maps (1843 and 1871-5) showing the approximate location of the site	Scale	NTS	Drawn by	KOM
Project	Profile Park, Kilbride, Co. Dublin	Date	1/12/21	Checked by	MP
		Job no.	J3750	Fig. 3	Rev. -

IAC Archaeology	Title Geophysical survey results: possible enclosure	Scale 1:2000@A4	Drawn by RB
	Project Profile Park, Kilbride, Co. Dublin	Date 1/12/21	Checked by MP
		Job no. J3750	Fig. 4 Rev. -



IAC Archaeology

Title	Satellite imagery of the proposed development area (Google Earth 2009)	Scale 1:2,000@A4	Drawn by RB
Project	Profile Park Power Plant, Dublin 22	Date 01/12/21	Checked by MP
		Job no. J3750	Fig. 5 Rev. -



IAC Archaeology

Title	Proposed test trench layout	Scale 1:1500@A4	Drawn by RB
Project	Profile Park Power Plant, Dublin 22	Date 1/12/21	Checked by SM
		Job no. J3750	Fig. 6 Rev. -

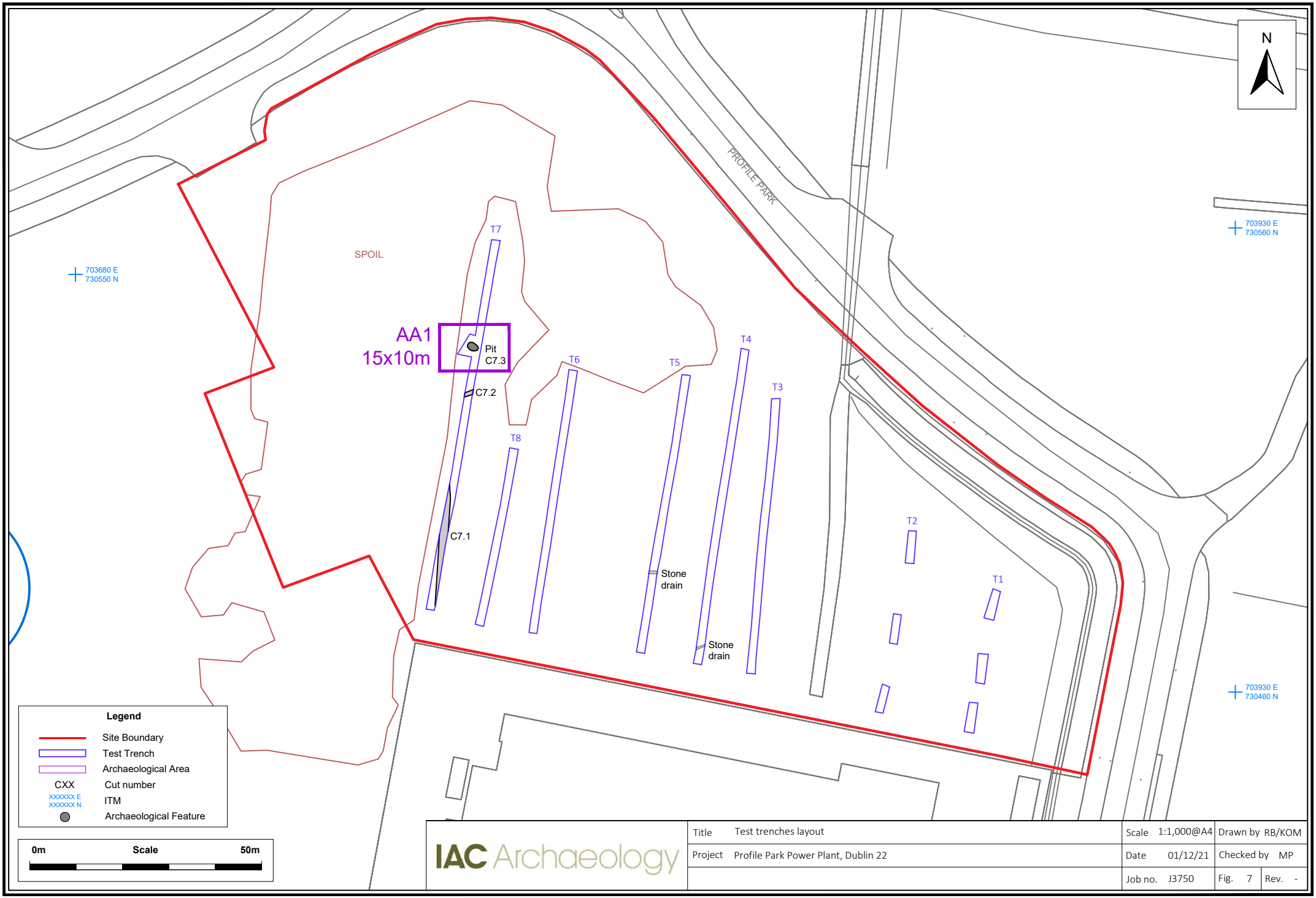

N
PROFILE PARK
SPOIL
703680 E
730550 N
703930 E
730560 N
703930 E
730460 N
AA1
15x10m
Pit
C7.3
C7.2
C7.1
T1
T2
T3
T4
T5
T6
T7
T8
Stone
drain
Stone
drain
Legend
Site Boundary
Test Trench
Archaeological Area
CXX
Cut number
XXXXXX E
XXXXXX N
ITM
Archaeological Feature
0m
Scale
50m
IAC Archaeology
Title
Test trenches layout
Scale
1:1,000@A4
Drawn by
RB/KOM
Project
Profile Park Power Plant, Dublin 22
Date
01/12/21
Checked by
MP
Job no.
J3750
Fig.
7
Rev.
-

Plate 1 Trench 1, southern trial pit, facing east

Plate 2 Trench 1, northern trial pit, facing west

Plate 3 Trench 2, middle trial pit, facing east

Plate 4 Trench 2, northern trial pit, facing south

Plate 5 Trench 3, facing north

Plate 6 Trench 4, facing southwest

Plate 7 Trenches 3-6, facing southwest

Plate 8 Trench 6, facing south

Plate 9 Trench 7, facing south

Plate 10 Pit C7.3, facing north

Plate 11 Spoil at western side of property, facing north

Plate 12 Spoil at northern side of property, facing southeast

Appendix 8 – Archaeological Assessment Report – Supporting Material

TOBIN
CONSULTING ENGINEERS

www.tobin.ie

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Email: info@tobin.ie

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Tel: + 353 (0)1 8030401
Email: info@tobin.ie

Market Square
Castlebar
Co Mayo
F23 Y427
Tel: +353 (0)94 9021401
Email: info@tobin.ie

Our Ref: *11066*

17 September 2021

IAC Ltd,
Unit G1,
Network Enterprise Park,
Kilcoole,
Co. Wicklow
A63 KT32

14 September 2021

Re Archaeological Testing at Profile Park, Baldonnel, Dublin 22

To Marc Piera and IAC Ltd,

On behalf of TOBIN & Co. Ltd, I confirm that in the event Marc Piera of IAC Ltd being granted a licence to carry out archaeological testing at Profile Park, Baldonnel, Dublin 22 in accordance with the application he has submitted to the National Monuments Service and which this letter accompanies, TOBIN & Co. Ltd will provide or ensure are available to him or his employer (as appropriate) sufficient funds and other facilities to allow her to complete the archaeological excavation and associated post-excavation work, including preparation of preliminary and final reports (including specialist reports) to the standard required under the licence, if granted.

Yours sincerely

_____

Mark McCarthy
Senior Project Manager and Planner
For and on behalf of TOBIN Consulting Engineers
Block 10-4
Blanchardstown Corporate Park
Dublin
D15 X98N
Tel: + 353 (0)1 8030401
mark.mccarthy@tobin.ie

Directors: **M. Shelly** (Chairman) **C. McGovern** (Managing Director) **E. Connaughton** (Company Secretary) **B.J. Downes** **D. Grehan** **M. McDonnell** **R.F. Tobin** **B. Carroll** **S. Tinnelly**

Associate Directors **M. Casey** **P. Cloonan** **P. Cunningham** **B. Gallagher** **B. Heaney** **C. Kelly** **T. Mackey** **A. Mulligan** **J. O'Flaherty**

Co. Reg. No. 42654 – Registered Office: Fairgreen House, Fairgreen Road, Galway H91 AXK8. Ireland.

An Rannóg Talamhúsáide, Pleanála agus Iompair
Land Use, Planning & Transportation Department

Telephone: 01 4149000 **Fax: 01 4149104** **Email: planningdept@sdublincoco.ie**

Mark McCarthy,
TOBIN Consulting Engineers
Block 10-4
Blanchardstown Corporate Park
Dublin
D15 X98N

PLANNING & DEVELOPMENT ACT, 2000 (as amended) AND PLANNING REGULATIONS THEREUNDER

Decision Order Number: 1121	**Date of Decision:** 19-Aug-2021
Register Reference: SD21A/0167	**Registration Date:** 25-Jun-2021

Applicant: Shane Minehane, Greener Ideas Limited

Development: Construction of a gas fired power plant with an electrical output of up to 125MW with associated balance of plant, equipment and buildings including; an Engine Hall building with a height of 18.9m, comprising 6 gas engines and ancillary infrastructure; an Electrical Annex Building with a height of 18.7m; a Workshop building with a height of 5. 1m; a Tank Farm building with a height of 5.68m; a Security hut with a height of 3.27m; an Exhaust Stack with a height of 31.8m; a Gas AGI including a kiosk with height of 3.3m; Radiator Coolers with a height of 8.46m; 2 electrical transformers with a height of 4.98m; Tanks including 2 x Diesel Oil Storage Tanks (volume of 2500m3 combined); SCR Urea Tank (26m3); Lube Oil Storage Tank (26m3); Lube Oil Maintenance Tank (26m3); Pilot Oil Tank (26m3); Fire Water Storage Tank (1000m3); Effluent Collecting Tank (26m3); Underground Surface Water Attenuation Tank (490m3); 2 new access onto the existing private road network with Profile Park; 12 parking spaces, footpaths, landscaping; fencing and all other associated site development plant and equipment and other works including surface water and foul wastewater drainage.

Location: Profile Park, Baldonnel, Dublin 22

Application Type: Permission

Dear Sir /Madam,

With reference to your planning application, received on 25-Jun-2021 in connection with the above, I wish to inform you that before the application can be considered under Section 33 of the Planning & Development Act 2000, six copies of the following ADDITIONAL INFORMATION must be submitted.

1. a) The applicant is requested to provide an addendum to the submitted design statement, which takes into consideration an assessment in terms of of Paragraph 11.2.0 and tables 11.17 and 11.18 of the County Development Plan.
   b) The applicant is requested to make modifications to address all requirements laid out in the sections of the County Development as listed in Item a).
   c) All changes to the design shall be clearly reasoned and should demonstrate compliance with the objectives and policies of the County Development Plan.
2. a) The Planning Authority has concerns regarding the design of the proposed develompent in terms of bulk and massing. There are also concerns that the proposed development represents an overdevelopment of the site given its footprint, hardstanding and underground attenuation tank. The applicant is requested to review the submitted development and revise the plans / provide further justification for the scale in terms of:
   i main gas generation building - there is currently no breaking up in terms of the design of the facades.
   ii The applicant is requested to revisit the design of the elevations fronting the site boundaries and add detail.
   iii scale / height of the tanks - these appear quite prominent in the local context. The applicant is requested to reduce the scale of these (this could include an increased number of smaller tanks).
   iv scale and height of the stacks. These are extremely prominent and are encased in a structure for the most part. The stacks are significantly taller than all surrounding structures. The applicant is requested to reduce the height and bulk of the structures. The Planning Authority would welcome a height of no more than 25m.
   v overall level of development on the site. There are concerns that the proposal is overdevelopment. The applicant is requested to set out the percentage of land taken by buildings / tanks etc, roads and open spaces / attenuation. The applicant should investigate other lands to attenuate to to provide for open and natural attenuation.

   b) The applicant is also requested to provide an existing layout plan, indicating all natural features present.

   Note: The above will likely result in significant additional information and therefore revised notices will be required.
3. The proposed power station introduces significant hardstanding and building development into the landscape which potentially runs contrary to Policy IE Objective 5 in the County Development Plan and other policies and objectives contained in Chapters 7 and 8 of the same plan. The applicant is requested to provide revised proposals demonstrating the following:

1) A reduction in hardstanding and soil sealing across the entire site
2) Increased planting to provide, that includes for the augmentation of biodiversity and increased ecology on the site. Clearly demonstrating how it links to other Green Infrastructure in the area.
3) How the landscape proposals can provide for above ground attenuation incorporating natural solutions. Please note the Planning Authority only accept underground attenuation tanks as a last resort. An alternative location should be sought and found for the provision of nature-based solutions and above ground attenuation or perhaps an alternative location should be found for the proposed development.
4) A landscape layout that ensures that a higher percentage of the soft natural SuDS features in the landscape are retained and augmented.
The applicant is requested to address all of the above issues.

4. a. In order for Water Services to assess surface water attenuation proposals, the applicant is requested to submit a report including design calculations showing how surface water up to and including the 1:100 (1%) year critical storm with climate change allowance will be attenuated on site to pre-developed greenfield run off rates. The report should include the following site information:
   - SAAR (Standard Average Annual Rainfall) Value
   - SOIL Value
   - MET Eireann Rainfall Data
   - Site Area
   - A breakdown of all proposed area types in m2 for the site eg. Roads, Hardstanding, Grasscrete, Grass etc.

   b. The applicant is requested to submit a cross section detail of all proposed Sustainable Drainage (SuDS) features for the development ie. Grasscrete, Swales permeable paving, infiltration basins etc. The applicant shall also examine whether there is potential to include further SuDS features across the site such as detention basins, further swales, filter drains etc.

   c. The applicant is requested to submit a revised surface water drainage layout showing that surface water is discharged to the Baldonnel Stream in the direction of flow and not against the flow which is currently proposed. The drawing shall also show that the proposed attenuation system is a minimum of 3m away from all existing and proposed Wastewater and Water supply infrastructure on the site also external to the site.

5. There is a lack of SuDS (Sustainable Drainage System) shown for the proposed development. Natural SUDS features should be incorporated into the proposed drainage system that address amenity, biodiversity and water quality as well as volume attenuation. The use of underground tanks should be avoided.

   The applicant shall show further proposed SuDS features for the development such as green roofs, living walls, further natural swales, channel rills, integrated tree pits, bioretention, above ground attenuation, detention basins, reed bed/wetland etc. and other such SuDS and show what attenuation capacity is provided by such SuDS. The SuDS features should be integrated into the landscape

proposal and details provided on how they work.

6. There are some areas within the subject site located within Flood Zone B according to South Dublin County Council's Strategic Flood Risk Assessment 2016-2022 and OPW's (Office of Public Works) CFRAM maps. The applicant is required to provide compensation flood storage for any loss in existing flood plain storage to help ensure there will be no exacerbation of flooding issues upstream or downstream of the subject site. The applicant is therefore requested to submit plans, cross sectional details and design calculations which clearly demonstrates how flood compensation storage is being provided on the site given that it is proposed to build within a Flood zone B area. Note: natural solutions and open attenuation should be provided and investigated.

7. The proposed application highlights a potential for noise to impact on a number of nearby receivers. The noise levels predict a notable change in the noise level at these receivers during the night time period.
   - The applicant is required to assess and re-evaluate all noise emitting equipment proposed on site in this application.
   - The applicant must undertake necessary modifications to the proposed structures and operations on site in order to reduce the predicted noise levels at the nearby receivers to an acceptable level during both day and night time.
   - The development must not give rise to noise levels that exceed the background level for evening and night time periods.
   - The applicant must demonstrate the development can meet the standards set out by South Dublin County Council as noted below:

   Noise due to the normal operation of the proposed development, expressed as Laeq over 15 minutes at the façade of a noise sensitive location, shall not exceed the daytime background level by more than 10 dB(A) and shall not exceed the background level for evening and night time. Clearly audible and impulsive tones at noise sensitive locations during evening and night shall be avoided irrespective of the noise level.

8. The Planning Authority notes the report received from the Department. The development site is located in a historic area adjacent to the site of Recorded Monument DU021-004- Kilbride Castle. In addition, recent archaeological investigations for the site immediately to the West of the proposed site (ref Geophysical Survey 20R0080 for Profile Properties) has identified the remains of a sub-circular enclosure and associated field systems. Archaeological testing has also confirmed the presence of this feature (carried out under licence 21E0061). Having regard to known archaeological features/materials including an enclosure measuring approximately .30m in diameter in proximity to the site the applicant is requested to submit a full Archaeological Assessment of the lands as part of this Additional Information request. The Planning Authority notes the lack of information in the EIAR. The applicant should liaise directly with the Department prior to responding to this AI request and submit all details of this correspondence and agreements.

9. The applicant is requested to submit a revised layout showing the, bicycle parking and pedestrian routes within the development. Please refer to Table 11.22: Minimum Bicycle Parking Rates– SDCC County Development Plan 2016-2022.
   a) The minimum width of footpaths shall be 1.8m wide to aid mobility impaired users.
   b) All external bicycle parking spaces shall be covered.

c) Footpath layout shall provide adequate connectivity around the development and footpaths on the main road.

NOTE: The applicant should note that any submission made in repsonse to the above will be examined and MAY be deemed to be SIGNIFICANT ADDITIONAL INFORMATION by the Planning Authority. In this event the applicant(s) will be subsequently notified and requested to publish a notice in an approved newspaper and erect or fix a site notice on the land or structure to which the further information relates and to submit copies of the both the newspaper and site notices to the Planning Authority in accordance with Article 35 (1) (a) and (b) of the Planning and Development Regulations 2001 (as amended).

Note: The applicant must submit the Further Information within **6 months** of the **date of decision**. If the information is not received within this period the planning authority shall declare the application to be withdrawn.

Please ensure that your reply to this Request for Additional Information is accompanied by a *covering letter* marked "ADDITIONAL INFORMATION" and that the Planning Register Reference Number given above is quoted on the covering letter.

Signed on behalf of South Dublin County Council

Register Reference: SD21A/0167

Date: 20-Aug-2021

Yours faithfully,

for **Senior Planner**

Mark McCarthy

From: Marc Piera <MPiera@iac.ie>
Sent: Tuesday 19 October 2021 11:33
To: Tim Coughlan; Sara Marandola
Subject: Fwd: 21E0692 - Licence - Co Dublin Kilbride J3750_Profile Park Marc Piera

Hi Tim/Sara
Profile licence has been approved
Regards
Marc
Get Outlook for iOS

From: licensingsection <licensingsection@housing.gov.ie>
Sent: Tuesday, October 19, 2021 10:54 a.m.
To: Marc Piera
Subject: 21E0692 - Licence - Co Dublin Kilbride J3750_Profile Park Marc Piera

Dear Marc

I confirm that our archaeologist has approved the above mentioned application.

Please note that Licence No. 21E0692 now issued by email is subject to the conditions set out on the application form as completed by you the applicant/licensee.

In view of the current uncertainty, we would ask that you bear in mind the need to let us know of when the works are commencing/ceasing/concluding, in accordance with section/condition 17, as appropriate.

The timeframe for this licence is 19/10/2021 to 19/10/2021.

Hard copies of licences are not being issued at present.

Kind regards

Kevin Mc namara

Kevin Mc Namara
National Monuments Service

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage
Teach an Chustaim, Baile Átha Cliath 1, D01W6XO
Custom House, Dublin 1, D01W6XO

www.archaeology.ie

From: Sara Marandola [mailto:smarandola@iac.ie]
Sent: Wednesday 22 September 2021 12:24
To: licensingsection <licensingsection@housing.gov.ie>
Cc: Marc Piera <MPiera@iac.ie>
Subject: FW: J3750_Profile Park_ Archaeological Testing Licence App

Good morning,

I am writing on behalf of Marc Piera, Site Director at Irish Archaeological Consultancy.
Please find attached Licence Application's documents for archaeological testing at Profile Park, Kilbride, Co. Dublin:

01_Licence App Form
02_Method Statement
03_Client Letter
04_Planning Condition

Any further queries please don't hesitate to contact me.

Thank you very much for your availability.

Kind regards,

Sara

Sara Marandola

IAC Archaeology
PROUDLY CELEBRATING 20 YEARS IN BUSINESS

IAC Archaeology Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow, A63 KT32, Ireland.
T +353 (0)1 2018380 www.iac.ie

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Is faoi rún agus chun úsáide an té nó an aonán atá luaite leis, a sheoltar an ríomhphost seo agus aon comhad atá nasctha leis. Má bhfuair tú an ríomhphost seo trí earráid, déan teagmháil le bhainisteoir an chórais.

Deimhnítear leis an bhfo-nóta seo freisin go bhfuil an teachtaireacht ríomhphoist seo scuabtha le bogearraí frithvíorais chun víorais ríomhaire a aimsiú.

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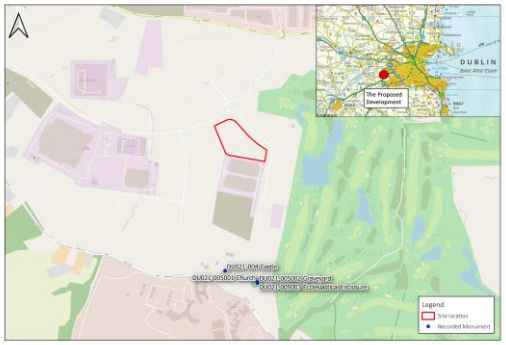
IAC Archaeology

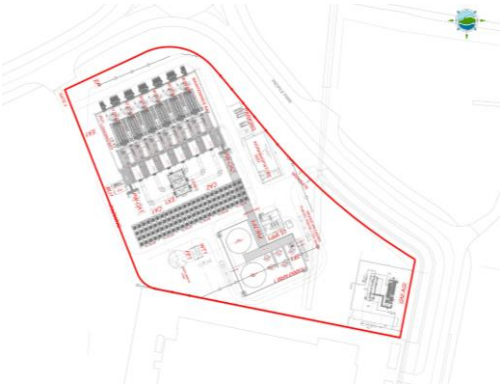
Profile Park,
Townland of Kilbride
County Dublin

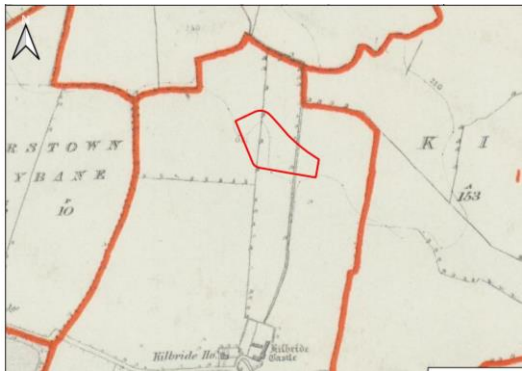
Method Statement to accompany Application for a Licence to undertake archaeological testing

Date: September 2021

Applicant: Marc Piera







1 SUMMARY

This method statement accompanies a licence application to carry out archaeological testing at the site of a proposed Power Park development, which is located in the townland of Kilbride, County Dublin (ITM 703681, 730561; Figure 1). Test trenching follows on from an Archaeological Impact Assessment carried out by Faith Bailey and Jacqui Anderson of IAC Archaeology (2019); and from a geophysical survey by ACSU (July 2020), which was carried out across the proposed development area and adjacent lands. A previous programme of archaeological testing along distributions roads, was carried out by IAC Archaeology under Licence 19E0370.

This programme of testing is being undertaken in response to a Request of Further Information.

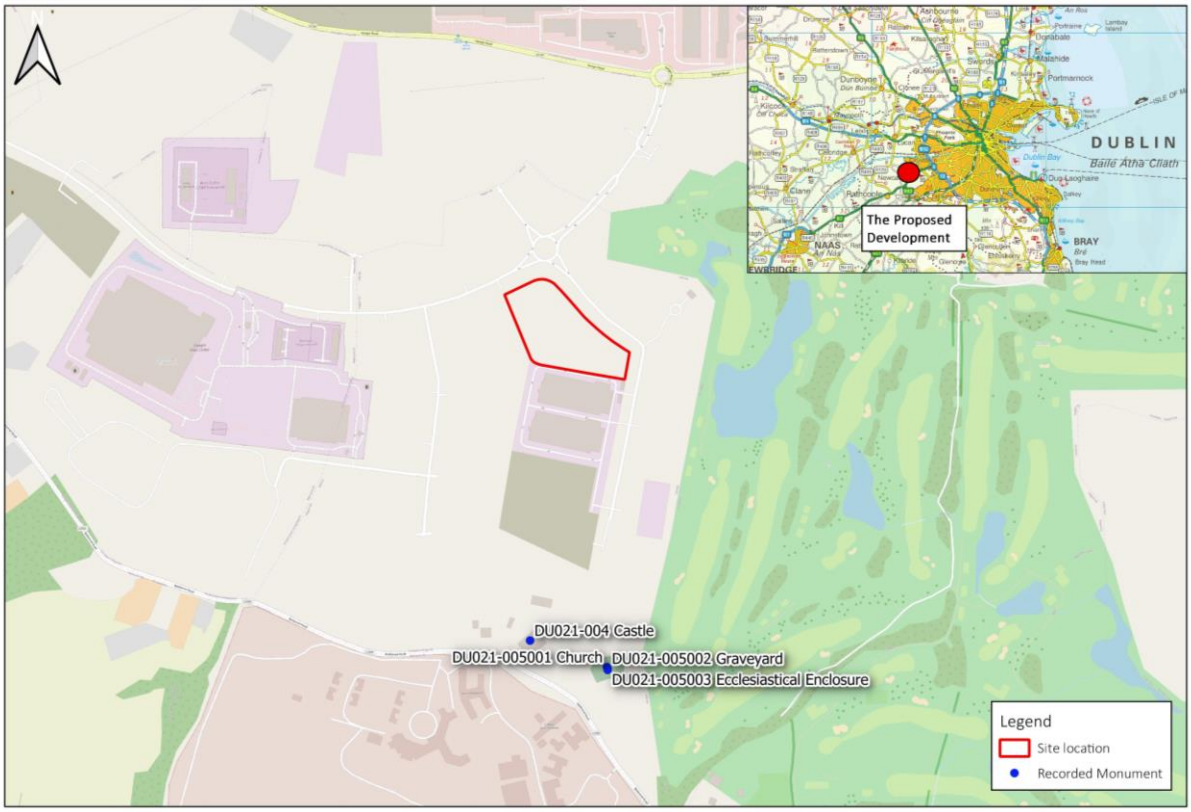


FIGURE 1: Site Location showing nearby recorded monuments.

2 DESCRIPTION OF DEVELOPMENT

The proposed development will consist of the construction of a Power Plant Park. A provisional site layout is shown in Figure 2 and shows that much of the site will contain large film studios. No detailed plans are available at present as the scheme is still under development.

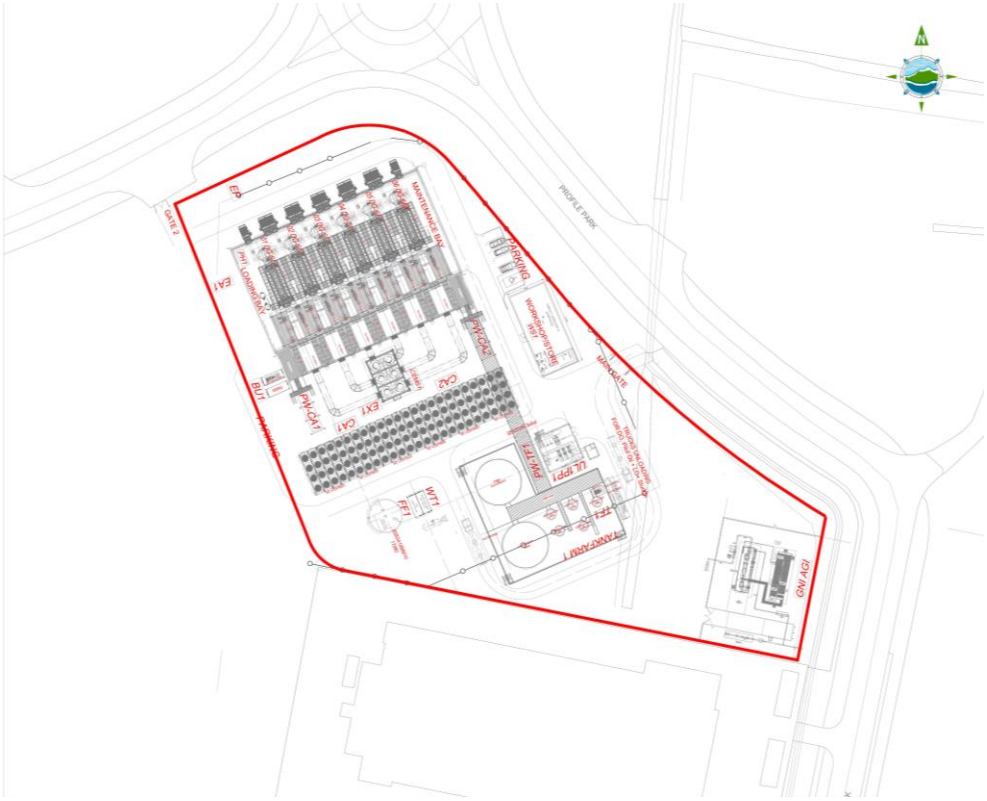


FIGURE 2: Plan of proposed development.

3 SITE SPECIFIC ARCHAEOLOGICAL BACKGROUND

The proposed development area is located in the townland of Kilbride, Parish of Kilbride and Barony of Newcastle. There are two groups of individual recorded monuments within 500m of the proposed development area. These comprise a castle (DU0021-004) and a church, graveyard and ecclesiastical enclosure group (DU0021-005001-3) located over 300m to the south (Figure 1).

TABLE 1: Recorded Archaeological Sites

RMP NO.	LOCATION	CLASSIFICATION	DISTANCE FROM SITE
DU021-004	Kilbride	Castle - unclassified	391m south
DU021-00500103	Kilbride	Church, Graveyard and Ecclesiastical enclosure	393m south

There have been no archaeological investigations within the proposed development area to date. A review of Excavations Bulletin (1970-2020) revealed that two previous programmes of archaeological monitoring took place in the vicinity of the proposed development area, one to the immediate south and one c. 327m north of the site. Neither revealed any features or deposits of archaeological significance (Licence 12E067, Bennett 2012:188, Licence 98E0572, Bennett 1999:170).

A review of the historic mapping demonstrated that the proposed development area remained as undeveloped agricultural greenfield throughout the post-medieval period (Figure 3). Aerial photographic analysis and satellite imagery proved the site remained greenfield until the construction of the roadways to the immediate east and north c. 2009

(Google Earth, Figure 4). The aerial photographic coverage has shown that the site has been subject to disturbance in the recent past.

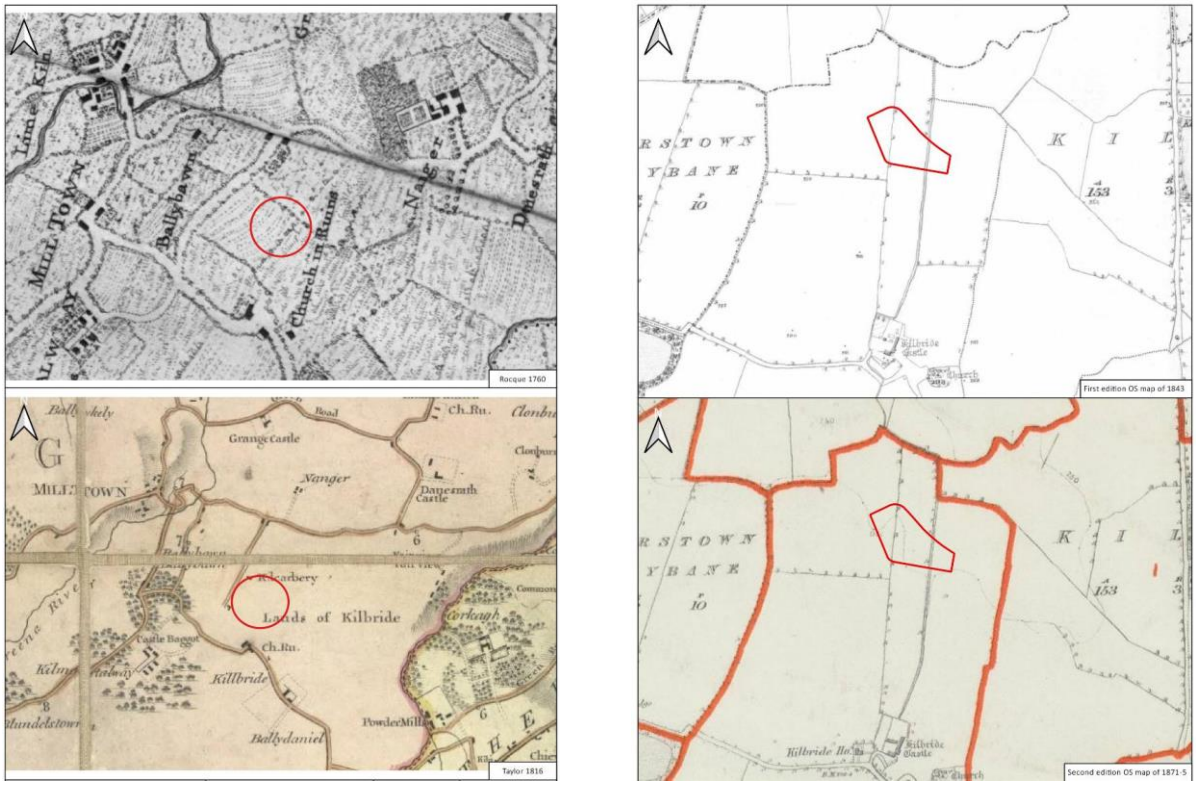


FIGURE 2: On the left: Extracts from historic maps Rocque (1760) and Taylor (1816).
On the right: Extracts from historic OS maps (1843 and 1871-5).

FIGURE 4: Satellite imagery of the proposed development area (Google Earth 2009).

A review of the topographical files revealed that no stray finds have been recovered from within the study area of the proposed development to date.

A field inspection confirmed that the proposed development area has been subject to disturbance, as indicated in the aerial photographic coverage. No features of archaeological potential were identified during the field inspection.

3.1 Results of geophysical survey (ACSU; Licence 20R0080)

Geophysical survey (Figure 3) within the boundary of the proposed Grange Castle Business Park West development has been successful in defining the location and extent of potential archaeological remains associated with enclosure site DU017-095, which lies to the south of the proposed development area. The geophysical survey has also recorded further potential archaeological remains within the proposed development area (Figure 5).

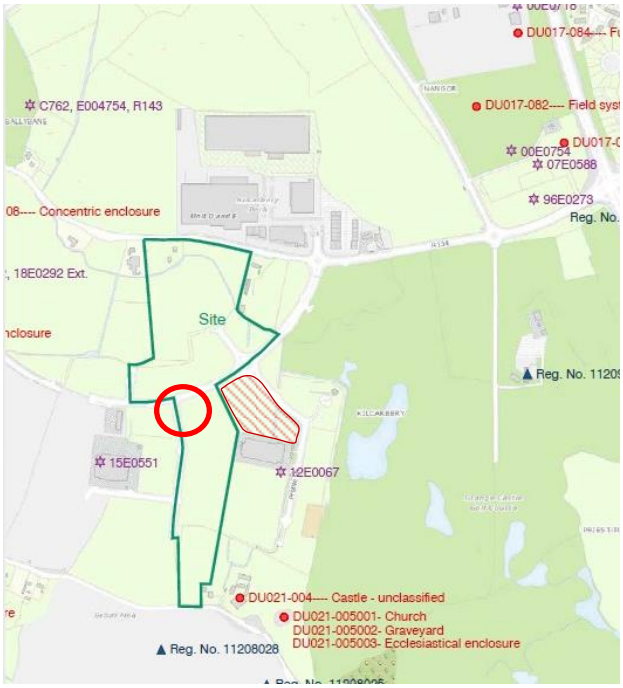


FIGURE 4 and 5: On the left (4): Geophysical Survey Results: possible enclosure. On the right (5): Location of enclosure DU017-095 on the western side of the development area.

Multiple responses of probable archaeological significance have also been identified from this geophysical survey. These include a concentration of strongly magnetic responses, small-scale positives and increased response at survey centre in M1 (within the proposed development area); a possible building to the W in M2; a possible ring ditch to the NW in M5; a discrete cluster of positive responses to the N in M6; small-scale positives and increased response to the NE in M8; and possible enclosure remains N of survey centre in M9, to the W in M11, and S in M12. The potential archaeological significance of a complex of linear responses which occupy the south-eastern corner of M11, adjacent to existing farm buildings has also been highlighted.

Remnants of early field systems have been recorded in M4-M6 and M11 and numerous small-scale responses and poorly defined linear anomalies of potential archaeological origin

have also been recorded in M1-M9 and M11-M12. An archaeological interpretation for these cannot not be entirely dismissed. However, a natural soil/geological, recent landuse or modern ferrous explanation is expected for the majority. The results from M1-M12 also highlight changing patterns of landuse, including former cultivation regimes, disused field boundaries, buried services, and magnetic disturbance from modern sources of interference. Throughout most survey locations low-level variations in response associated with natural soil/geological variation are also apparent.

4 TESTING STRATEGY

The programme of testing will aim to establish whether archaeological features and/or deposits exist within the footprint of the proposed development. It is proposed to excavate c. 8 test trenches or c. 560 linear metres of test trenches across the footprint of the proposed development as per Figure 6. It is envisaged that testing will commence on or after 11th October 2021 and continue over the course of two days pending approval of licence. Testing will be carried out using a mechanical excavator with a flat grading bucket under strict archaeological supervision.

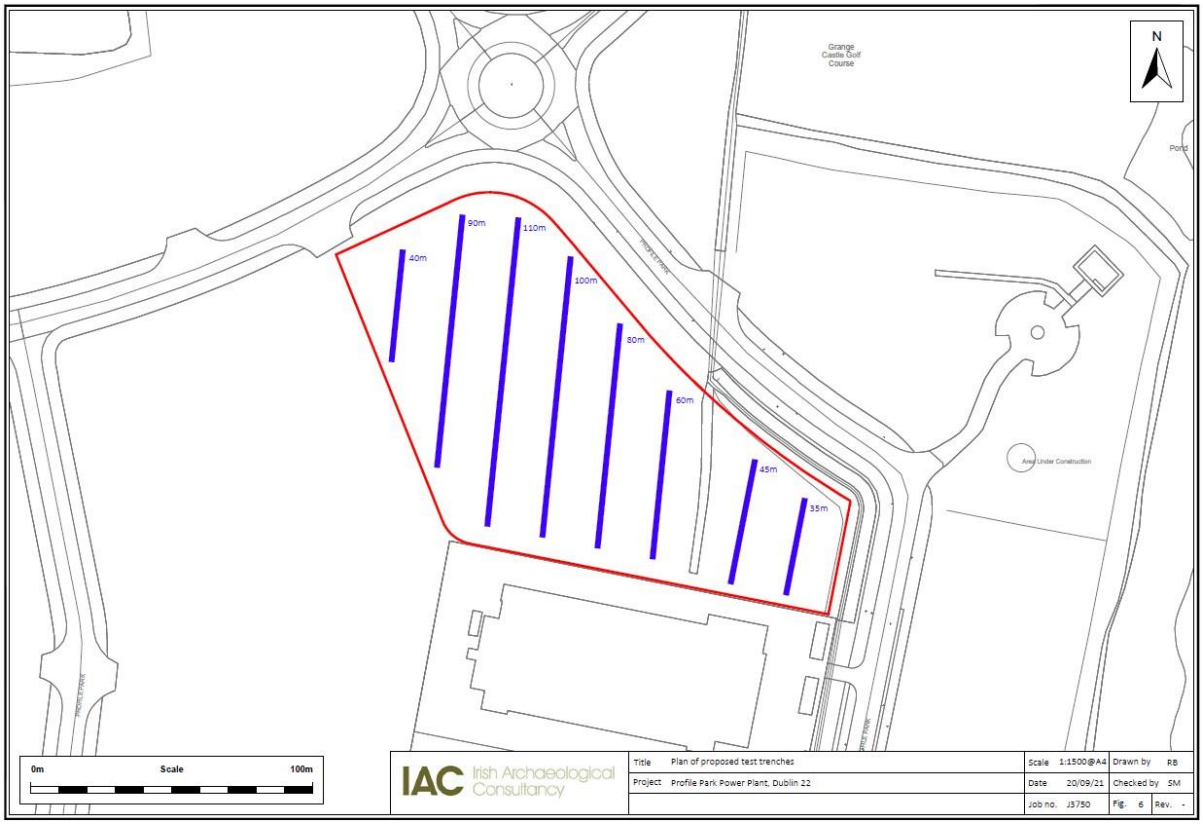


FIGURE 6: Proposed test-trenching layout.

Archaeological test trenches are intended to determine the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts on the site. Topsoil will be machine excavated in spits of 15cm under direct archaeological supervision using a mechanical excavator equipped with a toothless grading bucket. Excavation will cease at the first significant archaeological level or natural subsoil (whichever is encountered first). If definite archaeological features are encountered, then a small amount of hand testing may

be carried out in order to assess the extent of such features, which will then be covered with polythene or *terram*, after recording has taken place. Where appropriate the test trenches may be extended in order to identify the extent of archaeology.

Once trenches have been excavated and recorded, they will then be back filled. The assessment of the degree of archaeological survival will enable the formulation of further mitigation strategies designed to reduce or offset the impact of any proposed development.

Should any human remains be discovered during testing, An Garda Síochána will be notified along with the National Monuments Service of the Dept. of Housing, Local Government and Heritage (DoHLGH) and the Irish Antiquities Division of the National Museum of Ireland. An Osteo-archaeologist (Jenny Coughlan) will be made available for consultation should this be deemed appropriate. An appropriate strategy will be implemented once all parties have been consulted. Any human remains will be treated in accordance with the guidance provided by the Institute of Archaeologists of Ireland 'The Treatment of Human Remains' (Buckley, Reilly and O'Donnabháin, 2004) and the IFA (Brickley and McKinley, 2004).

5 FINDS RETRIEVAL STRATEGY

Any finds will be individually recorded and given a finds number. They will be allocated to specific contexts, individually bagged and catalogued. All finds will be stored in secure storage at Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow, during post-excavation works, and following post-excavation works will be forwarded to the National Museum.

5.1 Sampling Strategy

Samples will be collected from appropriate contexts for the purposes of radiocarbon dating and paleoenvironmental analysis where appropriate.

5.2 Treatment of archaeological objects

All archaeological objects recovered from the site will be cleaned/washed, labelled and stored in accordance with the National Museum of Ireland's (NMI) Guidelines for Excavators (2010). The location of the finds and the context from which they were obtained will also be recorded. Any items recovered during the excavations which require urgent conservation, will be treated immediately by a professional conservator. All archaeological objects will be catalogued and stored until they are transferred to the NMI. Details of archaeological objects will be entered in the NMI finds database registry. All finds will be stored in secure storage at Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow, during post-excavation works, and following post-excavation works will be accessioned to the NMI.

5.3 Specialists

Specialists will be employed where required and may include the following –

- Radiocarbon Dating – CHRONO Centre
- Faunal Remains – Margaret McCarthy
- Palaeoenvironmental analysis/reconstruction – Ellen O'Carroll
- Lithics identification – Shane Delaney
- Small Finds and medieval pottery – Siobhan Scully

- Prehistoric pottery – Eoin Grogan
- Osteoarchaeologist – Jenny Coughlan

6 POST EXCAVATION

The developer is aware of their responsibility to provide adequate funds to cover all post-excavation and specialist costs that may be associated with the programme of excavation.

The site archive, and any finds, samples etc. would be kept in safe storage during the post-excavation stage. All necessary conservation would only be undertaken by a professional conservator. All finds will ultimately be housed in the National Museum Ireland at the Swords Collections Resource Centre.

The excavation archive (if required) shall be ordered, arranged, boxed and deposited with the statutory authorities in accordance with Guidelines and Forms for the Transfer of Excavation Archives to National Monuments Service Archive (National Monuments Service 2012) and Guidelines for producing database record, for Archaeological Archives presented to National Monuments Service Archive (National Monuments Service 2012).

7 REPORTING

A final monitoring report outlining the results (in writing and graphically) of the excavations will be submitted to the client and the Department of Culture, Heritage and the Gaeltacht within four weeks of the completion of fieldwork. A Final Report (if required) will be submitted within 52 weeks of the completion of the excavations. The excavation report will comply in general with the Guidelines for Authors of Reports on Archaeological Excavations (DEHLG 2006). An entry for the Excavations Bulletin gazetteer will be prepared and submitted to the on-line publication.

8 REFERENCES

ACSU Archaeological testing of geophysical anomalies at Grange Castle West Business Park. Unpublished client report.

Piera, M. and Coughlan, T. 2019 *Archaeological Assessment of The Grange Castle West Access Road, Milltown (Phase 3)*, Clondalkin, Dublin 22. Licence 19E0370ext. Unpublished report prepared by IAC Ltd.

Bailey, F. and Anderson, J. 2019 *Archaeological Impact Assessment of the Profile Park Townland of Kilbride, Co. Dublin*, Licence 190521, unpublished report prepared by IAC Ltd.

www.excavations.ie – Summary of archaeological excavation from 1970–2019.

www.archaeology.ie – DoCHG website listing all SMR sites.

www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.

www.googleearth.com – Satellite imagery of the proposed development area.

www.bingmaps.com– Satellite imagery of the proposed development area.

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

Form NMS 1 – 2019

National Monuments Service

DATE STAMP (RECEIVED)

Method statement: Yes ☐ No ☐

Letter regarding funding: Yes ☐ No ☐

Application checked: .....

Date: .....

LICENCE NUMBER .....

FOR OFFICE USE ONLY

Application for a licence to excavate

under section 26 of the National Monuments Act 1930 (as amended)

Information and Advice Notes – APPLICANTS ARE REQUESTED TO READ THESE BEFORE COMPLETING THE APPLICATION FORM AND IT WILL BE ASSUMED THAT THEY HAVE DONE SO. Further guidance notes are provided in the form (in italics) where appropriate.

1. All references in this form to the 'Minister' refer to the Minister for Culture, Heritage and the Gaeltacht. References to the 'National Monuments Service' mean the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht. **The Minister is the licensing authority under the legislation.**

2. Please note that all questions or requests to provide information on the form are mandatory. Where appropriate insert 'Not applicable'. Where the form is not completed correctly the applicant will be notified that it cannot be processed.

3. The application form must be accompanied by a **detailed method statement** (see No. 18 on the form) and a **letter from the person or body funding this excavation** (see No. 12 on the form), confirming that sufficient funds and other facilities are available to complete the archaeological excavation, post-excavation, and preliminary and final reports. Where these are not included the applicant will be notified that the application cannot be processed.

4. The completed application form, together with the detailed method statement and letter must be received by the National Monuments Service (Custom House (G50), Dublin, D01 W6X0 or by email at licensingsection@chg.gov.ie) at least **three weeks** prior to the date on which it is proposed to commence the excavation. Note that while the National Monuments Service endeavours to process all applications as quickly as reasonable and has a general target of deciding on applications three weeks after receipt, no guarantee can be provided that this will be met and there is no legal entitlement on the part of an applicant to receive a decision on their application within three weeks. In particular, delays arising from incomplete or inaccurate information being submitted or from issues regarding non-compliance with previous licences are the responsibility of the applicant.

5. Given that appropriate professional competence and experience is a material factor in deciding whether or not a licence should be issued, a first-time applicant may expect to be requested to attend an interview arranged by the National Monuments Service to assess such competence and experience. So as to avoid delay in being interviewed, a facility is provided to potential first-time applicants whereby they can attend interview in advance of lodging a particular licence application. It is recommended that persons considering a first-time application apply to attend such interview well in advance of lodging their first application. Applications to attend an interview should be submitted to the National Monuments Service, Custom House (G50), Dublin, D01 W6X0.

6. Persons claiming any exemption from attendance at interview as referred to above on grounds related to EU law (Directive 2005/36/EU as amended) on the recognition of professional qualifications should state so clearly, with supporting material, when lodging a particular licence application. The National Monuments Service cannot accept responsibility for any delay arising from an applicant failing to do so. Such an exemption may, in particular

circumstances, be available to persons coming from another EU member state or member of the European Economic Area.

7. Please note that licences under section 26 of the National Monuments Act (as amended) are issued **at the discretion of the Minister**. The Minister may refuse a licence application and applicants should not assume that a licence will be granted on foot of any particular application. Furthermore, the Minister may insert in any licence such conditions or restrictions as she or he thinks proper. In addition to conditions appearing on this form, any licence issued may therefore be subject to particular conditions specified by the National Monuments Service.

8. The Director of the National Museum of Ireland is a statutory consultee in relation to licence applications, as provided under section 26(2) of the National Monuments Act 1930 (as amended).

9. In the normal course, a licence to excavate will only be issued for a single geographic extent. Reasons to support applications that seek to cover multiple locations must be set out in the method statement.

10. Under no circumstances must any excavation work be carried out before an applicant has been notified by the Minister that a licence has been issued to her/him. The carrying out of an unlicensed archaeological excavation is an offence under section 26(3) of the National Monuments Act 1930 (as amended). Such offence may be tried summarily or on indictment and serious penalties may apply on conviction (see section 26 (3) of the 1930 Act as amended by section 17 of the National Monuments (Amendment) Act 1987).

11. Finds of archaeological objects made in the course of a licensed archaeological excavation are exempt from the requirement under section 23 of the National Monuments Act 1930 (as amended) to report same to the Director of the National Museum of Ireland within 96 hours. No such exemption applies to finds of wrecks more than 100 years old and these must be reported to the Minister in accordance with statutory procedures under section 3 of the National Monuments (Amendment) Act 1987: breach of this requirement is an offence.

12. A person to whom an archaeological excavation licence has been issued has no exemption from the requirements of the National Monuments Acts 1930 to 2014 in respect of licensing of alteration of archaeological objects or the requirements of the National Cultural Institutions Act 1997 in respect of export of archaeological objects: breach of these requirements is an offence.

13. If it is proposed to use a detection device in the course of, or as part of, the archaeological excavation then a separate consent is required under section 2 of the National Monuments (Amendment) Act 1987.

14. In addition to the specific points noted in the two paragraphs above, it is essential to note that the issuing by the Minister of a licence under section 26 of the National Monuments Act 1930 does not, except where expressly provided under law, provide any exemption from other statutory or legal obligations. It is the obligation of the applicant to ensure that all such obligations are complied with and the Minister has no, and does not accept, responsibility or liability for any failure by the applicant to do so and the consequences (civil or criminal) which may arise from such failure. In particular, and without prejudice to the generality of the foregoing, the issuing of a licence under section 26 does not give the licensee any powers to enter lands or carry out works against the wishes of the owner or occupier.

15. A licence, if issued, will issue to the applicant, who will become the licensee under it. No other party than the licensee is bound by the conditions of a licence. It is of the utmost importance that an applicant understands this and that the National Monuments Service will, for example, have no powers under the National Monuments Acts to require any other party to fund the fulfilment of licence conditions. Applicants therefore need to ensure that they have in place before commencing any excavation work appropriate and enforceable contractual arrangements with the person or body which has engaged them to carry out the excavation. As part of this, applicants should consider putting in place arrangements under which funds for the carrying out of post-excavation work are secured even in the event of the person or body which engaged them running into financial difficulties.

16. There is no guarantee that any licence issued will be considered appropriate to be extended or transferred to another party. In the normal course, requests for extensions will not be considered more than two years after the completion of the excavation site works.

17. A person who accepts the transfer to them of a licence needs to understand that they will thereby be accepting full responsibility for compliance with the conditions of the licence. Such a person should therefore ensure, before accepting such transfer, that necessary funds are in place and that they will be able to rely on the contractual arrangements referred to at (15) above.

18. All matters relating to employment and health and safety law which may arise in the course of the archaeological excavation or subsequently are matters for the applicant/licensee and the relevant statutory bodies and, depending on circumstances, the applicant/licensee's employer and the occupier of the lands. The Minister, the

National Monuments Service and the National Museum of Ireland have no role in relation to such matters under the National Monuments Acts and any archaeological excavation licence.

Application for Licence under section 26 of the National Monuments (Amendment) Act 1930 (as amended)

PRIVACY STATEMENT

The Department of Culture, Heritage and the Gaeltacht is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law.

The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy. Further information on Data Protection can be found on our website at: https://www.chg.gov.ie/help/legal-notices/data-protection/

APPLICATION FORM (NMS 1 – 2019)

1. Applicant's name Marc Piera

Email mpiera@iac.ie
Phone 01 2018380
Mobile 086 035395

Address of applicant
c/o IAC Archaeology Ltd.,
Unit G1 Network Enterprise Park,
Kilcoole, Co. Wicklow
Eircode / postcode

2. Have you previously held a licence to excavate under section 26 of the National Monuments Act 1930 (as amended)? Yes [X] No [ ]

3. Reason for excavation Conservation [ ] Mitigation/rescue [ ] Monitoring [ ] Research [ ] Testing [X]

4a. Location of excavation Rural [X] Urban [ ] Underwater [ ] If a 'wreck' fill out details at 4c.

4b. County **Dublin** **Townland** **Kilbride**
City/town **Number/street/road**

ITM easting 703681 **ITM northing** 730561

These must be given for the centre of the site to be excavated or mid-point of a linear development. They can be calculated using the 'locate' tool on the National Monuments Service Historic Environment Viewer (see www.archaeology.ie).

Name of site (where relevant) **n/a** e.g., Ennereilly Church

4c. Wreck name n/a
If unknown insert 'Unknown'
Port of origin
If unknown insert 'Unknown'
Latitude : : **Longitude** : :

5. Classification
n/a
Type of monument/site for which the licence is being sought.

6. SMR number
If the site does not have an SMR number, insert 'Not applicable'.

7. Owner of land / wreck
South Dublin County Council
In present context the owner means the person with sufficient legal interest in the land/wreck as to have the authority to permit the proposed work.

Address of owner
County Hall
Tallaght
Dublin 24
Eircode / postcode

8. Has permission been granted by the owner to excavate? Yes [X] No [ ]

If the answer is 'No' please provide an explanation in the method statement.

9. Have you inspected the site? Yes [X] No [ ]

If the answer is 'No' please provide an explanation in the method statement.

10a. Duration of licence sought From 11 (dd) 10 (mm) 2021 (yyyy) to **19** (dd) **11** (mm) **2021** (yyyy)

10b. Duration of archaeological excavation From 11 (dd) 10 (mm) 2021 (yyyy) to **12** (dd) **10** (mm) **2021** (yyyy)

The dates submitted must relate to the expected timeframe of the proposed excavation. In the normal course the dates of the 'duration of licence sought' and the 'duration of archaeological excavation' should be the same. Where the period within which the archaeological excavation will actually take place is not known with certainty, the applicant should try to state as closely as possible when the excavation will take place. Please note that applications will not be accepted where unreasonably lengthy periods are proposed. Therefore, the justification for seeking the length sought should be set out in the method statement.

11a. If you are undertaking the excavation as an employee / sub-contractor of an archaeological firm please supply the contact details of the firm.

Name of firm IAC Archaeology Ltd.

Address of firm Unit G1 Network Enterprise Park, Kilcoole, Co. Wicklow

Email archaeology@iac.ie

Phone 01 2018380

Mobile

Eircode / postcode

If you are not an employee / sub-contractor of an archaeological firm please insert 'Not applicable'.

11b. Please supply the name and contact details of the person or body funding this excavation.

Name Mark McCarthy – Tobin Ltd

Address Block 10-4 Blanchardstown Corporate Park, Dublin 15, Ireland.

Email mark.mccarthy@tobin.ie

Phone +353-(0)1-8030401

Mobile

Eircode / postcode

12. Have you enclosed with this application a letter from the person or body (referred to in 11b) confirming that sufficient funds and other facilities are available to complete the archaeological excavation and associated post-excavation work, including preparation of preliminary and final reports (including specialist reports) to the standard required under the licence, if granted? Note that the letter submitted must adhere to the form and content of the template letter appended to this Application Form. Yes [X] No [ ]

Failure to submit this letter will mean that the licence application cannot be processed.

13. Do you understand that, as licensee, it will be your responsibility to comply with and fulfil the conditions of the licence and, therefore, you must ensure that all necessary funds are in place to do so, including the funding of post-excavation work? Yes [X] No [ ]

14a. Where the application results from planning or other development control conditions please provide the name of the Planning Authority or relevant development control body. **South Dublin County Council**

14b. Is a full copy of the planning / control conditions relating to the site attached? Yes [ ] No [X]

14c. In the case of a Planning Authority, please supply the Planning Register No. SD21A/0167

The above sections must be filled out where the application to excavate results from a planning or other development control condition/consent/decision. A full copy of the relevant planning condition/consent/decision must be attached and not just those relating to archaeology. Where the application is not the result of planning or other development control conditions insert 'Not applicable' and provide an explanation in the method statement.

15a. Is the excavation covered under a Code of Practice? Yes [ ] No [X]

A code of practice refers to where such has been agreed between the Minister and another body.

15b. If yes, please provide the name of the relevant party to the Code.

15c. Where the relevant code provides for a Project Archaeologist has she/he approved this application? Yes [ ] No [ ]

15d. If yes, please provide the name of the Project Archaeologist.

Sections b, c and d must be filled out where the application to excavate results from a code of practice between the Minister and another body.

16a. Do you understand that any archaeological objects recovered in the course of the proposed excavation will be State property? Yes [X] No [ ]

16b. Do you understand that the final place of deposition of any archaeological objects recovered in the course of the proposed excavation will be the National Museum of Ireland, unless otherwise agreed with the National Museum of Ireland, and that deposition must be done in accordance with all or any standards specified by the National Museum of Ireland? Yes [X] No [ ]

16c. Where will the archaeological objects be housed during post-excavation? **IAC Office, Unit G1 Network Enterprise Park, Kilcoole, Co. Wicklow**

16d. Name(s) of finds conservator(s)? **Susannah Kelly**

17a. Do you understand that the final place of deposition of the archaeological archive will be the National Monuments Service, unless otherwise agreed? Yes [X] No [ ]

17b. Where will the site archive be housed pending final deposition? **IAC Office, Unit G1 Network Enterprise Park, Kilcoole, Co. Wicklow**

18. Content of method statement. Please tick the boxes to confirm that the following are included:

1. **Summary:** *Provide a summary of the proposed excavation, purpose and details of duration.* Yes [X]
2. **Location description:** *Provide a description of the site location (county, townland and/or town/street and house/site number) and other details re topography and situation.* Yes [X]
3. **Location map:** ***Provide copy of OSi map (1:5000) for rural areas and (1:1000) for urban areas.*** *In the case of maritime excavations, provide a copy of the relevant admiralty chart.* Yes [X]
4. **Location site plans:** *Site plan showing the location and layout of the proposed cuttings. The length and width of proposed cuttings should be stated clearly and all plans of the proposed excavation must have a scale on them. This must be at a suitable scale and on a map base that can be linked to current OSi mapping.* Yes [X]
5. **Aims of the excavation:** *Description of research objectives and planning history (as appropriate). Description of local archaeological context – previous excavations/surveys. Description of archaeological potential of the site/location.* Yes [X]
6. **Excavation strategy:** *Describe the excavation area (including cuttings) and method of excavation.* Yes [X]
7. **Description of development:** *Describe the development, build method and schedule (where relevant). Include planning condition and explain timescales involved and time restrictions (if any).* Yes [X]
8. **Constraints on archaeological methods:** *Outline safety hazards, piling/shoring/access (if applicable).* Yes [X]

9. **Illustrations:** *Where relevant include aerial photographs (vertical and/or oblique) or ground photography to illustrate the method statement.* Yes **X**

10. **Excavation team:** *Outline the team structure – number of personnel (e.g. archaeologists, supervisors), the back-up measures, and logistical support (e.g. details of excavation team on call, if applicable).* Yes **X**

11. **Finds retrieval strategy:** *The detailed finds retrieval strategy must be site specific. Describe in detail the methods and equipment to be used.* Yes **X**

12. **Sampling and analysis:** *The method statement will indicate what programme of sampling and post-excavation analysis will be undertaken as appropriate and in accordance with best practice.* Yes **X**

13. **Conservation:** *Outline the on-site facilities, off-site facilities, site/monument conservation implications.* Yes **X**

14. **Specialists:** *Provide names and addresses of relevant qualified specialists.* ***Note:*** *If the site is likely to produce human remains then name and address of qualified osteoarchaeologist must be included.* Yes **X**

15. **Storage:** *Outline where the storage of finds and site archive will be housed and under what conditions after completion of the fieldwork component.* Yes **X**

16. **Reporting:** *Specify delivery dates for the preliminary report, excavations.ie report and final report. The dates specified must be in accordance with conditions of the licence relating to lodging of reports.* Yes **X**

Conditions to which any licence issued under section 26 of the National Monuments Act 1930 (as amended) are subject.

Any licence issued will be subject to the following conditions and any other conditions that may be specified to the licensee.

1. This licence is issued on the basis of information provided by the applicant and on the understanding that all information provided with the application, and associated statements made by the applicant, are accurate and truthful.

2. The licensee must obtain permission from the owner of the land/ wreck to carry out the excavation and particularly to alter, dig or excavate in or under the site before availing of this licence. No responsibility or liability shall attach to the Minister for failure on the part of the licensee to obtain such permission.

3. By accepting the licence, the applicant acknowledges that the Minister is not responsible or liable in any manner for any loss or injury to persons or property in any way arising from the licensed activities.

4. The licensee shall restore the land to its original condition on termination of this licence, unless otherwise directed by the landowner.

5. The licensee shall comply in all respects with the provisions of the National Monuments Acts 1930 to 2014 and any Acts altering, amending or replacing those Acts. Copies of the Acts are available from the National Monuments Service website www.archaeology.ie and from Government Publications (see http://www.opw.ie/en/governmentpublications/).

6. Under the provisions of section 2 of the National Monuments (Amendment) Act 1994 the ownership of an archaeological object found in the State which has no known owner at the time it is found stands vested in the State. The National Museum of Ireland is the State repository for all such archaeological objects. The licensee shall adhere to the directions of the Director of the National Museum of Ireland in relation to the final disposition/location of any archaeological objects and the temporary storage of finds and also to advice notes issued by the National Museum of Ireland. Separate licences must be applied for under the relevant provisions of the National Monuments Acts 1930 to 2014 and the National Cultural Institutions Act 1997 if it is intended to alter (which includes to destructively sample), or export any archaeological object recovered during the excavation.

7. The licensee shall be given a reference number in relation to each excavation or part thereof which shall be used in all correspondence relating to the excavation and for the numbering of finds (if any) recovered during the excavation. The licensee shall also comply with the requirements of the National Museum of Ireland as regards to the numbering and care of archaeological objects.

8. The licensee shall conduct the excavation in accordance with the method statement as submitted with the applicant's application for a licence under section 26 of the National Monuments Act 1930 (as amended) and also in accordance with the information provided (including answers given) in or on the application form submitted with that application, subject to any amendment approved by the National Monuments Service prior to the issue of this licence. Once the licence has been issued, any proposed amendment or variation to the methodology set out in those documents must be submitted in advance to the National Monuments Service and can only be proceeded with if approved by the National Monuments Service.

9. The licensee shall comply with the *Policy and Guidelines on Archaeological Excavations* (1999) and any subsequent policies, guidance or advice, issued by, or on behalf of the Minister and advice notes issued by the National Museum of Ireland.

10. Unanticipated discovery of human remains must be reported as soon as possible to the National Monuments Service and the National Museum of Ireland.

11. (1) The licensee shall:

a) Lodge **one digital (PDF/A format on CD or USB) and two hard copies** of a Preliminary Report on the excavation with the National Monuments Service, and **one digital (PDF/A format on CD or USB) and one hard copy** of same with the National Museum of Ireland within four weeks of the completion of the excavation. The Preliminary Report **must** be in the recommended format set out in the *Guidelines for Authors of Reports on Archaeological Excavations* (2006) issued by the National Monuments Service. Note that the coordinate referencing system in current use is the Irish Transverse Mercator (ITM) and not the 'National Grid' as set out in the Guidelines (pp. 3, 5, 8).

b) Lodge as an appendix within the preliminary report (referred to in (a) above) a 'Monument Report Form' for every previously-unrecorded monument discovered in the course of the excavation. The monument classification used on the form must accord with that operated by the National Monuments Service (see www.archaeology.ie Historic Environment viewer).

c) Unless otherwise agreed with the Minister, lodge, within twelve months of completion of the excavation, **one digital (PDF/A format on CD or USB) and two hard copies** of the Final Report on the excavation with the National Monuments Service, and **one digital (PDF/A format on CD or USB) and one hard copy** of same with the National Museum of Ireland. The Final Report **must** be in the recommended format set out in the *Guidelines for Authors of Reports on Archaeological Excavations* (2006) issued by the National Monuments Service. Note that the coordinate referencing system in current use is the Irish Transverse Mercator (ITM) and not the 'National Grid' as set out in the Guidelines (pp. 3, 5, 8). This report must be to publication standard and include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy along with a discussion and specialist reports.

d) Publish a concise report to the standard accepted for publication on the www.excavations.ie website for the year in which the licence is valid.

e) Lodge with the National Monuments Service one copy of any publication where the results of the excavation have been published.

f) Without prejudice to any of the above, where the licensee submits a written report on the excavation to another person or body prior to having submitted the reports referred to above to the National Monuments Service then the licensee shall notify the National Monuments Service in writing (which may be in email form) that such report has been submitted to that other person or body.

(2) Without prejudice to any other requirements regarding the format of a report to be submitted to the National Monuments Service and the National Museum of Ireland in accordance with the above, all such reports shall be in two separately bound parts (or in the case of digital copies two separate files) as follows:

First Part

The first part shall contain purely archaeological information, i.e. the nature of the site in archaeological terms and the results in archaeological terms of the archaeological excavation. This part shall be identified using the references number provided to the licensee under Condition 7 above. The first part shall, in particular, contain no personal data other than the name of the licensee.

Second Part

The second part shall contain other information where appropriate to be provided regarding the archaeological excavation, e.g. owner of the site, reasons for carrying out the archaeological excavation (other than archaeological research), information regarding funding and planning and development issues. This second part shall be identified with the same reference number but with an "X" appended.

12. The Minister may publish or make generally available in any form (including printed or electronic form which, without prejudice to any other form of publication or making available, may include publishing or making available on the internet), any report, or part thereof, submitted under or in fulfilment of the conditions of this licence. A copy of a report so published or made available may identify the licensee.

13. The final place of deposition of all archives associated with the archaeological excavation shall be the National Monuments Service archive except as may be otherwise directed by the Minister, which direction (which shall be complied with by the licensee) may provide for the deposition (in such manner as the Minister may determine) of the archives in another appropriate place or places or their disposal (whether in whole or part) in such manner as the Minister may determine. Where the final place of deposition is the National Monuments Service archive, the licensee shall comply with all directions and requirements of the Minister in regard to the manner and timing in which the archives are presented for deposition. Pending the deposition or disposal of the archives in accordance with the foregoing, the licensee shall maintain the archives safely and securely and shall advise the Minister, as and when requested, as to their location and the provision being made for their safety and security and shall provide access to the officers or agents of the Minister to inspect the archives at any reasonable time. Nothing in the foregoing shall oblige the Minister to accept deposition of all or part of the archives in the National Monuments Service archive, or to otherwise accept any responsibility for the archives, unless the Minister is satisfied that all other conditions of the licence have been complied with or fulfilled and that it is appropriate to accept such deposition or responsibility. In the foregoing 'archives' includes plans, drawings, photographs, site notebooks, record sheets, context sheets, finds lists or similar or related material whether in paper, hard copy or digital form.

14. Officers, servants or agents of the Minister or the Board of the National Museum of Ireland may inspect at any reasonable time the archaeological excavation to which this licence applies and (without prejudice to the provisions of condition 13) any associated storage facilities, archives or records and the licensee shall facilitate any such inspection. In the foregoing 'reasonable time' includes (but is not limited to) any time when archaeological excavation work is being carried out on or at the location of the archaeological excavation or any time when post-excavation is being undertaken.

15. The licensee accepts that failure by her or him to comply with or fulfil any of the above conditions shall be grounds for the Minister to refuse to issue to her or him any further or other licence under section 26 of the National Monuments Act 1930 (as

amended), or to otherwise authorise or permit her or him under any other provision of the National Monuments Acts 1930 to 2014 to carry out archaeological excavation, until such time as such non-compliance or non-fulfilment has been rectified to the satisfaction of the Minister in such manner as the Minister may determine. Nothing in this condition shall be interpreted as obliging the Minister to issue or grant any particular licence or consent which may be applied for under the National Monuments Acts 1930 to 2014. An applicant aggrieved by a refusal by the Minister pursuant to this Condition to issue or grant a licence or consent may request the Minister to review the decision. Where such a review is requested, the Minister will appoint an independent and appropriately qualified person or persons to review the case and make a recommendation to the Minister. The final decision on the matter will rest with the Minister. Any applicant requesting a review under the provisions of this Condition must comply with any procedures specified by the Minister for requesting such a review and provide any information reasonably requested by the Minister or the independent person or persons appointed by the Minister under this Condition, including making themselves or any documents, records, objects or other material associated with the archaeological excavation available for interview or examination as the case may be.

16. This licence may be revoked or suspended by the Minister on grounds of breach of, or non-compliance with, any condition of this licence or otherwise on the grounds that such revocation or suspension is necessary in the interests of protection of the archaeological heritage or otherwise in the public interest. This is without prejudice to any powers of the Minister under any enactment.

17. The licensee shall notify the National Monuments Service in writing (which may be in email form) of the commencement of the excavation and of the conclusion or cessation (whether temporary or permanent) of archaeological excavation at the location to which the licence relates. Such notification shall take place as soon as may be after such commencement, conclusion or cessation.

18. If the licensee decides or become aware that the licence will no longer be availed of within the time period for which it was issued, then the licensee shall as soon as may be notify the National Monuments Service in writing (which may be in email form) of this.

I declare that all the information provided by me in completing the above application form is accurate. I further declare and acknowledge that I have read and understood all notes and guidance on this form, and that I have also read and understood the above conditions and am aware that, except as may be otherwise determined and specified by the Minister, the above conditions will apply to any licence which may be issued to me on foot of this application.

Signature:* _____

Date: 21.09.20

** The form must be signed and dated by the applicant in person: scanned copies of a signature are not acceptable. The form may be submitted in hard copy or scanned and submitted in digital format (see Preamble no. 4 at the beginning of the form).*

APPENDIX

Template of letter to be enclosed with application, as referred to in Question 12 of this Application Form

To [INSERT NAME OF APPLICANT] and [INSERT NAME OF FIRM, IF ANY, OF WHICH APPLICANT IS AN EMPLOYEE],

On behalf of [INSERT NAME OF COMPANY OR OTHER BODY OR DELETE AS APPROPRIATE], I confirm that in the event of [INSERT NAME OF APPLICANT FOR LICENCE] being granted a licence to carry out archaeological excavation at [INSERT LOCATION OF PROPOSED ARCHAEOLOGICAL EXCAVATION] in accordance with the application she or he has submitted to the National Monuments Service and which this letter accompanies, I [OR NAME OF COMPANY OR BODY WHERE APPROPRIATE] will provide or ensure are available to her or him or his employer (as appropriate) sufficient funds and other facilities to allow her or him to complete the archaeological excavation and associated post-excavation work, including preparation of preliminary and final reports (including specialist reports) to the standard required under the licence, if granted.

Yours etc.

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