LAND PLANNING & DESIGN

CUNNANE STRATTON REYNOLDS

An Bord Pleanála
64 Marlborough Street
Dublin 1

BY HAND
Our Ref. 21420

09 June 2021

RE. APPLICATION FOR PERMISSION UNDER S. 37L

further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void at Windmillhill, Rathcoole, Co. Dublin within the administrative area of South Dublin County Council.

Dear An Bord Pleanála,

This cover letter accompanies a planning application under S.37L of the Planning and Development Act, 2000 as amended [P&D Act] on behalf of Mr. Laurence Behan of Behan, Behan Quarry, Windmillhill, Rathcoole, Co. Dublin for the above development. A full description of the development for which permission is sought is at Appendix 1.

This is an application for permission for further development of a quarry as a quarry that is accompanied by an Environmental Impact Assessment Report (EIAR).

This application is made concurrent with an application for substitute consent for the quarry under S261A of the P&D Act that is accompanied by a remedial EIAR (rEIAR).

This cover letter has been provided at the request of Golder Associates Ireland who are the lead consultants for the applicant and agents for the application. The purpose of the letter is to provide a context for, and record of, the enclosed application.

By means of reference to the enclosed application documentation, this letter seeks to illustrate how the application has been prepared having regard to statutory provisions and the planning history and context of the application site.

The letter seeks to highlight information to address S37N of the P&D Act and emphasise that the proposed development, in largely coinciding with an extant quarry void and consisting of further extraction of that void will not have a significant negative effect on the environment as is the finding of the EIAR, and respects the development objectives for the lands and use set out in the South Dublin Development Plan 2016 -2022.

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The format of the letter is as follows:

1.0 Content of enclosed planning application

2.0 S37L impact on appearance and type of development proposed
2.1 Concurrent application for substitute consent

3.0 Current S37L application

4.0 Conclusion

1.0 Content of enclosed planning application

1. A completed Planning Application Form that includes supplementary and additional information in a document appended to that form recording:
   1.1 A schedule of the set of drawings.
   1.2 A copy of the Site Notice erected in 4 no. locations indicated on submitted drawings.
   1.3 A copy of the newspaper notice, a full page from The Daily Mail.
   1.4 The planning application fee calculation of €20,517.05. A cheque in this amount is separately provided.

   These documents have been prepared having regard to the requirements of the P&D Act and associated Planning and Development Regulations 2001 – 2021 [P&D Regulations].

2. A remedial Environmental Impact Assessment Report (rEIAR) with Non-Technical Summary.
   2.1 A copy of the EIA portal certificate, which is appended to the application form.

3. A Screening Report to inform remedial Appropriate Assessment (AA).

   These reports to aid environmental assessments have been prepared having regard to enabling Directives, relevant statutory guidance and best practice across the realms of Planning and Development; Environment; Birds and Habitats that are scheduled at the outset of each document.

10 no. hard copies of the application documents are provided and an electronic copy.

2.0 S37L impact on appearance and type of development proposed

As noted, a full description of development is provided at Appendix 1.1, it is submitted that the planning application being made here Is under S37L of the P&D Act that sets a particular circumstance under which this type of permission may be sought and limits the type of development for which planning permission may be sought.

A S37L application may only be sought were there is a substitute consent application in being. In this instance a time extension grant under PL06S.308313 related to the concurrent substitute consent application requires that both the substitute consent application and S37L application be made at the same time.

S37L further provides that proposed development may only be for further development of a quarry as a quarry. This prescription has primarily informed the extent and appearance of the proposal now made under S37L.

In summary, the proposed development consists of extraction works. Sought is a minor northern lateral extension of the extant quarry void by 4.1 ha. and a deepening of the extant void and that lateral extension over a total area of 26.87 ha. The deepening sought is from the current average working depth of 173 mAOD to 150 mAOD which is above groundwater. The application site relates to the quarry only and is further quarrying as is prescribed under S37L.

The resulting application site area is irregular in shape and does not include the administration and plant processing area at the entre of the current operation as no further quarry development is proposed over this area which is part of the substitute consent application area. However, in deference to the requirements of Environmental Impact Assessment (EIA), quarry planning guidance and best practice the proposed development includes for a restoration proposal of the application site and the associated lands of the administration and plant processing area within the ownership and control of the applicant and thus capable of being proposed and reinforceable by condition for this restoration under S34(4).

2.1 Concurrent application for substitute consent

This S37L application is contingent on the making and, to a great extent the outcome of, an application for substitute which is concurrently made. That application is accompanied by an rEIAR and cover letter that provides a full rendition of the key statutory provisions in relation to planning permission for existing quarries and the quarry's recent planning history and reason for substitute consent application arising.

That substitute consent application is by High Court Order and is accompanied by rEIAR as was determined to be the requirement at after An Bord Pleanála review (ref. PL06S.QV0090) of S261A of the site (ref. SQD05A/04) by South Dublin County Council.

The requirement for the concurrent substitute consent is submitted to originate from the development's status as a quarry originally permitted in 1968, provided revised conditions as a result of S261 registration, and arises, in effect, from its review under Section 261A of the P&D Act. This S37L application is only possible as a concurrent substitute consent application under S261A of the P&D Act is in being.

3.0 Current S37L application

The history of the site set out in the accompanying substitute consent application ends with a record of previous substitute consent application and concurrent S37L application decision quashed by High Court Order in 2020.

The previous S37L application was made in November 2015 and was accompanied by an EIS Environmental Impact Statement (EIS now called EIAR) under ref. PL06S.QD0003 which was refused on the 21st of September 2018.

Judicial review of this decision and that for the then concurrent substitute consent application granted reliefs by High Court Order [2018 No. 929 JR] perfected in August 2020 that included;

"…that a fresh application to the Respondent for continued development in relation to the site at Windmill Hill Rathcoole County Dublin pursuant to the notice dated 11 August 2015 issued by the Respondent in respect of section 37L of the Planning and Development Act 2000 as amended shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks of the date of perfection of this Order or such further period as the Board may allow…"

The opportunity therefore for the making of this S37L application originates on foot of a notice from An Bord Pleanála

in November 2015, during the currency of the consideration of the quashed previous substitute consent application, informing the then (and now) applicant of the amendment that gave rise to S37L and the opportunity to submit an application under the provisions of that section.

Without prejudice to the P&D Act and Regulations, Appendix 2 is an extract of section 1.1 the submitted EIAR that describes in greater detail the history of this application. It includes a rendition of the definition of a quarry from the P&D Act.

Immediately upon the High Court Order the applicant set about retaining technical experts to prepare his substitute consent and concurrent further development of the quarry applications. Golder Associates, Ireland were retained by the applicant who in turn, for the design of the developments the subject of the applications and the preparation of portions of the rEIAR and EIAR, retained further specialist subconsultants, including the services of Cunnane Stratton Reynolds (CSR) for planning consultancy and landscape impact assessment purposes.

Golder Associates and CSR have been provided full access to the site for the purposes of survey and monitoring. An Bord Pleanála facilitated pre-planning communication in respect of the proposed structure and content of the substitute consent application that informs this S37L application under ref. PL06S.308315 and allowed time extension for the submission of the application under PL06S.308313. Though the site has remained open supplying to necessary and emergency works, the time extension was primarily requested to ensure all specialist technical subconsultants could travel to the site during periods of Level 5 lockdown due on foot of Covid-19 public health guidance.

The application for further development of the quarry that this letter accompanies has had regard to the full planning and development history of the site and the designations for the site under the current South Dublin County Development Plan 2016 -2022 and the requirements for substitute consent applications in the Planning and Development Regulations 2001 – 2021.

Having regard to the High Court Order and the reliefs granted therein, this application preparation has had regard to the concurrent preparation of an application for substitute consent under S261A of the P&D Act.

In this regard too, the requirements of the environmental assessment directives, their transposition into Irish law and guidance for the preparation of applicant reports to support EIA and AA have informed the EIAR submitted with this application, the rEIAR with the concurrent application for substitute consent and the AA screening reports with both applications. The extent of the quarry area for this S37L application automatically gives rise to EIA and thus the requirement for EIAR.

AA preliminary consideration and screenings by An Bord Pleanála in their review of S261A notice ref. SQD05A/04 (ref. PL06S.QV0090) in 2013 and previous substitute consent (ref. PL06S.SU0068) and further development S37L (ref. PL06S.DQ0003) applications in 2018, have not required progression to Stage 2 AA. In view of the requirement for AA consideration as part of the application consideration, the passage of time since prior AA, and being unable to determine if either a Natura Impact Statement (NIS) or AA Screening report were submitted as part of the previous S37L application, a Screening Report to inform Appropriate Assessment (AA) has been prepared and is submitted as part of this application.

As set out in the EIAR, in view of this EIAR and the rEIAR being concurrently prepared for much of the same operational lands, it is submitted that a single EIA project boundary for the purposes of assessment by experts of works past and proposed is consistent and will facilitate EIA of each development proposal within the same EIA project envelope.

The EIA project boundary envelopes an area of 46.14 ha. that encloses previous recent quarry application areas, current workings and intended future workings.

The EIA project boundary is therefore larger than the associated planning application units in order to capture:

- the currently proposed substitute consent and S.37L application boundaries and associated infrastructure; and
- the workable area registered under S.261 for which conditions were imposed.

To a lesser extent, the EIA project boundary was chosen to capture previous applications on the lands as they may include information useful to construct the history and baseline of the current development proposals. In this regard, it was assumed that the most relevant information would derive from the rEIS and EIS submitted for the previous substitute consent and S.37L applications (refs. PL06S.SU0068 and

PL06S.DQ0003), therefore the current EIA project boundary largely coincides with those EIA project boundaries.

It is recognised and accepted that the previous S37L application and substitute consent decisions have been quashed by High Court Order. Without undermining that order it is submitted that the previous application for substitute consent and concurrent S37L applications were considered and determined by An Bord Pleanála. The Inspector's reports, Bord Directions and Orders associated with those applications have been reviewed as they represent the most recent review of the lands by a planning authority and a competent authority.

Notwithstanding and in addition, the matters raised in the judicial review case have been noted and inform this application; principally that the S37L application sought permission for development that is not within the definition of a quarry. The description of development for re. PL06S.QD003 was; "*(A) to continue the development of a quarry having a total site area of 40.875 Hectares, (B) Reinstatement of worked out quarry to agricultural use by means of the importation of inert sub soil and top soil amounting to a total of 11,151,570 cubic metres."*

The landholding of the applicant at approximately 73 ha. Has remained unchanged since his coming into possession of the lands in the 1960s. Here are the main differentiating features of the current application for substitute consent as compared to that previously submitted.

- The S37L planning application unit at 26.87 ha. within the above 46.14 ha. EIA project unit, is significantly smaller than that for which substitute consent was previously sought. The previous application was over 40.875 ha. that also constituted the EIA unit. The reason for this difference is that the current planning application unit seeks quarry development of extraction. It is estimated that the proposed quarry development will access a remaining reserve of approximately 5M tonnes and is expected to be extracted over 10 to 15 years, depending on market demand. The proposed extraction rate is anticipated at an average of 500,000 tonnes per year accords with observed historic extraction rates and does not represent intensification of development.
- No further deepening of the quarry is proposed in this application where it was to be in the previous S37L consent application. The proposed final working floor depth is 150mAOD, which parts of the void have already reached. This level allows for proposed quarrying to be undertaken above watertable and thus avoids interference with the watertable and potential negative effects thereon.
- In addition, the current application does propose the extraction of lands to the south of the current quarry site, within the S261 registered quarry area and the EIA project unit. These lands appeared included and proposed for extraction in the previous S37L application. The extraction of these lands has been excluded in the proposal in order to observe Development Plan designations and pending further archaeological assessment of these elevated lands that contain the remains of a stone mill, the stone for which likely came from the current quarry. These features give rise to the townland name: Windmillhill and hold to conservation objectives in the current Development Plan recorded at Section 3.3.5 of the submitted EIAR.
- As noted at the outset, the application includes a restoration proposal that includes all quarried and proposed for quarrying lands within the entire of the EIA project unit. Restoration is anticipated to occur subsequent to extraction and will take 2 to 5 years to reflect the potential for slippage in that programme by reason of demolition and removal issues or planting failures.

4.0 Conclusion

It is submitted that the EIAR does not identify significant negative effects from the proposed development that are not adequately mitigated.

The site's long and continued existence is submitted to be in the interests of the proper planning and development of the area as it does not compromise development objectives for the lands and will maintain the employment and aggregate product resource at this location into the immediate future which is submitted to be particularly in the socio economic interests of the employed and supplied populations associated with this quarry.

On behalf of the applicant, we look forward to a positive outcome for this application. We understand the An Bord Pleanála may seek any informaiton it feels is necessary to support their proper consideration of the application and environmental assessment. An Bord Pleanála is welcome to seek any informaiton it may deem necessary at any time.

Yours faithfully,

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Cliona Ryan

Associate Director

Appendix 1 Full description of development

The development consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. over a total of 5.16 ha. to accommodate screening berms and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. A restoration plan to return the application site and existing administration and processing plant area to agricultural and amenity use upon completion of proposed extraction has been prepared and is proposed to be implemented upon cessation of extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years depending on market conditions, and a further 2 - 5 years for restoration.

The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The further development of the quarry relates to further extraction only and is to utilise the extant existing administration and processing plant area and quarry access that are included in a concurrent application for substitute consent.

The application site is contained within a quarry area registered in 2005 under S.261 and assessed in 2012 under S.261A (ref. no. SDQU05A/04) by the local planning authority. The S.261A notice was reviewed under An Bord Pleanála ref. 06S.QV.0090 resulting in a requirement for application for substitute consent accompanied by remedial Environmental Impact Assessment Report (rEIAR). That application (ref. no. PL06S.SU0068) was made in 2013 and an application to further develop that quarry (ref. no. PL06S.QD0003) was made in 2015. Those applications have been superseded By High Court Order (2018 No. 929 JR) that inter alia ordered the making of this application. This application is made concurrent with an application for substitute consent for quarrying at this location, also part of that Order.

The application is accompanied by an Environmental Impact Assessment Report (EIAR). The EIAR is for an EIA project unit over 46.14 ha. that encompasses the area of the further development of the quarry application under S.37L, the concurrent substitute consent application and the quarry as registered under S.261.

Appendix 2 Extract of section 1.1 of EIAR

Requirement for EIAR

Certain proposed developments, due to their typology, or scale automatically attract the requirement for EIA by a competent authority as part of that authority's formal assessment of a development proposal seeking permission, consent or licensing. As set out in the next section, a hierarchical suite of European and national legislation and guidance govern EIA and direct EIAR content.

The further development of a quarry proposal is over a site area of 26.87 ha. that automatically attracts the requirement for EIA. The applicant seeking this development permission is therefore bound to provide an EIAR for the purposes of EIA.

The permission for development sought in this instance is under S.37L of the Planning and Development Act, 2000. This type of planning permission may only be sought where an application for substitute consent is in being.

In this instance the concurrent substitute application with rEIAR and this EIAR to accompany the application for further development of the quarry is by Order of the High Court [2018 No. 929 JR] of August 2020 that set aside a previous substitute consent (ref. PL06.SU0068) and a S.37L (PL06S. QD0003) ref. application decisions and granted relief including:

> *"…that a fresh application to the Respondent for continued development in relation to the site at Windmill Hill Rathcoole County Dublin pursuant to the notice dated 11 August 2015 issued by the Respondent in respect of section 37L of the Planning and Development Act 2000 as amended shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks of the date of perfection of this Order or such further period as the Board may allow…"*

A copy of this Order is at Appendix 1.1.

A copy of the notice of 11 August 2015 is at Appendix 1.2. This notice consisted for a letter from An Bord Pleanála to the applicant for substitute consent under PL06.SU0068, stating that new legislative provisions had been made that allowed for concurrent application for permission for further quarrying to be made concurrent to substitute consent applications. Ref. PL06.SU0068 was an application for substitute consent before the Bord at the time of the notice. The provision referred to is S.37L of the Planning and Development Act, 2000 as amended.

Context and description of previous application for further quarry development

Section 37L of the Planning and Development Act 2000, as amended is entitled 'Further matters in relation to control of quarries' and allows for the making of an application for planning permission for the further development of a quarry site for quarrying only. Furthermore, this section of the Act restricts the circumstances timing of the making of the application to within 6 weeks of the submission of a subsite consent application on the same site.

As noted in the last section the current S.37L application is made on foot of the quashing of an order in respect of an earlier S.37L application that itself was allowed to be sought as a then concurrent application for substitute consent for a quarry was in being. That substitute consent application arose as a result of the review of the quarry under S.261A of the Planning and Development Act as amended (South Dublin County Council ref. SDQU5/04 & An Bord Pleanála Quarries Review ref. PL06S.QV0090).

The S.261A review of the quarry arose following registration in 2005 under S.261 by Mr. Laurence Behan of a quarry being operated by L Behan & Sons Ltd. with an estimated 'site boundary' of 73 ha. and a

'workable area' of 39.27 ha. This registration further recorded that the quarry was pre '63 and later revised to recognise the securing of a planning permission in 1968. The S.261 registration as assigned ref. SDQU05/04 by South Dublin County Council. The registration map submitted is repeated at **Figure 1.1**.

A description of the superseded substitute consent and S.37L applications is below:

An application for substitute consent for '*a quarry'* over 40.875 ha. on behalf of Laurence Behan was made 24 October 2013 and assigned ref. PL06S.SU0068. A copy of the site location map part of this application is at **Figure 1.2**

An application was made, also on behalf of Laurence Behan for further development of the quarry under S.37L on 25 November 2015 and assigned ref. PL06S.DQ0003. The development was stated to consist of: '(*A) to continue the development of a quarry having a total site area of 40.875 Hectares, (B) Reinstatement of worked out quarry to agricultural use by means of the importation of inert sub soil and top soil amounting to a total of 11,151,570 cubic metres.'* A copy of the site location map part of this application is at **Figure 1.3**.

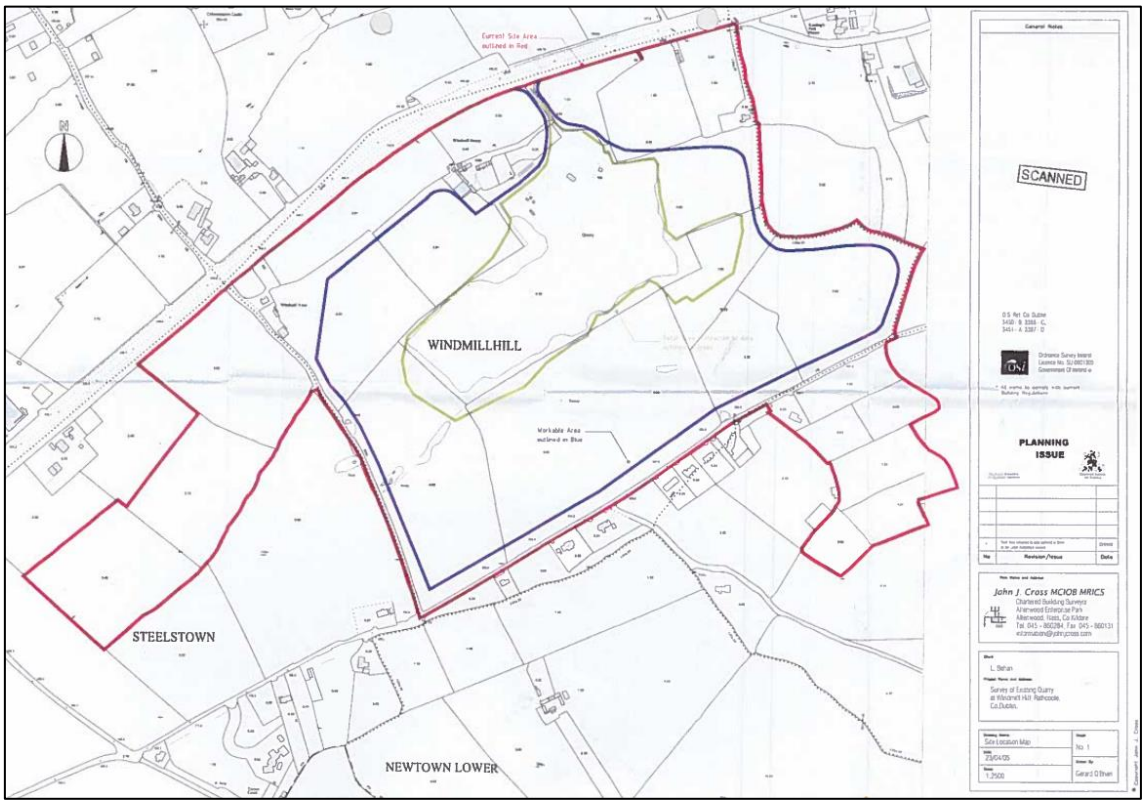


Figure 1.1: Copy of S.261 registration map submitted 10 October 2005, in response to request for further information for S.261 registration ref. no. SDQU05/4 'revised map indicating (a) site boundary in red, (b) extractable area in blue.

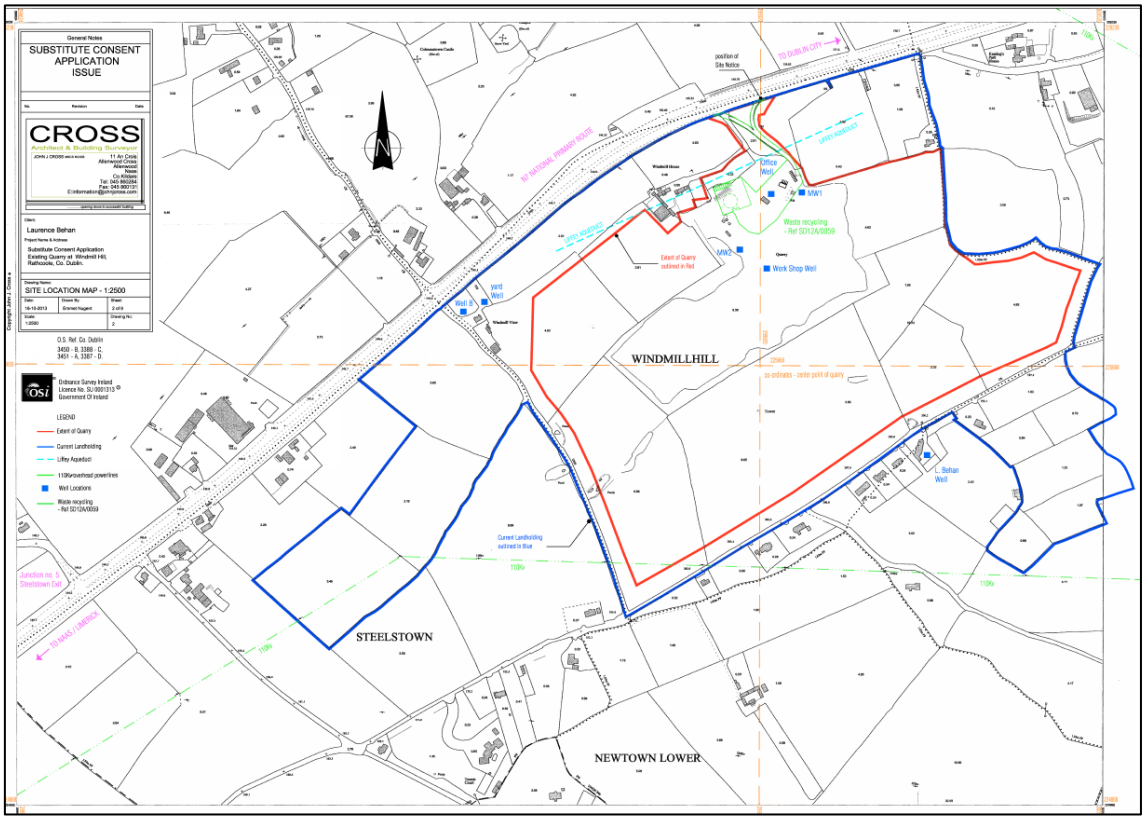


Figure 1.2: Copy of substitute consent application ref. PL06S.SU0068, site location map. Application made 2013, refused 2018, decision quashed by High Court Order 2020.

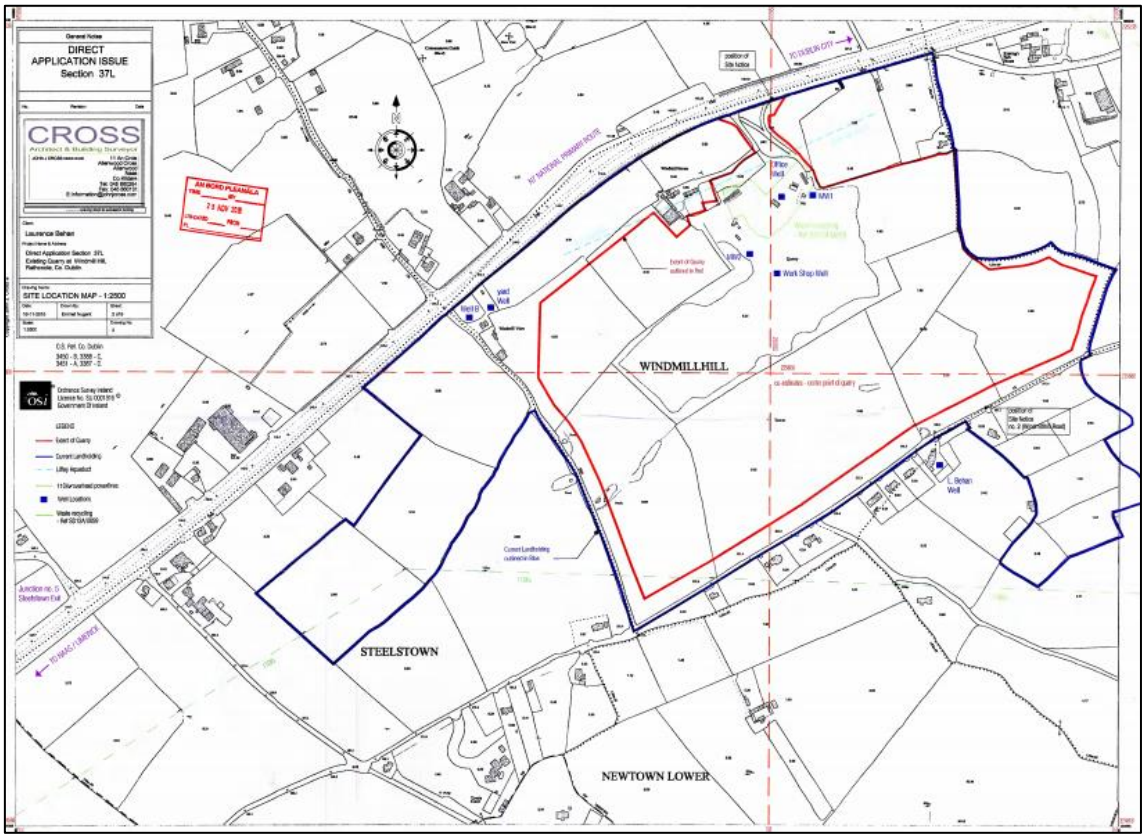


Figure 1.3: Copy of S.37L application ref. PL06S.DQ0003, site location map. Application made 2015, refused 2018, decision quashed by High Court Order 2020.

S.37L application and EIA project boundary

The application for substitute consent, made 24 October 2013, assigned ref. PL06S.SU0068 was refused 21 September 2018. The application for further development of the quarry under S.37L, made on 25 November 2015, assigned ref. PL06S.DQ0003 was also refused 21 September 2018. These application decisions were quashed by High Court Order [2018 No. 929 JR].

Therefore, having regard to section 1.1. above and the Order of the High Court [2018 No. 929 JR] of August 2020: the quashing of the decision under ref. L06A.0003 has given rise to this 'fresh' application further quarrying under S.37L, that is accompanied by this EIAR.

The S.37L planning application unit extends to 26.87 ha. and reflects the extracted area of the quarry and a northern extension to that void area of 4.1 ha. requiring a total additional land take of 5.19 ha. for landscaping berms, all contained within the S.261 workable area registration boundary at **Figure 1.1**. This additional extraction area is the only new development currently proposed for the quarry.

The S.37L planning application boundary unit (26.87 ha.) that this EIAR accompanies is significantly smaller than that for which permission was previously sought (40.875 ha.) under PL06S.DQ0003 as it excludesthe extraction of lands in the south of the originally registered S.261 quarry area. In addition, the S.37L application previously submitted sought development permission for infilling of the void. This infilling is not further quarry development and no such proposal is now included. A restoration proposal for the site is included as mitigation in this EIAR and presented at Chapter 11 and in submitted application drawing. The restoration proposed principally consists of the regrading of the current void and use of stored top and subsoils on site for restoration purposes. The restoration proposal includes the restoration of the extant plant processing area at the centre of the site within the Applicant's ownership area and the subject of concurrent substitute consent application.

As noted at the outset, the application under S.37L that this EIAR accompanies is to be made concurrent with an application for substitute consent for the over an area of 28.8 ha. That application is accompanied by an rEIAR.

In view of this rEIAR and the EIAR being concurrently prepared for much of the same operational lands it is submitted that a single EIA project boundary for the purposes of assessment by experts of works past and proposed is consistent and will facilitate EIA of each development within the same EIA project envelope.

The EIA project boundary envelopes an area of 46.14 ha. that encloses previous recent quarry application areas, current workings and intended future workings.

The EIA project boundary is therefore larger than the associated planning application units in order to capture:

- the currently proposed substitute consent and S.37L application boundaries and associated infrastructure; and
- the workable area registered under S.261 for which conditions were imposed.

To a lesser extent, the EIA project boundary was chosen to capture previous applications on the lands as they may include information useful to construct the history and baseline of the current development proposals. In this regard, it was assumed that the most relevant information would derive from the rEIS and EIS submitted for the previous substitute consent and S.37L applications (refs. PL06S.SU0068 and PL06S.DQ0003), therefore the current EIA project boundary largely coincides with those EIA project boundaries.

Definition of a quarry

The substitute consent application being made in respect of this site is for a quarry and arises on foot of S.261A review. The S.37L application that this EIAR accompanies is for further quarrying only. As such, a definition of a quarry is here repeated in order the application made accords with the legislative provision for these applications.

The proposed S.37L further quarrying proposal excludes areas that are not proposed for quarrying i.e.it excludes the centre of the current operational site that holds the ancillary plant and welfare facilities for the site that are mainly included in the substitute consent application area as those lands are not proposed to be extracted and therefore outside of the provision of S.37L. It is intended that the material extracted under the further quarrying proposal will be processed in the extant central plant area of approximately 5 ha. and will continue to utilise the main site entrance to the north which is onto the N/M7. The site location and layout maps submitted with the S.37L application indicate this arrangement.

It is noted that at S.261(13) of the Planning and Development Act 2000, as amended are definitions for that Section. This includes 'quarry'; *"has the meaning assigned to it by section 3 of the Mines and Quarries Act, 1965."* This definition is set out here, Section 3, Mines and Quarries Act, 1965

> *"In this Act "mine" means an excavation or system of excavations made for the purpose of, or in connection with, the getting, wholly or substantially by means involving the employment of persons below ground, of minerals (whether in their natural state or in solution or suspension) or products of minerals.*
>
> *(2) In this Act "quarry" means an excavation or system of excavations made for the purpose of, or in connection with, the getting of minerals (whether in their natural state or in solution or suspension) or products of minerals, being neither a mine nor merely a well or bore-hole or a well and bore-hole combined.*
>
> *(3) "Mine" and "quarry" include, respectively, any place on the surface surrounding or adjacent to the shafts of the mine or to the quarry occupied together with the mine or quarry for the storage or removal of the minerals or for the purposes of a process ancillary to the getting of minerals, including the breaking, crushing, grinding, screening, washing or dressing of such minerals but, subject thereto, does not include any place at which any manufacturing process is carried on.*
>
> *(4) For the purposes of this Act, any place occupied by the owner of a mine or quarry and used for depositing refuse from it shall form part of the mine or quarry, but any place so used in connection with two or more mines or quarries, and occupied by the owner of one of them, or by the owners of any two or more in common, shall be deemed to form part of such one of those mines or quarries as the Minister may direct.*
>
> *(5) For the purposes of this Act any line or siding (not being part of a railway) serving a mine or quarry shall form part of the mine or quarry, but, if serving two or more of them, shall be deemed to form part of such one of them as the Minister may direct.*
>
> *(6) For the purposes of this Act a conveyor or aerial ropeway provided for the removal from a mine or quarry of minerals or refuse shall form part of the mine or quarry."*

European Union (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2011 (S.I. No. 584 of 2011) inserted a discreet 'quarry' definition into Section 2 'Interpretation' of the Planning and Development Act, 2000 as amended as follows:

> *""quarry" means an excavation or system of excavations made for the purpose of, or in connection with, the getting of minerals (whether in their natural state or in solution or*

suspension) or products of minerals, being neither a mine nor merely a well or bore-hole or a well and bore-hole combined, and shall be deemed to include—

(i) any place on the surface surrounding or adjacent to the quarry occupied together with the quarry for the storage or removal of the minerals or for the purposes of a process ancillary to the getting of minerals, including the breaking, crushing, grinding, screening, washing or dressing of such minerals but, subject thereto, does not include any place at which any manufacturing process is carried on;

(ii) any place occupied by the owner of a quarry and used for depositing refuse from it but any place so used in connection with two or more quarries, and occupied by the owner of one of them, or by the owners of any two or more in common, shall be deemed to form part of such one of those quarries as the Minister may direct;

(iii) any line or siding (not being part of a railway) serving a quarry but, if serving two or more quarries shall be deemed to form part of such one of them as the Minister may direct;

(iv) a conveyor or aerial ropeway provided for the removal from a quarry of minerals or refuse."

As noted above, the only new development of the quarry currently proposed i.e. development in excess of what exists that is the subject of concurrent substitute consent application, is further extraction over the existing void to include a 4.1 ha. northern extension to that void. The extant void that contains reserve and the lateral extension area total 28.8 ha. in extent and constitute the S.37L application boundary which accords with S.37L(3):

"(1) Where an application for substitute consent is or was required to be made by the owner or operator of a quarry pursuant to subsection (7), (10) or (12) of section 261A, the owner or operator may apply for permission to further develop that quarry in accordance with this section.

(2) An application for permission to further develop a quarry under subsection (1) shall be made to the Board.

(3) An application for permission under subsection (1) may only be made for further development of a quarry as a quarry."

SCHEDULE 5

"Form No. 2 *Article 22*

Planning Application Form

PLANNING APPLICATION FORM

BEFORE FILLING OUT THIS FORM PLEASE NOTE THE FOLLOWING

Failure to complete this form or attach the necessary documentation, or the submission of incorrect information or omission of required information will lead to the invalidation of your application. Therefore please ensure that each section of this application form is fully completed and signed, entering n/a (not applicable) where appropriate, and that all necessary documentation is attached to the application form.

ADDITIONAL INFORMATION

It should be noted that each planning authority has its own development plan, which sets out local development policies and objectives for its own area. The authority may therefore need supplementary information (i.e. other than that required in this form) in order to determine whether the application conforms with the development plan and may request this on a supplementary application form.

Failure to supply the supplementary information will not invalidate your planning application but may delay the decision-making process or lead to a refusal of permission. Therefore applicants should contact the relevant planning authority to determine what local policies and objectives would apply to the development proposed and whether additional information is required.

OTHER STATUTORY CODES

An applicant will not be entitled solely by reason of a planning permission to carry out the development. The applicant may need other consents, depending on the type of development. For example, all new buildings, extensions and alterations to, and certain changes of use of existing buildings must comply with building regulations, which set out basic design and construction requirements. Also any works causing the deterioration or destruction of the breeding and resting places of bats, otters, natterjack toads, Kerry slugs and certain marine animals constitute a criminal offence unless covered by a derogation licence issued by the Minister for Culture, Heritage and the Gaeltacht (pursuant to Article 16 of the Habitats Directive).

DATA PROTECTION

It is the responsibility of persons or entities wishing to use any personal data on a planning application form for direct marketing purposes to be satisfied that

they may do so legitimately under the requirements of the Data Protection Acts 1988 to 2018. The Office of the Data Protection Commissioner states that the sending of marketing material to individuals without consent may result in action by the Data Protection Commissioner against the sender including prosecution.

PLANNING APPLICATION FORM

1. NAME OF RELEVANT PLANNING AUTHORITY:
SOUTH DUBLIN COUNTY COUNCIL

2. LOCATION OF DEVELOPMENT:	
Postal Address or Townland or Location (as may best identify the land or structure in question)	WINDMILLHILL, RATHCOOLE, CO. DUBLIN
Ordnance Survey Map Ref No (and the Grid Reference where available)[1]	MAP REF NO.3450-B, 3388-C, 3451-A, 3387-D ITM CO-ORDINATES 699748, 725670

3. TYPE OF PLANNING PERMISSION (PLEASE TICK APPROPRIATE BOX):	
[✓] Permission	PLEASE NOTE: APPLICATION UNDER SECTION 37L
[ ] Permission for retention	
[ ] Outline Permission	
[ ] Permission consequent on Grant of Outline Permission	

4. WHERE PLANNING PERMISSION IS CONSEQUENT ON GRANT OF OUTLINE PERMISSION:
Outline Permission Register Reference Number:.....
Date of Grant of Outline Permission:...../...../.....

5. APPLICANT[2]:	
Name(s)	LAURENCE BEHAN
	Contact details to be supplied at the end of this form. (Question: 24)

6. WHERE APPLICANT IS A COMPANY (REGISTERED UNDER THE COMPANIES ACTS):	
Name(s) of company director(s)	
Registered Address (of company)	
Company Registration number	

7. PERSON/AGENT ACTING ON BEHALF OF THE APPLICANT (IF ANY):	
Name	RUTH TRACEY, GOLDER ASSOCIATES
	Address to be supplied at the end of this form. (Question 25)

8. PERSON RESPONSIBLE FOR PREPARATION OF DRAWINGS AND PLANS[3]:	
Name	PAUL O'BRIEN
Firm/Company	GOLDER ASSOCIATES

9. DESCRIPTION OF PROPOSED DEVELOPMENT:	
Brief description of nature and extent of development[4]	PLEASE SEE SUPPLEMNTARY INFORMATION AT REAR

10. LEGAL INTEREST OF APPLICANT IN THE LAND OR STRUCTURE:		
Please tick appropriate box. *Where legal interest is 'Other', please expand further on your interest in the land or structure*	*A. Owner* ✓	*B. Occupier*
	C. Other	
If you are not the legal owner, please state the name and address of the owner and supply a letter from the owner of consent to make the application as listed in the accompanying documentation		

11. SITE AREA:	
Area of site to which the application relates in hectares	26.87 ha

12. WHERE THE APPLICATION RELATES TO A BUILDING OR BUILDINGS:	
Gross floor space[5] *of any existing building(s) in* m^2	N/A
Gross floor space of proposed works in m^2	N/A
Gross floor space of work to be retained in m^2 *(if appropriate)*	N/A
Gross floor space of any demolition in m^2 *(if appropriate)*	N/A

13. IN THE CASE OF MIXED DEVELOPMENT (E.G. RESIDENTIAL, COMMERCIAL, INDUSTRIAL, ETC), PLEASE PROVIDE BREAKDOWN OF THE DIFFERENT CLASSES OF DEVELOPMENT AND BREAKDOWN OF THE GROSS FLOOR AREA OF EACH CLASS OF DEVELOPMENT:	
Class of Development	Gross floor area in m^2
N/A	N/A

14. IN THE CASE OF RESIDENTIAL DEVELOPMENT PLEASE PROVIDE BREAKDOWN OF RESIDENTIAL MIX:							
Number of	Studio	1 Bed	2 Bed	3 Bed	4 Bed	4+ Bed	Total
Houses							
Apartments							
Number of car-parking spaces to be provided							Total:

15. WHERE THE APPLICATION REFERS TO A MATERIAL CHANGE OF USE OF ANY LAND OR STRUCTURE OR THE RETENTION OF SUCH A MATERIAL CHANGE OF USE:	
Existing use[6] (or previous use where retention permission is sought)	N/A
Proposed use (or use it is proposed to retain)	
Nature and extent of any such proposed use (or use it is proposed to retain)	

16. SOCIAL AND AFFORDABLE HOUSING:		
(Please tick appropriate box)	*Yes*	*No*
Is the application an application for permission for development to which Part V of the Planning and Development Act 2000 applies?[7]		✓
If the answer to the above question is 'yes' and the development is not exempt (see below), you must provide, as part of your application, details as to how you propose to comply with section 96 of Part V of the Act including, for example, (i) details of such part or parts of the land which is subject to the application for permission or is or are specified by the Part V agreement, or houses situated on such aforementioned land or elsewhere in the planning authority's functional area proposed to be transferred to the planning authority, or details of houses situated on such aforementioned land or elsewhere in the planning authority's functional area proposed to be leased to the planning authority, or details of any combination of the foregoing, and (ii) details of the calculations and methodology for calculating values of land, site costs, normal construction and development costs and profit on those costs and other related costs such as an appropriate share of any common development works as required to comply with the provisions in Part V of the Act. If the answer to the above question is 'yes' but you consider the development to be exempt by virtue of section 97 of the Planning and Development Act 2000[8], a copy of the Certificate of Exemption under section 97 must be submitted (or, where an application for a certificate of exemption has been made but has not yet been decided, a copy of the application should be submitted). If the answer to the above question is 'no' by virtue of section 96(13) of the Planning and Development Act 2000[9], details indicating the basis on which section 96(13) is considered to apply to the development should be submitted.		

17. DEVELOPMENT DETAILS:		
Please tick appropriate box	*Yes*	*No*
Does the proposed development consist of work to a protected structure and/or its curtilage or proposed protected structure and/or its curtilage?		✓
Does the proposed development consist of work to the exterior of a structure which is located within an architectural conservation area (ACA)?		✓
Does the application relate to development which affects or is close to a monument or place recorded under section 12 of the National Monuments (Amendment) Act 1994[10]?		✓
Does the proposed development require the preparation of an Environmental Impact Assessment Report[11]?	✓	
Does the application relate to work within or close to a European Site (under S.I. No. 94 of 1997) or a Natural Heritage Area[12]?		✓
Does the application relate to a development which comprises or is for the purposes of an activity requiring an integrated pollution prevention and control licence?		✓
Does the application relate to a development which comprises or is for the purposes of an activity requiring a waste licence?		✓
Do the Major Accident Regulations apply to the proposed development?		✓
Does the application relate to a development in a Strategic Development Zone?		✓
Does the proposed development involve the demolition of any structure?		✓

18. SITE HISTORY:
Details regarding site history (if known)
Has the site in question ever, to your knowledge, been flooded? Yes [ ] No [✓] If yes, please give details e.g. year, extent. Are you aware of previous uses of the site e.g. dumping or quarrying? Yes [✓] No [ ] If yes, please give details. PLEASE SEE SUBMITTED EIAR
Are you aware of any valid planning applications previously made in respect of this land/structure?
Yes [✓] No [ ] If yes, please state planning reference number(s) and the date(s) of receipt of the planning application(s) by the planning authority if known: Reference No.: PLEASE SEE REAR ..... Date: ..... If a valid planning application has been made in respect of this land or structure in the 6 months prior to the submission of this application, then the site notice must be on a yellow background in accordance with article 19(4) of the Planning and Development Regulations 2001 as amended.
Is the site of the proposal subject to a current appeal to An Bord Pleanála in respect of a similar development [13]***?***
Yes [ ] No [✓] An Bord Pleanála Reference No.: .....

19. PRE-APPLICATION CONSULTATION:
Has a pre-application consultation taken place in relation to the proposed development[14]?
Yes [ ] No [✓]
If yes, please give details:
Reference No. (if any): .....
Date(s) of consultation: ...../...../.....
Persons involved: .....

20. SERVICES:
Proposed Source of Water Supply
Existing connection [ ] New connection [ ]
Public Mains [ ] Group Water Scheme [ ] Private Well [ ]
Other (please specify): .....
Name of Group Water Scheme (where applicable): .....
Proposed Wastewater Management/Treatment
Existing [ ] New [ ]
Public Sewer [ ] Conventional septic tank system [ ]
Other on-site treatment system [ ] Please specify.....
Proposed Surface Water Disposal
Public Sewer/Drain [ ] Soakpit [ ]
Watercourse [ ] Other [ ] Please specify..... PLEASE SEE SUBMITTED EIAR

21. DETAILS OF PUBLIC NOTICE:	
Approved newspaper[15] in which notice was published	DAILY MAIL
Date of publication	03 JUNE 2021
Date on which site notice was erected	09 June 2021

22. APPLICATION FEE:	
Fee Payable	€13,435.00
Basis of Calculation	PLEASE SEE SUPPLEMENTARY INFORMATION AT REAR

23. DECLARATION:	
I hereby declare that, to the best of my knowledge and belief, the information given in this form is correct and accurate and fully compliant with the Planning & Development Act 2000, as amended, and the Regulations made thereunder.	
Signed *(Applicant or Agent as appropriate)*	K. McGillycuddy KEVIN McGILLYCUDDY, GOLDER ASSOCIATES
Date	04 JUNE 2021

CONTACT DETAILS — NOT TO BE PUBLISHED

24. APPLICANT ADDRESS/CONTACT DETAILS:	
Address	BEHAN QUARRY, WINDMILLHILL RATHCOOLE CO. DUBLIN
Email address	larbehan@gmail.com
Telephone number (optional)	

25. AGENT'S (IF ANY) ADDRESS/CONTACT DETAILS:	
Address	TOWN CENTRE HOUSE DUBLIN ROAD NAAS CO. KILDARE, W91 TD0P
Email address	rtreacy@golder.com
Telephone number (optional)	00353 45 810200
Should all correspondence be sent to the agent's address (where applicable)? Please tick appropriate box. (Please note that if the answer is 'No', all correspondence will be sent to the applicant's address) Yes [✓] No [ ]	

A contact address must be given, whether that of the applicant or that of the agent.

This form should be accompanied by the following documentation:

Please note that if the appropriate documentation is not included, your application will be deemed invalid.

ALL Planning Applications

- ❒ The relevant page of newspaper that contains notice of your application
- ❒ A copy of the site notice
- ❒ 6 copies of site location map[16]
- ❒ 6 copies of site or layout plan[16+17]
- ❒ 6 copies of plans and other particulars required to describe the works to which the development relates (include detailed drawings of floor plans, elevations and sections — except in the case of outline permission)
- ❒ The appropriate Planning Fee

Where the applicant is not the legal owner of the land or structure in question:

- ❒ The written consent of the owner to make the application

Where the application is for residential development that is subject to Part V of the 2000 Act:

- ❒ Details of the manner in which it is proposed to comply with section 96 of Part V of the Act including, for example,

  (i) details of such part or parts of the land which is subject to the application for permission or is or are specified by the Part V agreement, or houses situated on such aforementioned land or elsewhere in the planning authority's functional area proposed to be transferred to the planning authority, or details of houses situated on such aforementioned land or elsewhere in the planning authority's functional area proposed to be leased to the planning authority, or details of any combination of the foregoing, and

  (ii) details of the calculations and methodology for calculating values of land, site costs, normal construction and development costs and profit on those costs and other related costs such as an appropriate share of any common development works as required to comply with the provisions in Part V of the Act.

or

- ❒ A certificate of exemption from the requirements of Part V

or

❒ A copy of the application submitted for a certificate of exemption.

Where the application is for residential development that is not subject to Part V of the 2000 Act by virtue of section 96(13) of the Act:

❒ Information setting out the basis on which section 96(13) is considered to apply to the development.

Where the disposal of wastewater for the proposed development is other than to a public sewer:

❒ Information on the on-site treatment system proposed and evidence as to the suitability of the site for the system proposed.

Where the application refers to a protected structure/ proposed protected structure/ or the exterior of a structure which is located within an architectural conservation area (ACA):

❒ Photographs, plans and other particulars necessary to show how the development would affect the character of the structure.

Applications that refer to a material change of use or retention of such a material change of use:

❒ Plans (including a site or layout plan and drawings of floor plans, elevations and sections which comply with the requirements of article 23) and other particulars required describing the works proposed.

Where an application requires an Environmental Impact Assessment Report:

❒ An Environmental Impact Assessment Report, and

❒ A copy of the confirmation notice received from the EIA portal in accordance with article 97B(2) of the permission regulations

Applications that are exempt from planning fees:

❒ Proof of eligibility for exemption[18]

Directions for completing this form

1. Grid reference in terms of the Irish Transverse Mercator.

2. 'The applicant' means the person seeking the planning permission, not an agent acting on his or her behalf.

3. Where the plans have been drawn up by a firm/company the name of the person primarily responsible for the preparation of the drawings and plans, on behalf of that firm/company, should be given.

4. A brief description of the nature and extent of the development, including reference to the number and height of buildings, protected structures, etc.

5. Gross floor space means the area ascertained by the internal measurement of the floor space on each floor of a building, that is, floor areas must be measured from inside the external wall.

6. Where the existing land or structure is not in use please state most recent authorised use of the land or structure.

7. Part V of the Planning and Development Act 2000 applies where—

   - the land is zoned for residential use or for a mixture of residential and other uses,

   - there is an objective in the Development Plan for the area for a percentage of the land to be made available for social and/or affordable housing, and

   - the proposed development is not exempt from Part V.

8. Under section 97 of the Planning and Development Act 2000, applications involving development of 9 or fewer houses or development on land of less than 0.1 hectare may be exempt from Part V.

9. Under section 96(13) of the Planning and Development Act 2000, Part V does not apply to certain housing developments by approved voluntary housing bodies, certain conversions, the carrying out of works to an existing house or the development of houses under an agreement made under section 96 of the Act.

10. The Record of Monuments and Places, under section 12 of the National Monuments Amendment Act 1994, is available, for each county, in the local authorities and public libraries in that county. Please note also that if the proposed development affects or is close to a national monument which, under the National Monuments Acts 1930 to 2004, is in the ownership or guardianship of the Minister for Culture, Heritage and the Gaeltacht or a local authority, or is the subject of a preservation order or a temporary preservation order, a separate statutory consent is required, under the National Monuments Acts, from the Minister for Culture, Heritage and the Gaeltacht. For information on whether national monuments are in the ownership or guardianship of the Minister for Culture, Heritage and the

Gaeltacht or a local authority or are the subject of preservation orders, contact the National Monuments Section, Department of Culture, Heritage and the Gaeltacht.

11. An Environmental Impact Assessment Report (EIAR) and the confirmation notice from the EIA portal are required to accompany a planning application for development of a class set out in Schedule 5 of the Planning and Development Regulations 2001-2018 which equals or exceeds, as the case may be, a limit, quantity or threshold set for that class of development. An EIAR and confirmation notice from the EIA portal will also be required by the planning authority in respect of sub-threshold development where the authority considers that the development would be likely to have significant effects on the environment (article 103).

12. An appropriate assessment of proposed developments is required in cases where it cannot be excluded that the proposed development would have a significant effect on a European site. It is the responsibility of the planning authority to screen proposed developments to determine whether an appropriate assessment is required and where the authority determines that an appropriate assessment is required, the authority will normally require the applicant to submit a Natura impact statement (NIS). Where the applicant considers that the proposed development is likely to have a significant effect on a European site it is open to him/her to submit a NIS with the planning application.

13. The appeal must be determined or withdrawn before another similar application can be made.

14. A formal pre-application consultation may only occur under Section 247 of the Planning and Development Act 2000. An applicant should contact his or her planning authority if he/she wishes to avail of a pre-application consultation. In the case of residential development to which Part V of the 2000 Act applies, applicants are advised to avail of the pre-application consultation facility in order to ensure that a Part V agreement in principle can be reached in advance of the planning application being submitted.

15. The list of approved newspapers, for the purpose of giving notice of intention to make a planning application, is available from the planning authority to which the application will be submitted.

16. All plans, drawings and maps submitted to the planning authority should be in accordance with the requirements of the Planning and Development Regulations 2001-2018.

17. The location of the site notice(s) should be shown on the site location map.

18. See Schedule 9 of the Planning and Development Regulations 2001. If a reduced fee is tendered, details of previous relevant payments and planning permissions should be given. If exemption from payment of fees is being claimed under article 157 of the 2001 Regulations, evidence to prove eligibility for exemption should be submitted.".

FURTHER EXTRACTION AREA S.37L APPLICATION FORM

(Form 2, Schedule 3, Planning & Development Regulations)

SUPPLEMENTARY INFORMATION

ITEM 9. DESCRIPTION OF DEVELOPMENT

ITEM 18. SITE HISTORY (PLANNING APPLICATIONS PREVIOUSLY MADE IN RESPECT OF THIS LAND/STRUCTURE)

ITEM 22. APPLICATION FEE

ALSO

SCHEDULE OF DRAWINGS

SITE NOTICE LOCATION MAP & COPY OF SITE NOTICE

COPY OF NEWSPAPER NOTICE

COPY OF EIA PORTAL CERTIFICATE

ITEM 9. DESCRIPTION OF PROPOSED DEVELOPMENT

The development consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. over a total of 5.16 ha. to accommodate screening berms and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. A restoration plan to return the application site and existing administration and processing plant area to agricultural and amenity use upon completion of proposed extraction has been prepared and is proposed to be implemented upon cessation of extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years depending on market conditions, and a further 2 - 5 years for restoration.

The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The further development of the quarry relates to further extraction only and is to utilise the extant existing administration and processing plant area and quarry access that are included in a concurrent application for substitute consent.

The application site is contained within a quarry area registered in 2005 under S.261 and assessed in 2012 under S.261A (ref. no. SDQU05A/04) by the local planning authority. The S.261A notice was reviewed under An Bord Pleanála ref. 06S.QV.0090 resulting in a requirement for application for substitute consent accompanied by remedial Environmental Impact Assessment Report (rEIAR). That application (ref. no. PL06S.SU0068) was made in 2013 and an application to further develop that quarry (ref. no. PL06S.QD0003) was made in 2015. Those applications have been superseded By High Court Order (2018 No. 929 JR) that inter alia ordered the making of this application. This application is made concurrent with an application for substitute consent for quarrying at this location, also part of that Order.

The application is accompanied by an Environmental Impact Assessment Report (EIAR). The EIAR is for an EIA project unit over 46.14 ha. that encompasses the area of the further development of the quarry application under S.37L, the concurrent substitute consent application and the quarry as registered under S.261.

ITEM 18. SITE HISTORY (PLANNING APPLICATIONS PREVIOUSLY MADE IN RESPECT OF THIS LAND/STRUCTURE)

Please note that this application is submitted under S37L of the Planning and Development Act, 2000 as amended and as such is for further development of a quarry as a quarry. The development proposed under this application is for further extraction only and intends to utilise the existing administration and plant processing area at the centre of the quarry site registered under S.261. That administration and plant processing area is included in a concurrent application for substitute consent.

Please see table below that sets out each of the valid planning applications related to the application site and associated administration and plant processing area, also at Table 2.1 of submitted EIAR along with those deemed invalid and other types of licenses, permits and consents.

Authority	Reference	App Type	Lodged	Decision	Decision	Development
An Bord Pleanála (ABP)	PL06S.SU0068	Substitute Consent Application	24.10.2013	21.09.2018	Quashed by High Court Order (2018 No. 929 JR)	Substitute Consent Application for a quarry
ABP	PL06S.QD0003	S.37L	25.11.2015	21.09.2018	Quashed by High Court Order (2018 No. 929 JR)	Continued development of a quarry, 40.875 Ha. Reinstatement of worked out quarry to agricultural use by importation of inert sub soil and top soil amounting to a total of 11,151,570 cubic metres.
South Dublin County Council (SDCC)	SDQF15A/4	Report for S.37L application	02.12.2015	21.01.2016	report sent to ABP by SDCC	Continued development of a quarry, 40.875ha. Reinstatement of worked out quarry to agricultural use by importation of inert subsoil and top soil amounting to a total of 11,151,570 cubic metres.
SDCC	SD12A/0059/EP	Ext. of duration of permission SD12A/0059	04.04.2018	28.05.2018	Refuse	A dedicated area within the existing quarry site in which no more than 10,000 tonnes per year of imported inert materials (soils, stones, rock, concrete, tarmacadam) generated by off-site construction activities shall be segregated, processed, recycled and reused as raw materials for the existing on-site asphalt manufacturing plant. The proposed development requires a Certificate of Registration under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008.
SDCC	SD12A/0059	Permission	30.03.2012	05.10.2012	Grant	
ABP	PL06S.241259	appeal	01.11.2012	24.05.2013	Grant upheld with revised conditions	
SDCC	SD11A/0271	Permission	18.11.2011	18.01.2012	Refuse	The establishment of a waste management facility with a maximum intake volume of 10,000 tonnes per annum to accept inert waste material including waste bituminous mixtures (EWC 170302), waste concrete (EWC 170101) & waste gravel and crushed rocks (EWC 010408) for it's recycling & reuse in the existing tarmacadam manufacturing plant located on the site. The site currently has a waste permit (Waste Permit No. WPR 051/2) with a permitted volume of 500 tonnes per annum. This facility requires a Certificate of Registration under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008.
SDCC	SD10A/0197	Permission	06.07.2010	02.03.2011	Declared withdrawn	The establishment of a Waste Management Facility with a maximum intake volume of 24,000 tonnes per annum to accept inert waste material including waste bituminous mixtures (EWC 170302), waste concrete (EWC 170101) & waste gravel and crushed rocks (EWC010408) for it's recycling & reuse in the existing tarmacadam manufacturing plant located on the site and to facilitate the deposit of waste bituminous product, waste gravel and waste concrete into haul roads throughout the subject quarry site in which the subject waste facility is located. The site currently has a Waste Permit (Waste Permit No. WPR 051/2) with a permitted volume of 500 tonnes per annum. This development requires a Waste Facility Permit under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008.

Authority	Reference	App Type	Lodged	Decision	Decision	Development
SDCC	SD08A/0764	Permission	07.11.2008	18.11.2008	withdrawn	**One and a half storey office building** single storey facing the N7. The building has a total area of 540sq.m., it includes office space, toilets and canteen, on the ground floor with board room on the upper floor and installation of a 'hydro' effluent treatment plant.
ABP	PL06S.PC0036	Strategic Infrastructure Development (SID)	06.09.2007	21.12.2007	Is an SID	N7 Resource Recovery Project at Behan's Quarry, Windmill Hill, Rathcoole, Co. Dublin
ABP	PL06S.PA0006	Strategic Infrastructure Development (SID)	29.05.2008	06.02.2009	Refused consent	N7 Resource Recovery Project at Behan's Quarry, Windmill Hill, Rathcoole, County Dublin
Dublin County Council	88A/709	Permission		20.12.1988	Grant	Mobile Asphalt Mixing Plant in Existing Quarry at Windmill Hill, Rathcoole
Dublin County Council	SA1936	Permission	16.11.1979	26.02.1980	Grant	Machinery store
Dublin County Council	Plan no. 11547 Folio: A14	Permission	04.01.1968	28.06.1968	Grant	Stone Quarrying
Dublin County Council	P.C. No. 11547/5056 Order No. 860/68	Permission	24.04.1968	20.06.1968	Grant	Reclamation of an existing quarry pit by [infill] and the construction of an access road, approximately 800-ft long.

Quarry status events under S.261 and 261A of the Planning and Development Act 2000, as amended

Authority	Reference	App Type	Lodged	Decision	Decision	Development
ABP	PL06S.QV0090	Quarries Review	30.08.2012	31.05.2013	Notice Confirmed with modifications	261A Quarries Review
ABP	PL06S.QB0360	Quarries Notice	22.08.2012	03.10.2012	notice reviewed	S261A Quarries Notice
SDCC	SDQU05A/4	261 Quarry Registration	25.04.2005	27.02.2007	Revised conditions	Quarry Registration, 261 & 261A

ITEM 22. APPLICATION FEE

Calculated after Schedule 9 of the Planning & Development Regulations

Class	Colum 1 Class of Development	Column 2 Amount of Fee	(Drawing ref. No.) Item	Area		Fee
6	*The use of land for— (a) the winning and working of minerals, (b) the deposit of refuse or waste.*	*€500, or €50 for each 0.1 hectare of site area, whichever is the greater.*	Application site area	26.87	Ha.	€13,435.00
TOTAL FEE CALCULATED						**€ 13,435.00**

SCHEDULE OF DRAWINGS

Drawings in accordance with requirements under Article 22 of the Planning and Development Regulations 2001 – 2021

Drawing. No.	Title	Scale	Size	Notes
01	Site Location Regional	20000	A3	
02	Site Location Local	2500	A1	
03	Existing Conditions	1000	A0	Site Layout Plan (Existing) in accordance with Art. 22 and PL06.38315 requesting larger scale paper drawing. [Additional Electronic drawings supplied at 1:500]
04	Proposed Conditions	1000	A0	Site Layout Plan (Proposed) in accordance with Art. 22 and PL06.38315 and PL06.38315 requesting larger scale paper drawing. [Additional Electronic drawings supplied at 1:500]
05	Cross-sections	500	A0	

SITE NOTICE LOCATION MAP & COPY OF SITE NOTICE

Erected at 4 no. locations on public roads around application site

Projection / Spatial Reference:
==========
Projection= IRENET95_ITM

Centre Point Coordinates:
==========
X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

726,250 N
725,750 N
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699,500 E
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SITE NOTICE
SITE NOTICE
SITE NOTICE
SITE NOTICE

Quarry
Tower
Windmill View
STEELSTOWN
Baile Stil

10kv
110kv
110kv
110kv
110kv

0 100 200 300m
1:2,500

LEGEND:
- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
PREPARED	AJ
DESIGN	POB
REVIEW	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
SITE LOCATION - Local

PROJECT No.	DRAWING No.	Rev.	SCALE
20137776	02	A	1:2,500 A1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A1
0 25 mm

Path: \\nas1-s-main01\Company\PROJECTS\20202\20137776 - Behan Quarry Planning and EIAE Technical Work\GRAPHICS\20b. App 2 - 37L EIAR Dwgs - as of May 2021\ | File Name: 02 - Site Location - Local - 2500 A1 March 2021.dwg

SITE NOTICE

APPLICATION TO AN BORD PLEANÁLA FOR PERMISSION FOR A QUARRY UNDER SECTION 37L OF THE ACT

I, Laurence Behan intend to apply for permission under section 37L of the Planning and Development Act 2000, as amended for development at this site at Windmillhill, Rathcoole, Co. Dublin.

The development consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 AOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. over a total of 5.16 ha. to accommodate screening berms and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. A restoration plan to return the application site and existing administration and processing plant area to agricultural and amenity use upon completion of proposed extraction has been prepared and is proposed to be implemented upon cessation of extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years depending on market conditions, and a further 2 - 5 years for restoration.

The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The further development of the quarry relates to further extraction only and is to utlise the extant existing administration and processing plant area and quarry access that are included in a concurrent application for substitute consent.

The application site is contained within a quarry area registered in 2005 under S.261 and assessed in 2012 under S.261A (ref. no. SDQU05A/04) by the local planning authority. The S.261A notice was reviewed under An Bord Pleanála ref. 06S.QV.0090 resulting in a requirement for application for substitute consent accompanied by remedial Environmental Impact Assessment Report (rEIAR). That application (ref. no. PL06S.SU0068) was made in 2013 and an application to further develop that quarry (ref. no. PL06S.QD0003) was made in 2015. Those applications have been superseded By High Court Order (2018 No. 929 JR) that inter alia ordered the making of this application. This application is made concurrent with an application for substitute consent for quarrying at this location, also part of that Order.

The application is accompanied by an Environmental Impact Assessment Report (EIAR). The EIAR is for an EIA project unit over 46.14 ha. that encompasses the area of the further development of the quarry application under S.37L, the concurrent substitute consent application and the quarry as registered under S.261.

Submissions or observations may be made on the application, to An Bord Pleanála, Marlborough Street, Dublin 1, free of charge. Submissions or observations must be in writing and made within the period of 5 weeks beginning on the date of receipt of the application by An Bord Pleanála and such submissions and observations will be considered by An Bord Pleanála in making a decision on the application. An Bord Pleanála may grant the consent subject to or without conditions, or may refuse to grant it.

The application for permission may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of An Bord Pleanála, 64 Marlborough Street, Dublin 1, or South Dublin County Council, County Hall, Town Centre, Tallaght, Dublin 24 during their public opening hours.

Signed: _____

AGENT: Golder Associates, Town Centre House, Dublin Rd, Naas, Co. Kildare.

Date of erection of site notice 09 JUNE 2021

COPY OF NEWSPAPER NOTICE

Published in the Irish Daily Mail (South Dublin County Council approved Newspaper) 03 June 2021

Serena keeps Grand Slam dream alive in Paris

FORMER world No.1 Serena Williams, chasing a record-tying 24th Grand Slam singles title, overcame a second-set blip to reach the French Open third round with a 6-3 5-7 6-1 win against Romania's Mihaela Buzarnescu yesterday.
Three-time Roland Garros champion Williams, who has been stuck on 23 major titles since 2017, one behind Margaret Court's all-

By SAM LOVETT

time record, went through the gears in the opening set before letting her guard down.
The 39-year-old, who is seeded seventh in Paris but has not been past the fourth round here since reaching the final in 2016, fell 4-2 behind in the second set as Buzarnescu broke for the first time. But the American was back to her dominant self as she stole her opponent's serve in the next game and set up two break points in the 11th game. Buzarnescu kept her composure to stave them off and level for 5-5 before sealing the second set on Williams's serve.
Meanwhile, men's fifth seed Stefanos Tsitsipas strolled past Spaniard Pedro Martinez 6-3 6-4 6-3 in a scrappy contest yesterday to reach the third round of the French Open. The Greek, who reached the semi-finals in 2020, is considered one of the main contenders to challenge Rafa Nadal for the Roland Garros title.
Elsewhere, German sixth seed Alexander Zverev blew hot and cold with his serve but had enough artillery to take down Russian qualifier Roman Safiullin 7-6(4) 6-3 7-6(1) to reach the third round.



Digging in: Williams

To advertise in this section contact Conor Coakley
Ph: 01 256 0885 E: legal@dmgmedia.ie

CLASSIFIED

Legal & Planning, DMG Media,
Two Haddington Buildings, D4

LEGAL NOTICES

Crisdel Spray Paint Limited (CRO no. 645396) having its registered office at, Regus, 3rd Floor, Ormond Building, 31-36 Ormond Quay Upper, Dublin 7 having ceased to trade, and having no assets exceeding €150 and having no liabilities exceeding €150, have resolved to notify the Registrar of Companies that the Company is not carrying on business and to request the Registrar on that basis to exercise her powers pursuant to Section 733 of the Companies Act 2014 to strike the name of the Company off the register.
By Order of the Board of Crisdel
Spray Paint Limited
Derek Driver Director

Crusoe's Fusion Limited having ceased to trade, having its registered office at 12 Georges Street, Drogheda, Co. Louth, and has no assets or liabilities exceeding €150, has resolved to notify the Registrar of Companies that the company is not carrying on business and to request the Registrar on that basis to exercise his/her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the company off the register.
By Order of the Board
Neil Kelly, Secretary.

Eddie Greene Limited having ceased to trade and having its registered office at Cappamore, Co. Limerick and its principal place of business at Cappamore, Co. Limerick and having no assets exceeding €150 and having no liabilities exceeding €150, has resolved to notify the Registrar of Companies that the company is not carrying on a business and to request the Registrar on that basis to exercise her powers pursuant to Section 733 of the Companies Act, 2014, to strike the name of the Company off the register.
By Order of the Board
Edward Greene
Company Secretary

Elite Moving Systems Limited, having its registered office at 3rd Floor, Ulysses House, Foley Street, Dublin 1, having never traded and having no assets exceeding €150 or liabilities exceeding €150, has resolved to notify the Registrar of Companies that the Company is not carrying on any business and to request the Registrar on that basis to exercise her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the Company off the register.
By order of the board
Ronan Woodhouse Director

Fenhold Limited, having ceased to trade having their registered office at Westlodge, Deerpark, Mitchelstown, Cork, and having no assets exceeding €150 and/or having no liabilities exceeding €150, has resolved to notify the Registrar of Companies that the company is not carrying on business and to request the Registrar on that basis to exercise her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the company off the register.
By order of the Board
Robert Fenton Director

Flavourtec Ireland Limited, having ceased to trade having its registered office at 45 Dawson Street, Dublin 2, D02VP62 and having no assets exceeding €150 and/or having no liabilities exceeding €150, has resolved to notify the Registrar of Companies that the company is not carrying on business and to request the Registrar on that basis to exercise her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the company off the register.
By order of the board
Bartosz Raczkowiak Director

JEMB Consulting Limited, having both its registered office and principal place of business at 5 Diswellstown Manor, Castlenock, Dublin 15, D15 X026, has ceased to trade. It has been confirmed the company has no liabilities and/or assets in excess of €150 and has informed the Registrar of Companies that they are not trading further, thus requesting the Registrar to exercise his/her powers, pursuant to section 733 of the Companies Act 2014, to strike the name of the company off the register.
By order of the board, Director
Pauric McBrearty

Lotteragh & Co. Consultancy Services Limited, having its registered office at Acorn Business Centre, Mahon Industrial Estate, Blackrock, Cork and having its principal place of business at Acorn Business Centre, Mahon Industrial Estate, Blackrock, Cork having ceased to trade and T.R.A.I.L. (Transition Residential Accomodation For Independent Living) Company Limited by Guarantee, having its registered office at 29 Mountjoy Square East, Dublin, D01C2N4 and having its principal place of business at 29 Mountjoy Square East, Dublin, D01C2N4 having ceased to trade and Joyce Films Designated Activity Company, having its registered office at 30 Hampton Park, St Helen's Wood, Booterstown, Co. Dublin A94CK33 and having its principal place of business at 30 Hampton Park, St Helen's Wood, Booterstown, Co. Dublin A94CK33 having ceased to trade and N.C. Roofing Limited, having its registered office at 16 Maryfield Crescent, Dublin 5, Artane, Dublin, D05Y2Y6 and having its principal place of business at 16 Maryfield Crescent, Dublin 5, Artane, Dublin D05Y2Y6 having ceased to trade and Superstyle Entertainment Limited, having its registered office at 14 Daletree Avenue, Ballycullen, Dublin 24, D24DWN3 and having its principal place of business at 14 Daletree Avenue, Ballycullen, Dublin 24, D24DWN3 having ceased to trade and Premier Drilling & Blasting International Limited, having its registered office at Hogan's Yard, Hogan's Pass, Nenagh, Co. Tipperary. and having its principal place of business at Hogan's Yard, Hogan's Pass, Nenagh, Co. Tipperary.having ceased to trade and each of which has no assets exceeding €150 and having no liabilities exceeding €150, have each resolved to notify the Registrar of Companies that the company is not carrying on business and to request the Registrar on that basis to exercise his/her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the company off the register.
By Order of the Board:
Edmond Howard, Secretary:
Lotteragh & Co. Consultancy Services Limited.
By Order of the Board: Patrick Doyle, Secretary: T.R.A.I.L. (Transition Residential Accomodation For Independent Living) Company Limited by Guarantee.
By Order of the Board:
David Blake-Knox, Director:
Joyce Films Designated
Activity Company.
By Order of the Board: Noel Cadwell, Director: N.C. Roofing Limited.
By Order of the Board:
Orla Gray, Director:
Superstyle Entertainment Limited.
By Order of the Board:
Edward Hogan Snr. Director:
Premier Drilling & Blasting
International Limited.

TPE CONSULTING ENGINEERS LIMITED, having ceased trading and having its registered office at Carnegie House, Library Road, Dun Laoghaire, Co. Dublin and the amount of any assets of the company do not exceed €150.00 and the amount of any liabilities of the company do not exceed €150.00, has resolved to notify the Registrar of Companies that the company is not carrying on business and to request the Registrar on that basis to exercise her powers pursuant to section 733 of the Companies Act 2014 to strike the name of the company off the register.
By Order of the Board
GREGORY HAYDEN
Director

AN CHUIRT DUICHE
THE DISTRICT COURT
DUBLIN METROPOLITAN
DISTRICT COURT
DISTRICT COURT NO.23
IN THE MATTER OF:
THE LICENSING ACTS 1833 TO 2018 THE COURTS OF JUSTICE ACT 1924 SECTION 77C
THE COURTS (SUPPLEMENTAL PROVISIONS) ACT 1961
THE BEER RETAILERS AND SPIRIT GROCERS
RETAIL LICENCES (IRELAND) ACT 1900 SECTIONS 1 AND 2
THE INTOXICATING LIQUOR ACT 2000 SECTION 18
THE INTOXICATING LIQUOR ACT 2008 SECTIONS 6 AND 8
DISTRICT COURT RULES, 1997, ORDER 68 AND IN THE MATTER OF AN APPLICATION BY:
UNIQUE HAMPERS & GIFTS LIMITED APPLICANTS
NOTICE OF APPLICATION FOR CERTIFICATES FOR SPIRIT RETAILER'S OFF-LICENCE AND BEER RETAILER'S OFF-LICENCE
TAKE NOTICE that Unique Hampers & Gifts Limited, having its registered office at 415 Howth Road, Raheny, Dublin 5, D05 X2E4, will apply to Dublin Metropolitan District Court on 23 day of June 2021 at 10.30am or at the first opportunity thereafter for CERTIFICATES entitling and enabling the Applicant to obtain and receive and hold a Spirit Retailer's Off-Licence and a Beer Retailer's Off-Licence in respect of the Applicant's premises situate at The Sigma Buildings, McKee Avenue, Finglas, Dublin 11, D11PH2A within the Court area and District aforesaid, as more particularly described on the plans accompanying this application and thereon surrounded by a red verge line.
AND FURTHER TAKE NOTICE that the Applicant, has not held any Spirit and Beer Retailer's Off-Licences within the previous two years.
Dated this 3 day of June 2021
To Whom it May Concern
Compton Solicitors
Solicitors for the Applicant
Pembroke House
30 Pembroke Street Upper Dublin 2

AN CHUIRT DUICHE
THE DISTRICT COURT
DISTRICT COURT AREA OF NAAS
DISTRICT NO. 25
IN THE MATTER OF:
THE LICENSING ACTS 1833 TO 2018 THE COURTS OF JUSTICE ACT 1924 SECTION 77C
THE COURTS (SUPPLEMENTAL PROVISIONS) ACT 1961
THE INTOXICATING LIQUOR ACT 2008 SECTIONS 6 AND 8
DISTRICT COURT RULES 1997
ORDER 68 AND IN THE MATTER OF AN APPLICATION BY:
UNIQUE HAMPERS & GIFTS LIMITED APPLICANTS
NOTICE OF APPLICATION FOR CERTIFICATE FOR WINE RETAILERS OFF-LICENCE
TAKE NOTICE that Unique Hampers & Gifts Limited, having its registered office at 415 Howth Road, Raheny, Dublin 5, D05 X2E4 in the city of Dublin will apply to Naas District Court sitting at The Courthouse, Main Street, Naas, in the County of Kildare on 24 day of June 2021 at 10.30am or at the first opportunity thereafter for a CERTIFICATE entitling and enabling the Applicant to obtain and receive and hold a WINE RETAILER'S OFF LICENCE in respect of the Applicant's premises situate at Unit 2 and Unit 4 Modus Link Factory Facility, Monasterevein Road, Greyabbey, in the County of Kildare, R51 A262 within the Court area and District aforesaid, as more particularly described on the plans accompanying this application and thereon surrounded by a red verge line.
Dated this 3 day of June 2021
TO WHOM IT MAY CONCERN
Compton Solicitors
Solicitors for the Applicant
30 Pembroke Street Upper Dublin 2

PLANNING APPLICATIONS

DUBLIN CITY COUNCIL
We, Larian Studios Games Limited, intend to apply for permission for development at 17a New Bride Street, Dublin 8, a Protected Structure.
The development will consist of amendments to the permitted development under Application No. 3522/20 comprising: the relocation of the ground floor toilet core to the basement, the expansion of the ground floor open plan studio, the demolition of the existing 20th century tea station roof FRL 16.925m and construction a new tea station roof FRL 17.670m, amendments to Chill Zone façade to facilitate DAC access, reconfiguration, and omission of 3no. rooflights to the single storey flat roof, and the provision of secondary door access to flat roof for fire escape purposes.
The planning application may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of Dublin City Council during its public opening hours and a submission or observation in relation to the application may be made to the authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the authority of the application.

APPLICATION TO AN BORD PLEANÁLA FOR PERMISSION IN RELATION TO A QUARRY; SECTION 37L OF THE PLANNING AND DEVELOPMENT ACT, 2000
I, Laurence Behan intend to apply for permission under section 37L of the Planning and Development Act 2000, as amended for development at Windmillhill, Rathcoole, Co. Dublin.
The development consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. over a total of 5.16 ha. to accommodate screening berms and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. A restoration plan to return the application site and existing administration and processing plant area to agricultural and amenity use upon completion of proposed extraction has been prepared and is proposed to be implemented upon cessation of extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years depending on market conditions, and a further 2 - 5 years for restoration.
The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The further development of the quarry relates to further extraction only and is to utilise the extant existing administration and processing plant area and quarry access that are included in a concurrent application for substitute consent.
The application site is contained within a quarry area registered in 2005 under S.261 and assessed in 2012 under S.261A (ref. no. SDQU05A/04) by the local planning authority. The S.261A notice was reviewed under An Bord Pleanála ref. 06S.QV.0090 resulting in a requirement for application for substitute consent accompanied by remedial Environmental Impact Assessment Report (rEIAR). That application (ref. no. PL06S.SU0068) was made in 2013 and an application to further develop that quarry (ref. no. PL06S.QD0003) was made in 2015. Those applications have been superseded By High Court Order (2018 No. 929 JR) that inter alia ordered the making of this application. This application is made concurrent with an application for substitute consent for quarrying at this location, also part of that Order.
The application is accompanied by an Environmental Impact Assessment Report (EIAR). The EIAR is for an EIA project unit over 46.14 ha. that encompasses the area of the further development of the quarry application under S.37L, the concurrent substitute consent application and the quarry as registered under S.261.
The application and accompanying documentation may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the at the offices of An Bord Pleanála, 64 Marlborough Street, Dublin 1 and South Dublin County Council, County Hall, Town Centre, Tallaght, Dublin 24 during their public opening hours and a submission or observation in relation to the application may be made to An Bord Pleanála in writing within the period of 5 weeks beginning on the date of receipt by the Board of the application.

APPLICATION TO AN BORD PLEANÁLA FOR SUBSTITUTE CONSENT
I, Laurence Behan intend to apply for substitute consent for development at Windmillhill, Rathcoole, Co. Dublin.
The development consists of a quarry over an area of 28.8 ha. with a current average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. The reserve consists of sandstone (greywacke) and is extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The quarry is accessed at a single location from the N7 and holds a centrally located existing administration and processing plant area over approximately 5 ha. that currently holds 2 no. office buildings, 4 no. portacabins, 4 no. containers, 2 no. storage / maintenance sheds, a storage / drying shed, water recycling unit and silt press, an asphalt plant, a concrete plant and washing, crushing, screening and bagging plants. Also, within this plant and administration area are 2 no. weighbridges, 4 no. wheel washes, fuel storage and refuelling area, 1 no. operations water well and sewage holding tank. The concrete plant and the storage / drying shed within this central administration and processing plant area have been erected within the last three years and are not part of this application. They will be the subject of a separate planning application process. The application site is contained within a quarry area registered in 2005 under S.261 and assessed in 2012 under S.261A (ref. no. SDQU05A/04) by the local planning authority. The S.261A notice was reviewed under An Bord Pleanála ref. 06S.QV.0090 resulting in a requirement for application for substitute consent accompanied by remedial Environmental Impact Assessment Report (rEIAR). That application (ref. no. PL06S.SU0068) was made in 2013 and has been superseded By High Court Order (2018 No. 929 JR) that inter alia ordered the making of this application. This application is made concurrent with an application to further develop the quarry at this location, also part of that Order. The application is accompanied by a remedial Environmental Impact Assessment Report (rEIAR). The rEIAR is for an EIA project unit over 46.14 ha. that encompasses the area of the substitute consent application, the concurrent further development of the quarry application under S.37L and the quarry as registered under S.261.
The application and accompanying documentation may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of An Bord Pleanála, 64 Marlborough Street, Dublin 1 and South Dublin County Council, County Hall, Town Centre, Tallaght, Dublin 24 during their public opening hours and a submission or observation in relation to the application may be made to An Bord Pleanála in writing within the period of 5 weeks beginning on the date of receipt by the Board of the application.

DUBLIN CITY COUNCIL:
Louise Harmon and Michael Cosgrave wishes to apply for planning permission for alterations and extension of the existing dwelling, to include a part two storey and part one storey extension to the rear south facing façade to include living room and kitchen accommodation at ground level and bedroom accommodation at first floor level, extend at first floor level over the existing garage to the side east facing facade to include additional bedroom accommodation, the demolition of the existing rear conservatory and garden shed, together with ancillary landscaping and site works, all at 109 Seafield Rd East, Dublin 3, D03 W2V6
The planning application may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of Dublin City Council during its public opening hours and a submission or observation in relation to the application may be made to the authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the authority of the application.

DUBLIN CITY COUNCIL
We, Ciaran & Jenny MacLoughlin intend to apply for permission for development at 94 Rathfarnham Road, Terenure, Dublin 6W. D6W ED82. The development will consist of works to existing two storey semi-detached dwelling to include for the following; demolition of single storey utility\wc\ boiler room block to rear (east) and single storey garage to front (west), construction of two storey extension to rear (east), two storey extensions to front (west) and an attic conversion. Minor internal general refurbishment and renewal of the building services, external hard & soft landscape works to front & rear to include widening of existing site access entrance off Rathfarnham Road and all associated other site development works above and below ground.
The planning application may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of Dublin City Council, during its public opening hours and a submission or observation in relation to the application may be made in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the authority of the application.

DUN LAOGHAIRE RATHDOWN COUNTY COUNCIL
We, The Estate of the late Peter Perrem intend to apply for permission for development at this site: 1 Monaloe Avenue, Deansgrange, Blackrock, Co. Dublin, A94 T0C7. The development will consist of: (1) The conversion of the existing attic including the provision of a new dormer window. (2) The provision of new rooflights. (3) The removal of the existing chimney to the front. (4) The widening of the existing vehicular entrance. (5) The extension of the existing front entrance porch. The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy at the offices of the Planning Authority, County Hall, Dún Laoghaire during its public opening hours. A submission/ observation may be made on payment of €20 within a period of 5 weeks from the date the application is received by the planning authority.

RECRUITMENT

Community Operations Analyst – (Evening shift Arabic) Salary:(€35,075.30). Hours: 37.5 p/ week. Employer: CPL Solutions Limited. Location: Nova Atria, Blackthorn Road, Sandyford Business Park, Sandyford, Dublin 18. Duties: Assist client's community & help resolve inquiries; investigate & resolve issues reported on client's platform; spot & scope scalable solutions to improve support of community of users; enforce client's Terms of Use by monitoring reports of abuse, identify inefficiencies in workflows & suggest solutions; escalate issues outside company policy to global team. Must have fluency in (Arabic) & English. Degree/1+ years professional experience preferred. CVs to Torben Jensen, Torben.Jensen@cpl.ie.

Name of employer: CPL Solutions Limited Description of employment: Community Operations Analyst Sinhalese. Investigate and resolve issues reported on client's platform. Spot and scope scalable solutions to improve support of community of users. Enforce client's Terms of Use by monitoring reports of abuse. Identify inefficiencies in workflows and suggest solutions. Escalate issues outside company policy to global team. Required fluent in market language and English, alongside cultural understanding of the market. Minimum annual remuneration €35,075.30 per year. Location of employment Nova Atria, Blackthorn Road, Sandyford Business Park, Dublin 18. Hours of work: 37.5 hours per week. Apply by post.

Name of employer: DHL Global Forwarding (Ireland) Limited Description of employment: Job Title Customs Clearance Specialist, Complete customs processes in accordance with the company defined process and maintain revenue compliance at country level. Build strong working relationships and liaise with operational departments to ensure Revenue compliance for imports and exports. Maintain knowledge of all regulation changes and any new processes that may arise. Minimum annual remuneration €30000 per year. Location of employment DHL Global Forwarding (Ireland) Limited Facility, Unit 1, Airport Business Park, Swords, Co. Dublin. Hours of work: 37.5 hours per week. Apply by post.

KEM Sheet Steel and Metal Fabricators Ltd, Milemill Road, Kilcullen, Co Kildare, wishes to recruit a CNC Operative, to engage in the operation and programming of Computer Numerical Control Fibre Laser to calibrate and produce precision stainless steel and other metal components. Annual salary €32,448; 39 hours per week.
Apply with CV by email to
fabricators@kem.ie

Experienced Meat Processor
Operatives
Kildare Chilling Company
Role Description
The successful candidates will work as part of the factory processing team producing Beef and Lamb. Successful candidates will be required to work in all areas of the factory where you will be required to, Report to the line and area supervisor. This role will involve working to challenging production targets; can be based in any area of the factory including cold/chilled areas. The employee will be required to move around the factory floor without assistance. Each employee must be in a state of good health and have the ability to render a regular and efficient service on a daily basis. The employee must be able to work in a cold environment for up to 8 hours per day.
Other duties.
* Ability to work on own initiative and as part of a team.
* Meet daily and weekly production targets.
* Work a shift schedule
* Will be required to work across all areas of the meat processing plant.
* Physical role including lifting and standing.
Skills/ Experience Required: Each candidate must be of good character, be flexible and be able to work in a team. All employees must follow all standard operating and health and safety procedures of Kildare Chilling Company. Training programs will be given to all successful candidates.
Remuneration
* Minimum Annual remuneration: €22,000
* Training in English skills will be given
* Access to suitable accommodation will be available
* Subsidised canteen available
* Standard working week 39 hours
* Training in English language skills, company operating procedures
Please send your application with references, marked for the attention of Padraig Delaney HR Manager. Kildare Chilling Co. Kildare Town Co. Kildare, Email: info@kildarechillingco.ie

Name of employer: Lighthouse Montessori School Limited Description of employment: Job Title Montessori Teacher. To ensure a safe, secure and healthy environment for the safety and welfare of the children. Provide for the holistic needs of the children. Actively engage the children in the developmentally appropriate learning activities to facilitate the potential development of each child. Act as a role model for the children and the parents. Observe and record children's progress. Location of employment 6A Pleasants Street, Dublin 8, D08 Y335 Minimum annual remuneration €30000 per year. Hours of work: 39 hours per week. Apply by post.

Name of employer: My Wonder Kitchen Limited Description of employment: Job Title Kitchen Designer. Plan, direct and undertake the creation of designs for kitchen building interiors. Advise clients on kitchen interior design. Liaises with client to determine the purpose, cost, technical specification and potential uses of kitchen design. Submits design to management, sales department or client for approval, communicates design rationale and makes any necessary alterations. Undertakes research and formulates design concepts. Minimum annual remuneration €30000 per year. Location of employment: Unit 5 Phoenix Enterprise Centre, Ballyfermot, Dublin 10. Hours of work: 39 hours per week. Apply with CV.

Name of employer: O Toole Transport limited Description of employment: Job Title International Logistics Analyst, the role involves working in a new purpose built logistics facility. Responsible for providing international logistics advice and project management of a BRC accredited logistics solution to food manufacturers and processors that require daily deliveries to all the major regional distribution centres in Ireland and the UK. Responsibilities include international logistics in relation to food imports. Minimum annual remuneration €32000 per year. Location of employment O Toole Transport limited, Bay Lane, Dublin 15. Hours of work: 39 hours per week. Apply by post.

Curry Chef (Indian Curry) - One Position at Qureshi & Mahra Ventures Ltd, T/A Delhi Rasoi, €30,000/- to €32,000/- P/A. At Sandyford Village, Opposite St. Mary's Church, Sandyford, Dublin 18. Job is Full Time - 39 hrs/ Week, contact at 01-2948725 / delhirasoi7@gmail.com

Name of employer: Rascals Brewing Company Limited Description of employment: Job Title/Role of Chef de Partie with a minimum of 2 years of experience is required to join our team. Preparing, cooking and presenting high quality dishes. Assisting the Head Chef in creating menu items, recipes and developing dishes. Making dough and monitoring dough fermentation. Assisting management with health and safety and food hygiene practices. Minimum annual remuneration €30000 per year. Location of employment Unit 5 Goldenbridge Industrial Estate, Tyrconnell Road, Inchicore, Dublin 8, D08 HF68 Hours of work: 39 hours per week. Apply by post.

Name of the employer Superior Group IRL Limited Job Title IT Security Specialist Job Description: Working with IT related security matters including installation and configuration of IT security systems. Must have relevant IT experience with software and equipment from Hikvision, Siemens and Samsung. Experience with C ++ programming, ladder and similar required. Relevant training or qualification desirable. Minimum annual remuneration €30000 per year. Location of employment Drumgurra, Carrickmacross, Co. Monaghan, A81E271 Hours of Work 39 hours per week. Apply by post.

Name of the employer Tanveer Alam & Co Limited trading as Tanveer Alam & Co Job Title Business Analyst Job Description Analyzing client's business data and recommending best practices to improve performance. Advising and making recommendations on suitable IT processes for business data handling. Understanding and good knowledge of change management and Micro and Macro analysis required. Good client management skills, Positive relationship management skills and Excellent communication skills required. Minimum annual remuneration €32000 per year. Location of employment Unit 5 Michael galvin building, base enterprise centre, mulhuddart, D15AP22 Hours of Work 37.5 hours per week. Apply by post.

Name of employer: Thunder Road Cafe Limited trading as Thunder Road Cafe Description of employment: Job Title/Role of Business Development Analyst (Business Innovation Specialist), Responsibilities include: specialist business and market analysis research, advises and makes recommendations to company related to business development and innovation based on business and market research findings, developing and managing measurable business development projects strategies, planning for and executing integrated business innovation campaigns and strategies. Minimum annual remuneration €30000 per year. Hours of work: 39 hours per week Location of employment: Fleet Street, Temple Bar, Dublin 2. Apply with CV by post.

COPY OF EIA PORTAL CERTIFICATE

From: Housing Eiaportal <EIAportal@housing.gov.ie>
Sent: Thursday 3 June 2021 14:44

Subject: EIA Portal Confirmation Notice Portal ID 2021115

EXTERNAL EMAIL

An EIA Portal notification was received on 03/06/2021 in respect of this proposed application. The information provided has been uploaded to the EIA Portal on 03/06/2021 under EIA Portal ID number **2021115** and is available to view at http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1.

Portal ID: 2021115

Competent Authority: An Bord Pleanála

Applicant Name: Laurence Behan

Location: Windmillhill, Rathcoole, Co. Dublin

Description: Further development of quarry as a quarry by extraction over an application area of 26.87 ha. within an EIA project boundary of 46.14 ha. Application made under S.37L concurrent with an application for substitute consent within the same EIA unit.

Linear Development: No

Date Uploaded to Portal: 03/06/2021

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

Teach an Chustaim, Baile Átha Cliath 1. D01 W6X0
Custom House, Dublin D01 W6X0

www.housing.gov.ie

OSI Licence No.
CYAL50192220

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY

0 400 800 1,200m

1:20,000

CLIENT

L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT

GOLDER

YYYY-MM-DD	2021-May-28
PREPARED	AJ
DESIGN	POB
REVIEW	RT
APPROVED	BB

PROJECT

37L APPLICATION - LAURENCE BEHAN

TITLE

SITE LOCATION - Regional

PROJECT No.	DRAWING No.	Rev.	SCALE
20137776	01	A	1:20,000 A3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A3

25 mm

0

Path: \\na1-s-mail01\Company\PROJECTS\2020\20137776 - Behan Quarry Planning and EIA\5. Technical Work\GRAPHICS\20h. App 2 - 37L EIAR Dwgs - as of May 2021\ | File Name: 01 - Site Location - Regional - 20000 A3 May 2021.dwg

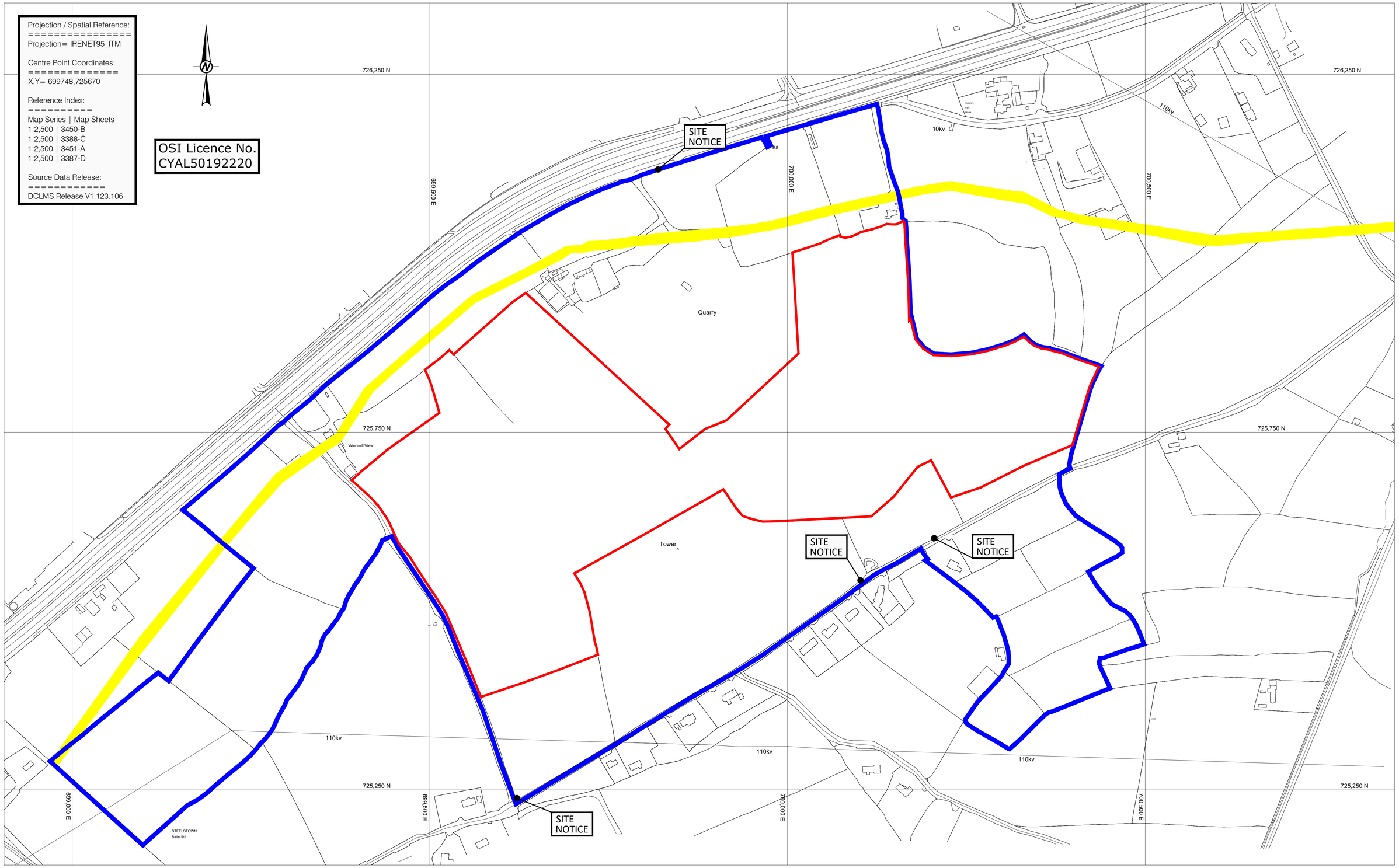
Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
==========
X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220



0 100 200 300m
1:2,500

LEGEND:
- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
PREPARED	AJ
DESIGN	POB
REVIEW	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
SITE LOCATION - Local

PROJECT No.	DRAWING No.	Rev.	SCALE
20137776	02	A	1:2,500 A1

Path: \\nas1-s-main01\Company\PROJECTS\20\20137776 - Behan Quarry Planning and EIAS\ Technical Work\GRAPHICS\20b App 2 - 37L EIAR Dvgs - as of May 2021\ | File Name: 02 - Site Location - L

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A1

0 25 mm

Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
==========
X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

A
A'
B
B'
C
C'
D
D'

725,750 N

725,7

699,500 E

700,000 E

Windmill View

Tower

SITE NOTICE

SITE NOTICE

82.5m
114.4m
44.7m
314.0m
113.6m
74.3m
381.4m
145.9m

0 40 80 120m
1:1,000

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03	A	1:1,000 A0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A0

25 mm
0

C:\Users\Leonard\Documents\PROJECTS\20137776 - Behan Quarry Planning and EIA\5. External Work\GRAPHICS\05_Fig 2 - EXI (1).mxd Plotted: 28 May 2021 | File Name: 05 | Drawing: 1000 A0 Map | Last Edited By: leonard_cosby | Date: 2021-05-04 Time: 11:05:56 AM | Printed By: leonard_cosby | Date: 2021-05-04 Time: 11:43:43 AM

Projection / Spatial Reference:
Projection= IRENET95_ITM

Centre Point Coordinates:
X,Y= 699748,725670

Reference Index:
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

See Dwg. 03a

See Dwg. 03b

See Dwg. 03c

See Dwg. 03d

725,750 N

725,7

699,500 E

700,000 E

Windmill View

Tower

SITE NOTICE

SITE NOTICE

A

A'

B

B'

C

C'

D

D'

82.5m

114.4m

44.7m

314.0m

74.3m

381.4m

415.9m

0 40 80 120m
1:1,000

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 03a (ecopy 1:500)
Drawing 03b (ecopy 1:500)
Drawing 03c (ecopy 1:500)
Drawing 03d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03	A	1:1,000 A0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A0

25 mm
0

C:\Users\ajordan\Desktop\PROJECTS\20020351\777778 - Behan Quarry Planning and EIAR_Technical Work\GRAPHICS\DB_App 2_37L EIAR Drawings - as of May 2021 | File Name: 03b - 03d - Existing - 000 A0 May 2021 (COPY.dwg | Last Edited By: tmeghlinsky | Date: 2021-05-04 Time: 4:44:25 PM | Printed By: tmeghlinsky | Date: 2021-05-04 Time: 5:01:15 PM

Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
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X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

725,750 N

Windmill View

A

A'

B

B'

74.3m

119.6m

381.4m

0 20 40 60m
1:500

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 03a (ecopy 1:500)
Drawing 03b (ecopy 1:500)
Drawing 03c (ecopy 1:500)
Drawing 03d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03a	A	1:500 A0

© THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A0

25 mm
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C:\Users\rtwisell\Desktop\PROJECTS\20200203137776 - Behan Quarry Planning and EIAS\ Technical Work\DRAWINGS\Dgn_Xrp\ 37L EIAR Dwgs - as of May 2021 | File Name: 03a - 03d - Existing - 000 A0 May 2021 EIDAPP.dwg | Last Edited By: tmcgillycuddy | Date: 2021-05-04 - Time:4:44:25 PM | Printed By: tmcgillycuddy | Date: 2021-05-04 - Time:5:00:19 PM

Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
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X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

C

C'

D

D'

82.5m

114.4m

44.7m

314.0m

0 20 40 60m
1:500

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 03a (ecopy 1:500)
Drawing 03b (ecopy 1:500)
Drawing 03c (ecopy 1:500)
Drawing 03d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03b	A	1:500 A0

@ THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A0

25 mm

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Path: \\cork1.ie\work1\Consultancy\PROJECTS\20137776_Behan Quarry Planning and EIAR_Technical Work\GRAPHICS\03b_Rpt 2_EIS EIAR Dwgs_as of May 2021 | File Name: 03b_Existing_000 AO May 2021 ECOPY.dwg | Last Edited By: bbaggott | Date: 2021-05-28 Time:4:44:25 PM | Printed By: bbaggott | Date: 2021-05-28 Time:4:43:42 PM

Projection / Spatial Reference:
Projection= IRENET95_ITM

Centre Point Coordinates:
X,Y= 699748,725670

Reference Index:
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

314.0m

SITE NOTICE

SITE NOTICE

0 20 40 60m
1:500

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 03a (ecopy 1:500)
Drawing 03b (ecopy 1:500)
Drawing 03c (ecopy 1:500)
Drawing 03d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03c	A	1:500 A0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A0

25 mm
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File Name: \\golder.gds\corp\dub\Projects\2013\13-20137776_Behan Quarry Planning and EIA\3_Technical Work\GIS\MXD\Figure 03c_Existing_Site_Layout_A0_May 2021 ECOPY.mxd | Last Edited By: mmcgillycuddy | Date: 2021-05-28 | Time: 9:44:43 PM | Printed By: mmcgillycuddy | Date: 2021-05-28 | Time: 9:44:43 PM

Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
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X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

74.3m
381.4m
115.8m
Pond
Tower
699,500 E

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 03a (ecopy 1:500)
Drawing 03b (ecopy 1:500)
Drawing 03c (ecopy 1:500)
Drawing 03d (ecopy 1:500)

0 20 40 60m
1:500

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
EXISTING SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	03d	A	1:500 A0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A0

25 mm
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C:\Users\amcneill\Documents\PROJECTS\20020\20137776 - Behan Quarry Planning and EIAR_Technical Work\DRAWINGS\05_App 2 - 37L EIAR Drwgs - as of May 2021 | File Name: 03b - 03d - Existing - 699 500 A0 May 2021.ECDP | Last Edited By: tmcgillycuddy | Date: 2021-05-04 - Time:3:35:19 PM | Printed By: tmcgillycuddy | Date: 2021-05-04 - Time:3:35:19 PM

Projection / Spatial Reference:
Projection= IRENET95_ITM

Centre Point Coordinates:
X,Y= 699748,725670

Reference Index:
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

See Dwg. 04a

See Dwg. 04b

See Dwg. 04c

See Dwg. 04d

Quarry

Tower

Windmill View

SITE NOTICE

SITE NOTICE

725,750 N

725,7

699,500 E

700,000 E

A

A'

B

B'

C

C'

D

D'

0 40 80 120m
1:1,000

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 PROPOSED CONTOUR (mOD)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 04a (ecopy 1:500)
Drawing 04b (ecopy 1:500)
Drawing 04c (ecopy 1:500)
Drawing 04d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	04	A	1:1,000 A0

25 mm
0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A0

Plotted By: MMcGlynnsutty Date: 2021-05-28 Time: 3:56:04 PM | Plotted By: MMcGlynnsutty Date: 2021-05-14 Time: 3:56:04 PM | Last Edited By: tmcgillycuddy Date: 2021-05-14 Time: 3:56:04 PM | Plotted: 2021-05-14 Time: 3:56:04 PM | File Name: Site - Hist - Proposed - 2020 10 May 2021 ECOPY.dwg | Last Edited By: tmcgillycuddy Date: 2021-05-14 Time: 3:56:04 PM | Plotted By: MMcGlynnsutty Date: 2021-05-14 Time: 3:56:04 PM

Path: \\eude.golder.com\projects\PROJECTS\20020001\137776 - Behan Quarry Planning and EIAS Technical Work\GRAPHICS\05 - Dgs 2 - 37L EIAR Dwgs - as of May 2021 | File Name: Site - Hist - Proposed - 2020 10 May 2021 ECOPY.dwg | Last Edited By: tmcgillycuddy Date: 2021-05-14 Time: 3:56:04 PM | Plotted By: MMcGlynnsutty Date: 2021-05-14 Time: 3:56:04 PM

Projection / Spatial Reference:
Projection= IRENET95_ITM

Centre Point Coordinates:
X,Y= 699748,725670

Reference Index:
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

Quarry

Tower

Windmill View

SITE NOTICE

SITE NOTICE

725,750 N

725,7

699,500 E

700,000 E

0 40 80 120m
1:1,000

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- PROPOSED CONTOUR (mOD)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT NO. 20137776 | DRAWING NO. 04 | REV. A | SCALE 1:1,000 A0

© THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A0

25 mm
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Plotted By: MMcGillycuddy Date: 2021-05-04 Time: 12:42:44 PM
File Name: M:\Projects\20137776_Behan Quarry Planning and EIAR_Technical Work\GIS\MXD\05_Rev 2 - EIAR Ridge - as of May 2021 - File Name: M - Proposed - 1000 A0 May 2021.mxd | Last Edited By: tmcgillycuddy Date: 2021-05-04 Time: 12:39:34 PM | Plotted By: MMcGillycuddy

Projection / Spatial Reference:
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Projection= IRENET95_ITM

Centre Point Coordinates:
==========
X,Y= 699748,725670

Reference Index:
==========
Map Series | Map Sheets
1:2,500 | 3450-B
1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:
==========
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

N

A

A'

B

B'

725,750 N

Windmill View

Quarry

0 20 40 60m
1:500

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- PROPOSED CONTOUR (mOD) (175)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 04a (ecopy 1:500)
Drawing 04b (ecopy 1:500)
Drawing 04c (ecopy 1:500)
Drawing 04d (ecopy 1:500)

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	04a	A	1:500 A0

25 mm
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1:2,500 | 3387-D

Source Data Release:
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DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

N

C

C

D

D

D'

D'

150 155 160 165 170 175 180

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 PROPOSED CONTOUR (mOD)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

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LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

Drawing 04a (ecopy 1:500)
Drawing 04b (ecopy 1:500)
Drawing 04c (ecopy 1:500)
Drawing 04d (ecopy 1:500)

0 20 40 60m
1:500

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	04b	A	1:500 A0

25 mm

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1:2,500 | 3387-D

Source Data Release:
DCLMS Release V1.123.106

OSI Licence No.
CYAL50192220

SITE NOTICE

SITE NOTICE

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- PROPOSED CONTOUR (mOD)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

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LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

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Drawing 04b (ecopy 1:500)
Drawing 04c (ecopy 1:500)
Drawing 04d (ecopy 1:500)

0 20 40 60m
1:500

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

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GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

PROJECT NO.	DRAWING NO.	REV.	SCALE
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Source Data Release:
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OSI Licence No.
CYAL50192220

699,500 E

Pond

Tower

A

0 20 40 60m
1:500

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 PROPOSED CONTOUR (mOD)
- PROPOSED ACCESS
- PROPOSED SAFETY BERM
- CROSS SECTION REFERENCE
- WASTEWATER TREATMENT SYSTEM
- WATER WELL
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DIMENSIONS ARE IN METRES.

REFER TO DRAWING 05 FOR CROSS SECTION DETAILS.

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CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

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DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
PROPOSED SITE LAYOUT

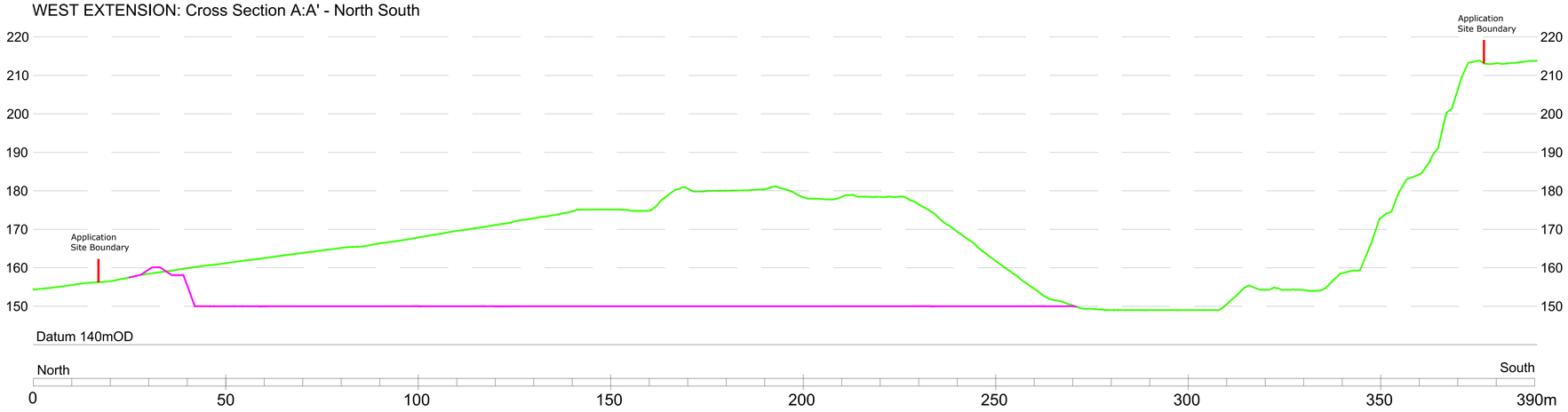
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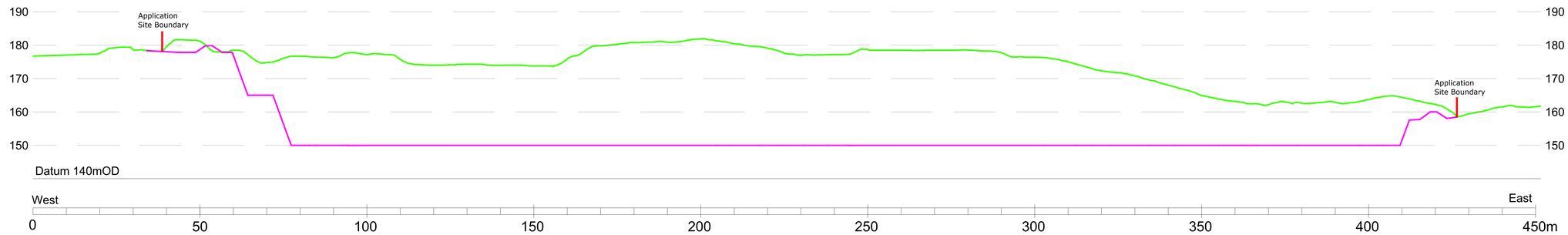
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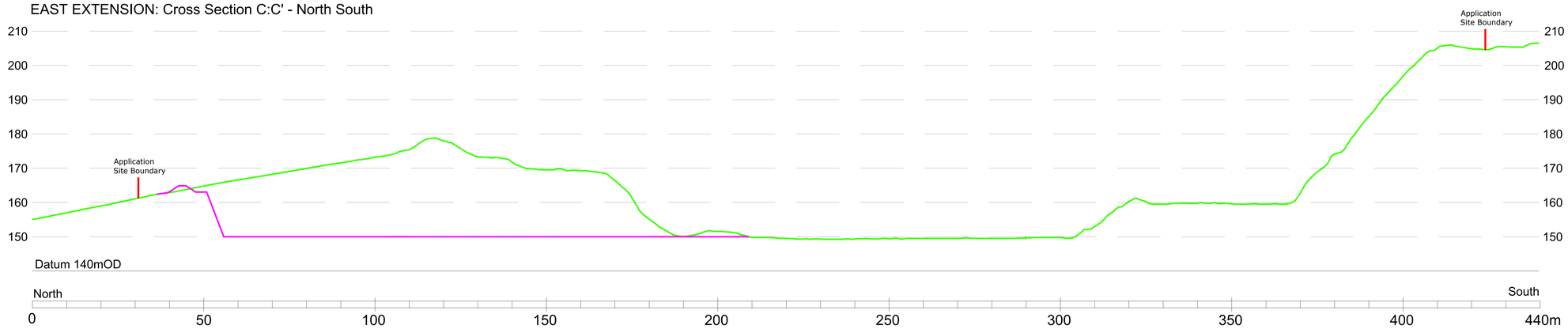
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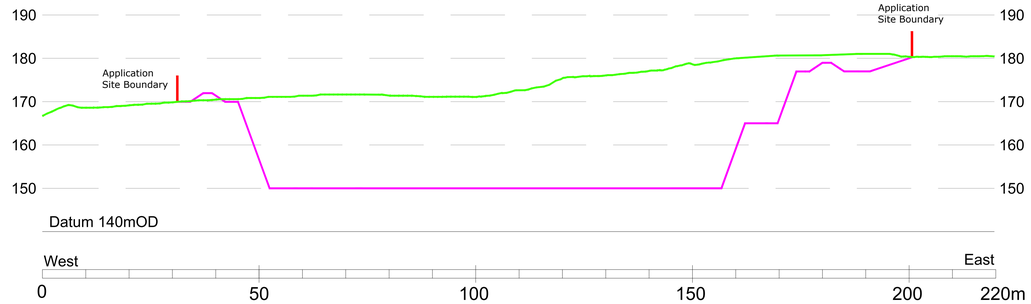
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EAST EXTENSION: Cross Section C:C' - North South



EAST EXTENSION: Cross Section D:D' - West East



0 20 40 60m
1:500

LEGEND:
- EXISTING GROUND (mOD)
- PROPOSED GROUND (mOD)

NOTES:

LEVELS ARE IN METRES & TO O.S. DATUM.

REFER TO DRAWINGS 03 AND 04 FOR CROSS SECTION LOCATIONS.

CLIENT
L BEHAN AGGREGATES & RECYCLING LTD

CONSULTANT
GOLDER

YYYY-MM-DD	2021-Mar-13
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

PROJECT
37L APPLICATION - LAURENCE BEHAN

TITLE
CROSS SECTIONS

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	05	A	1:500 A0

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X,Y= 699748,725670

Reference Index:

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1:2,500 | 3388-C
1:2,500 | 3451-A
1:2,500 | 3387-D

Source Data Release:

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OSI Licence No. CYAL50192220

700,000 E

725,750 N

Weighbridge - OUT (See Dwg. 13)

Office (See Dwg. 06)

Portacabin 3 (See Dwg. 29)

Storage Container 4 (See Dwg. 28)

Storage Container 3 (See Dwg. 27)

Weighbridge - IN (See Dwg. 12)

Sewage Holding Tank (See Dwg. 07)

Fuel Storage & Refuelling (See Dwg. 26)

Operations Water Well

Portacabin 1 (See Dwg. 08)

Former Dispatch Office (See Dwg. 09)

Main Wheelwash - OUT (See Dwg. 15)

Storage Shed (See Dwg. 25)

Portacabin 2 (See Dwg. 10)

Materials Testing Laboratory (Portacabin - See Dwg. 11)

Maintenance & Garage (See Dwg. 24)

Storage Container 1 (See Dwg. 16)

Storage Container 2 (See Dwg. 17)

Main Wheelwash - IN (See Dwg. 14)

Quarry

Storage/Drying Shed (See Dwg. 32)

Wheelwash 2 (See Dwg. 20)

Bagging Plant (See Dwg. 23)

Asphalt Plant (See Dwg. 18a & 18b)

Wheelwash 1 (See Dwg. 19)

Screening Plant (See Dwg. 30)

Screening & Washing Plant (See Dwg. 21)

Concrete Plant (See Dwg. 31)

Water Recycling Unit (See Dwg. 22)

Silt Press (See Dwgs. 33a, 33b, 33c & 33d)

LEGEND:

- LANDS UNDER CONTROL OF APPLICANT
- APPLICATION BOUNDARY
- 175 EXISTING GROUND CONTOUR (mOD)
- CROSS SECTION REFERENCE
- WAYLEAVE

NOTES:

GRID REFERENCES ARE IN METRES & TO ITM COORDINATES.

LEVELS ARE IN METRES & TO O.S. DATUM.

DRAWING NUMBERS REFER TO THE CONCURRENT SUBSTITUTE CONSENT APPLICATION, THEY ARE NOT PART OF THE 37L APPLICATION.

CLIENT: L BEHAN AGGREGATES & RECYCLING LTD

PROJECT: 37L APPLICATION - LAURENCE BEHAN

CONSULTANT: GOLDER

YYYY-MM-DD	2021-May-28
DESIGNED	POB
PREPARED	AJ
REVIEWED	RT
APPROVED	BB

TITLE: **FOR INFORMATION ONLY**
ADMINISTRATION AND PROCESSING AREA
NOT PART OF 37L APPLICATION

PROJECT NO.	DRAWING NO.	REV.	SCALE
20137776	INFO-01	A	NTS

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GOLDER
MEMBER OF WSP

REPORT

EIAR - Non-Technical Summary

Laurence Behan

Submitted to:

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20137776.R04.B0

May 2021

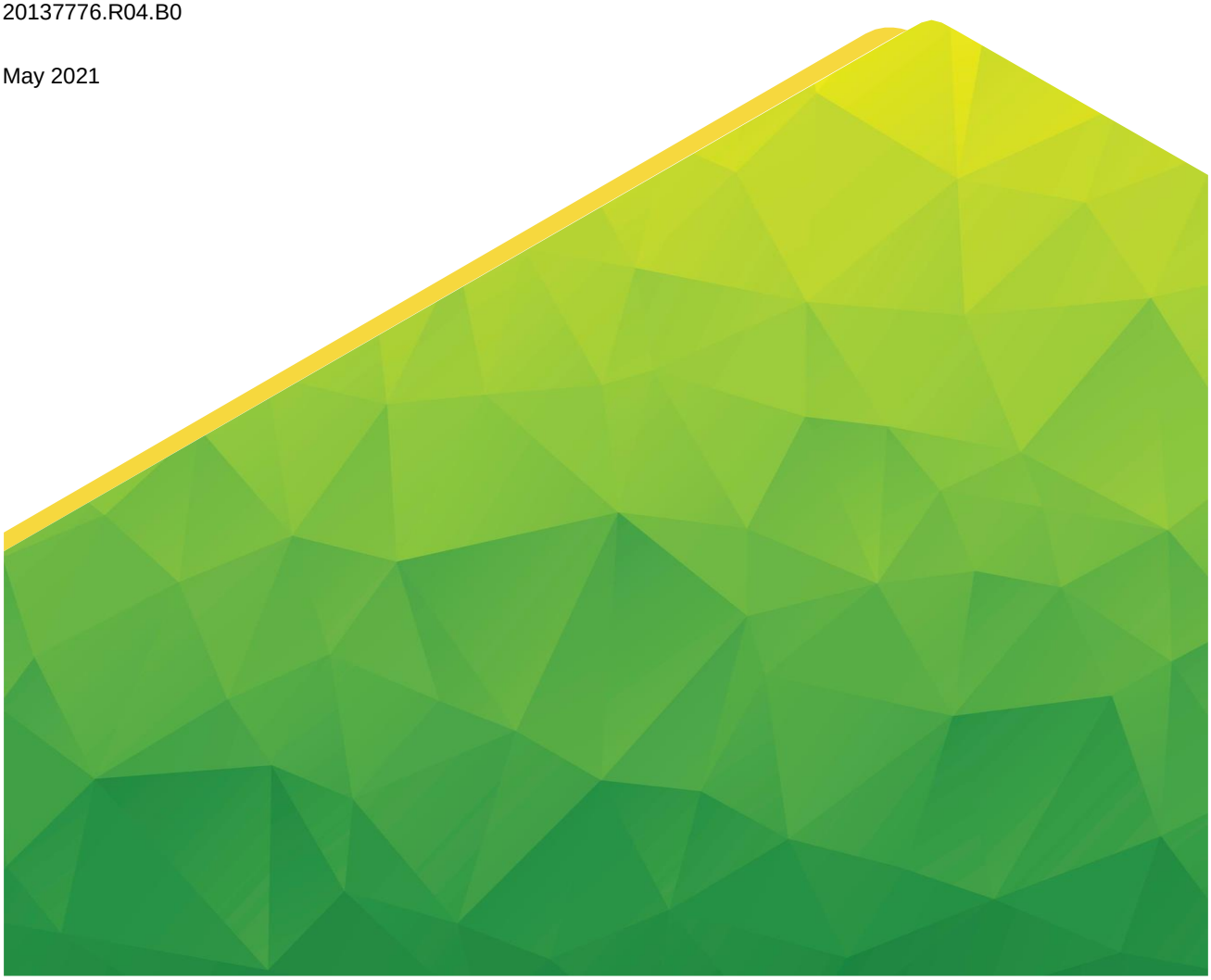


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NON-TECHNICAL SUMMARY

1.0 INTRODUCTION

Golder Associates Ireland Ltd (“Golder”) have been commissioned to prepare this Environmental Impact Assessment Report [EIAR] to accompany an application for permission for further development of an existing quarry over approximately 26.87 hectares [ha.] at Windmillhill, Rathcoole, Co. Dublin. This EIAR is submitted on the instruction of Mr. Laurence Behan, owner and operator of this quarry who will is making the application for permission.

It is noted that this EIAR has been prepared in tandem with an rEIAR to accompany an application for substitute consent for that existing quarry under Section 261A of the Planning and Development Act, 2000 as amended by the same applicant.

This document is a Non-Technical Summary (NTS) of the EIAR, and its purpose is to describe the Proposed Development and provide a summary in non-technical language of the key findings of the EIAR submitted to An Bord Pleanála (ABP) in support of the application for permission for further development.

The proposed development site (application site) lies at the centre of a contiguous, established landholding of approximately 73 ha. That landholding is centred on the townland of Windmillhill and covers much of that townland area, with minor portions of that the landownership extending north-westerly into the townland of Steelstown and south-easterly into the townland of Carrigeen.

The centre of the landholding has been the subject of historic, current and intended future extraction of rock, and is roughly rectangular in shape with its long axis orientated parallel to the N7/M7 (Naas Road). The southern boundary is delineated by the local Windmillhill Road (L6065) and the western and eastern boundaries of this area by the Windmillhill townland boundaries. This area extends to approximately 46.14 ha. and constitutes the EIA project boundary for this quarry.

The lands the subject of this EIAR [the subject lands] at 46.14 ha. entirely encompass the application lands of 26.87 ha. The reserve at this quarry is greywacke rock, overlain by boulder clay, currently worked to an average depth of 173 mAOD.

The reserve is excavated by blasting and mechanical means, and primarily processed by mobile plant at the working face. Excavated material is transported to a centrally located existing administration and processing plant area over approximately 5 ha. that holds further processing plant (washing, screening, grading, bagging), an asphalt production plant and concrete plant. This plant and processing area is an established part of the quarry area and has also been formerly used for the recovery of inert C&D waste.

To note, a Stage 1 Screening Report for Appropriate Assessment (AA) has been submitted to accompany this planning application. This assesses the potential effects which may occur on Natura 2000 sites and associated qualifying species as a result of the Proposed Development.

Figure 1 provides a depiction of the application area and the EIA project boundary

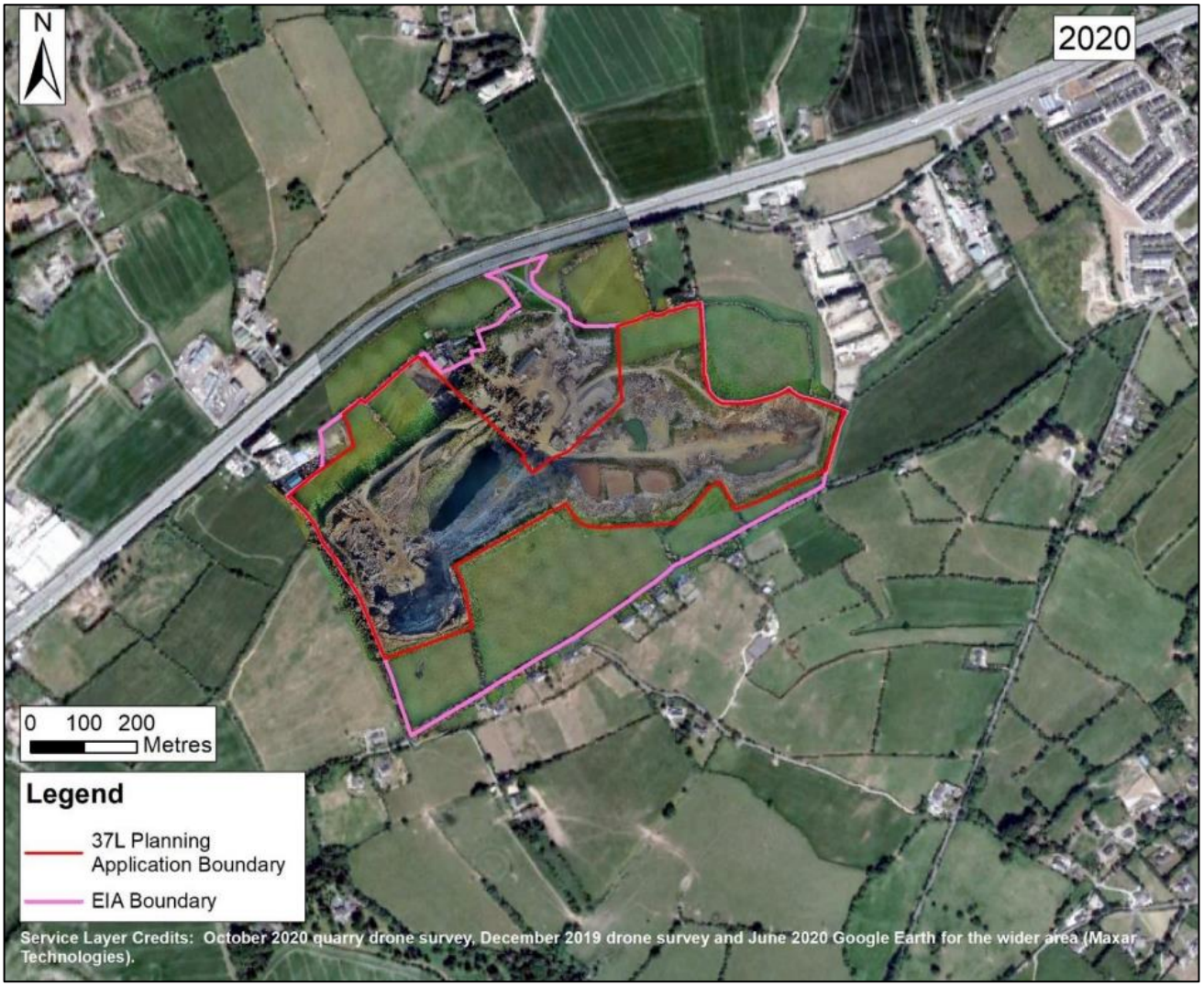


Figure 1: Location, Section 37L Planning Application Boundary and the EIA Boundary of the Proposed Development.

1.1 EIA Scope and Methodology

Environmental Impact Assessment (EIA) is a process used to predict the adverse and beneficial impacts of a proposed development. It provides a means of drawing together the findings from a systematic analysis of the likely significant environmental effects of a scheme to assist planning authorities, statutory consultees and other key stakeholders in their understanding of the impacts arising from a development.

Certain proposed developments, due to their type, and scale automatically attract the requirement for EIA by a competent authority as part of that authority's formal assessment of the development proposal when that proposal seeks permission, consent or licensing. As set out in the next section, a hierarchical suite of European and national legislation and guidance govern EIA and direct EIAR content.

The permission for development sought in this instance is under Section 37L of the Planning and Development Act, 2000. This type of planning permission may only be sought where an application for substitute consent is in being.

In this instance the concurrent substitute application with rEIAR and this EIAR to accompany the application for further development of the quarry is by Order of the High Court [2018 No. 929 JR] of August 2020 that set aside

a previous substitute consent (ref. PL06.SU0068) and a S.37L (PL06S. QD0003) ref. application decisions and granting relief including:

> *"…that a fresh application to the Respondent for continued development in relation to the site at Windmill Hill Rathcoole County Dublin pursuant to the notice dated 11 August 2015 issued by the Respondent in respect of section 37L of the Planning and Development Act 2000 as amended shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks of the date of perfection of this Order or such further period as the Board may allow…"*

Each technical environmental topic necessarily has separate legislative, policy and best practice requirements, however the assessments have applied the same overall standard approach. These include:

- Confirming the relevant legislative and policy context;
- Determining the applicable study area for that discipline;
- Establishing the baseline conditions for that discipline;
- Identifying potential receptors and their importance;
- Identifying potential sources of impact (change) to the receptors due to the Proposed Development;
- Applying a risk-based assessment methodology to evaluate the level of significance of environment effects resulting from each of the identified impacts;
- Where applicable, propose mitigation measures to avoid, reduce or remedy undesirable potential impacts, as appropriate, and thereby reduce the level of significance of each potential effect; and
- Conducting a final assessment of residual environmental effects, factoring in the measures and compensation strategies.

The EIAR was prepared by appropriately qualified and competent consultants as required by the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU). Further technical details concerning the scope and methodology of the EIAR have been provided in Chapter 2 of the EIAR.

The structure of the main EIAR document is laid out as follows:

- Chapter 1 – Introduction, Scope and Methodology;
- Chapter 2 – Project Description;
- Chapter 3 – Population and Human Health;
- Chapter 4 – Ecology and Biodiversity;
- Chapter 5 – Land, Soils and Geology;
- Chapter 6 – Water;
- Chapter 7 – Air Quality and Climate;
- Chapter 8 – Noise and Vibration;
- Chapter 9 – Cultural Heritage;
- Chapter 10 – Landscape and Visual;

- Chapter 11 – Traffic;
- Chapter 12 – Material Assets;
- Chapter 13 – Interactions;
- Chapter 14 – Mitigation and Monitoring Measures.

1.2 The Need for the Development and Consideration of Alternatives

The greywacke rock reserve at the subject location is of proven quality, capable of being used to produce aggregate for construction purposes and asphalt products. This EIAR is prepared to accompany an application for the continued extraction of reserves over a lateral extension of ca. 4.1 ha. to a final average working depth of 150 mAOD.

As with all aggregate extraction development the nearer the supply of aggregate to the market, the more economically viable it is and given the nature of aggregate deposits, quarries can only be worked where the sediments occur. Aligned to this economic situation is the environmental and social preferability of locally sourced aggregates. Aggregates sourced close to their market is preferable to that sourced at more remote locations as it lessens road traffic and associated environmental impacts and economic costs. Socially, the local sourcing of construction aggregate strengthens the local economy through job provision and associated spending, and exploits advantages and opportunities inherent in local supply chains.

Aggregates are an essential material for the construction industry and are used in all major development plans (including housing, road surfacing, infrastructure etc.). As such, they are of major significance to the overall growth of their local areas and the country and an important economic resource despite fluctuations in levels of construction due to wider economic forces, or the Covid-19 pandemic suspension of construction just ended at the time of writing this EIAR.

The purpose of this EIAR is to assess the site with regard to experienced / potential impacts on the environment, and to recount / propose measures to avoid, reduce or remedy undesirable potential impacts, as appropriate.

In this case, the quarry site represents the sole land asset upon which the developer's companies and employees rely. The developer has a personal intergenerational association with the lands and is a quarry operator and employer who wishes to maintain this asset as a sustainable extraction and processing development. In order for this operation to continue, planning permission for further extraction is sought to continue to feed market demand for aggregate and its products. The concurrent substitute consent application and rEIAR may only seek permission for development that has already occurred and as such the further extraction of reserve is the subject of this S.37L application and accompanying EIAR.

Maintaining the quarry site and adjacent suitable lands as a viable quarry, with associated processing facilities, will ultimately realise the extraction potential of this established quarry, and will maintain the direct and indirect jobs which have only lately returned to pre-recession levels.

1.2.1 Site Selection and Alternative Designs Considered

In this instance the EIAR has arisen as a direct requirement of the extraction area exceeding EIAR preparation thresholds. However, this extraction area occurs over an existing extraction site with minor lateral extension and is intended to utilise the plant and processing area the subject of a concurrent substitute consent. In other words, the site for which proposed development permission is sought is not a new site but rather an existing extraction site with contiguous lateral extension that will utilise a contiguous plant and processing area.

The necessity for the application this EIAR accompanies arises as the concurrent substitute consent application may only permit development already undertaken as a result of S.261A review. As such, without a S.37L

application and permission for further extraction of reserve, the continuation of the existing quarry would not be possible. Therefore, the site selection methodology employed is primary driven by the existence of the existing quarry and remaining reserve at the quarry. In this way, the site selected was required to be functionally conjoined or capable of being conjoined to the extant plant and processing area and quarry entrance.

The Proposed Development represents the immediate reserve available for extraction at the Site: a lateral extension in a northerly direction to ensure aggregate product to meet existing market demand from the quarry site.

Also deployed in site selection methodology was a review of the Development Plan objectives for the area and previous reports prepared by the local planning authority in their S.261A Assessment, An Bord Pleanála's review of that assessment and the former subsite consent and S.37L applications arising at this quarry. In this regard, the presence of Windmill Hill Protected Structure no. 358 and the specific objective for the preservation of this structure is noted and detailed at Chapter 3 of the EIAR, alongside previous ground investigation of the lands around this structure as assessed in the Cultural Heritage Chapter (Chapter 9) of the EIAR. The area around the protected structure requires further archaeological investigation as to extent and importance. Therefore, it is not proposed to extend the current quarry void in a southerly direction at this time as was previously proposed under the quashed S.37L application.

Though it is evident that the Applicant holds significant landholding at this location, controlled lands to the west, east and south of the current EIA boundary are mainly on the opposite sides of public roads or accesses. The accessing of reserve at these locations, which are currently greenfield, would require detailed design of road crossing, or over / underbridge proposals that would require detailed design consideration and pre-application assessment by transport authorities and likely roads opening or similar licenses that are not currently sought. In addition, further lateral extension of the current quarry to the west, east or further south is not required at this time where there exists sufficient reserves, estimated at approximately 5 Mt, within the existing void and the proposed northern lateral extension This remaining reserve is expected to be extracted at an average rate of ca. 500,000 tonnes per year, as has been the average for the previous approximately 25 years for the Site, and so gives rise to an expected lifespan of 10 to 15 years depending on market conditions.

The existence and continued use of the established quarry and processing complex will have less net environmental and economic impact than developing a new greenfield quarry.

2.0 PROJECT DESCRIPTION

2.1 Proposed Development Description

The subject lands have been used for quarrying since ca. 1710 and first obtained planning permission for rock extraction in 1968. As such, the quarry and associated uses are an established feature of the landscape, and the main feature of the EIA project lands.

The extracted area extends to 28.8 ha. and occupies the centre of the EIA project area. The quarry has a roughly oblong shape with a west-east axis of approximately 800 m, and a north-south axis of approximately 340 m.

The current average working depth of the quarry is approximately 173 mAOD. The reserve consists of greywacke (sandstone) and is extracted by blasting and mechanical means. The excavated material is crushed and screened at the working face by mobile plant, and transported to the central processing area for washing and grading. It is proposed to further developer this quarry by laterally extending the quarry void to the north by ca. 4.1 ha, giving a total application site area of 26.87 ha.

The N7/M7 national primary road (Naas Road) lies immediately north of the lands. The quarry Site is accessed from a left in / left out entrance via demarcated skip lanes off the N7/M7. A short avenue leads to an established

administration and processing area that occupies an area of approximately 5 ha. that was previously quarried. As a result, extraction in recent decades has been to the west and south-west, and east and south-east of this administration and processing plant area.

2.2 Major Accidents and Disasters

The EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU), requires that an assessment is made of *'the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned'.*

The consideration of major accidents and disasters seeks to assess the relevant accidents and disasters which a Development is vulnerable to, and the relevant accidents and disasters that a Development could give rise to.

The objective of this assessment is to confirm that suitable precautions are taken into account for the Proposed Development and that the potential for significant adverse effects on the environment is reduced as far as possible.

Potential risks of major accidents and / or disasters which are inherent to quarrying operations include;

- Fire / explosion;
- Unplanned outages or disruption to services;
- Road traffic accidents resulting from Heavy Good Vehicle (HGV) movements;
- Contamination of the groundwater/ surface water;
- Flooding; and
- Falling debris or the collapse of benches or quarry faces.

The assessment was based on guidance of Major Accidents and Disasters from the Department of Environment, Heritage and Local Government (Guidance Document 1, A Guide to Risk Assessment in Major Emergency Management' (DEHLG 2010 Guidance)).

The assessment considered the Site's safety and management procedures and proposed environmental controls / mitigation when evaluating the appropriate classification.

The Site currently implements an emergency plan in their Site's Safety Statement and Site-Specific Risk Assessments. Once these plans are implemented and updated accordingly it is considered that the risk of major accidents will be appropriately addressed in line with the DEHLG 2010 Guidance.

3.0 POPULATION AND HUMAN HEALTH

The population and human health assessment describes the human environment and identifies and assesses any construction and operational related impacts from the proposed activities at the Site. The human environment and potential impacts on the 'quality of life' as a consequence of the Proposed Development's operation have been discussed under the following headings:

- Populations;
- Employment;
- Amenity;
- Land-use;
- Human health; and

- Health and safety.

Impact Assessment and Mitigation Measures

An assessment of residential receptors during the assessment period has been made in relation to a 500 m EIA boundary offset. A total of 39 No. existing third-party residential dwellings are found to be currently within 500 m of the Site boundary, of these 16 No. receptors are located within 250 m of the Site boundary. The number of residences is based on a field survey, a review of aerial photography during the assessment period, DCCAE Eircode mapping and a local authority planning permission search. Three properties owned by the Applicant and located within their land holding have been identified within 250 m of the boundary.

Potential impacts to human health from effects of the Proposed Development to water surrounding the Site include discharges to the underlying groundwater. This could result in a change in water quality depending on the activities that are undertaken. There is the potential for impacted underlying groundwater to migrate to local groundwater wells and effect the users of such water supplies.

The potential associated health impacts were assessed via the biophysical factors of air, water, and noise and vibration by the appropriate chapters in the EIAR.

Potential impacts to human health from the air include dust generating activities on the Site and increase in concentrations of airborne particles, emissions from the asphalt plant, nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment used on site and vehicles accessing the Site.

Impacts to human health from excess noise and vibration on site may result in; hearing loss and various vibration syndromes of workers from high level occupational exposure; and also annoyance and effects on mental health in the surrounding residential receptors.

The Proposed Development also has the potential to impact on local businesses, rural enterprise and amenities surrounding the Site.

The various assessments undertaken indicated that there will not be significant adverse effects on the human environment, amenity and health as a result of the Proposed Development. Some small positive economic factors are identified through the creation of local employment both directly and indirectly.

4.0 ECOLOGY AND BIODIVERSITY

Study Area

The ecology and biodiversity chapter considers the effect of the Project on ecology and biodiversity.

In order to establish what species and habitats may occur at the Site a study area was defined. The study area for ecology and biodiversity includes all habitats, including the built form, within the EIA Study area which is shown on Figure 2 below.

Method and Guidance

Baseline ecological surveys within the Study Area have occurred since 2015 and are on-going during 2021. Good practice survey methods have been used throughout this work as described in Chapter 4.

The impact assessment methodology used is as defined within the second edition of the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Chartered Institute of Ecology and Environmental Managers (CIEEM), 2018). In accordance with CIEEM guidance (2018), the value of habitats and species has been measured against published selection criteria defined by the CIEEM (2018), where available.

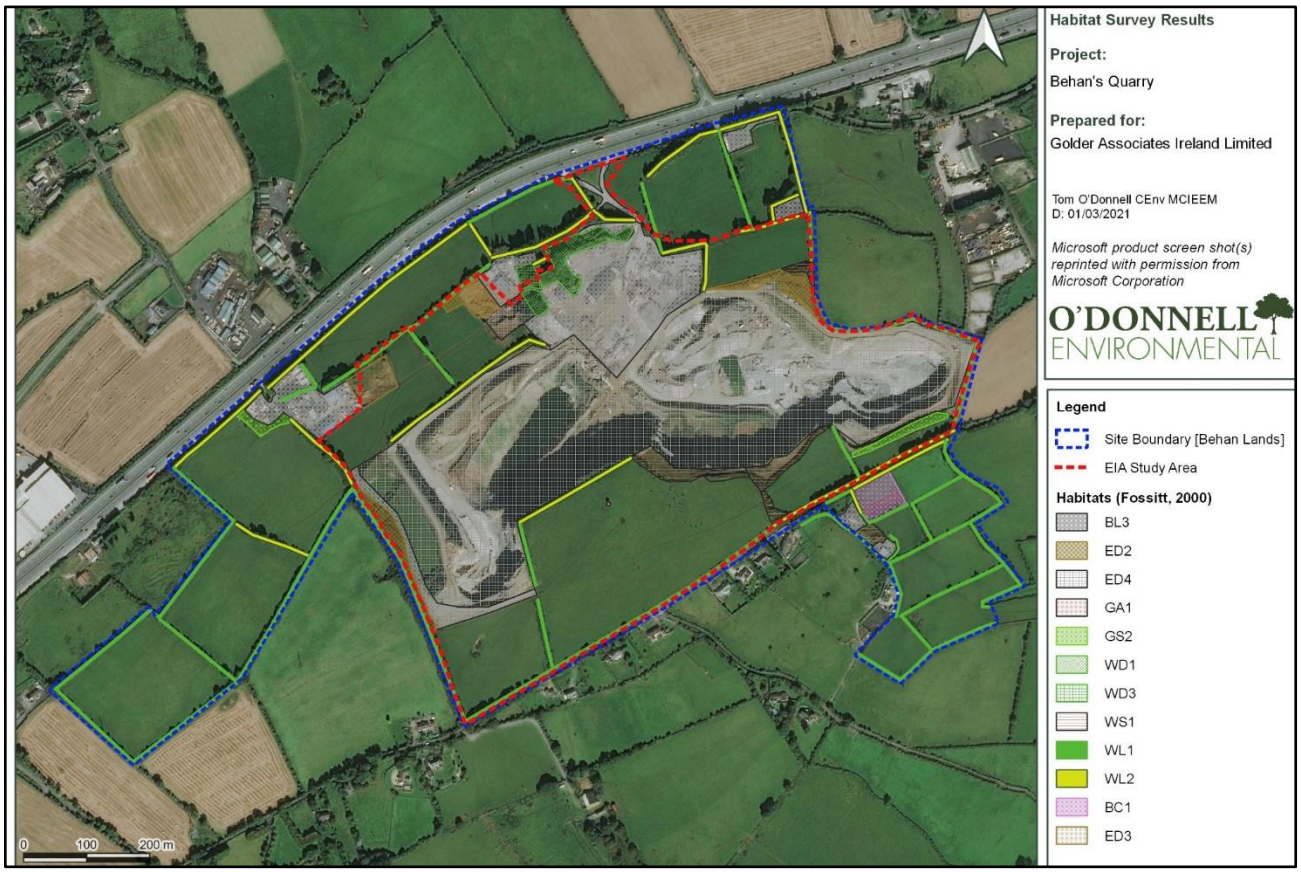


Figure 2: The Study Area and Habitat Map.

Existing Baseline Conditions

International Designations (Natura 2000 sites)

There are six Natura 2000 sites located within 15 km of the proposed development, as listed below:

- Red Bog, Kildare SAC – (ca. 7.5 km south of the Site);
- Poulaphouca Reservoir SPA – (ca. 10 km south of the Site);
- Wicklow Mountains SAC (ca. 12 km south east of the Site);
- Wicklow Mountains SPA (ca. 12 km south east of the Site);
- Glensamole Valley SAC (ca. 7.5 km east of the Site); and
- Rye Water Carton SAC (ca. 10 km north of the Site.

National Designations (NHAs) and pNHA

No Natural Heritage Areas (NHAs) were identified within 5 km of the Site. However, three proposed NHAs (pNHAs) were identified.

- Kilteel Wood pNHA (ca. 4 km South of the Site);
- Slade of Saggart And Crooksling Glen (ca. 3 km south-east of the Site); and
- Grand canal (ca. 4 km north-west of the Site).

Habitats

The Site is dominated by improved agricultural grassland (GA1 - Fossitt (2000)). For clarity and ease of use, GA1 is not mapped within Figure 2 above, and consists of all areas within the study area not otherwise mapped. Discrete areas of scrub, arable, hedgerow and semi-natural woodland were also recorded.

Fauna Assessment

Walkover surveys and camera trapping were carried out to identify mammal species utilising the Site. Badger, rabbit and fox were all recorded on Site. A possible badger sett was also recorded within the Site. Some limited potential for roosting bats was recorded. It is also possible that bats use the Site to forage and commute.

The Site periphery, including boundary features is likely to be used by general passerine and farmland bird species using the hedgerows surrounding the Site for nesting and foraging. It is possible that Site operations have created habitat for some bird species, such as Jackdaws who frequently nest in crevices on exposed rock faces.

In addition, a Peregrine Falcon (*Falco peregrinus*) is known to make use of the quarry faces that would have otherwise not existed at the Site. There are no water courses running through the Site or directly adjacent to it. Ordnance Survey maps show that the nearest stream lies to the east and drains into the Griffeen River, which itself joins the River Liffey in the centre of Lucan village. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site. Areas of open pooled water are noted on the quarry floor, and the absence of aquatic or marginal plants indicates that there is little or no residual biodiversity value in these features.

Potential Effects

Given the nature of the assessment, the operational impacts are summarised below:

- Land take (permanent loss) ca. 5.19 ha;
- Habitat modification through anthropogenic effects;
- Disturbance to habitats and species through noise from traffic and blasting;
- Individual species disturbance / mortality; and
- Impacts of dust as a result of extraction activities.

Potential direct and indirect impacts from water quality and quantity are as follows:

- Local (Site based) Impacts of dust and Site runoff (sediments, fuel, etc.) as a result of quarrying activities; and
- Impacts on surface water quality within the Site.

Mitigation and Management

Good practice management of plant and machinery will continue to be adopted to avoid pollution on Site. All retained habitats on Site will be suitably protected and habitat creation will occur at the Site to address tree and hedgerow loss on a ‘like for like’ basis. A restoration plan for the Site will be implemented which will detail all of the planting and habitat creation committed as part of the Project.

Bat activity surveys will be undertaken. and monitoring of the possible badger sett will also occur. A breeding bird (including Peregrine Falcon) survey has been undertaken and commenced in March 2020. The result of this work will form the basis of a Peregrine Falcon management and monitoring plan for the Site. To increase opportunities of roosting bats and nesting birds, a number of bat and bird boxes will be incorporated in the restoration plan for the Site, placed on trees of a suitable size. In addition, to increase opportunities for

invertebrates within the Site, invertebrate boxes will be provided under the restoration plan. These boxes will be located in sheltered areas of new and retained vegetation, in association with hedgerows.

Residual Effects

The on-going operation of the quarry, committed delivery of mitigation measures and eventual restoration of the quarry is likely to result in all effects being considered to be not significant. In essence, this can be described as having no perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation. Depending on the efficacy of the restoration proposals at eventual closure of the Site, there may be an opportunity to provide a minor positive (net gain) for biodiversity value at the Site level.

5.0 LAND, SOILS AND GEOLOGY

This assessment considers the potential impacts and effects on soils and geology that can be reasonably foreseen as consequences of the normal construction and operation of the Proposed Development.

Baseline Conditions

The Site contains agricultural fields, the existing quarry areas (including extraction areas and plant) and the proposed extension areas.

Three main land uses have been identified within the Site and the study area (500 m from the EIA boundary), these are agricultural and single-house residential lands, the N7/M7 road network and the quarry site. The lands to the north, west, south and east can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Dry cattle, sheep rearing and grazing of horses are the main activities in the area, with further arable activities to the south-west.

Corine landcover classification (EPA, 2018) classifies the area the same as the adjacent N7/M7 road classification, that of ‘Road and Rail Network’, however the area of land should be classified as ‘Mineral Extraction Sites’ which is typical of such rock quarries. The lands to the south, east and west are defined as ‘Agricultural Areas’ and ‘Pastures’.

A review of the South Dublin County Council Development Plan (2016 – 2022) indicates that the proposed north western extraction area is listed as a site ‘to provide for Traveller Accommodation Sites to be Selected’. The Draft South Dublin County Council Traveller Accommodation Plan 2019 – 2024 further identifies that the site is an indicative location with sites to be selected depending on need. The South Dublin County Council Development Plan also identifies the Site sits within an area designated as ‘Rural’ in which extractive industry is ‘Permitted in Principle’ while Traveller Accommodation is ‘Open for Consideration’.

There are no soils remaining in-situ in the existing extraction area due to extraction activities onsite. The plant area is composed of Made Ground (e.g. concrete pads, hard standing and concrete foundation areas for the plant area) overlying natural ground (soils). The northern, southern and western parts of the Site containing agricultural fields are underlain by natural ground.

The Irish Soil Information System layer (EPA, 2021) indicates that soils on the Site were once compositionally uniform across much of the EIA study area, prior to extraction activities. Superficial deposits were comprised of a clayey drift with siliceous stones, and these currently remain in-situ in the proposed north western and north eastern extension areas. These superficial deposits are described as glacial tills derived from Silurian bedrock.

Subsoils are mapped by the EPA (2021) as being sandstone and shale tills which have a clayey texture and are derived from Lower Paleozoic parent material around the northern perimeter of the Site and underlying the majority of the wider study area. The majority of subsoils underlying the quarry area have been mapped by the EPA (2021) as bedrock which is at surface, this extends into the south, west and east of the study area.

Four groundwater monitoring wells installed in March 2020 recorded a very thin soil cover (ca. 0.5 – 1 m thick) overlying a weathered/fractured greywacke, which becomes more competent with depth.

The Site is underlain by the Carrighill Formation of Silurian calcareous greywacke, siltstone and shale. The current visible floor of the existing quarry is at ca. 150 mAOD.

A review of available aerial photography indicates that the Site is the only extraction operation within the study area and no other designated geological assets or heritage sites are identified within the study area.

A review of the GSI's landslide susceptibility classification layer (GSI, 2021) indicates that the majority of the Site area has a classification of Moderately Low to High susceptibility.

The Radon Map for Ireland (EPA, 2021) indicates that the Site and study area are located in an area where between 1% and 5% of homes are estimated to be above the radon reference level.

Impact Assessment and Mitigation Measures

Four main sensitive receptors were identified in the impact assessment for the Site: superficial deposits (soil/subsoils), bedrock geology, land (agricultural land and potential Traveller Accommodation) and human health. These are classified as of negligible, medium, low and high sensitivity respectively.

The main potential impacts and associated effects considered were as follows:

- Activities or events that might impact land quality (e.g. leaks and spills from machinery or stored substances, or discharges);
- Change of land use/land take (i.e. loss of agricultural lands and loss of potential lands for Traveller Accommodation);
- Loss of superficial deposits and bedrock; and
- Destabilisation and/or subsidence of unconsolidated soils, sub-soils or rock faces.

For activities or events that might impact land quality, the magnitudes associated with the potential groundwater and surface water impacts at the Site were assigned as negligible or low.

Change of land use/land take will occur in the extension areas to the northwest and northeast, however, the lands are of low value and low productivity as an agricultural resource. Also, two alternative sites exist within close proximity to the Site which could be used as suitable alternative sites to provide Traveller Accommodation.

Loss of superficial deposits and bedrock can be considered temporary in nature for the former and permanent for the latter. Superficial deposits are very thin (ca. 0.5 – 1 m) and of low value locally, the removed soils will remain in the immediate area as they are to be utilised at the margins of the disturbed area as screening berms. By the nature of quarrying the underlying deposit of rock will be removed which will result in a direct and irreversible impact on the Site, and the deposit has a medium/high resource potential and will be used in construction projects in the greater Dublin region with ca. 5 Mt to be extracted.

General earthworks (e.g. excavation, soil movement, ground compaction, stockpiling, reprofiling) have the potential to affect human health of workers if they were to become unstable. Stability issues may also arise during the excavation of the quarry faces and the construction and management of the silt ponds.

The extraction plan for the proposed extension has incorporated industry standards for quarry face and slope design, thus mitigating any potential geotechnical / geohazard risks.

The management of the existing quarry faces, and silt ponds will be in accordance with the Health and Safety Authority's 'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008, (as amended), and the recommendations of geotechnical appraisals will be carried out on site.

Mitigation through embedded design and mitigation measures determines that the proposed development is unlikely to have significant adverse effects on the land, soil or geology environment at, or surrounding the Site. In all cases the residual adverse effect is not significant and not greater than slight.

6.0 WATER

Baseline and Subsequent Conditions

Water enters the Site through direct rainfall precipitation and via the movement of groundwater through the subsurface which predominantly flows from southeast to northwest, coincident with local topography. In the excavated areas of the Site in the eastern and western areas water is present in the lowest elevations of the pits. The excavations on the Site intersect the groundwater table and therefore ponds are considered to be a mix of both groundwater and rainfall. Once present in the pit this water mass will be subject to evaporation and will provide some recharge to the underlying bedrock. Rainfall on other areas of the Site will predominantly infiltrate the ground where it will be subject to evapotranspiration or becomes recharge to groundwater.

Bedrock underlying the Site is classified as unproductive. Flow in the bedrock is likely to be predominantly confined to bedding planes, faults and fractures due to the fine-grained, low porosity nature of the bedrock. Connectivity of fracture sets within the bedrock is expected to be low, with limited lateral connectivity (tens of metres from the Site) and limited connectivity of groundwater with off-site receptors (such as adjacent domestic water supplies). There may be zones of increased hydraulic conductivity in the unexcavated upper weathered zones (or shallow zones subject to blasting) which can allow for rapid infiltration of rainwater. This hydraulic conductivity decreases with depth as weathering of the rock reduces. Pumping at the Site is shown to cause drawdown localised to the quarried areas, with limited impact observed in the surrounding natural ground.

Groundwater quality within the central areas may be impacted due to activities at the Site, however quality results for boreholes located at the Site perimeter are generally good and further prove the dysconnectivity of the Site with surrounding receptors. Some exceedances of drinking water standards were noted, most frequently naturally occurring metals such as arsenic and some sporadic exceedances of hydrocarbons and total coliforms, which are interpreted to be derived from off-site sources. Bottled water is used as drinking water on-site.

There are no watercourses which pass through the Site boundary. Local surface water features are predominantly fed by rainfall runoff from higher topographical areas which collect in natural gullies and form headwaters for tributaries to larger streams and rivers. The topography of the Site and the surrounding area means that surface water runoff from the Site (e.g. in the event of flooding from the Site) could eventually reach the N7/M7 motorway or contribute to the River Griffeen, however assessment shows that there is sufficient attenuation capacity within the quarried areas to allow capture of rainfall under extreme storm events.

As part of the water management system on the site, water abstracted from the western quarry pit is discharged following periods of prolonged rainfall to a culvert located on the northern portion of the Site adjacent to the N7/M7 motorway. Water from this culvert is discharged into the motorway drainage system. It is unknown where the water in the motorway drainage system flows to from this point and may discharge to a tributary of the River Griffeen near Rathcoole. The water quality of the River Griffeen is generally shown to be good, with no exceedances of environmental quality standards and no effects identified regarding the potential discharge of pumped water via the motorway drainage system.

Impact Assessment and Mitigation Measures

Three main sensitive receptors were identified in the impact assessment for the Site: groundwater (quality and level), surface water (quality) and floodplain areas associated with discharge to the River Griffeen. These are classified as being of negligible, medium and low sensitivity respectively.

No pathway was identified between the Site and Natura 2000 designated sites as these are located at distances exceeding 8 km from the Site and not in hydraulic connectivity with the Site. Equally, there is no pathway between the Site and human health receptors (both on-site workers and off-site residential receptors).

Mitigation through embedded design and remedial measures determines that the proposed development is unlikely to have significant adverse effects on the water environment at or surrounding the Site. In all cases the residual adverse effect is not significant and not greater than slight.

7.0 AIR QUALITY AND CLIMATE

This chapter presents an assessment of the potential air quality and climate effects associated with the continued operation of the Site. The effects have been assessed in the context of relevant national, regional and local air quality policies.

A qualitative assessment of dust impacts from the quarrying activities has been undertaken in line with Institute of Air Quality Management (IAQM); Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016.

A traffic screening and quantitative operational phase assessment of effects from road traffic emissions has been undertaken in accordance with the Environmental Protection UK/Institute of Air Quality Management guidance document 'Land –Use Planning & Development Control: Planning for Air Quality' (EPUK/IAQM 2017), as part of the concurrent substitute consent rEIAR submitted for the Site. The assessment concluded that the impact of traffic on local receptors was not Significant. As there are no proposed changes to traffic flows associated with this application (and vehicle emissions are predicted to improve with time due to improvements in technology and emissions), impacts from traffic emissions are considered to be Not Significant and are therefore not considered further.

A quantitative assessment of combustion emissions related to the asphalt manufacturing site was undertaken as part of the concurrent substitute consent rEIAR. Detailed dispersion modelling was undertaken using the latest version (Version 5.2.2) of CERC ADMS5 dispersion modelling software, to predict concentrations of NOx, NO_2, SO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors. The assessment concluded that the impacts from the operation of the plant on local receptors was Not Significant. As there are no proposed changes to the operation of the asphalt plant at the Site, impacts from the combustion emissions are considered to be not Significant and are therefore not considered further.

Impact Assessment and Mitigation Measures

The background air quality has been classified using Site monitoring data gathered during 2020 and 2021 for dust, and EPA monitoring data for NO_2, NO_x, SO_2, PM_{10} and $PM_{2.5}$. Climate data for the area has been obtained from the Met Éireann station at Casement Aerodrome, Baldonnell, Co. Dublin, ca. 5.5 km northeast of the Site, and has been used to inform the dust assessment.

The assessment has also considered the potential climate impacts during the operational phase. The effect of climate change on the continued operation of the Site is discussed in relation to air quality, noise, landscape and visual, water and flood risk, geology, ground conditions and groundwater, and ecology and biodiversity. No additional mitigation or monitoring has been considered necessary as a result of continued operation of the Site in relation to climate change. Consideration to the potential greenhouse gases which may be generated from the ongoing operation of the Site is also included in the assessment.

The impact of coarse particulates (dust) on the surrounding area as a result of the ongoing activities at the Site is considered to be 'slight' and therefore Not Significant. The assessment considered the ongoing mitigation measures which will continue to be in place. With regards to fine particulates, it is considered that there may be the potential for an increase in PM_{10} and $PM_{2.5}$ concentrations at the residential receptors downwind in the vicinity of the Site, but the PEC is still predicted to be below the annual AQS, with headroom. The impact of fine particle PC from the Site is therefore considered to be imperceptible and therefore Not Significant.

When considering all of the emissions to air associated with the ongoing operation of the Site, the impacts to air and climate are considered to be Not Significant.

8.0 NOISE AND VIBRATION

This assessment has considered potential noise and vibration impacts associated with the Proposed Development's extraction and restoration activities. The assessment has comprised characterisation of the baseline noise and vibration environment, adoption of appropriate evaluation criteria, prediction of noise levels at identified Noise Sensitive Receptors (NSRs) and specification of appropriate mitigation.

The primary source of noise from the development will include traffic, blasting, screening, and crushing of extracted materials, vehicle movements, intermittent noises, reversing alarms, and general plant and machinery.

The primary source of vibration associated with the proposed activity is blasting from the excavation of rock. Blasting results in ground borne vibrations and air-overpressure impacts. It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern.

The study area considered in this assessment comprises a buffer approximately 600 m beyond the quarry boundary. This area includes the receptors anticipated to be impacted by quarry operations. The closest receptors are located approximately 200 m south of the quarry boundary.

The noise environment at the closest NSRs to the quarry are noted to be dominated by road traffic noise from the N7/M7 dual carriageway. Operational noise from the quarry is sporadically audible at the Site's monitoring position and is inaudible at properties to the north, east and west of the quarry.

Noise modelling has predicted noise from proposed quarry activities to determine the likely worst-case contribution of proposed quarry operations to the noise environment. Two scenarios have been modelled to assess noise impacts from the proposed operations: the first scenario assessed excavation and mobile processing of materials; while the second scenario examined the loading and moving of trucks. In line with the operational hours of different activities, Scenario 1 was evaluated against the daytime target level, and Scenario 2 was evaluated against the night-time target level

Under Scenario 1 the predicted noise level due to quarrying activities was below the measured noise level at all NSRs except one which is owned by the applicant and was above the measured baseline ambient level by between 0.2 and 1.1 dB. Under Scenario 2 the predicted noise level due to quarrying activities under each scenario is below the measured noise level at all NSRs. Both modelled scenarios also made conservative assumptions and as such the predicted exceedances are unlikely to occur in practice. It should be noted that predicted noise levels are within the acceptable limits of the existing planning permission and those prescribed in Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA 2006)

Vibration measurements undertaken at the eastern and western boundary of the quarry throughout 2019 and 2020 were examined and these records are provided in the chapter's appendix. The maximum Peak Particle Velocity and air overpressure measurements comply with their respective limits. Future extraction and blasting activities are proposed to the north of the Site and closer to the Irish Water main line. The extraction methods and mitigation measures will be agreed in consultation with Irish Water (IW) prior to the commencement of extraction activities in the northern sections of the Site. Should further surveys be required then these will also

be commissioned in conjunction with the requirements of Irish Water. To reduce the potential of damage to the Irish Water pipeline numerous mitigation measures are currently employed during blasts; these are identified in detail in the chapter. The quarry will deploy a vibration monitor at the IW pipeline during all blasting events on the northern face of the quarry. From these monitoring records the blasting contractor can determine the margin of compliance with the vibration limit and if blast parameters require refinement for future blasting events.

With the implementation of these mitigation measures and controls it is considered that vibration effects on the IW pipeline from blasting are 'not significant'.

No significant noise or vibration impacts have been identified in the design and operation of the Proposed Development.

9.0 CULTURAL HERITAGE

This assessment considers the potential effects of the Proposed Development on cultural heritage during both the operation and decommissioning phases. The term 'cultural heritage' is used collectively to refer to all assets of archaeological, architectural and historical or cultural value. The assessment includes a detailed baseline study to establish the existing conditions, and an effects analysis and impact assessment that considers both direct effects (e.g. physical disturbance) and indirect effects (e.g. changes to setting due to dust and visual changes). The assessment of indirect effects is informed by the results of other assessments, including air quality, noise and vibration, and landscape and visual. Where required, appropriate mitigation measures have been proposed to avoid or reduce identified impacts.

In lieu of specific guidance from the Institute of Archaeologists of Ireland (IAI), the impact assessment conforms to the guidelines set out by the Chartered Institute for Archaeologists (CIfA, 2020a[1]; 2020b[2]).

Impact Assessment and Mitigation Measures

There are five known cultural heritage assets within the Site, however these all lie outside the area of proposed extraction. As such, no direct effects are predicted to known designated or non-designated assets during operation. An imperceptible effect is predicted during operation as a result of indirect effects from noise, dust and visual changes to the setting of these known assets. The imperceptible significance of this effect reflects the baseline setting of the assets on the periphery of an existing quarry. Visual changes are expected to have an imperceptible to slight positive effect on 16 cultural heritage assets located within the wider Study Area. During decommissioning, when indirect effects to the setting of assets is expected to stop and the Site is restored, a slight positive effect is predicted for all assets.

There is potential for previously undiscovered archaeological remains to survive within the Site, including the two previously undeveloped additional extraction areas. If such remains do exist beneath the surface in these additional extraction areas, then there is potential for them to be directly affected by ground disturbance during operation, resulting in a potentially profound adverse effect. No additional ground disturbance is expected to occur during decommissioning and so no direct effects are expected during this phase.

To mitigate for the potential presence of undiscovered archaeological remains within the additional extraction areas, a phased approach is recommended. Initially, a geophysical survey of the two additional extraction areas will be undertaken. The results of this geophysical survey will then inform the further development of the mitigation strategy, including the need for further intrusive archaeological investigation. If required, this may

[1] CIfA (2020a). Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment.

[2] CIfA (2020b). Standard and guidance for historic environment desk-based assessment.

range from archaeological supervision of soil stripping work by a licensed archaeologist, to trial trenching and targeted evaluation, to broader, more extensive archaeological excavation.

To ensure the protection of the five known assets from inadvertent direct impacts, the area will be clearly demarcated, and the presence, significance and protections afforded to these assets will be communicated to all staff working on site, as part of their environmental induction.

10.0 LANDSCAPE AND VISUAL

Despite its scale, views of the working quarry are generally hidden by the surrounding topography. The upper profile of the worked southern boundary does however stands proud of the tree cover within the quarry and in contrast to the surrounding local hills.

The Proposed Development will result in further excavation from the existing quarry void and expanding it laterally northwards across three small fields, over an additional 5.19 ha of which 4.1 ha will be extracted. This will result in loss of pasture cover and some boundary hedgerows and trees. The alternation to the landform across the agricultural lands set within the proposed extension area will highly noticeable across the local landscape but limited over the wider landscape. Mitigation measures include the use of mounds and woodland planting along the revised boundary edges to help enclose the development. The implementation of the proposed landscape mitigation and remediation measures will increase the quantity and diversity of vegetation and habitat in the local landscape, as highlighted on the restoration plan (See Chapter 10).

Similarly, the viewpoint assessment found that this alternation of landform would be most apparent from those nearest visual receptors north of the proposed site which already experience clear views of the existing quarry's deep southern rock face. These affected receptors will experience a localised visual change of landcover from pasture to quarrying, with the associated site works gradually lowering the existing landform. This will open the lands up and potentially increase the visual prominence of the quarry within these views compared to the existing quarry's visibility. However, the landscape mitigation measures include new mounds and woodland planting across the boundaries of the affected fields to help screen inwards views, which will further reduce as the planting matures.

The ridgeline of Windmillhill, which is a South Dublin County Council protected prospect, helps to screen views of the existing quarry and proposed extension areas from the majority of receptors views located south of the quarry and this ridgeline. Some limited receptors have partial views of the existing quarry's mounds on the southern boundary. However, the proposed mitigation measures will help to soften their appearance with woodland planting.

11.0 TRAFFIC

The objective of this Chapter is to assess the traffic impacts associated with the proposed development in terms of its integration with existing traffic on the surrounding road network. This assessment determines the impact on operational performance of trips generated by the development on the local road network.

Further development at the quarry proposes a lateral northward extension of the current quarry void over approximately 4.1 ha, (requiring a total additional land take of 5.19 ha. for landscaping berms), and a deepening to a final working base of 150 mAOD. The Proposed Development relates to quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area, with the current access being retained.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions, with a further 5 years for restoration.

Twelve-Hour classified Junction Turning Counts (JTCs) were carried out on three consecutive days from Tuesday 13th to Thursday 15th October 2020 at the quarry access. The count was carried out between 5:00 am and 5:00 pm, with this time period encompassing the main operating hours of the quarry. The total number of trips has been calculated as 832, 806 and 828 trips respectively, which includes exported material and all staff, and miscellaneous, trips.

At the time of preparing this report Government enforced travel restrictions were in place nationally due to the COVID-19 pandemic. As a direct result of these travel restrictions, travel patterns on the N7/M7 are likely to have significantly reduced, and therefore may not be representative of typical travel patterns on the N7/M7. For this reason, it was not considered practical to undertake traffic counts on the N7/M7, as the results would not be representative of the average volume of traffic travelling on the N7/M7.

In lieu of traffic count data on the N7/M7 westbound carriageway, historical (pre-pandemic) AADT and peak hour figures, recorded and reported by the TII traffic counter TMU N07 015.0 W, were used to estimate the average daily traffic patterns.

The traffic generated by the quarry represents between 1.23% and 1.62% of total traffic on the N7/M7 National Road between 2020 and 2051, the final future forecast year. It is consequently concluded that the N7/M7 will have sufficient link capacity for each of the future assessment years with, and without, the proposed development.

The N7/M7 bounds the quarry lands to the north and is the main arterial road in the area. A search of planned adjacent developments which may have an impact on future traffic flows in the vicinity of the proposed development was undertaken and it is noted that there are no extractive or sizable industries in the surrounds of the site which may contribute to cumulative traffic from adjacent developments having an impact on the operation of the N7/M7 carriageway. The large volume of traffic on the N7/M7, as recorded by the TII traffic counters, relative to traffic generated by adjacent developments results in this dominating the baseline traffic data.

For the purposes of the traffic flow capacity assessment at the quarry access, the existing road layout at the left-in/left-out junction was assessed in accordance with the permitted traffic volumes for this type of junction layout, as detailed in Chapter 7 of TII Publications document DN-GEO-03060, *"Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions)."*

This assessment concludes that the current junction layout should be amended to bring the access junction in line with current TII standards. This can be achieved by amending the current road markings at the quarry access junction. Specifically, the following amendments are required to ensure the junction layout complies with the current TII Publication documents.

1) Nose length of 75 m with a ratio of 1:25 to be provided for the merge, and nose length of 70 m with a ratio of 1:15 to be provided for the diverge;

2) Auxiliary lane to be extended to 160 m for merge, and 150 m for diverge; and

3) Auxiliary Lane Taper to be extended to 75 m for merge, and 70 m for diverge.

However, due to the presence of an existing access to the east of the existing diverge lane, the full auxiliary lane and auxiliary lane taper is not feasible without conflicting with this access. It is therefore considered sufficient to retain the existing arrangement of the diverge at the quarry access. The merge should, however, be amended in line with the requirements listed above. Further design would be required prior to implementing the necessary road markings at this location.

Sightlines were assessed on the westbound on- and off-slip arrangements, and were found to be compliant with TII sightline requirements.

The assessment therefore indicates that the development will have a negligible impact on traffic flows on the existing road network due to the low volumes of traffic to be generated from it and, with the above amendments being implemented at the merge at the quarry access junction, the junction will accommodate existing and future traffic volumes for all future forecast years.

12.0 MATERIAL ASSETS

Material assets comprise the physical resources in the environment, which may be of human or natural origin. The objective of the assessment is to ensure that these assets will be used in a sustainable manner with respect to future operations at the Site.

Material Assets in the vicinity of the Site comprise of built services and infrastructure, such as:

- Electricity network utilities;
- Gas infrastructure;
- Telecommunications;
- Local water supplies and foul water network;
- Surface water drainage infrastructure;
- Waste management infrastructure; and
- Geological resource.

Other material assets include roads and traffic, which have been assessed in Chapter 11 (Traffic) and the potential effects of blasting and vibration on neighbouring dwellings (assessed in Chapter 8 (Noise and Vibration)).

Information for the assessment of potential impacts on the identified material assets was obtained by means of a desk-based review, and included the following sources:

- ESB network utility plans;
- Gas Networks Ireland utility plans;
- Eir CYBD mapping;
- Irish water utility mapping;
- Field surveys of the Application Site;
- Department of Communication, Climate Action and Environment (DCCAE) Eircode maps; and
- Aerial and ordnance survey maps of the area.

Impact Assessment and Mitigation Measures

Electricity

The Proposed Development will utilise electricity supplies to the Site via the existing onsite connection to the grid. The Proposed Development seeks to maintain existing connections and no new connections or demands on the electrical infrastructure are proposed. Further expansion of the existing pit is not proposed to the south-west in the area where the overhead 110KV line traverses the Site. Potential effects from the Proposed

Development's continuation of quarrying on the local electrical supply network are therefore considered to be imperceptible

Gas Supply

There will be no requirements for a GNI connection to service the Development. Therefore, there will be no additional supply demands on the GNI network. Excavation and blasting works will take place on Site, however these activities will not be conducted in the vicinity of the distribution pipeline to the north of the Site between the boundary and the N7/M7. Effects from the Proposed Development's activities on the gas supply network are considered to be imperceptible.

Telecommunications

The Site's office currently utilises a privately owned mast located to the south of the pit for telecommunications. The Proposed Development does not seek to access additional telecommunication infrastructure, nor does it seek to carry out extraction activities which may result in telecommunication infrastructure being affected. Effects from the Proposed Development's activities on the local telecommunication networks are considered to be imperceptible.

Local Water Supplies and Foul Water Infrastructure

Water used on Site is abstracted from groundwater wells, and bottled water is used for drinking water. Additional abstraction points or access to the public water supply network are not required as part of the Proposed Development. As it is not proposed to consume water from the local supply network then potential effects from the Proposed Development on the water supply network are considered imperceptible.

Controlled blasting is conducted at the quarry as a method of rock extraction. As well as impacting local residents and their properties an improperly managed blast could damage the Irish Water pipeline located to the north of the quarry. Extraction in this area of the pit is proposed to be carried out in a phased manner in a northerly direction. To reduce the potential for damage to the Irish Water pipeline numerous mitigation measures are currently employed during blasts and these have been described in detail in Chapter 8 of the EIAR (Noise and Vibration). These measures include a number of operational controls and also the requirement for blasting contractors to be trained and competent. The blasting activity itself will be conducted using these existing blasting methods that are currently employed on Site. Further extraction methods and mitigation measures will be agreed in consultation with Irish Water prior to the commencement of extraction activities in the northern sections of the Site. With these embedded design and management measures it is considered that effects of Site activities on the Liffey aqueduct water main will be imperceptible.

Surface Water Drainage Infrastructure

As noted, surface water on the Site infiltrates through the underlying soils and sub-soils and percolates to the groundwater. In addition, as part of the water management system on the Site, water abstracted from the western quarry pit is periodically discharged intermittently following periods of prolonged rainfall to a culvert located on the northern portion of the Site adjacent to the N7/M7 roadway. Water from this culvert is discharged into the roadway drainage system. Discharged water does not come into contact with 'dirty' water from the washing plant.

It is considered that these discharges have resulted in a negligible impact on the network resulting in effects that are capable of measurement but without significant consequences (imperceptible).

Waste Management Infrastructure

The proposed continuation in quarrying activities will not generate any new waste streams or additional quantities of wastes. Current waste management practices will be maintained, and waste will be managed by

suitable qualified, permitted and licenced operators. It is considered that the effects on the local waste infrastructure will be imperceptible.

Geology as an Economic Resource

The Proposed Development will result in a permanent loss of the geological resource within the confines of the Site. This extraction of aggregate is considered an acceptable use of the resources at the Site and material extracted from the Proposed Development will be used as raw material in the construction industry. Therefore, potential impacts from the Proposed Development's extraction of the geological resources and economic use is considered to be low (beneficial) resulting in effects that are slight.

13.0 INTERACTIONS

This assessment summarises the primary interactions and inter-relationships and provides a matrix to coherently display the interactions of these disciplines. The overall objective of this assessment is to identify whether additional mitigation is required that would not otherwise have been identified in the individual study areas for these interacting or cumulative effects.

Interactions of EIA study topic areas are typically displayed visually in a matrix table which identifies potential interactions which are likely to occur between the various disciplines. This table, from Chapter 13 of the EIAR, has been reproduced in Table 1. Green shaded boxes identify the potential interacting disciplines where a relationship exists, and the respective phase where there is an interaction is also indicated.

Table 1: Behan Quarry EIAR Environmental Interactions.

	Pop. & Human Health	Ecology & Biodiversity	Land, Soils & Geology	Water	Air Quality & Climate	Noise & Vibration	Cultural Heritage	Traffic & Transport	Landscape & Visual	Material Assets
Pop. & Human Health										
Ecology & Biodiversity										
Land, Soils & Geology										
Water										
Air Quality & Climate										
Noise & Vibration										
Cultural Heritage										
Traffic & Transport										
Landscape & Visual										
Material Assets										

14.0 MITIGATION AND MONITORING MEASURES

The purpose of this Section is to collate the mitigation and monitoring measures identified in the EIAR that are considered necessary to protect the environment during operational and restoration phases of the Proposed Development.

Where appropriate, environmental monitoring activities have been proposed for the operational and restoration phases. Monitoring is ongoing and will take place after the consent is granted for the Proposed Development

to provide assurance that aspects of the design and management are functioning as intended and therefore not generating significant effects.



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1.0 INTRODUCTION, SCOPE & METHODLOGY

Golder Associates Ireland Ltd ("Golder") have been commissioned to prepare this Environmental Impact Assessment Report [EIAR] to accompany an application for permission for further development of an existing quarry over approximately 26.87 hectares [ha.] at Windmillhill, Rathcoole, Co. Dublin. This EIAR is submitted on instruction of Mr. Laurence Behan, owner and operator of this quarry who will is making the application for permission.

It is noted that this EIAR has been prepared in tandem with an rEIAR to accompany an application for substitute consent for that existing quarry under Section 261A of the Planning and Development Act, 2000 as amended by the same applicant.

The further development of the quarry is proposed over an area nearly entirely consisting of lands already excavated and is therefore mainly for the purpose of recovering the economic reserve that remains in the void. The proposed development site (application site) lies at the centre of a contiguous, established landholding of approximately 73 ha. That landholding is centered on the townland of Windmillhill and covers much of that townland area with protruding minor portions of that ownership unit extending north westerly into the townland of Steelstown and south easterly into the townland of Carrigeen.

The centre of the landholding has been the subject of historic, current and intended future extraction and is roughly rectangular in shape with a south to north orientation onto the N/M7. The southern boundary is delineated by the local Windmillhill Road and the western and eastern boundaries of this area are delineated by the Windmillhill townland boundaries. This area extends to 46.14 ha. and constitutes the EIA project boundary for the quarry.

The lands the subject of this EIAR [the subject lands] at 46.14 ha. entirely encompass the application lands of 26.87 ha. The reserve at this quarry is greywacke rock, overlain by boulder clay, currently worked to an average depth of 173 mAOD.

The reserve is excavated by blasting and mechanical means, primarily processed by mobile plant at the working face. Excavated material is transported to a centrally located existing administration and processing plant area over approximately 5 ha. that holds further processing plant (washing, screening, grading, bagging), an asphalt production plant and concrete plant. This plant and processing area is an established part of the quarry area and has also been formerly used for the recovery of inert C&D waste.

Figure 1.1 provides a depiction of the application area and the EIA project boundary.

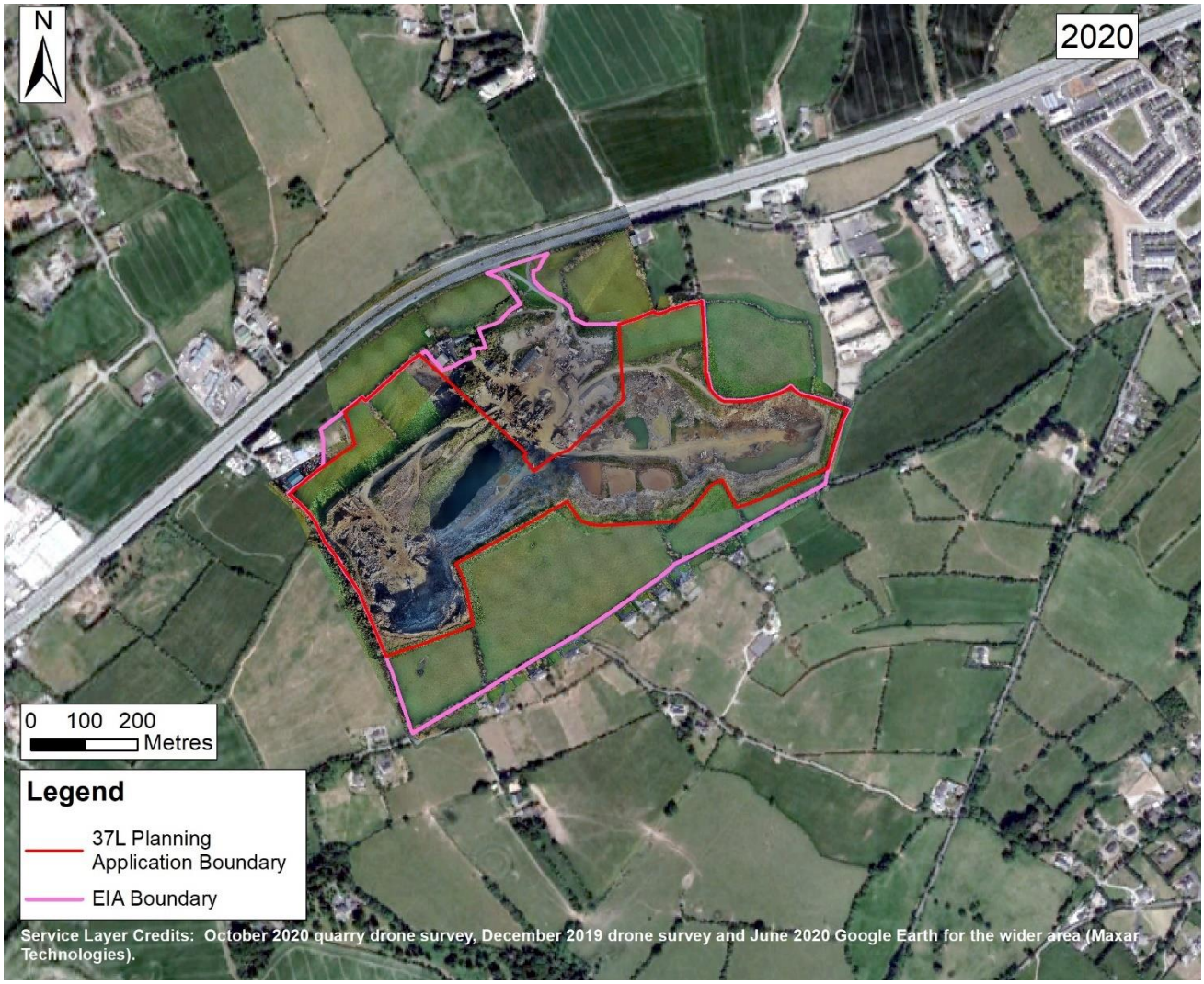


Figure 1.1: Further development of the quarry application area and the lands the subject of the EIAR.

1.1 Requirement for EIAR

Certain proposed developments, due to their typology, or scale automatically attract the requirement for EIA by a competent authority as part of that authority's formal assessment of a development proposal seeking permission, consent or licensing. As set out in the next section, a hierarchical suite of European and national legislation and guidance govern EIA and direct EIAR content.

The further development of a quarry proposal is over a site area of 26.87 ha. that automatically attracts the requirement for EIA. The applicant seeking this development permission is therefore bound to provide an EIAR for the purposes of EIA.

The permission for development sought in this instance is under S.37L of the Planning and Development Act, 2000. This type of planning permission may only be sought where an application for substitute consent is in being.

In this instance the concurrent substitute application with rEIAR and this EIAR to accompany the application for further development of the quarry is by Order of the High Court [2018 No. 929 JR] of August 2020 that set aside a previous substitute consent (ref. PL06.SU0068) and a S.37L (PL06S. QD0003) ref. application decisions and granted relief including:

> *"…that a fresh application to the Respondent for continued development in relation to the site at Windmill Hill Rathcoole County Dublin pursuant to the notice dated 11 August 2015 issued by the Respondent in respect of section 37L of the Planning and Development Act 2000 as amended shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks of the date of perfection of this Order or such further period as the Board may allow…"*

A copy of this Order is at Appendix 1.1.

A copy of the notice of 11 August 2015 is at Appendix 1.2. This notice consisted for a letter from An Bord Pleanála to the applicant for substitute consent under PL06.SU0068, stating that new legislative provisions had been made that allowed for concurrent application for permission for further quarrying to be made concurrent to substitute consent applications. Ref. PL06.SU0068 was an application for substitute consent before the Bord at the time of the notice. The provision referred to is S.37L of the Planning and Development Act, 2000 as amended.

1.1.1 Context and description of previous application for further quarry development

Section 37L of the Planning and Development Act 2000, as amended is entitled 'Further matters in relation to control of quarries' and allows for the making of an application for planning permission for the further development of a quarry site for quarrying only. Furthermore, this section of the Act restricts the circumstances timing of the making of the application to within 6 weeks of the submission of a subsite consent application on the same site.

As noted in the last section the current S.37L application is made on foot of the quashing of an order in respect of an earlier S.37L application that itself was allowed to be sought as a then concurrent application for substitute consent for a quarry was in being. That substitute consent application arose as a result of the review of the quarry under S.261A of the Planning and Development Act as amended (South Dublin County Council ref. SDQU5/04 & An Bord Pleanála Quarries Review ref. PL06S.QV0090).

The S.261A review of the quarry arose following registration in 2005 under S.261 by Mr. Laurence Behan of a quarry being operated by L Behan & Sons Ltd. with an estimated 'site boundary' of 73 ha. and a 'workable area' of 39.27 ha. This registration further recorded that the quarry was pre '63 and later revised to recognise the securing of a planning permission in 1968. The S.261 registration as assigned ref. SDQU05/04 by South Dublin County Council. The registration map submitted is repeated at Figure 1.2.

A description of the superseded substitute consent and S.37L applications is below:

An application for substitute consent for '*a quarry'* over 40.875 ha. on behalf of Laurence Behan was made 24 October 2013 and assigned ref. PL06S.SU0068. A copy of the site location map part of this application is at Figure 1.3

An application was made, also on behalf of Laurence Behan for further development of the quarry under S.37L on 25 November 2015 and assigned ref. PL06S.DQ0003. The development was stated to consist of: '*(A) to continue the development of a quarry having a total site area of 40.875 Hectares, (B) Reinstatement of worked out quarry to agricultural use by means of the importation of inert sub soil and top soil amounting to a total of 11,151,570 cubic metres.'* A copy of the site location map part of this application is at Figure 1.4.

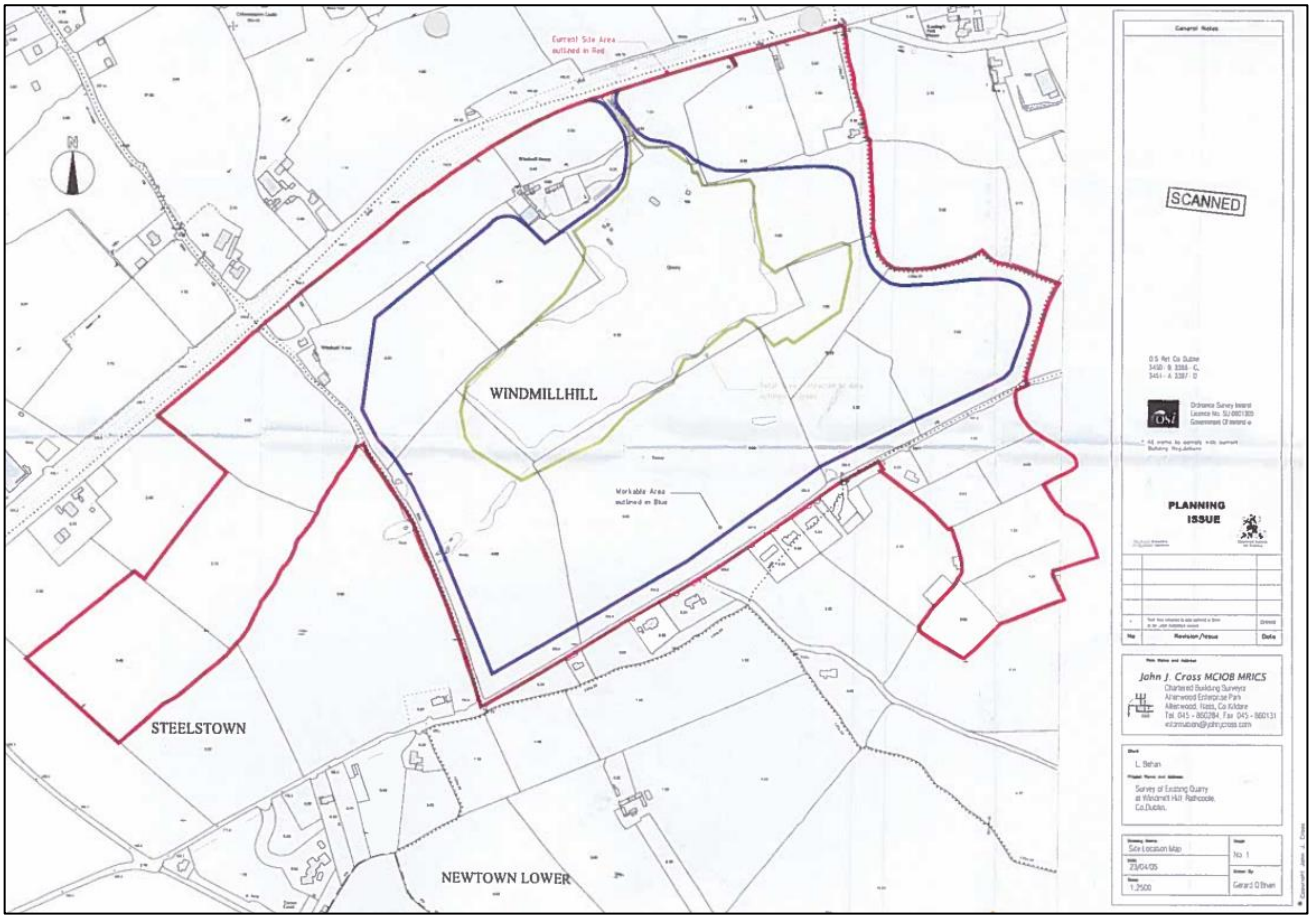


Figure 1.2: Copy of S.261 registration map submitted 10 October 2005, in response to request for further information for S.261 registration ref. no. SDQU05/4 'revised map indicating (a) site boundary in red, (b) extractable area in blue.

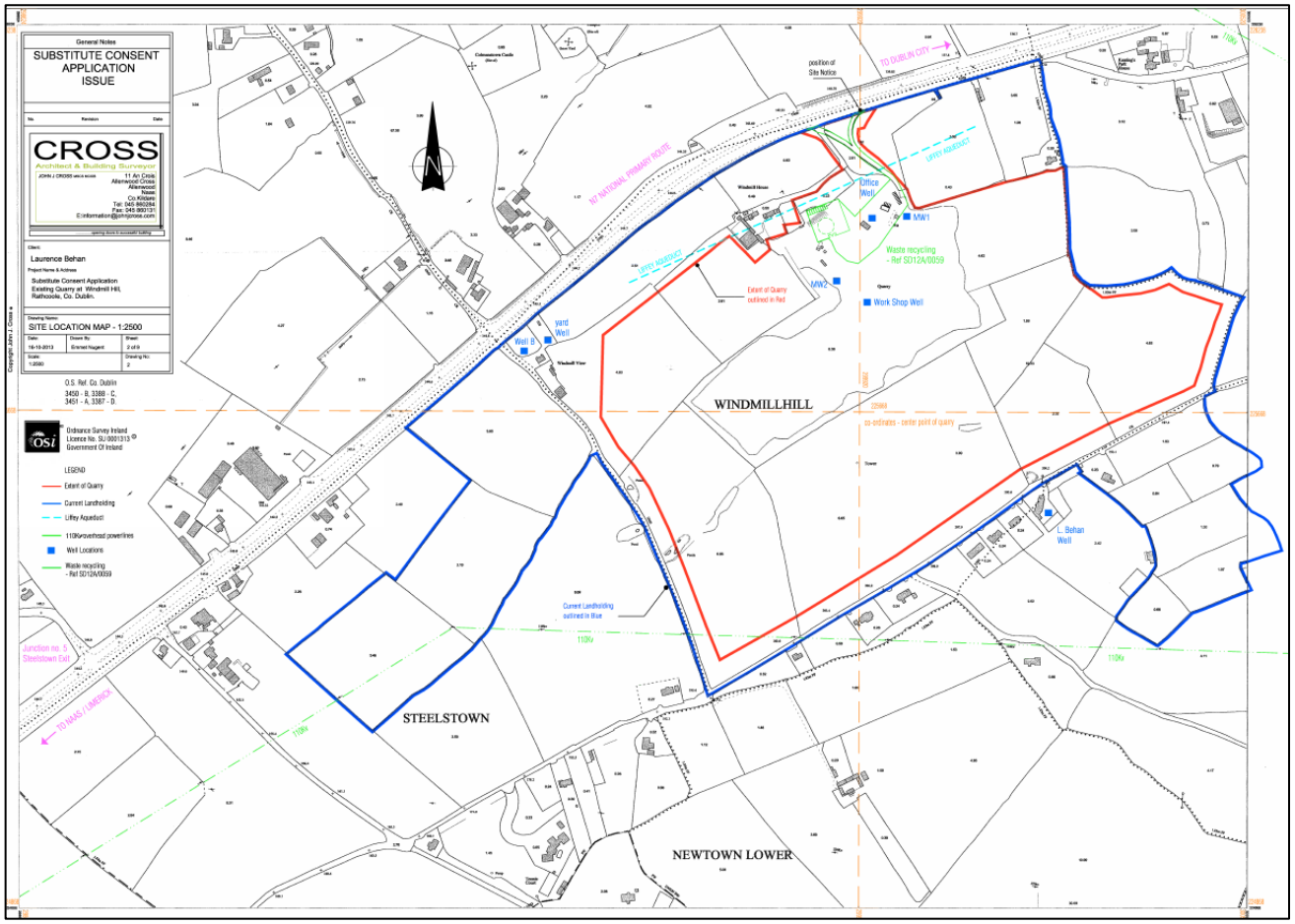


Figure 1.3: Copy of substitute consent application ref. PL06S.SU0068, site location map. Application made 2013, refused 2018, decision quashed by High Court Order 2020.

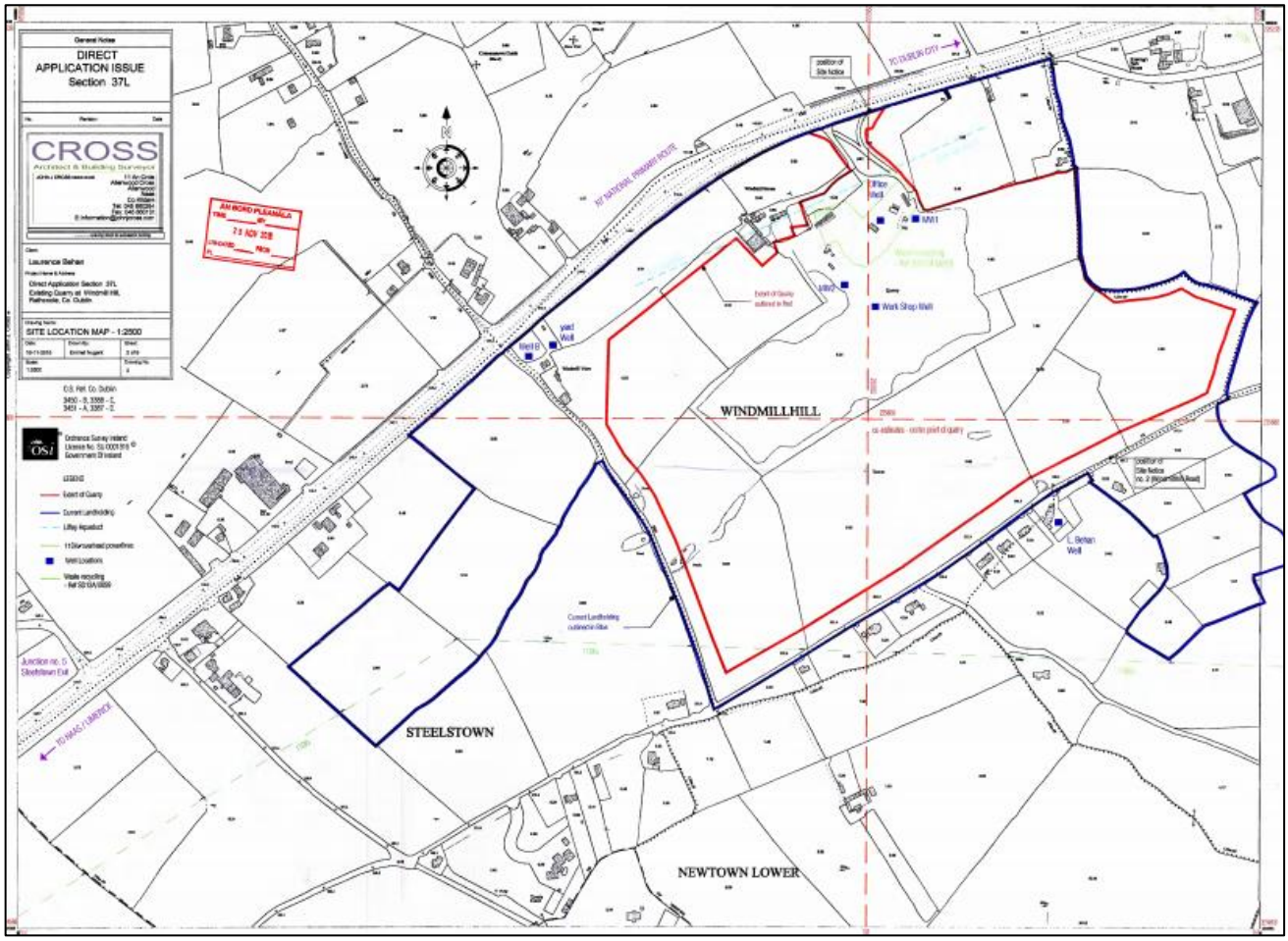


Figure 1.4: Copy of S.37L application ref. PL06S.DQ0003, site location map. Application made 2015, refused 2018, decision quashed by High Court Order 2020.

1.1.2 S.37L application and EIA project boundary

The application for substitute consent, made 24 October 2013, assigned ref. PL06S.SU0068 was refused 21 September 2018. The application for further development of the quarry under S.37L, made on 25 November 2015, assigned ref. PL06S.DQ0003 was also refused 21 September 2018. These application decisions were quashed by High Court Order [2018 No. 929 JR].

Therefore, having regard to section 1.1. above and the Order of the High Court [2018 No. 929 JR] of August 2020: the quashing of the decision under ref. L06A.0003 has given rise to this 'fresh' application further quarrying under S.37L, that is accompanied by this EIAR.

The S.37L planning application unit extends to 26.87 ha. and reflects the extracted area of the quarry and a northern extension to that void area of 4.1 ha. requiring a total additional land take of 5.19 ha. for landscaping berms, all contained within the S.261 workable area registration boundary at Figure 1.2. This additional extraction area is the only new development currently proposed for the quarry.

The S.37L planning application boundary unit (26.87 ha.) that this EIAR accompanies is significantly smaller than that for which permission was previously sought (40.875 ha.) under PL06S.DQ0003 as it excludesthe extraction of lands in the south of the originally registered S.261 quarry area. In addition, the S.37L application previously submitted sought development permission for infilling of the void. This infilling is not further quarry development and no such proposal is now included. A restoration proposal for the site is included as mitigation in this EIAR and presented at Chapter 11 and in submitted application drawing. The restoration proposed principally consists of the regrading of the current void and use of stored top and subsoils on site for restoration

purposes. The restoration proposal includes the restoration of the extant plant processing area at the centre of the site within the Applicant's ownership area and the subject of concurrent substitute consent application.

As noted at the outset, the application under S.37L that this EIAR accompanies is to be made concurrent with an application for substitute consent for the over an area of 28.8 ha. That application is accompanied by an rEIAR.

In view of this rEIAR and the EIAR being concurrently prepared for much of the same operational lands it is submitted that a single EIA project boundary for the purposes of assessment by experts of works past and proposed is consistent and will facilitate EIA of each development within the same EIA project envelope.

The EIA project boundary envelopes an area of 46.14 ha. that encloses previous recent quarry application areas, current workings and intended future workings.

The EIA project boundary is therefore larger than the associated planning application units in order to capture:

- the currently proposed substitute consent and S.37L application boundaries and associated infrastructure; and
- the workable area registered under S.261 for which conditions were imposed.

To a lesser extent, the EIA project boundary was chosen to capture previous applications on the lands as they may include information useful to construct the history and baseline of the current development proposals. In this regard, it was assumed that the most relevant information would derive from the rEIS and EIS submitted for the previous substitute consent and S.37L applications (refs. PL06S.SU0068 and PL06S.DQ0003), therefore the current EIA project boundary largely coincides with those EIA project boundaries.

1.1.3 Definition of a quarry

The substitute consent application being made in respect of this site is for a quarry and arises on foot of S.261A review. The S.37L application that this EIAR accompanies is for further quarrying only. As such, a definition of a quarry is here repeated in order the application made accords with the legislative provision for these applications.

The proposed S.37L further quarrying proposal excludes areas that are not proposed for quarrying i.e.it excludes the centre of the current operational site that holds the ancillary plant and welfare facilities for the site that are mainly included in the substitute consent application area as those lands are not proposed to be extracted and therefore outside of the provision of S.37L. It is intended that the material extracted under the further quarrying proposal will be processed in the extant central plant area of approximately 5 ha. and will continue to utilise the main site entrance to the north which is onto the N/M7. The site location and layout maps submitted with the S.37L application indicate this arrangement.

It is noted that at S.261(13) of the Planning and Development Act 2000, as amended are definitions for that Section. This includes 'quarry'; *"has the meaning assigned to it by section 3 of the Mines and Quarries Act, 1965."* This definition is set out here, Section 3, Mines and Quarries Act, 1965

> *"In this Act "mine" means an excavation or system of excavations made for the purpose of, or in connection with, the getting, wholly or substantially by means involving the employment of persons below ground, of minerals (whether in their natural state or in solution or suspension) or products of minerals.*
>
> *(2) In this Act "quarry" means an excavation or system of excavations made for the purpose of, or in connection with, the getting of minerals (whether in their natural state or in solution or suspension) or products of minerals, being neither a mine nor merely a well or bore-hole or a well and bore-hole combined.*

(3) "Mine" and "quarry" include, respectively, any place on the surface surrounding or adjacent to the shafts of the mine or to the quarry occupied together with the mine or quarry for the storage or removal of the minerals or for the purposes of a process ancillary to the getting of minerals, including the breaking, crushing, grinding, screening, washing or dressing of such minerals but, subject thereto, does not include any place at which any manufacturing process is carried on.

(4) For the purposes of this Act, any place occupied by the owner of a mine or quarry and used for depositing refuse from it shall form part of the mine or quarry, but any place so used in connection with two or more mines or quarries, and occupied by the owner of one of them, or by the owners of any two or more in common, shall be deemed to form part of such one of those mines or quarries as the Minister may direct.

(5) For the purposes of this Act any line or siding (not being part of a railway) serving a mine or quarry shall form part of the mine or quarry, but, if serving two or more of them, shall be deemed to form part of such one of them as the Minister may direct.

(6) For the purposes of this Act a conveyor or aerial ropeway provided for the removal from a mine or quarry of minerals or refuse shall form part of the mine or quarry."

European Union (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2011 (S.I. No. 584 of 2011) inserted a discreet 'quarry' definition into Section 2 'Interpretation' of the Planning and Development Act, 2000 as amended as follows:

""quarry" means an excavation or system of excavations made for the purpose of, or in connection with, the getting of minerals (whether in their natural state or in solution or suspension) or products of minerals, being neither a mine nor merely a well or bore-hole or a well and bore-hole combined, and shall be deemed to include—

(i) any place on the surface surrounding or adjacent to the quarry occupied together with the quarry for the storage or removal of the minerals or for the purposes of a process ancillary to the getting of minerals, including the breaking, crushing, grinding, screening, washing or dressing of such minerals but, subject thereto, does not include any place at which any manufacturing process is carried on;

(ii) any place occupied by the owner of a quarry and used for depositing refuse from it but any place so used in connection with two or more quarries, and occupied by the owner of one of them, or by the owners of any two or more in common, shall be deemed to form part of such one of those quarries as the Minister may direct;

(iii) any line or siding (not being part of a railway) serving a quarry but, if serving two or more quarries shall be deemed to form part of such one of them as the Minister may direct;

(iv) a conveyor or aerial ropeway provided for the removal from a quarry of minerals or refuse."

As noted above, the only new development of the quarry currently proposed i.e. development in excess of what exists that is the subject of concurrent substitute consent application, is further extraction over the existing void to include a 4.1 ha. northern extension to that void. The extant void that contains reserve and the lateral extension area total 28.8 ha. in extent and constitute the S.37L application boundary which accords with S.37L(3):

"(1) Where an application for substitute consent is or was required to be made by the owner or operator of a quarry pursuant to subsection (7), (10) or (12) of section 261A, the owner or operator may apply for permission to further develop that quarry in accordance with this section.

(2) An application for permission to further develop a quarry under subsection (1) shall be made to the Board.

(3) An application for permission under subsection (1) may only be made for further development of a quarry as a quarry."

1.2 Structure and Content of the EIAR

EIA is a process undertaken for certain types of development. It provides a means of drawing together the findings from a systematic analysis of the likely significant environmental effects of a scheme to assist local planning authorities, statutory consultees and other key stakeholders in their understanding of the impacts arising from the development.

The following subsections outline the evolution of EIA Directives and their interpretation in the Irish jurisdiction, statutory provisions and guidance that provide the purpose and content of the EIAR that is summarised at the end of this section.

1.2.1 EIA Directives and Transposition

The requirement for an Environmental Impact Assessment [EIA] process arises from European Union [EU] Directives required to be adhered to by member States and transposed into national laws.

The original EIA Directive 85/337/EEC has been amended and superseded by Directives 97/11/EC, 2003/35/EC, 2009/31/EC to Directive 2011/92/EU.

Having regard to the transposition of the original environmental assessment Directive into Irish Law it is determined by reference to the Planning and Development Act, 2000 as amended [P&D Act] that appointed day at which the requirement for same arose is the 1st of February 1990.

On 16th April 2014 Directive 2011/92/EU was amended by Directive 2014/52/EU of the European Parliament and of the Council [2014 EIA Directive].

The amending 2014 EIA Directive consists of 16 no. Articles and 5 no. Annexes that define EIA and the supporting information and processes available and required for EIA determination in the form of reasoned conclusion by the competent authority.

This is the environmental impact assessment report [EIAR] by the developer defined at Article 1 and required under Article 3 in order EIA may be undertaken. This report relates to lands of 46.14 ha. that enclose lands that have been the subject of extraction and are intended for further quarry development area over a total application area of 26.87 ha.. Extraction area of that magnitude attracts automatic requirement for EIA as an Annex 1 project and is therefore subject to an assessment in accordance with articles 5 through 10.

Article 5 of the 2014 EIA Directive sets down the minimum information to be supplied in an EIAR including those matters at Annex IV as follows;

> *(a) a description of the project comprising information on the site, design, size and other relevant features of the project;*
>
> *(b) a description of the likely significant effects of the project on the environment;*
>
> *(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
>
> *(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
>
> *(e) a non-technical summary of the information referred to in points (a) to (d); and*

(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."

The 2014 EIA Directive required that *"Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 16 May 2017."*

The requirement for the current EIAR arises as a result of the associated development proposal being made for a development typology that exceeds the EIA threshold. The development proposal seeks planning permission under S.37L of the Planning and Development Act 2000, as amended, therefore the competent authority undertaking EIA is An Bord Pleanála.

1.2.2 Purpose of EIAR and Statutory Provisions

As stated above the requirement for the current EIAR arises as a result of High Court Order that allowed a 'fresh' application for further development of a quarry as a quarry reviewed under S.37Lof the Planning and Development Act, 2000 as amended [P&D Act]. The procedures and considerations for S.37L applications are also contained in the P&D Act therefore the planning and development statutes and related policy and guidance are relied upon to contextualise and define this report.

The report of the assessment of environmental effects to be prepared and submitted by a developer is referred to as an Environmental Impact Assessment Report (EIAR) in the current planning and development statutes after the transposition of the 2014 EIA Directive.

The P&D Act defines an EIAR as follows;

"means a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive;"

Regulations have been made to administer EIA. For the purposes of this EIAR and the statutes under which the requirement for its preparation has arisen, the following Statutory Instruments are relevant and have informed this report:

- European Communities (Environmental Impact Assessment) Regulations (1989-2006);
- European Union (Environmental Impact Assessment and Habitats) Regulations (2011- 2019);
- European Communities (Environmental Impact Assessment) Regulations (2011 – 2020); and
- Planning and Development Regulations (2001 – 2021).

1.2.3 Guidance

Under the P&D Act the minister may make regulations and issue guidance. Summarily, Sections 28 and 29 of the P&D Act require that planning authorities and An Bord Pleanála have regard to guidelines and comply with policy directives, respectively in the performance of their functions.

The structure and content of this EIAR is in accordance with the following guidance:

Guidelines issued by the Housing, Local Government and Heritage Department

- 2020 *Environmental Assessments and Planning in Ireland – Planning Leaflet 11,* Office of the Planning Regulator
- 2018 August *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment,* Department of Housing, Planning and Local Government

- 2012 July *Section 261A of Planning and Development Act, 2000 and related provisions Supplementary Guidelines for Planning Authorities,* Department of the Environment, Community and Local Government
- 2012 January *Section 261A of Planning and Development Act, 2000 and related provisions Guidelines for Planning Authorities,* Department of the Environment, Community and Local Government
- 2009 December (revision February 2010) Appropriate Assessment of Plans and Projects in Ireland**,** Department of Environment, Heritage and Local Government
- 2009 November The Planning System and Flood Risk Management G*uidelines for Planning Authorities,* Department of Environment, Heritage and Local Government
- 2004 April *Quarries and Ancillary Activities Guidelines for Planning Authorities*, Department of the Environment, Heritage and Local Government

Guidance issued by the Environmental Protection Agency [EPA]

- August 2017 *DRAFT Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* [Draft 2017 EPA Guidance which updated that Draft Guidance of May 2017]
- September 2015 *DRAFT Revised Guidelines on the Information to be Contained in Environmental Impact Statements*
- September 2015 *DRAFT Advice Notes For Preparing Environmental Impact Statements*
- 2006 *Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*
- 2003 September *Advice Notes On Current Practice In The Preparation Of Environmental Impact Statements*
- 2002 March *Guidelines On The Information To Be Contained In Environmental Impact Statements*

1.2.4 Purpose & Content of EIAR

Taking the definition of an EIAR as in the P&D

this EIAR has been prepared in a 'Grouped Format' structure having regard to the prescribed environmental factors of the EIA Directive and the 2017 EPA Guidance; “Population and Human Health; Biodiversity, Land & Soils, Water, Air, Climate, Material Assets, Cultural Heritage, Landscape, Interactions.”

In this way each aspect of the environment is presented as a separate section referring to the environment as it existed before development commenced, the existing development, experienced and / or likely impacts, and employed / proposed mitigation measures.

The EIAR has therefore been systematically organised to provide the following information and environmental aspect chapters identified in Table 1.1.

Table 1.1: Overall structure of the rEIAR.

Content	Chapter
Context and Requirement for rEIAR	1.0 Introduction
A description of the existing environment.	2.0 Project Description; and As appropriate in the respective discipline chapters.
A description of the project.	2.0 Project Description

Content	Chapter
Identification of experienced / likely significant impacts during construction and operation of the development and a description of the measures employed / envisaged in order to avoid, reduce and, if possible, remedy significant adverse impacts.	3.0 Population and Human Health 4.0 Ecology and Biodiversity 5.0 Land, Soils and Geology 6.0 Water 7.0 Air Quality and Climate 8.0 Noise and Vibration 9.0 Cultural Heritage 10.0 Landscape and Visual Impact 11.0 Traffic 12.0 Material Assets 14.0 Mitigation and Monitoring Measures
Sets down the cumulative and in combination significant effects of the project and considers expected / experienced effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned	Cumulative: As appropriate in the respective discipline chapters. In combination: 13.0 Interactions Major accidents and/or disasters: 2.0 Project Description

Alternatives are examined by reference to locations, design and processes, as appropriate.

Likely and significant impacts arising from the existence of the development, its use of natural resources, the emission of pollutants and, the creation of nuisances are identified, described as direct, indirect, secondary, cumulative; by duration short, medium and long-term, permanent and temporary; and by type positive and negative, as appropriate.

A Non-Technical Summary (NTS) accompanies the EIAR and provides a summary of the key findings of the EIA in non-technical language.

Table 1.2 identities the data and information to be included by the developer in the EIAR as describes in Annex IV of the amended EIA Directive, and the location of this information within the document.

Table 1.2: Requirements of 2014/52/EU Annex IV and where these have been addressed in this rEIAR.

Item	Requirement of Annex IV item	Reference in rEIAR
1	Description of the project, including in particular: (a) a description of the location of the project; (b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases; (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.	(a) and (b) Chapter 2 – 'Project Description' (c) and (d) Chapter 2 – 'Project Description', and identified in the relevant technical chapters
2	A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Section 1.8 – 'Alternatives'
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	A 'Baseline Conditions' section has been provided in each technical chapter' along with a section which summarises a 'Do-Nothing'

Item	Requirement of Annex IV item	Reference in rEIAR
		scenario without development.
4	A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	Each relevant study area which has been scoped into the EIAR is provided within a dedicated technical chapter. Chapters 3 – 12.
5	A description of the likely significant effects of the project on the environment resulting from, inter alia: (a) the construction and existence of the project, including, where relevant, demolition works; (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) the technologies and the substances used. The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.	(a), (b) and (c) Each technical chapter, as appropriate (d) Chapter 3 (Pop. and Human Health), Chapter 9 (Cultural Heritage), and Chapter 2 (in relation to accidents and disasters) (e) Each technical chapter, as appropriate (f) Chapter 7 (Air Quality and Climate) (g) Each technical chapter, as appropriate Descriptions of effects are identified in each technical chapter, as appropriate
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Assessment methodology is identified in each technical chapter, as appropriate, or a common framework and terminology has been identified in Section 1.7. Difficulties encountered in compiling the rEIAR have been identified in each technical chapter, as appropriate
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	The identification of mitigation measures is identified in each technical chapter, as appropriate. These have also been compiled in Chapter 14.
8	A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects	Chapter 2, Section 2.6 (Major Accidents and Disasters)

Item	Requirement of Annex IV item	Reference in rEIAR
	of such events on the environment and details of the preparedness for and proposed response to such emergencies.	
9	A non-technical summary of the information provided under points 1 to 8.	EIAR Volume 1; Report No.: '20137776.R04.B0'
10	A reference list detailing the sources used for the descriptions and assessments included in the report.	Final Section of each technical chapter.

1.3 Summary description of development the subject of EIAR

The lands the subject of this EIAR extend to approximately 46.14 ha. at the centre of a landholding in the control of the applicant of approximately 73 ha. This Environmental Impact Assessment Report [EIAR] has been prepared to accompany application for further development of a quarry as a quarry at an existing quarry at Windmillhill, Rathcoole, Co. Dublin that is the subject of a concurrent application for substitute consent, itself accompanied by a rEIAR.

As stated above, the lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The quarry area that makes up the application further development of a quarry as a quarry planning unit extends to approximately 26.87 ha. at the centre of the EIA project area that is generally bounded by the N/M7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called 'Four Winds' that is within the ownership of the developer to the east; and the former local Athgoe Road to the west.

The current quarry site is accessed toward the centre of its northern boundary from the N/M7 and has been accessed from that road since grant of planning permission for stone quarrying on site in 1968 (under Reg. Ref. 11547). The current quarry void is centrally located within the EIA unit and roughly rectangular is shape with an east – west orientation, parallel to the N/M7 and local Windmillhill Road. At the centre of the current quarry area is the existing administration and processing plant area over approximately 5 ha. The current quarry area, including the plant and processing area is the subject of the concurrent substitute consent application.

S.37L confines development proposal to be for further development of a quarry as a quarry. The proposed development for which this EIAR has been prepared is for a deepening of the existing void from an average of 173 mAOD to 150 mAOD and an extension to that void of 4.1 ha. The lateral extension area is in two parts to the west and east of the original farmhouse (now used to house site employees) on the northern margin of the existing plant and processing area and will require a total of 5.16 ha. to facilitate the storage of top and subsoils currently covering the proposed lateral extraction area extension as screening berms around the lateral extension. The proposed development will therefore consist of extraction in areas that surround the extant plant and processing area over a total application site area of 26.87 ha. The plant and processing area is included in the application for substitute consent area that includes restoration concept for the purposes of retrospective assessment in the accompanying rEIAR. This EIAR contains a restoration proposal for the proposed further quarry area and the extant plant and processing area for the purposes of mitigation.

1.3.1 Description of Site at Baseline

Section 3.6.1 of the 2017 Draft EPA EIAR Guidance states that after the description of the project *"…the description of the baseline scenario is the second of the two factual foundations of the EIAR."*

In this instance the EIAR relates to proposed development at a site already in operation as a quarry with related ancillary processing activities and supporting welfare facilities. Please refer to submitted site layout for identification of the below summarised current quarry operation description:

The quarry operation is accessed from a single entry/exit point at the centre of the northern EIA boundary. This access point is onto the N/M7 and only accessible from the outbound lane via entry and exit demarcated slip roads.

The access point connects to an avenue with asphalt surface with a southerly inline and direction to access a plant and processing area over approximately 5 ha. holding: holds 2 no. office buildings, 4 no. portacabins, 4 no. containers, 2 no. storage / maintenance sheds, a storage / drying shed, water recycling unit and silt press, an asphalt plant, a concrete plant and washing, crushing, screening and bagging plants. Also, within this plant and administration area are 2 no. weighbridges, 4 no. wheel washes, fuel storage and refuelling area, potable water well and sewage holding tank. The concrete plant and the storage / drying shed have been erected within the last three years and will be the subject of a separate planning application process.

The plant and processing area is centrally located within the existing quarry operation and EIA boundary area. The reserve consists of greywacke (sandstone) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to the central processing area for washing and grading. The current associated quarry void is south, south west and south east of the plant and processing area at a current average working depth of 150 mAOD. The same manner of working a is currently employed will be utilised.

The reader is minded that historic extraction of the subject lands was evidenced in previously submitted S261 registration information and High Court Order [2018 No. 929 JR]. That Order recorded first extraction evidence on the lands in 1710. In addition, planning permission for 'stone quarrying' was granted 28 June 1968 (Reg. Ref. A.14 /11547).

In order to retrospectively build a narrative of the development of the lands over their extraction lifetime the concurrent rEIAR contains a record of primary site and surrounding development events that is repeated n Section 2.0 of this EIAR for the purposes of context.

1.4 Limitations & Difficulties in Compiling the Specified Information (Schedule 6 of SI 600 of 2001, as amended)

Limitations and difficulties encountered in preparing this EIAR having regard to the Planning and Development Regulations and Section 3.7.2 of the 2017 EPA Guidelines relate to the lack of monitoring and survey data from the period that the subject lands were excavated and material processed. Golder Associates were allowed full access to all records held by the substitute consent applicant [the developer], who has possessed the lands the subject of this EIAR and their surrounding landholding since the 1960s when he inherited the lands. The developer, upon taking possession of the lands, continued (and continues, alongside his children) to operate the quarry therein and it was he (Laurence Behan) who secured the above 1968 permission for stone quarrying at the lands, which was the first permission on the lands since the commencement of the Local Government (Planning and Development) Act, 1963.

Historic planning application and license files were inspected at the offices of South Dublin County Council 21 October 2020.

In this instance the subject lands and processing plant have variously been the subject of, or part of previous planning applications, an rEIS, EIS and Screening for AA which themselves contain monitoring, impact and mitigation analyses which are part relied upon to discern the environmental impact of development on the subject lands before, during and after their extraction phases.

Conditions imposed 27 April 2007 under S.261 registration (ref. SDQA5/04) apply to the operational site as registered under S.261 that allow for a compilation of emission thresholds. Throughout this EIAR, monitoring and survey data and analysis, previously submitted in earlier planning applications, or monitoring records held

by the applicant are relied upon to model the subject site throughout its lifetime and discern impacts on the environment of the subject site.

Further relevant difficulties or survey limitations specific to each study area have been identified therein, as appropriate.

Conservative assessments have been applied where information concerning methodology or program could not be fully determined.

As appropriate information from publicly available sources has been used in the course of this assessment. This includes mapping sources such as the Environmental Protection Agency, Geological Survey of Ireland, Department of Communication, Climate Action and Environment, etc., and other information including Census returns. Due care has been taken in the review of these data sets however no responsibility can be taken for inaccuracies which may be present within this public data.

1.5 EIAR Contributors and Guarantee of Competency and Independence

S177F(1A) requires that the EIAR be prepared by experts with the competence to ensure its completeness and quality. In the interests of consistency and the leveraging of existing specialist knowledge of the subject site, alongside the applicant, competent experts have been retained to compile this EIAR. It was not possible to draw those experts from the earlier rEIS and EIS as they were not available, though they generously supplied information they held in respect of those reports.

Notwithstanding the quashing of previous substitute consent and S.37L applications (refs. PL06S.SU0068 and PL06S.DQ0003) decisions, the environmental assessments that gave rise to those outcomes by both the local authority and An Bord Pleanála were reviewed to identify the following group of experts, all of whom are particularly experienced in environmental assessment of quarry and mining projects.

The EIAR was completed by a project team led by Golder, who also prepared a number of the chapters.

The members of the team and their respective inputs are presented in Table 1.3.

In accordance with EIA Directive 2014/52/EU, we confirm that experts involved in the preparation of the EIAR are fully qualified and competent in their respective field. Each has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality.

Table 1.3: EIAR Contributors

Discipline	Lead Specialist	Qualifications	Accreditations	Years of professional experience
Population & Human Health; Material Assets	Kevin McGillycuddy	BA (Mod) Botany MSc Environmental Science	PIEMA	8+
Land, Soils & Geology, and Water	Barry Balding	BA (Mod) Natural Science (Geology) MSc Applied Geophysics	PGeo Institute of Geologists Ireland EurGeol European Federation of Geologists	30+
Biodiversity	Freddy Brookes	MSc Aquatic Ecosystem Management	Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) Member of the Institute of Fisheries Management (MIFM)	12+

Discipline	Lead Specialist	Qualifications	Accreditations	Years of professional experience
Air Quality; and Climate	Rachel Lansley	MSc Environmental Monitoring and Analysis, BSc Physical Geography	Chartered Scientist (CSci), Member of the Institution of Environmental Sciences (IES) and the Institute of Air Quality Management (IAQM)	13+
Noise and Vibration	Simon Waddell	BSc (Hons.) Environmental Geoscience PG Dip Acoustics and Noise Control	Member of Institute of Acoustics (MIOA)	9+
Cultural Heritage & Archaeology	Conor Ryan	BA (Jt. Hons.) Archaeology and Geography	Associate of the Chartered Institute for Archaeologists (ACIfA)	7+
Landscape & Visual	Richard Barker (Macro Works)	MLA, PG Dip Forestry, BA Env	Corporate Member Irish Landscape Institute	15+
Traffic & Transport	Peter Monahan	BE MSc RSA Cert Comp CEng FIEI	Chartered Engineer (CEng) – Engineers Ireland Fellow of Engineers Ireland (FIEI) – Engineers Ireland Fellow Consulting Engineer (FConsEI) – Association of Consulting Engineers of Ireland	25+
Interactions	All relevant Lead Specialists			
Mitigation and Monitoring Measures	All relevant Lead Specialists			
Introduction, Project Description, and Planning	Cliona Ryan	BA (Hons), MRUP, MBA	Irish Planning Institute (IPI)	15+

1.6 The Applicant/Developer

The developer for the purposes of this EIAR and applicant for the purposes of application for development of a quarry as a quarry under S.37L of the P&D Act is Mr. Laurence Behan. As noted above, Laurence Behan now alongside his own children has exclusively operated the quarry since the early 1960s when he inherited the landholding and quarry. As also noted above, it is the developer who secured the 1968 permission (Reg. Ref. A.14 / 11547) for stone quarrying at the lands, which was the first permission on the lands since the commencement of the Local Government (Planning and Development) Act, 1963.

It was also the developer who personally S.261 registered (ref. SDQA5/04) the quarry site 25 April 2005 and supplied the application form and map of the quarry at that time, recording that it was operated by L. Behan and Sons Ltd. Subsequent to registration there was a request for further information and the developer then engaged the services of a consulting engineer to undertake correspondence on his behalf who latterly re-supplied the registration form and updated the registration map (repeated at Figure 1.2 in this rEIAR).

On 27 April 2007 the developer received final conditions (36 no.) under which the site registered under S.261 (ref. SDQA5/04) was to operate and continues to operate to today.

Since the developer's taking over of the quarry and associated lands, he has sought to improve and expand the operational capabilities of the quarry. Besides securing washing, screening, grading and bagging plants to

produce all grades of construction aggregate from dimension stone to fine fill, he has sought alternative related commercial uses.

In December 1988 under Reg. Ref. 88A/709 permission was granted for a 'mobile asphalt mixing plant in existing quarry' to Laurence Behan. Asphalt production continues today and the asphalt plant lies within a now centrally located plant and processing area of approximately 5 ha. in extent that also holds the site's current and former site and shipping offices, portacabins and (shipping) containers.

Between 2005 and 2012 the central plant and processing area facilitated the intake of inert soil and stones (C&D) waste under successive waste permits (ref no. WPR051) at a rate of 5,000 tonnes per annum. Latterly a certificate of registration (ref. COR-DS-12-0002-01) alongside planning permission Reg. Ref. SD12A/0059, granted in May 2013 after appeal (ref. PL06S.241259) allowed intake of 10,000 tonnes per annum of the same inert waste that was segregated, processed, recycled and reused as raw materials for the existing on-site asphalt manufacturing plant up to June 2018.

In order to maintain control over the site's supply chain and costs, the developer and companies that run the quarry site maintain a fleet of heavy goods vehicles and drivers.

Also, within this central plant and processing area is a demountable concrete batching plant, brought to site in 2018 and a storage / drying shed used to store clean, dry aggregate erected in 2019. These items, occurred on site subsequent to S.261 registration and whilst within the substitute consent application area for reason of occurring in the centre of the quarry site, and considered for the purposes of rEIAR and EIAR assessments, are excluded from the substitute consent application as they constitute development that is not exempted development and is therefore bound to be the subject of a separate consent process.

As stated at section 1.3. Golder Associates have had full access to the quarry site, associated lands, offices and records, including access to the developer and employees of companies operating the quarry site in order to inspect and monitor and to prepare this rEIAR and concurrent EIAR.

1.7 EIAR Process - Prediction of Impacts and Effects and Assessment of Mitigation Measures

1.7.1 Determining the Extent of the Assessment

It is necessary to define the extent of the EIA in both spatial and temporal terms, and this has been done as described below.

Geographical Extent

The EIA directly covers the physical extent of the Site as shown in the EIA boundary plan (Figure 1.1). Also, as many predicted impacts can extend beyond the immediate EIA boundary, for example the use of the Site for foraging by a species that is primarily located off-site. For certain topic areas a wider 'zone of influence' has been considered, as described in the individual topic chapters.

The geographical extent of the EIA boundary also includes the cumulative impacts from related and unrelated development activities in both the construction and operational phases.

Temporal Extent

Under this programme, it is expected that the duration of the proposed extraction operations will be 10 to 15 years depending on market conditions. The restoration phase of the Proposed Development will last between 2 to 5 years.

1.7.2 Prediction of Impacts and Effects Prior to Mitigation

Prediction methods are required to identify and assess the significant effects of the development on the environment. The predictive methods used for each technical discipline are detailed in the respective chapter. For several topic areas, predictive methods have been developed by professional bodies. Where these are available they have been identified in the individual chapters as appropriate.

For topics where there is no topic specific guidance available, a common framework of assessment criteria and terminology has been used based on the EPA's draft Guidelines on the Information to be Contained in EIARs (EPA, 2017)[1].

This common framework follows a 'matrix approach' to environmental assessment which is based on the characteristics of the impact (magnitude and nature) and the value (sensitivity) of the receptor. The terms used in the common framework are described below. Details of how these specifically relate to the individual topic areas are provided within the respective topic chapters.

The descriptions for value (sensitivity) of receptors are provided in Table 1.4.

Table 1.4: Environmental value (sensitivity) and descriptions.

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

The descriptions for magnitude of impact are provided in Table 1.5.

Table 1.5: Magnitude of impact and typical descriptions.

Magnitude of impact (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.

[1] Environmental Protection Agency (2017) Guidelines on the information to be contained in Environmental Impact Assessment Reports, Draft, August 2017

Magnitude of impact (change)		Typical description
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

The approach followed to derive effects significance from receptor value and magnitude of impacts is shown in Table 1.6. Where Table 1.6 includes two significance categories, evidence is provided in the topic chapters to support the reporting of a single significance category.

Table 1.6: Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental value (Sensitivity)		Negligible	Low	Medium	High
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

A description of the significance categories used in Table 1.7.

Table 1.7: Significance categories and typical descriptions.

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

The approach to assigning significance of effect included reasoned argument, the professional judgement of competent experts and using effective consultation to ensure the advice and views of relevant stakeholders were taken into account.

The assessment of the significance of environmental effects covered the following factors:

1. The receptors/resources (natural and human) which would have been affected and the pathways for such effects;
2. The geographic importance, sensitivity or value of receptors/resources;
3. The duration (long or short term); permanence (permanent or temporary) and changes in significance (increase or decrease);
4. Reversibility - e.g. is the change reversible or irreversible, permanent or temporary;
5. Environmental and health standards (e.g. local air quality standards) being threatened; and
6. Feasibility and mechanisms for delivering mitigating measures, e.g. Is there evidence of the ability to legally deliver the environmental assumptions which are the basis for the assessment?

1.7.3 Design and Mitigation

The environmental assessment and design of the Proposed Development incorporated mitigation measures using a hierarchical system as follows:

1. Avoidance and prevention: design and mitigation measures to prevent the effect (e.g. alternative design options or avoidance of environmentally sensitive sites);
2. Reduction: where avoidance is not possible, then mitigation is used to lessen the magnitude or significance of effects; and
3. Remediation: where it is not possible to avoid or reduce a significant adverse effect, these are measures to offset the effect.

Any enhancement measures have also been described (measures that are over and above what is required to mitigate the adverse effects of a project), as well as any requirements for monitoring of mitigation measures associated with any significant environmental effects.

1.7.4 Prediction of Residual Impacts and Effects

Once the mitigation measures had been developed the assessment process for predicting impacts and effects described above was repeated to determine the residual effects (i.e. the effects remaining after mitigation).

1.7.5 Cumulative Assessment

The EIAR assesses cumulative effects including those from:

1. The development itself (e.g. numerous different effects impacting a single receptor); and
2. Other appropriate developments in the surrounds of the Site (together with the development itself).

The cumulative effects were assessed when the conclusions of individual environmental topic assessments had been reached and reported.

The assessment of cumulative effects from different developments included:

1. Establishment of the zone of influence of the development together with other projects;

2. Establishment of a list of developments which had the potential to result in cumulative impacts, including:
3. Obtaining further information and detail on the list of identified projects to support further the assessment.

1.8 The Need for the Development and Consideration of Alternatives

The greywacke rock reserve at the subject location is of a proven good quality capable of being used as aggregate fill and for further processing to asphalt products. Therefore, the reserve material assumed to be present at the subject site is suitable aggregates for construction purposes. This EIAR is prepared to accompany an application for the continued extraction of this reserve within existing extraction areas from their average current working depth of 173 mAOD to 150 mAOD, and a lateral extension of those extraction areas to extract reserve over an area of 4.1 ha. which also has a final working depth of 150 mAOD.

As with all aggregate extraction development the nearer the supply of aggregate to the market, the more economically viable it is and given the nature of aggregate deposits, quarries can only be worked where the sediments occur. Aligned to this economic situation is the environmental and social preferability of locally sourced aggregates. Aggregates sourced close to their market is preferable to that sourced at more remote locations as it lessens road traffic and associated environmental impacts and economic costs. Socially, the local sourcing of construction aggregate strengthens the local economy through job provision and associated spending and exploits advantages and opportunities inherent in local supply chains.

Aggregates are an essential material for the construction industry and are used in all major development plans (housing, road surfacing, infrastructure etc.). As such, they are of major significance to the overall growth of their local areas and the country and an important economic resource despite fluctuations in levels of construction due to wider economic forces, or the Covid-19 pandemic suspension of construction just ended at the time of writing this EIAR.

The purpose of this EIAR is to assess the site with regard to experienced / potential impacts on the environment, and to recount / propose measures to avoid, reduce or remedy undesirable potential impacts, as appropriate.

In this case, the quarry site represents the sole land asset upon which the developer's companies and employees rely. The developer has a personal intergenerational association with the lands and is a quarry operator and employer who wishes to maintain this asset as a sustainable exaction and processing development. In order for this operation to continue, planning permission for further extraction is sought to continue to feed market demand for aggregate and its products. The concurrent substitute consent application and rEIAR may only seek permission for development that has already occurred and as such the further extraction of reserve is the subject of he S.37L application that this EIAR accompanies.

Maintaining the quarry site and adjacent suitable lands as a viable quarry with associated processing plants will ultimately realise the sustainable extraction potential this extant, established quarry and will maintain those direct and indirect jobs which that had only lately returned to pre-recession levels.

1.8.1 Site Selection and Alternative Designs Considered

In this instance the EIAR has arisen as a direct requirement of the proposed extraction area exceeding EIAR preparation thresholds. However this extraction area occurs over an existing extraction site with minor lateral extension and is intended to utilise the plant and processing area the subject of concurrent substitute consent. In other words, the site for which proposed development permission is sought is not a new site but rather an existing extraction site with minor, contiguous lateral extension that will utilise a contiguous plant and processing area.

The necessity for the application this EIAR accompanies arises as the concurrent substitute consent application may only permit development already undertaken as a result of S.261A review. As such, without a S.37L application and permission for further extraction of reserve, the continuation of the existing quarry will not be possible. Therefore site selection methodology employed is primary driven by the existence of the existing quarry and remaining reserve at the quarry. In this way, the site selected was required to be functionally conjoined or capable of being conjoined to the extant plant and processing area an quarry entrance.

The proposed development represents the immediate reserve available for extraction at the site: a deepening of the existing void and minor lateral northern extension of the void to ensure aggregate product to meet existing market demand from the quarry site.

Also deployed in site selection methodology was a review of the Development Plan objectives for the area and previous reports prepared by the local planning authority in their S.261A Assessment, An Bord Pleanála's review of that assessment and the former subsite consent and S.37L applications arising at this quarry. In this regard, the presence of Windmill Hill Protected Structure no. 358 and the specific objective for the preservation of this structure is noted and detailed at Chapter 3 of this EIAR, alongside previous ground investigation of the lands around this structure as assessed in the Cultural Heritage Chapter (Chapter 9) of this EIAR. The area around the protected structure requires further archaeological investigation as to extent and importance and therefore it is not proposed to extend the current quarry void in a more southerly direction at this time as was previously proposed under quashed S.37L application.

Though it is evident that the Applicant holds significant landholding at this location, controlled lands to the west, east and south of the current EIA boundary are mainly on the opposite sides of public roads or accesses. The accessing of e=reserve at these locations, which are currently greenfield, would require detailed design of road crossing or over or underbridge proposals that would require detailed design consideration and pre-application assessment by transport authorities and likely roads opening or similar licenses that are not currently sought. In addition, further lateral extension of the current quarry to the west, east or further south is not required at this time where there exists sufficient reserve, estimated at approximately 5M tonnes, within the existing void and the minor northern lateral extension proposed. This remaining reserve is expected to be extracted at an average rate of 500,000 tonnes per year, as has been the average for the previous approximately 25 years for the site, and so gives rise to an expected lifespan of 10 to 15 years depending on market conditions.

The existence and continued use of the established quarry and processing complex will have less net environmental and economic impact than developing a new greenfield quarry.

APPENDIX 1.1

2018 No. 929 JR - Final Perfected Order

THE HIGH COURT

JUDICIAL REVIEW

2018 No. 929 JR

Thursday the 27th day of August 2020

BEFORE MR. JUSTICE BARRETT

BETWEEN

LAURENCE BEHAN

APPLICANT

AND

AN BORD PLEANÁLA

RESPONDENT

The Motion of Counsel for the Applicant pursuant to Notice of Motion herein dated the 16th day of November 2018 having been at hearing before the Court on the 25th 26th 27th and 28th days of February 2020 in the presence of Counsel for the Respondent

Whereupon and having read said Notice the Statement filed herein on the 9thday of November 2018 signed by the Solicitor for the Applicant the Order herein dated the 12thday of November 2018 giving leave to the Applicant to apply for *inter alia* an Order of Certiorari by way of application for judicial review quashing the decision of the Respondent made on 21st September 2018 by which it refused to grant substitute consent pursuant to an application made under section 177E of the Planning and Development Act 2000 as amended ("the 2000 Act") to it on the 24th October 2013 the Affidavit of Laurence Behan filed herein on the 9th day of November2018the Affidavits (2) of Geraldine Fahy both filed herein on the 8th day of January 2020 the Statement of Opposition filed herein on the 26th day of

April2019 on behalf of the Respondent the Affidavit of Gerard Egan filed herein on the 26th day of April 2019 and the documents and exhibits referred to in said respective Affidavits and having heard what was offered by Counsel for the Applicant and Counsel for the Respondent and having read the written submissions of Counsel for the Applicant and Counsel for the Respondent

The Court was pleased to reserve judgment herein

And judgment having been delivered on the 12th day of March 2020

And the matter coming before the Court this day in the presence of Counsel for the Applicant in relation to finalisation of the Order and on hearing said Counseland there being no attendance in Court by or on behalf of theRespondent

THE COURT DOTH GRANT an Order of Certiorari in respect of the decision of the Respondent made on 21st September 2018 by which it refused to grant substitute consent pursuant to an application made under section 177E of the Planning and Development Act 2000 as amended ("the 2000 Act") to it on the 24th October 2013 following the issue of a notice pursuant to section 261A(3)(a) of the 2000 Act by the planning authority South Dublin County Council on 31st May 2013 for the quarry at Windmill Hill Rathcoole County Dublin having An Bord Pleanála Reference No. PL 06S.SU0068 Register Reference No.SDQU05A/4and also in breach of s.126 of the Planning and Development Act 2000 as amended

THE COURT DOTH GRANT an Order of Certiorari in respect of the decision of the Respondent made on 21st September 2018 by which it refused permission for continued development at the site having An Bord Pleanála Reference No. PL. 06S.QD.0003

THE COURT DOTH DECLARE that the application for substitute consent made on behalf of the Applicant to the Respondent on the 24th October 2013 An Bord Pleanála Reference No. Pl06S.SU0068 was invalid as it was not in compliance with the requirements of Section 177E(2) of the 2000 Act as amended

and the regulations made under section 177N as amended as such non-compliance constituted a material defect in the application which could not be readily rectified through the submission of additional documentationand also in breach of s.126 of the Planning and Development Act 2000 as amended

THE COURT DOTH DECLARE that the decision of the Respondent made on 21st September 2018 in respect of the application for substitute consent having An Bord Pleanála Reference No. PL 06S.SU0068 was contrary to and in breach of the provisions of sections 177E of the 2000 Act and Articles 228(1) (3) and (4) of the Planning and Development Regulations 2001 as amended ("the 2001 Regulations") and was therefore *ultra vires* and invalid and also in breach of s.126 of the Planning and Development Act 2000 as amended

THE COURT DOTH DECLARE thatthe decision of the Respondent made on 21st September 2018 refusing to grant substitute consent having An Bord Pleanála Reference No. PL 06S.SU0068 was contrary to natural and constitutional justice and in breach of the Applicant's rights also in breach of s.126 of the Planning and Development Act 2000 as amended and was contrary to and in breach of the Charter of Fundamental Rights of the European Union (2000/C364/01) and in breach of the Applicant's rights as provided for thereinand also in breach of the right to good administration a general principle of European Union law

AND BY CONSENT IT IS ORDERED that a fresh application for substitute consent submitted by the Applicant to the Respondent pursuant to the Record of Executive Business and Managers Order of South Dublin County Council dated 9th August 2012 in respect of the determination made and notice issued under section 261A (2)(a), 261A(3)(a) and 261A(7) of the Planning and Development Act 2000 as amended in relation to the quarry at Windmill Hill Rathcoole County Dublin shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks from the date of

perfection of this Order or such further period as the Board may allow

AND BY CONSENT IT IS ORDERED that a fresh applicationto the Respondent for continued development in relation to the site at Windmill HillRathcooleCounty Dublin pursuant to the notice dated 11 August 2015 issued by the Respondent in respect of section 37L of the Planning and Development Act 2000 as amended shall be deemed to have been made within the time limits prescribed therein where the application is made not later than twelve weeks of the date of perfection of this Order or such further period as the Board may allow

AND BY CONSENT IT IS ORDERED that in accordance with Article 228(3) of the Planning and Development (Amendment) (No 3) Regulations 2011 the Respondent do refund the fee in respect of the invalid application for substitute consent pursuant to section 261A of the Planning and Development Act 2000 as amended submitted by the Applicant on 24th October 2013 (An Bord Pleanála Reference No. PL06S.SU0068)

AND BY CONSENT IT IS ORDERED that in accordance with Article 268(3) of the Planning and Development (Amendment) (No. 2) Regulations 2015 the Respondent do refund the fee in respect of the application for continued development pursuant to section 37L of the Planning and Development Act 2000 as amended submitted by the Applicant on 25th November 2015 (An Bord Pleanála Reference No. PL06S.QD0003)

AND BY CONSENT IT IS ORDEREDthat the Applicant do recover against the Respondent the costs of the within proceedingsto include all reserved costs herein such costs to be adjudicated upon by the Office of the Legal Costs Adjudicator in default of agreement between the parties

THE HIGH COURT

AISLING O'NEILL

REGISTRAR

28TH AUGUST 2020

BKC Solicitors
Solicitors for the Applicant

Philip Lee
Solicitors for the Respondent

APPENDIX 1.2

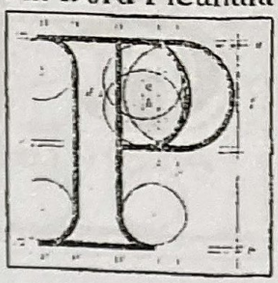
ABP Notice for Section 37L

DRAFTING

Our Ref: SU 06S.SU0068
P.A.Reg.Ref: SDQU05A/4

Your Ref: Laurence Behan

An Bord Pleanála



John Cross,
Cross Architects & Building Surveyor,
11 An Crois, Allenwood Cross,
Allenwood,
Naas,
Co. Kildare.

Date: 28 August, 2015.

Application **Re:** Quarry.
Windmill Hill, Rathcoole, Co. Dublin.

Dear Sir,

I wish to acknowledge receipt of your letter received 27th August, 2015 notifying the Board of the intention of your client to submit an application in respect of the above mentioned Substitute Consent application in accordance with article 4(1) of S.I. 301 of 2015.

Your attention is drawn to article 7 of the said regulations with regards to the timelines of such applications. The period of 6 months within which to make an application commences on 14th July 2015. In the regard please note that the Board has no powers to extend the period for the making of an application.

Yours faithfully,

David Curran,
Senior Executive Officer
Direct Line:01-8737130

64 Sráid Maoilbhríde,
Baile Átha Cliath 1

Teil (01) 858 8100 Tel
Glao Áitiúil 1890 275 175 LoCall
Facs (01) 872 2684 Fax
Láithreán Gréasáin www.pleanala.ie Web
Ríomhphost bord@pleanala.ie Email

64 Marlborough Street,
Dublin 1.

2.0 PROJECT DESCRIPTION

This Environmental Impact Assessment Report [EIAR] has been prepared to accompany an application for permission for further development of a quarry as a quarry at Windmillhill, Rathcoole, Co. Dublin.

This EIAR has been prepared in tandem with an rEIAR to accompany an application for substitute consent for that existing quarry under Section 261A of the Planning and Development Act, 2000 as amended by the same applicant.

The further development of the quarry is proposed over an area nearly entirely consisting of lands already excavated and is therefore mainly for the purpose of recovering the economic reserve that remains in the void. The proposed development site (application site) lies at the centre of a contiguous, established landholding of approximately 73 ha. That landholding is centered on the townland of Windmillhill and covers much of that townland area with protruding minor portions of that ownership unit extending north westerly into the townland of Steelstown and south easterly into the townland of Carrigeen.

The centre of the landholding has been the subject of historic, current and intended future extraction and is roughly rectangular in shape with a south to north orientation onto the N/M7. The southern boundary is delineated by the local Windmillhill Road and the western and eastern boundaries of this area are delineated by the Windmillhill townland boundaries. This area extends to 46.14 ha. and constitutes the EIA project boundary for the quarry.

The lands the subject of this EIAR [the subject lands] at 46.14 ha. entirely encompass the application lands of 26.87 ha. The reserve at this quarry is greywacke rock, overlain by boulder clay, currently worked to an average depth of 173 mAOD. The reserve is excavated by blasting and mechanical means, primarily processed by mobile plant at the working face. Excavated material is transported to a centrally located existing administration and processing plant area over approximately 5 ha. that holds further processing plant (washing, screening, grading, bagging), an asphalt production plant and concrete plant. This plant and processing area is an established part of the quarry area and has also been formerly used for the recovery of inert C&D waste.

This Chapter of the EIAR provides a description of the proposed development (the operational plan) and its physical context. Where appropriate, the Site's development policy context that is detailed at Chapter 3 is also here referenced for the purposes of description. It also includes information to support the need for the development within the construction market.

A detailed description of the project is presented in the following sections and provides a general description of the Site in its current form and a description of the proposed development, including an extension of the existing quarry void in the west (Western Quarry Area) and east (Eastern Quarry Area), and the continuation of extraction of rock (greywacke) for use as aggregate in the construction industry.

2.1 Location of Subject Lands

The EIAR project unit occupies the majority of the townland area of Windmillhill, Rathcoole, Co. Dublin centered at ITM coordinates 699794, 725614, 53°16'23.3"N 6°30'08.0"W.

Located on the southern side (outbound lane) of the N/M7, between Junctions 4 (east) and 5 (west) in County Dublin, just inside the county boundary approx. 2km from the County Kildare border to the west.

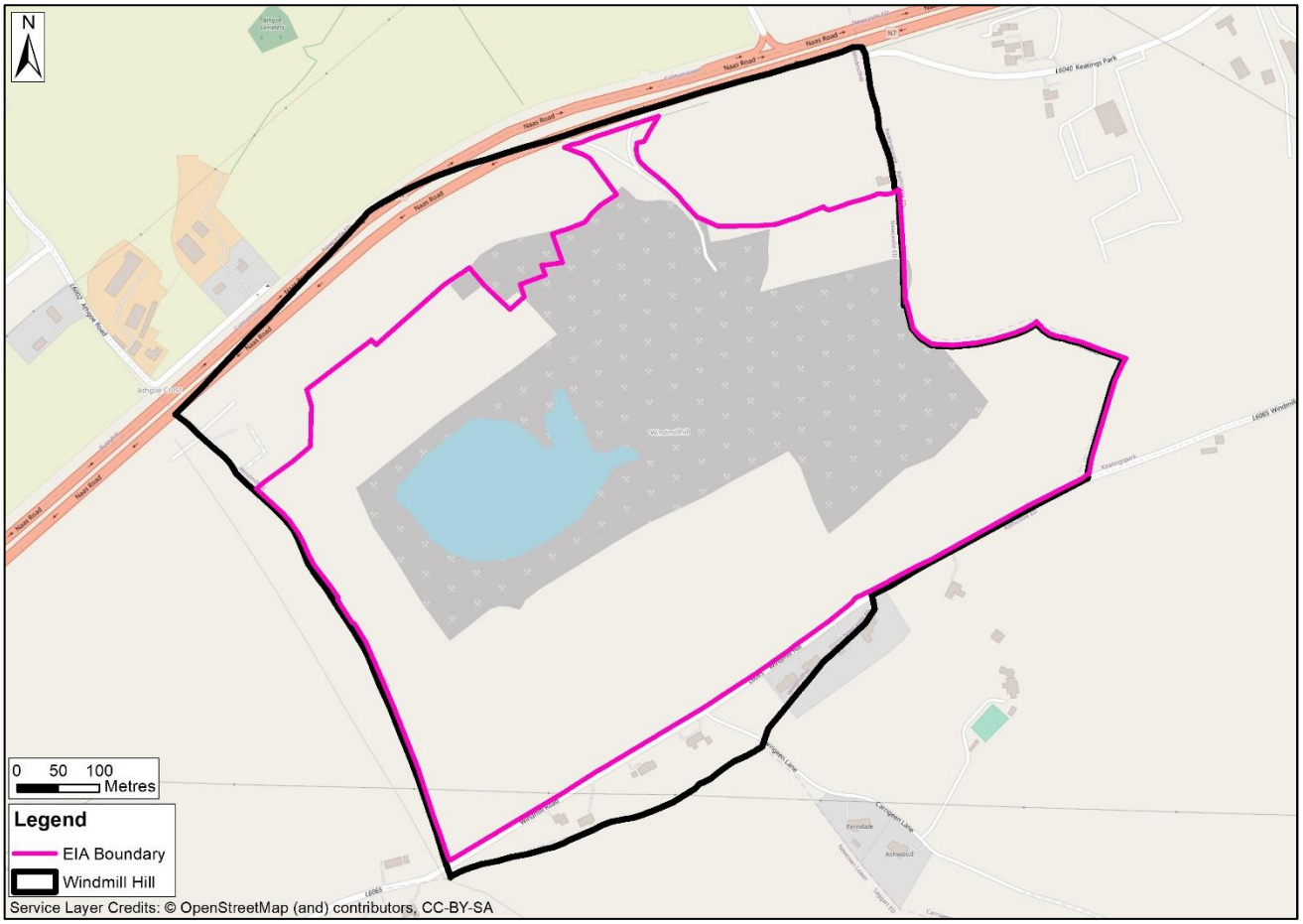


Figure 2.1: Subject Site and EIA and Windmillhill Townland boundary.

2.2 Context and Landscape Character of Subject Lands

The lands the subject of this EIAR are roughly rectangular in shape with a south to north orientation toward the N/M7. The lands are also bound by a local public road (Windmillhill Road L6065) to their south along which there are one-off house and agricultural pasture lands.

The western and eastern boundaries of the subject lands are formed by field boundaries and the eastern and western boundary of Windmillhill townland. The boundary to the west used to hold the local Athgoe Road (Tierney's Lane), no longer in use since the upgrade of the N7 in 2006. The eastern boundary is formed to its north by the avenue to a private dwelling in the ownership of the developer called 'Four Winds' and mature field boundaries thereafter. Further east (about 1 km) is Rathcoole currently designated as a Small Town in the South Dublin Development Plan 2016-2020. Between the subject lands and Rathcoole lie low density commercial uses; plant rentals and coach depot. Similarly, to the immediate north west of the subject lands are two service garages that access the northern portion of the ex. local Athgoe Road. In addition, to 'Four Winds', the subject lands holds another dwelling house, also in the ownership of the developer which is the farmhouse associated with the management of the agricultural land bank owned by the developer that encloses the EIA project boundary.

In this way, the immediate character of the lands is peri-urban with low density, one off roadside housing and low density commercial development, most established and formerly directly associated with the N7. Moving more west and south of the lands, the landscape becomes predominantly rural.

The subject lands have been used for quarrying since 1710 and obtained planning permission for stone quarrying in 1968. As such, the quarry and associated uses are an established feature of the landscape and the main feature of the EIA project lands.

The already extracted area extends to 28.8 ha. and occupies the centre of the EIA project unit. The quarry has a roughly oblong shape with a west – east axis of approximately 800 meters in length as opposed to the north – south axis that is an average of 340 meters in width. That quarry and associated plant and processing area is the subject of a concurrent application for substitute consent with rEIAR. It is proposed to further developer this quarry by deepening the eastern and western sides of the current void and laterally extending that void to the north over a total application site area of 26.87 ha.

The quarry Site is accessed from a left in / left out entrance via demarcated skip lanes off the N7. A short avenue leads to an administration and processing area that occupies an area of approximately 5 ha. that was evidently previously quarried. This plant area is established. As a result, extraction in recent decades has been to the west and south west and east and south east of this administration and processing plant area where extraction depth is now at an average of 173 mAOD.

A review of historic aerial photography and mapping indicates that the lands the subject of this EIAR have a south to north incline. This incline is removed from the extant quarry area but remains on surrounding agricultural land part of the developer's ownership. It is noted that the highest point of the lands at the ruined Wind Mill located in the centre of the southern quadrant of the EIA project boundary. The Cultural Heritage Chapter of this EIAR provides more detail on the Wind Mill, its status and the derived townland name, similarly landscape character assessment is provided at Chapter 10 of this EIAR.

It is noted that the subject Site is proximate to pieces of strategic infrastructure:

Roads: The N7 national primary road lies immediately north of the lands and the Site is accessed from this road which was first upgraded in the 1960s commensurate with the first planning permission for quarrying stone on the lands. The N/M7 to the north of the Site is strategic infrastructure that, elsewhere along its length, is amongst the National Development Plan 2018 – 2027 investment priorities and South Dublin / Kildare County Plans refer to intention to protect this road along its current alignment.

Local roads existed to the west and south of the quarry area denoting the southern margin of the landholding (respectively referred to as the Athgoe and Windmillhill Roads in South Dublin Development Plan 2016 – 2022 maps). The Windmill Road is a public road, and the Athgoe Road (Tierney' Lane) closed for through traffic since the last upgrade of the N7 in 2006.

The South Dublin Development Plan 2016 – 2022 indicates a roads objective for bypass in Development Plan to the west of Rathcoole within 1km of the Site to the east, not within subject Site landholding.

Electricity: There is a 110kV line traversing south western corner of the quarry area of the landholding.

Water: The Poulaphuca to Saggart water main runs parallel to the N7, part within the landholding. This is a major arterial watermain and therefore a strategic piece of established infrastructure indicated by wayleave on land folios.

Gas: There is a medium-pressure distribution pipe (180 PE-80 4 bar) located just outside northern section of the Site, between the boundary of the study area and the N7. The nearest extremity of the quarry to a transmission pipeline is some 1,800 m.

The transport context of the Site is set out in the traffic section of this EIAR at Chapter 11. The landscape context of the subject site is set out in the Landscape and Visual Impact Assessment at Chapter 10 of this EIAR.

2.3 Proposed Development Site already part of an operational quarry

As noted the proposed development is the further development of a quarry as a quarry. The existing quarry and associated plant and processing area is the subject of a concurrent application for substitute consent and rEIAR.

Extraction on the EIA lands evidenced in previously submitted registration and application material to have begun in the 1710 with planning permission originally secured for stone quarrying in 1968 (Reg. Ref. A.14/1157).

Table 2.1 has been prepared to provide a rendition of the development of the quarry to the current time using publicly available resources; historic mapping and photography; permitting and licensing histories; and historic monitoring records. Environmental monitoring records made available by the developer have been utilised alongside site visits and monitoring undertaken specifically for the preparation of this EIAR and concurrent rEIAR. In addition, the developer and companies running the quarry Site provided historical excitation rates and direction information.

2.4 Description of Subject Lands

Table 2.1 sets down a timeline in order to present the progression of the subject site in a coherent order. Here we have identified the start of operations as 1710, 1968 and then from 1990 through to 2021.

The principal events identified at Table 2.1 to have taken place on the subject site are joined by the principal projects in the vicinity of the site in order to allow for a description of the development of the Site context.

Having regard to the EIAR requirement to assesses in-combination and cumulative effects we have similarly tracked significant projects in the area and their permitting timelines and, where possible, reviewed the information submitted with those applications, their considerations and decisions to further aid in building a profile of the development subject site over its lifetime.

Table 2.1: Summary of key events on subject site and surrounding lands.

Time		Events	
Year	**Reference / Source**	**Site Event**	**Principal Projects / Extra Site Events**
1710	25 April 2005, S.261 Registration Form & High Court Order [2018 No. 929 JR].	[1] Extraction declared and accepted to be began circa. 1710	
1937			
to 1945	1945	Watermain laid	Poulaphouca reservoir constructed and original watermain laid.
Oct 1964			*Local Government (Planning and Development) Act, 1963 commencement*
June 1968	Reg. Ref. 1547 A.14	Planning permission granted for 'stone quarrying'	
1972			Dublin County Development Plan 1972
	Reg. Ref. SA1936	Planning application submitted for '*machinery store'* (granted)	
1976			Planning act that required Development Plans for periods of 5 years and formed An Bord Pleanála.
Feb. 1980	Reg. Ref. SA1936	Planning permission granted for '*machinery store'* (Reg. Ref. SA1936)	
1983			Dublin County Development Plan 1983
Dec. 1988	Reg. Ref. 88A/709	Planning permission granted for '*mobile asphalt mixing plant in existing quarry'* (Reg. Ref. 88A/709)	
1991			Dublin County Draft Development Plan
1993			Dublin County Development Plan 1993
1994			Dublin County Council abolished and South Dublin County Council formed.
1998			South Dublin County Development Plan 1998 - 2004
1998			N7 Jct 1A-4 Newlands Cross-Rathcoole upgrade complete

Time		Events	
Aug 2002			ABP PL09 .ER2008 N7 ABP PL09 .ER2008 N7 Rathcoole to Kildare County Boundary Road Improvement Scheme (CPO confirmation & proposed rd. dev. S.51) (concurrent CPO ref. PL09 .CH2025)
July 2003			ABP PL06S.ER2018 N7 Rathcoole to Kildare County Boundary Road Improvement Scheme (CPO confirmation & proposed rd. dev. S.51) Confirmed (concurrent CPO ref. PL09 .CH2077)
Apr 2005	SDCC Waste Permit ref. WPR051	Waste permit for 'Deposit of waste bituminous product into haul Roads throughout the quarry of L. Behan & Sons, Windmill Hill.' Begins for up to 5,000 tonnes p.a. for 'Recycling or reclamation of other inorganic materials.'	
2004			Adoption of South Dublin County Development Plan for the period 2004 - 2010
Apr. 2005	South Dublin County Council (SDCC) S.261 Registration ref. SQU05A/4	Quarry registered as existing and Pre '63	
Oct. 2005	S.261 Registration SDCC ref. SQU05A/4	Response to further information request under S.261 received - revised map indicating (a) site boundary in red, (b) extractable area in blue, (c) 'total extracted area in green'.	
Oct. 2005	S.261 Registration SDCC ref. SQU05A/4	Letter from agent stating that they had found 'full planning permission for the operation of the he quarry' ref. 'A.14.11547 and is dated 20th May 1968'. Copy enclosed.	
Feb. 2006	S.261 Registration SDCC ref. SQU05A/4	This letter requires the site to be re-registered and a new public notice will be required as status found to be permitted and will be considered on that basis)	
Oct 2006	S.261 Registration SDCC ref. SQU05A/4	Resubmission of S.261 registration form by agent	
Feb. 2007	S.261 Registration SDCC ref. SQU05A/4	Revised planning conditions notified on operation (ref. SDQ05A/4) this followed preparation of planner's report on registration readvertisement in Jan 2007	
Apr 2007	S.261 Registration SDCC ref. SQU05A/4	36 no. conditions applied under S.261. Cond. No. 1 refers to original info. And further information maps. No. 35 limits extraction to within blue line on revised site location sheet no. 1 dated 23/04/05 '*submitted as Additional Information on 10 October 2005.'*	

Time		Events	
Sept 2007	An Bord Pleanála (ABP) ref. PL06S.PC0036	Application to determine if N7 Resource Recovery Project (N7RRP) Strategic Infrastructure Development (SID) (ref. PL06S.PC0036 (SID) for Energy Answers International Ltd.	
Dec. 2007	An Bord Pleanála (ABP) ref. PL06S.PC0036	N7 Resource Recovery Project (N7RRP) determined to be SID ((ref. PL06S.PC0036 (SID) for Energy Answers International Ltd.	
Apr 2008	SDCC Waste Permit ref. WPR051	Waste permit for 'Deposit of waste bituminous product into haul Roads throughout the quarry of L. Behan & Sons, Windmill Hill.' Ends	
May	SDCC Waste Permit	Application made (annotating anticipated start July 2008)	
May 2008	ABP ref. ref. PL06.PA0006	SID planning application submitted for N7 Resource Recovery Project (N7RRP)	
Feb. 2009	ABP ref. ref. PL06.PA0006	Planning consent refused to Energy Answers International Ltd. for SID N7 Resource Recovery Project (N7RRP) (ref.PL06.PA0006)	
Feb 2010			Refuse to approve Kildare County Council Motorway (M7 Osberstown Interchange) Scheme Order 2008 ref. PL09 .MA0005
Oct. 2008	SDCC Reg. Ref. SD08A/0707	Planning application for 1.5 storey office invalid (Reg. Ref. SD08A/0707)	
Nov. 2008	SDCC Reg. Ref. SD08A/0764	Planning application for 1.5 storey office withdrawn (Reg. Ref. SD08A/0764)	
May 2010	SDCC Reg. Ref. SD10A/0139	Planning application invalid to increase to 50,000 tonnes per annum the existing waste management facility (WPR 051/3) to accept tar macadam, waste concrete & waste aggregates for its recycling & reuse in the tar macadam manufacturing plant located on the site. (Reg. Ref. SD10A/0139)	
June 2010	SDCC Reg. Ref. SD10A/0175	Planning application invalid to increase to 24,000 tonnes per annum the existing waste management facility (WPR 051/2) to accept tar macadam, waste concrete & waste aggregates for its recycling & reuse in the tar macadam manufacturing plant located on the site. (Reg. Ref. SD10A/0175)	
July 2010	SDCC Reg. Ref. SD10A/0197	Planning application made for waste management facility 24,000 tonnes intake per year (reuse and recycling in asphalt plant and deposition on site in haul roads	
Oct 2010			South Dublin County Development Plan for the period 2010-2016 came into effect

Time		Events	
Mar. 2011	SDCC Reg. Ref. SD10A/0197	Planning application declared withdrawn for a Waste Management Facility with a maximum intake volume of 24,000 tonnes per annum to accept inert waste material including waste bituminous mixtures (EWC 170302), waste concrete (EWC 170101) & waste gravel and crushed rocks (EWC010408) for recycling & reuse in the existing tarmacadam manufacturing plant located on the site and to facilitate the deposit of waste bituminous product, waste gravel and waste concrete into haul roads throughout the subject quarry site in which the subject waste facility is located. The site currently has a Waste Permit (Waste Permit No. WPR 051/2) with a permitted volume of 500 tonnes per annum. This development requires a Waste Facility Permit under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008. (Reg. Ref. SD10A/0197)	
Nov 2011	SDCC Reg. Ref. SD11A/0271	Planning application made for waste management facility 10,000 tonnes intake per year (reuse and recycling in asphalt plant)	
Jan. 2012	SDCC Reg. Ref. SD11A/0271	Planning permission refused for 'a waste management facility with a maximum intake volume of 10,000 tonnes per annum to accept inert waste material including waste bituminous mixtures (EWC 170302), waste concrete (EWC 170101) & waste gravel and crushed rocks (EWC 010408) for it's recycling & reuse in the existing tarmacadam manufacturing plant located on the site. The site currently has a waste permit (Waste Permit No. WPR 051/2) with a permitted volume of 500 tonnes per annum. This facility requires a Certificate of Registration under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008.' (Reg. Ref. SD11A/0271)	
Mar 2012	SDCC Reg. Ref. SD12A/0059 (appeal ref. PL06S.241259)	Planning application made for importation of 10,000 tonnes per year (reuse and recycling in asphalt plant)	
Aug 2012	S.261A Quarries Notice ABP ref. PL06S.QB0360	S.261A Quarries Notice issued to ABP by SDCC	
Aug 2012	S.261A Quarries Notice ABP ref. PL06S.QV0090	S.261A Quarries Notice application for review on behalf of operator	
Oct. 2012	S.261A Quarries Notice ABP	S.261A Quarries Notice recorded as received ref. SDQ05A/04 (ref. PL06S.QB0360)	

Time		Events	
	ref. PL06S.QB0360		
Oct / Nov 2012	SDCC Reg. Ref. SD12A/0059 (appeal ref. PL06S.241259)	Notification of grant of planning permission for importation of 10,000 tonnes per year (reuse and recycling in asphalt plant), 3rd party appeal lodged	
Oct 2012	SDCC Certificate of registration (COR) COR-DS-12-0002-01	Application made for annual intake of inert (soil and stones) of less than 10,00 tonnes p.a.	
May 2013	S.261A Quarries Notice ABP ref. PL06S.QV0090	S.261A Quarries review ref. SDQ05A/04 resulting in modification:- requirement for substitute consent with rEIS(ref. PL06S.QV0090)	
May 2013	SDCC Reg. Ref. SD12A/0059 (appeal ref. PL06S.241259)	Planning permission upheld on appeal for 'a dedicated area within the existing quarry site in which no more than 10,000 tonnes per year of imported inert materials (soils, stones, rock, concrete, tarmacadam) generated by off-site construction activities shall be segregated, processed, recycled and reused as raw materials for the existing on-site asphalt manufacturing plant. The proposed development requires a Certificate of Registration under the Waste Management (Facility Permit and Registration) Regulations 2007 and 2008'. (Reg. Ref. SD12A/0059 and appeal ref. PL06S.241259)	
Aug 2014			Kildare County Council (M7 Naas Newbridge Bypass Upgrade) Motorway Scheme Order 2013 approved with modifications (ref. PL09.MA0012 (CPO ref. HA0045)) & Kildare County Council M7 Osberstown Interchange Motorway Scheme Order 2013 (ref. PL09MA.0013 (CPO refs. HA0046 & KA0031))
Jun 2016			South Dublin County Development Plan for the period 2016-2022 came into effect
Apr / May 2018	SDCC Reg. Ref. SD12A/0059/EP	Extension of duration of Reg. Ref. SD12A/0059 application made and refused (Reg. Ref. SD12A/0059/EP)	
Oct 2013	S.261A substitute consent application ABP ref. PL06S.SU0068	Substitute consent application made for	
Nov 2015	S.37L further development of a quarry application ABP ref. PL06S.QD0003	S.37L application made for '*Continued development of a quarry, 40.875 Ha. Reinstatement of worked out quarry to agricultural use by importation of inert sub soil and top soil amounting to a total of 11,151,570 cubic metres.'*	

Time		Events	
Sept 2018	S.261A substitute consent ABP ref. PL06S.SU0068	Substitute consent refused	
Sept 2018	S.37L further development of a quarry ABP ref. PL06S.QD0003	S.37L further quarry development refused	
Aug 2020	High Court Order No.	Substitute consent application ABP ref. PL06S.SU0068 and S.37L further quarry development PL06S.QD0003 decision quashed and new applications ordered.	
Sept 2020			Pre-Draft consultation phase for South Dublin Development Plan 20022 – 2028 ends.

NOTES: Reg. Ref. = Planning Application Register Reference Number under Planning & Development Acts
SDCC = South Dublin County Council
ABP= An Bord Pleanála

2.4.1 Summary of Progression of Extraction from Baseline to Current Time

The single most significant impact of the Development the subject of this EIAR is that it consists of a quarry and therefore there has been movement of soils and subsoils and extraction of aggregate beneath over the void area.

The developer supplied information that provides extraction direction of lands beginning in an area of approximately 8 ha. centred on the established administration and processing plant area (approximately 1962 to 2012). Extraction then moved westward over and area of about 10 ha. and continues to be extracted today (approximately 1990 – today) and continued eastward in tandem over another area of nearly 12 ha. that also continues to be extracted today. Together, these extraction areas give rise to the concurrent substitute consent application area of 28.8 ha.

Estimated historic extraction rates from 1990 to 2021 average around 500,00 tonnes per year, save for peak demand over 2007 to 2009 mainly reflecting supply to the Monasterevin bypass and recession from 2010 to 2013 where extraction rates dropped to and estimated 50,000 tonnes per year and the quarrying activity on site was augmented by the importation and recovery of C&D waste.

2.4.2 Future Extraction

A reserve of an estimated 5 million tonnes of greywacke rock lies beneath the extant void, currently at an average working depth of 173 mAOD. It is proposed to laterally extend and deepen the extension areas to the current quarry depth of 150 mAOD, above the watertable.

The Applicant intends to maintain the aggregate extraction and throughput rate of the site and therefore an average extraction rate of 500,000 tonnes per annum is proposed over a lifetime of 10 to 15 years to account for any potential demand reductions.

The proposed development of further extraction is to be in the existing void areas east and west of the central administration and processing plant area with relatively minor lateral extension of the void to the north. The rates of extraction predicted as part of that application, which will be accompanied by EIAR that has regard to the historic rates here set out.

A restoration proposal is included in this EIAR that is entirely within the EIA unit and the Applicant land ownership that is intended to be implemented once extraction proposed is complete. This restoration summarily consists of the regrading of void faces to safe inclines with the bottom of the void flooded. Native species planting is proposed in accordance with advices from the ecologist team for this EIAR. The restoration proposal is detailed in Chapter 11 of this EIAR. It is anticipated that restoration will require 24 months for plant and building removal, regarding and plating works and first planting season inspection. This two year requirement is proposed to be over a period of 2 to 5 years to reflect the potential for slippage in that programme by reason of demolition and removal issues or plant failure.

2.5 Description of the Project

The quarry development EIAR area consists of the following:

- An EIA area of 46.14 ha;
- A further development of a quarry as a quarry over an area of 26.87 ha. consisting of further extraction within that EIA unit;
- The material being extracted and proposed to be extracted is greywacke rock;

- Stripped overburden (soils and subsoils) estimated at a depth of ca. 1 m over an area of 5.16 ha. to expose a laterally extend the existing quarry void by 4.1 ha. to the west and east of the existing farmhouse (used as staff accommodation) on the northern margin of the Plant and processing area;
- Removed overburden (soils and subsoils) from the laterally extended void will be stored on the margins of this expanded area as screening berms;
- Aggregate excavated will utilise the existing plant and processing area the subject of concurrent substitute consent and rEIAR;
- The existing site entrance from the n/M7 is proposed to continue to be utilise for the prosed further development of the quarry;
- A restoration proposal is included in this EIAR that is entirely within the EIA unit and the Applicant land ownership that is intended to be implemented once extraction proposed is complete as final mitigation.

2.5.1 Method and Direction of Working

- The proposed development consists of the continuation of extraction that will maintain existing average extraction rates and practices.
- This is a greywacke (sandstone) rock quarry and therefore material is extracted by blasting which is proposed to continue;
- Blasting practices used over the assessment period accord with best industry practice and are carried out by independent, licensed contractors. Blasting is monitor and reported for each blast, (Chapter 8 of the EIAR considers noise and vibration). Blasting currently takes place approximately weekly at the Site which is proposed to continue;
- This material is then crushed via mobile primary plant at the face and transported. The material processed via mobile plant is brought by internal haul route to the plant area for sale or onward processing in the plant area. This practice is proposed to continue and relies on the concurrent application for substitute consent being approved.
- The quarry was previously worked below watertable and therefore pumps water via pipeline from the void northwards across the plant area to discharge at a point close to north of the Site office. Chapter 6 of this EIAR sets out water management arrangements and effects.
- Current extraction activities take place above the watertable to an average working depth of 173 mAOD and are proposed to remain above the watertable at a proposed final average working depth of 150 mAOD, with the lowest point of the quarry remaining at ca. 120 mAOD (the base of the quarry sump).

2.5.2 Traffic Control

All traffic occurring within the Site is internal traffic using internal short informal haul routes. Excavated rock leaves the quarried faces and it either transported off-site or to the plant area for storage or further processing. The proposed extracted material will be transported in the same way.

The Site entrance to the lands from the N7 is the sole entrance for the Development thus caters for all employees, visitors and aggregate products and materials (import/export). Therefore it this interurban national route that accommodates the traffic arising from the current development that is proposed to be maintained at current average annual levels for the purposes of excavating remaining reserve at the site. No traffic arising from the quarry operation access the local network as there is no access to that quarry from that network.

The Traffic section of this EIAR sets down a description of the existing traffic environment of the site and the precited impact of the prosed continuation of the average annual traffic from the Site for 10 – 15 whereupon traffic generation for the quarry will cease with ad hoc traffic generation from restoration implementation.

2.5.3 Hours of Operation

There were no prescribed operational hours for quarry operation under the 1968 permission. Reflecting normal practice and declared on the S.261 registration form for the site ref. SQU05A/4 in both April 2005 and October 2006 were operational hours of 0500 to 1900 hours Monday to Friday and 0500 to 1400 hours Saturday with no Sunday working. Further information responses and resubmission of the S261 registration appear to include reference to out of hours working resulting in the final S.261 conditions for the site, from April 2007, imposing condition no. 3 that sets operational hours of 0500 to 2100 Monday to Friday and 0500 to 1400 on Saturdays.

Having regard to the above and observed operational practices on site, those operational hours imposed under S.261 registration are proposed to remain: 0500 to 1900 hours Monday to Friday and 0500 to 1400 hours Saturday. Operations do not occur working on Sundays or bank holidays. It is understood that working outside of these hours has been undertaken on ad hoc occasions for the fulfillment of certain significant infrastructure projects. It is further understood that such out of hours working is by arrangements with the authority.

These operational times of the Site to present day and are proposed to be maintained in the current development proposal.

2.5.4 Employment

Existing direct and indirect employment is attributable to the quarry. Employment levels vary in accordance with market demand and associated extraction and processing requirements. Direct employment is in the categories of plant operators, fitters, laboratory technicians, administrative staff.

Since 1990, full time employment on the site is an average of 12 no. employees with these hauliers and other contractors and service employees generate secondary employment of a further 30 no. fulltime equivalents

The quarry operator has a fleet of haulage vehicles and drivers but the majority of the haulage requirements of the site are met by independent contractors who do not have their permanent work place on site.

It is noted that at times when peak demand existed; the work including direct employees, sub-contractors, hauliers, maintenance contractors, material suppliers etc. has increased from time to time.

There is also indirect employment in the supply chain to provide material, specialist labour and services for the workforce. Based on the information available at present, it is not possible to quantify the extent of the indirect employment created, however, it is expected to have been in the order of 25 to 33% of direct employment, based on estimated additional jobs created in similar projects.

A total of 42 no. fulltime jobs (EFT) are proposed to remain as a result of the proposed development which will allow for further extraction of aggregate for 10 – 15 years. The indirect employment that the site supports at a rate of 15% to 30% of the EFT will also remain.

2.5.5 Fuel and Chemical Storage

Fuel storage is in bunded fuel tanks in the plant area, part of the concurrent substitute consent application and within the EIA boundary. Refuelling occurs at these tanks over a concrete apron with interceptor below. It Remaining oils, chemicals and admixtures are ordered and used as needed used oil and chemical containers are separately stored within the maintenance sheds for disposal by licensed contractor.

2.5.6 Waste Management

The waste arising on site is municipal waste from staff welfare activities and is disposed of via domestic waste collection. Similarly, scrap metal arising on site is stored within a designated area at the site prior to collection by a licensed waste contractor.

As noted above, part of the quarry site has been previously utilised for the purposes of the operation of intake and processing for reuse inert C&D waste under waste permits and a certificate of registration over the period 2005 to 2018. Currently there is no waste permit, certificate of registration or license associated with the site and one is proposed as part of the further quarry development.

2.5.7 Water

2.5.7.1 Waste Water

There exists a holding tank on site of sufficient capacity to cater for the PE equivalent of average 30 persons on site arising from: full time site employees, contractors and additional visitors. The location of this tank is within he plant and processing area and is included in the concurrent application for substitute consent. Chapter 6 of this EIAR describes this system.

2.5.7.2 Potable Water

There is a well in the plant area for which toilet flushing and WC washing water is drawn. Also indicated on submitted site layout drawings is a separate well from which water for the purposes of aggregate processing is drawn. Drinking water is supplied by contractor in bottles that are periodically replaced.

Obtaining water from wells within the site boundaries and importing potable bottled water is the established practice on site and is intended to continue subject to substitute consent.

2.5.7.3 Surface and Groundwater

There is currently no below groundwater table working nor any below. Chapter 6 of this EIAR performs a water balance for proposed quarrying and extant quarry and plant and processing areas in order to demonstrate the ability of the existing water management system of silt press, water recycling unit and settlement ponds within the substitute consent area to manage within site boundaries the surface water arising within the operational areas of the EIA project area.

This EIAR accompanies a proposal for the deepening of the average working depth of the quarry from ca. 173 mAOD to ca. 150 mAOD that has been assessed to be above the watertable. The eventual restoration of the site will result in the bottom of the void areas becoming flooded. This will be achieved by water ingress via the extant quarry sump, which has a floor elevation of ca. 120 mAOD. Changes in groundwater levels within the quarry from the proposed pumping have been assessed in Chapter 6 (Water), these effect have been determined to be not significant.

2.5.8 Power Supply & Telecommunications

Power is supplied to the subject lands via the electricity network. The south western corner of the EIA project area and substitute consent application area are traversed by 110kV a public power line. There is a substation on site indicated on site layouts submitted with substitute consent application that has been in existence on site since before 1990. There are also mobile generators utilised on site from time to time.

2.5.9 Safety and Security

The subject site is required to meet conditions of existing planning permissions, licences and permits and certain statues. In particular, the relevant Health & Safety legislation (*Safety, Health & Welfare at Work Act, 2005*, the *Mines and Quarries Act, 1965)* and subsequent Quarries Regulations relating to health and safety, training, appropriate site management etc. will be complied with in that main quarry complex. Amongst these regulatory

requirements are the need to keep on site and up to date Health and Safety File which records safe procedures, deviations from those procedures and accident reports.

Compliance with these requirements will persist during the proposed further development of the quarry. The operator maintains a Health and Safety File and facilitates site inspections by the health and Safety Authority (HSA) and audits for geotechnical stability and site arrangements.

The EIA unit is fully fenced with any agricultural entrance permanently closed and locked. The only vehicular entrance in operation is that from the N7 which is gated inside the edge of the carriageway to allow for safe onward travel of vehicles that may mistakenly exit the N7 on the slip road to the site. All vehicles entering the site must do so from the N7 entrance and travel along the dedicated private avenue which is observed by the shipping office into the operational areas of the site. As noted at 2.5.2 this traffic management arrangement is to persist for the proposed further development of the quarry

The lands are remotely secured via CCTV cameras with 24 hour monitoring which is to remain on site. There is no requirement for lighting outside of the subject lands but within the lands, certain working hours (after dark in winter periods) necessitate lighting that is extinguished when the site is closed thus no external light spill occurs. This situation is to remain in the proposed development which does not require additional lighting.

2.5.10 Rehabilitation / Restoration

Extraction has occurred on the subject lands since 1710 and the originating planning permission is from 1968 when proposals for post-quarrying reuse (rehabilitation, restoration) were not envisaged nor required. Condition nos. 26, 27 and 28 of the April 2007 conditions imposed after S.261 registration required inter alia; the submission of 'phased carrying out of rehabilitation and landscaping operations within a definite period or periods related to the anticipated pace of extraction operations' (cond. no. 26); landscaping and boundary treatment proposals (cond. no. 27); and the removal of all plant and buildings within 12 months of the cessation of quarrying on site with implementation of landscaping proposals at that time (cond no. 28).

Compliance submissions in relation to the above conditions were made on behalf of the operator in May 2008. Exchanges on the material suited continued until May 2013 when the local authority had begun S.261A review of quarries within their administrative area and communicated that further compliance submissions would be inappropriate given that review. In summary, it is submitted that the then proposed phasing indicated the further lateral extraction over the areas from the central plant area south west and south east to the S.261 extraction boundary to a final average depth of 135 mAOD with a 'low point' of 120 mAOD.

It is further submitted that restoration was then submitted to be carried out at the end of the extraction life of the site. This is submitted to remain the practical rehabilitation model in this instance as the extant void is an open pit that holds commercial reserve and that cannot be worked on phased basis.

As recorded at 2.4.2 above, a restoration proposal is included in this EIAR that is entirely within the EIA unit and the Applicant land ownership that is intended to be implemented once extraction proposed is complete.

This restoration summarily consists of the regrading of void faces to safe inclines with the bottom of the void flooded. Native species planting is proposed in accordance with advices from the ecologist team for this EIAR. The restoration proposal is detailed in Chapter 11 of this EIAR. It is anticipated that restoration will require 24 months for plant and building removal, regarding and plating works and first planting season inspection. This two year requirement is proposed to be over a period of 2 to 5 years to reflect the potential for slippage in that programme by reason of demolition and removal issues or plant failure.

2.6 Major Accidents and Disasters

The EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU) requires that an assessment is made of *'the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned'*.

The consideration of major accidents and disasters seeks to assess the relevant accidents and disasters which the Proposed Development is vulnerable to, and the relevant accidents and disasters that the Proposed Development could give rise to.

The objective of this assessment is to confirm that suitable precautions are taken into account for the Proposed Development and that the potential for significant adverse effects on the environment is reduced as far as possible.

A primer document on the assessment of major accidents and disasters in the context of EIA was published by the Institute of Environmental Management and Assessment (IEMA) in September 2020 ('Major Accidents and Disasters in EIA: A Primer'). The document offers an assessment methodology based on known current practice to date and identifies key terminology that can be used in the assessment. As this is an emerging topic, the IEMA document is intended as a primer to introduce the concept of the topic and offer an initial appreciation of methodology that could be adopted.

The document provides the below terminology to describe 'major accidents' and 'disasters'.

- **Major Accidents**: Events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events; and
- **Disaster**: May be a natural hazard (e.g. earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident.

In terms of national guidance, in January 2010 the then Department of Environment, Heritage and Local Government (DEHLG) produced 'Guidance Document 1, A Guide to Risk Assessment in Major Emergency Management' (DEHLG 2010 Guidance). This guidance has been used to inform the assessment of Major Accidents and Disasters.

2.6.1 Scope of this Assessment

The assessment of major accidents and disasters is based on the premise that the Proposed Development has been designed and will be developed/extracted and operated in line with best current practice and national guidelines.

Site management practices and environmental mitigation relevant to the vulnerability of a development to major accidents and disasters are covered by a wide range of safety and non-safety-related legislation. In most scenarios such mitigation is generally sufficient to manage a development's vulnerability to major accidents and/or disasters without the need for further specific assessments or mitigation.

The environmental impact assessment process includes the appraisal of potential accident scenarios such as pollution incidents as well as the evaluation of potential flooding events. Such scenarios are assessed within this EIAR, including Chapters 5 Land, Soils and Geology and Chapter 6 Water.

2.6.2 Methodology

The DEHLG 2010 Guidance has been used to categorise the potential impacts from the potential major accidents and disasters identified above.

The assessment steps have included:

- Risk / hazard identification;
- Risk / hazard classification, and the likelihood and consequence; and
- Risk / Hazards Assessment and Evaluation.

2.6.3 Risk / Hazard Identification

The identification of risks and hazards has concentrated on the plausible incidents which could potentially occur at the Proposed Development and that are inherent to quarrying operations. These include;

- Fire / explosion;
- Unplanned outages or disruption to services;
- Road traffic accidents resulting from Heavy Goods Vehicle (HGV) movements, on and off site;
- Contamination of the groundwater/ surface water;
- Flooding; and
- Falling debris or the collapse of benches or quarry faces.

2.6.4 Risk / Hazard Likelihood and Consequences

Likelihood

The likelihood of occurrence of each of the risks / hazards identified above has been assessed in accordance with the criteria identified in Table 2.2. The assessment considered the Site's safety and management procedures and proposed environmental controls / mitigation when evaluating the appropriate classification. Therefore, the likelihood ranking allocated to each of the risks or hazards has made the assumption that all proposed mitigation measures and relevant procedures are in place, operational and have been/will be successful in reducing the potential for a major accident and / or disaster to occur.

Table 2.2: DEHLG, 'A Guide to Risk Assessment in Major Emergency Management' (2010), Risk Likelihood Classification.

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years

Ranking	Likelihood	Description
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Consequence

The DEHLG 2010 Guidance sets out criteria to classify emergencies on a five level scale from 'Minor' to 'Catastrophic' (Table 2.3). Those emergencies which have been classified as 'Serious', 'Very Serious' and 'Catastrophic' are deemed to be 'Major Emergencies'. The identification of the consequence makes the worst-case assumption that the Site's safety and management procedures and proposed environmental controls / mitigation have failed.

Table 2.3: DEHLG, 'A Guide to Risk Assessment in Major Emergency Management' (2010), Risk Classification Table.

Rank	Classification	Impact	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects <€0.5M. Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6 - 24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration €3-10M. Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated Heavy contamination, localised effects or extended duration

Rank	Classification	Impact	Description
			€10 - 25M Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

2.6.5 Risk / Hazards Assessment and Evaluation

The identified risk / hazard 'likelihood' and 'consequence' are combined in a matrix to indicate the overall risk score for the particular major accident or disaster. This matrix, as per the DEHLG 2010 Guidance, has been provided in Figure 2.2, below. As identified in the matrix events which are classified as 'Serious' or above are identified to be major emergencies and are therefore significant in terms of their effects.

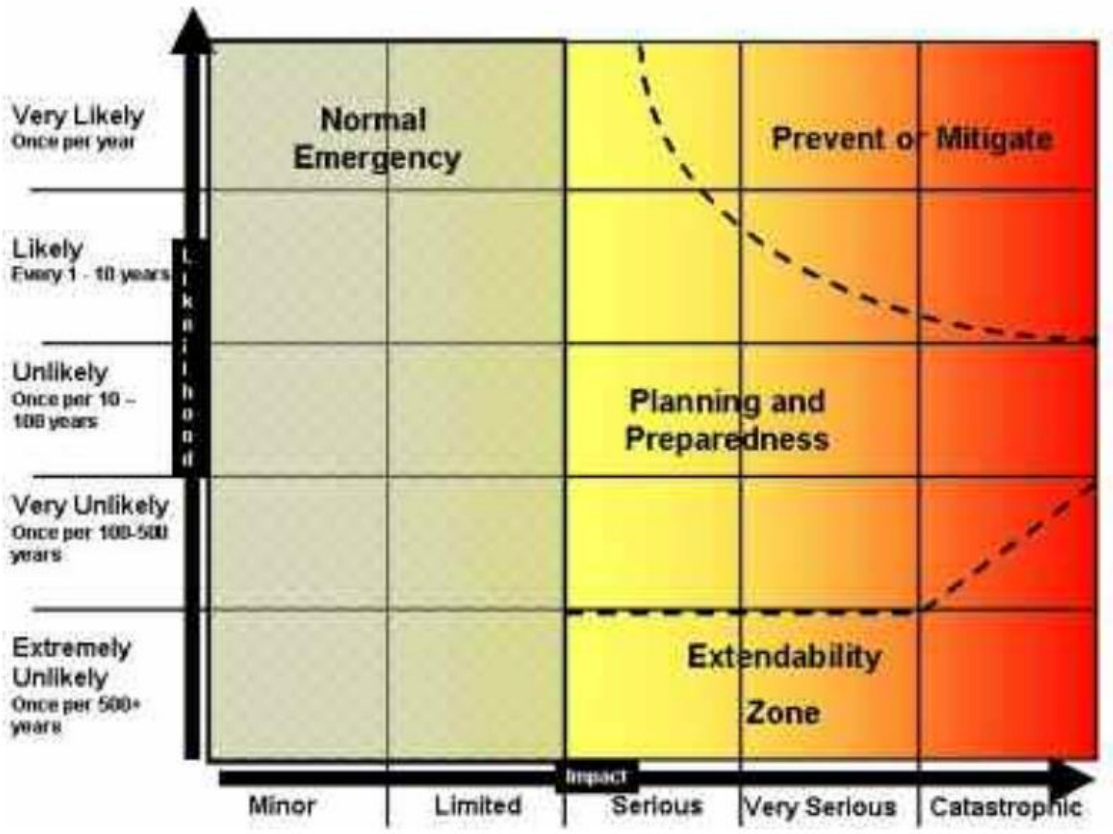


Figure 2.2: DEHLG, 'A Guide to Risk Assessment in Major Emergency Management' (2010), Risk Matrix Zones (Figure 2.1a).

The following sections identify the potential, relevant risks which could occur at the Proposed Development and that are inherent to quarrying operations. Based on the assumption that the Proposed Development has been designed and will be developed/extracted and operated in line with best current practice and national guidelines, a number of the potential risks identified have been disregarded from further assessment. Where appropriate the relevant risk likelihood, consequences and evaluations have been carried out to identify the appropriate further measures to be taken to address the specific major accident and / or disaster.

Fire / Explosion

During the operation and restoration of the Proposed Development there is potential for fire to occur from vehicle collisions on Site, and from plant such as the asphalt plant and aggregate screens. Plant activities and employee work practices are governed by the L Behan Aggregates and Recycling Safety Statement and Site-Specific Risk Assessments, (revision 08 January 2020). Furthermore, plant and equipment are regularly maintained on Site at the appropriate intervals. Vehicles are checked daily for obvious defects by the driver and are regularly serviced and maintained (in accordance with manufacturers' guidance) by a competent person. All maintenance and repairs are only completed by authorised persons. It is considered that with the implementation of the appropriate management measures for site safety, equipment use and maintenance, there will be adequate control of the risk of fire/explosion from vehicles or plant, therefore this has been disregarded from further assessment.

Given the lack of underground services within the Proposed Development area, damage to or contact with unmapped underground services and utilities, such as the electricity and gas supply networks is considered to be low, and therefore the risk of fire/explosion from contact with underground services has been disregarded from further assessment.

Blasting activities are carried out by appropriately trained and qualified personnel, and the Site has strict protocols to govern the use of explosives for this task. It is considered that with the implementation of these established management measures, there will be adequate control of the risk of explosion from blasting activities, therefore this has been disregarded from further assessment.

The risk of major accidents and / or disasters from fire / explosion is **not significant**.

Unplanned outages or disruption to services

Similar to above, given the lack of underground services within the Proposed Development area, the occurrence of unplanned outages or disruption to services from accidental interactions with services and utilities routed through the Site is considered to be low, and therefore the risk of outages or disruption has been disregarded from further assessment.

The risk of major accidents and / or disasters from unplanned outages or disruption to services is **not significant**.

Road traffic accidents resulting from Heavy Goods Vehicle (HGV) movements on and off site

With regards to on site events, the facilitation of private vehicle use on site is limited to the office and car park area. Movements within the working area are routed on defined and maintained haul roads with restricted speed limits.

HGVs will interact with the public domain and the adjacent road network. During these times there is potential for activities to result in a road collision or incident with a non-motorised member of the public. This may occur as a result of public negligence/error, objects on the road, or the failure of vehicle operators. It is considered that the occurrence of an accident involving a Site HGV is no more likely than typical occurrence of typical road traffic accidents. Furthermore, individual accidents and incidents are not considered to constitute a 'major

accident/disaster' for the purposes of this assessment, and therefore this has been disregarded from further assessment.

The risk of major accidents and / or disasters from road traffic accidents is **not significant**.

Contamination of the groundwater / surface water

In the context of water, large oil and fuel spills which enter groundwater would constitute a major accident or disaster. It is considered that there are sufficient design and management measures in place to negate the potential for such spills to occur. Fuels are / will be stored in bunded storage areas and given these management measures the likelihood of a major accident or disaster occurring is low and therefore this has been disregarded from further assessment. Detailed mitigation measures have been identified in Chapter 6 Water of this EIAR.

The risk of major accidents and / or disasters from groundwater and surface water contamination is **not significant**.

Flooding

The potential impacts of flooding on the Site have been considered in Chapter 6 Water of this EIAR. Given certain characteristics of the development, including: the size and scale of the Site, the lack of surface watercourse surrounding the Site, the topography, and the potential consequences involved in a flooding scenario, it is considered that such individual accidents are not considered to constitute a 'major accident/disaster' for the purposes of this assessment, and therefore this has been disregarded from further assessment.

The risk of major accidents and / or disasters from flooding is **not significant**.

Falling debris or the collapse of benches or quarry faces

The nature of the Proposed Development requires that rock is blasted and extracted from faces. The hazards posed by these faces are considered significant or potentially significant if a failure would directly or indirectly, be liable to endanger where people are likely to be found offsite, or likely to cause serious or fatal injuries to persons on or off-site.

The Proposed Development has been planned and designed to ensure it can be developed without becoming a significant hazard both during its operational and restoration phases, and during subsequent after use. The maximum safe height of excavated faces is influenced by the geology and physical properties of the material, the size, height and type of machinery and working methods used. However, where the face height exceeds 20 metres a geotechnical assessment is required.

Geotechnical assessments are to be carried out at quarry Sites in accordance with the requirements of the Safety, Health and Welfare at Work (Quarries) Regulations 2008 (S.I. No. 28 of 2008; as amended) for the provision of a Geotechnical Assessment (in accordance with the requirements of Regulation 55, namely Schedule 3: Geotechnical Assessments); and in accordance with the Health and Safety Authority's (HSA; 2020) 'Safe Quarry. Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008'. Features under these regulations which constitute a significant hazard must be subject to geotechnical assessment at least once every two years with appropriate remedial works completed in accordance with any recommendations of the assessment.

With the implementation of such design, mitigation measures, management practices and the implementation of the recommendations identified in the geotechnical assessments it is considered that the likelihood of such risks / hazards occurring is '**Unlikely**'. Given the potential for greater than one fatality and less than five, and also the scale of the Proposed Development, it is considered that the classification of the impact will likely be no greater than '**Serious**'.

The impacts of such an incident are considered '**significant**' and in accordance with the DEHLG 2010 Guidance (Figure 2.2) the risk falls outside the zone where the Site is required to implement further preventative or mitigation measures. However, the Site should implement planning and preparedness measures and adopt an emergency plan in accordance with Section 3.5.2 of the L Behan Aggregates and Recycling Safety Statement and Site-Specific Risk Assessments (revision 08 January 2020). Once these plans are updated in accordance with the recommendations of the geotechnical assessment it is considered that the risk of major accidents from debris falls or the collapse of benches or quarry faces will be appropriately addressed in line with the DEHLG 2010 Guidance.

2.6.6 Do-Nothing Scenario

In the event that the Proposed Development does not proceed, it is considered that there will be no increase in risk of major accidents or disasters from: fire / explosion; unplanned outages or disruption to services; road traffic accidents resulting from Heavy Good Vehicle (HGV) movements, the contamination of the groundwater/ surface water; and flooding.

However, if the Proposed Development were not to proceed and the Site were to cease operations it is considered that the measures outlined above in relation to 'falling debris or the collapse of benches or quarry faces', would still be required to be implemented for the existing operational areas of the Site. Once the recommendations of the geotechnical assessment are adhered to it is considered that the risk of major accidents from debris falls or the collapse of benches or quarry faces will be appropriately addressed in line with the DEHLG 2010 Guidance.

2.6.7 Cumulative Effects

There are no cumulative effects identified with regards to the likely risks of a major accident or disaster in respect of the Proposed Development and other developments, plans or projects.

3.0 POPULATION & HUMAN HEALTH

3.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Golder Associates Ireland Ltd (Golder) for the L Behan Aggregates and Recycling Ltd Section 37L Application (of the Planning and Development (Amendment) (No. 2) Regulations 2015) to An Bord Pleanála, (ABP). The Application has been made for the proposed quarrying activities (the Proposed Development) located at the lands at Windmillhill, south of Rathcoole in South Dublin (the Site).

This Chapter of the EIAR describes the human environment and identifies and assesses impacts from the Proposed Development on the surrounding population and human health.

Effects of a development on the environment can impinge upon the surrounding human environment, directly and indirectly, positively and negatively. Direct effects may include such matters as safety, air and water quality, noise, landscape quality and road traffic. Indirect effects pertain to such matters as ecology and biodiversity, heritage and archaeology. These matters form discreet sections of this EIAR in their own right and corresponding mitigation measures are comprehensively provided in those sections.

The following assessment has been prepared by Kevin McGillycuddy (BA (Mod), MSc). Kevin is a Practitioner Member of the Institute of Environmental Management and Assessment and has more than 8 years' experience.

3.2 Methodology

3.2.1 Technical Scope

This assessment has been made with reference to the 'Guidelines on the information to be contained in environmental impact assessment reports', published in 'draft' by the EPA in August 2017 (EPA, 2017 Draft Guidelines). These guidelines were drafted by the EPA with a view to facilitating compliance with the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU, together the 'EIA Directive').

The EPA's 2017 draft 'Guidelines on the information to be contained in environmental impact assessment reports' suggest the following sub-headings under which to arrange issues; *"Employment, Human Health (considered with reference to other headings such as water and air), Amenity (e.g. effects on amenity uses of a site or of other areas in the vicinity – may be addressed under the factor of Landscape)."*

The assessment also considered 'Advice Notes for Preparing Environmental Impact Statements', also published in 'draft' by the EPA in September 2015.

Having regard to the above guidance; particularly the 2017 EPA draft guidance on the information to be contained in an EIAR; the characteristics and context of the lands the subject of this EIAR; and the nature of the development, this EIAR chapter aims to identify the likely significant impacts that the Proposed Development may have on the 'quality of life' and these are discussed under the following headings:

- Populations;
- Employment;
- Amenity;
- Land Use and development patterns;
- Human health; and
- Health and safety.

3.2.2 Prediction of Impacts and Effects Prior to Mitigation

Prediction methods are required to identify and assess the significant effects of the Proposed Development on the environment. The predictive method used for this assessment is a common framework of assessment criteria and terminology based on the EPA's draft 'Guidelines on the information to be contained in environmental impact assessment reports' with some adjustments to improve clarity.

This common framework follows a 'matrix approach' to environmental assessment which is based on the characteristics of the impact (magnitude and nature) and the value (sensitivity) of the receptor. The terms used in the common framework are described below. Details of how these specifically relate to the human environment are based on the UK's Design Manual for Roads and Bridges (January 2020, Volume 11, Section 3, LA112, Revision 1, Sustainability and environment. Appraisal. Population and human health). The sensitivity of communities and populations has been included and has been conservatively attributed a 'High' sensitivity. These descriptions for value (sensitivity) of receptors are provided in Table 3.1 and Table 3.2.

Table 3.1: Environmental value (sensitivity) and descriptions.

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

The environmental sensitivity descriptions have been assigned to receptor groups as appropriate for the assessment on the human environment. These descriptions and rankings have been provided below in Table 3.2.

Table 3.2: Environmental value (sensitivity) and descriptions for assessment groups.

Group	Receptor / resource	Designated value (sensitivity) of receptor / resource
Populations / Communities	All individuals located in a particular location (this can be local, regional or at a national scale), and groups of people living in the same place or having a particular characteristic in common.	High
Private Dwellings	Residential property.	High
Community land and facilities, and other lands	Designated local green space / valued community facility.	High
	Undesignated local green space / non-essential community facility.	Low
	Derelict or unoccupied buildings or lands.	Low
Local Businesses	Businesses where viability is likely to be permanently jeopardised by a short disruption or worsening of trading conditions.	High
	Businesses where profitability may be harmed by a short or medium-term disruption or worsening of trading conditions.	Medium

Group	Receptor / resource	Designated value (sensitivity) of receptor / resource
	Businesses that could continue to operate without substantial harm if affected by a disruption or worsening of trading conditions.	Low
	Businesses that could continue to operate relatively unharmed if affected by a disruption or worsening of trading conditions.	Negligible
Non-motorised users	All non-motorised users utilising roads and networks, including pedestrians, cyclists, horse-riding, etc.	High
Human health	Health receptor that would be likely or expected to be directly affected. Receptor is well placed to take advantage of beneficial impacts, and/or is not well placed to deal with any adverse impacts.	High
	Health receptor that would be likely to be indirectly affected. Average ability to maximise beneficial impacts or cope with adverse impacts.	Medium
	Health receptor that would be unlikely to be affected. Receptor is not well placed to take advantage of beneficial impacts, and/or is well placed to deal with any adverse impacts.	Low
	Health receptor that would be unlikely to be affected or effects would be temporary in nature, or which would be anticipated to have a slight or no effect on human health.	Negligible
Vehicle travellers	Public transport, motor vehicles.	Low

The descriptions for magnitude of impact are provided in Table 3.3. The numerous descriptions for both the adverse and beneficial magnitudes of impact provided below reflects the diverse range of receptor groups which may be impacted.

Table 3.3: Magnitude of impact and typical descriptions.

Magnitude of impact (change)		Typical description
High	Adverse	■ Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements; ■ An impact that is expected to have considerable adverse socioeconomic effects. Such impacts will typically affect large numbers of businesses, workers or residents; ■ Very large damage to local business which may compromise its viability; ■ Adverse health impact to a large number of people and adverse impact affecting sensitive population groups.
	Beneficial	■ Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality; ■ An impact that is expected to have considerable beneficial socioeconomic effects. Such impacts will typically affect large numbers of businesses, workers or residents; ■ Very large direct or indirect benefits for local business; ■ Beneficial health impact to a large number of people and beneficial impact affecting sensitive population groups.

Magnitude of impact (change)		Typical description
Medium	Adverse	■ Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements; ■ Moderate magnitude impacts will typically be long-term in nature, resulting in the permanent change of the study area's baseline socio-economic conditions; ■ Moderate to large damage to local business, but with changes to management it should remain viable; ■ Adverse impact affecting moderate number of people. Adverse impact affecting some sensitive population group(s).
	Beneficial	■ Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality; ■ Moderate magnitude impacts will typically be long-term in nature, resulting in the permanent change of the study area's baseline socio-economic conditions; ■ Moderate to large benefits for local business; ■ Beneficial impact affecting moderate number of people. Beneficial impact affecting some sensitive population group(s).
Low	Adverse	■ Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements; ■ An impact that is expected to have a minor socio-economic effect. Such impacts will typically have a noticeable effect on a limited number of businesses, workers or residents, and will lead to a permanent (but not drastic) change to the study area's baseline socio-economic conditions; ■ Slight to moderate damage to local business, but with minor changes to management it should remain viable; ■ Adverse impact affecting low-moderate number of people. Adverse impact affecting few sensitive population groups.
	Beneficial	■ Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring; ■ An impact that is expected to have a minor socio-economic effect. Such impacts will typically have a noticeable effect on a limited number of businesses, workers or residents, and will lead to a permanent (but not drastic) change to the study area's baseline socio-economic conditions; ■ Slight to moderate benefits for local business; ■ Beneficial impact affecting low-moderate number of people. Beneficial impact affecting few sensitive population groups.
Negligible	Adverse	■ Very minor loss or alteration to one or more characteristics, features or elements; ■ An impact that is expected to affect a small number of businesses, workers or residents. Or an impact that may affect a larger number of receptors but without materially changing the study area's baseline socio-economic conditions. Such impacts are likely to be temporary in nature; ■ The identified impacts are predicted to have little or no damage to local business; ■ No or non-perceptible impact to health, population or sensitive groups.
	Beneficial	■ Very minor benefit to or positive addition of one or more characteristics, features or elements; ■ An impact that is expected to affect a small number of businesses, workers or residents. Or an impact that may affect a larger number of receptors but without materially changing the study area's baseline socio-economic conditions. Such impacts are likely to be temporary in nature; ■ The identified impacts are predicted to have little or no benefit to local business; ■ No or non-perceptible impact to health, population or sensitive groups.

The approach followed to derive effects significance from receptor value and magnitude of impacts is shown in Table 3.4. Where Table 3.4 includes two significance categories, evidence is provided in the topic chapters to support the reporting of a single significance category.

Table 3.4: Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental value (Sensitivity)		Negligible	Low	Medium	High
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

A description of the significance categories used is provided in Table 3.5.

Table 3.5: Significance categories and typical descriptions.

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics. Only adverse effects are usually assigned this level of significance. These factors are key issues in the decision-making and consent process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance which are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also be included in this significance category.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment. These can be beneficial or adverse effects and are considered to be very important issues which are likely to be substantial in the decision-making process.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. These are beneficial or adverse effects which may be important but are not likely to be central to decision-making or consent. The cumulative effects of these factors may influence consent or decision-making if they should lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Imperceptible	An effect capable of measurement but without significant consequences. No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

The approach to assigning significance of effect included reasoned argument and the professional judgement of competent experts. The assessment of the significance of environmental effects covered the following factors:

1. The receptors/resources (natural and human) which would have been affected and the pathways for such effects;
2. The geographic importance, sensitivity or value of receptors/resources;
3. The duration (long or short term); permanence (permanent or temporary) and changes in significance (increase or decrease);
4. Reversibility - e.g. is the change reversible or irreversible, permanent or temporary;
5. Environmental and health standards (e.g. local air quality standards) being threatened; and
6. Feasibility and mechanisms for delivering mitigating measures, e.g. is there evidence of the ability to legally deliver the environmental assumptions which are the basis for the assessment?

Using the described classification and professional judgement, **effects considered to be Profound or Large are deemed significant and those Moderate, Slight, or Imperceptible, to be not significant**, for the purposes of this assessment.

3.2.3 Information Sources

The description of the receiving environment for this EIAR is set out under the headings identified in Section 3.2.1.

In regard to Human Health the reader is reminded that other chapters of this EIAR assess effects and set down mitigation measures for other environmental factors that ultimately require emission regulation by national/international standard, or specific planning / licensing condition for reason of protection of human health and the environment. Those assessments are referenced in this chapter to address potential Human Health impacts in accordance with EPA draft guidance on the information to be contained in an EIAR; *"In an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc. The Advice Notes [Advice Notes on Current Practice (in the preparation of Environmental Impact Statements, Sept. 2003] provide further discussion of how this can be addressed."*

Sources of information for the assessment of potential impacts on populations and human health included the following:

- Census Returns (Central Statistics Office (CSO), 1991, 1996, 2002, 2006, 2011 and 2016 Census);
- South Dublin County Council Development Plan, 2016-2022;
- South Dublin County Council Development Plan, 2016-2022, Two year Progress Report, 2018;
- South Dublin County Council Development Plan, 2022-2028, Issues paper, 2021;
- South Dublin County Council, Traveller Accommodation Programme, 2019 -2024;
- Department of Health, Key Trends in Ireland, 2018;
- Field surveys of the Application Site and inspection of the surrounding area;
- Correspondence with the Applicant/Site Owner;

- Desktop reviews of previous assessment from historic planning applications;
- Review of available Ordnance Survey of Ireland Aerials (1991, 1994, 1995, 2000, 2004, 2012, 2016 and 2020); and
- Department of Communication, Climate Action and Environment (DCCAE) Eircode maps.

The EPA's 2017 'Guidelines on the information to be contained in environmental impact assessment reports' identify that the legislation does not generally require assessment of Land Use planning, demographic issues or detailed socio-economic analysis, which should be avoided in an EIAR, unless issues such as economic or settlement patterns give rise directly to specific new developments and associated effects. As such, assessments of these topics have not been conducted as the Proposed Development is not considered likely to have impacts on the land use planning within the locality, nor is it likely to affect the local demographics or socio-economic dynamics of the area. However, baseline information on the local area has been provided to show its context to, and comparison with, the region (county) and national average. In addition, information on industrial land use in proximity to the Site has been included. The land-uses identified include: similar industry to the Proposed Development, EPA regulated and licenced facilities (such as waste or IPC/IE sites); and upper or lower tier SEVESO sites.

3.2.4 Temporal Scope

Under the programme of the Proposed Development, the extraction phase will last for 10 to 15 years which will provide for fluctuations in market demands for the aggregate extracted from the Site. The duration of the extraction phase is therefore classified as 'medium-term' by the EPA's 2017 draft 'Guidelines on the information to be contained in environmental impact assessment reports' (seven to fifteen years).

The restoration phase of the Proposed Development will follow the extraction phase and will be 2 to 5 years in duration, which is 'short-term' (those lasting from one to seven years).

3.2.5 Geographical Scope

The EIA directly covers the physical extent of the Site as shown in Figure 3.1. As predicted impacts on the human environment can extend beyond the immediate Site boundary, a wider 'zone of influence' has been considered.

The geographical study area for the assessment covers the development area and a buffer zone of 500 m from the development boundary. The buffer area has been identified based on the UK's Design Manual for Roads and Bridges (Volume 11, Section 3, LA112, Revision 1, Sustainability and environment. Appraisal. Population and human health). An assessment of residential receptors has been made in relation to a 500 m offset to the planning application boundary.

The study area defined for the population and demographic trends is the Electoral Division (ED) of Rathcoole.

In the assessment of cumulative impacts the geographical extent of the EIAR has been extended as appropriate to include relevant related or unrelated development activities that have the potential to create significant negative impacts with the Proposed Development.

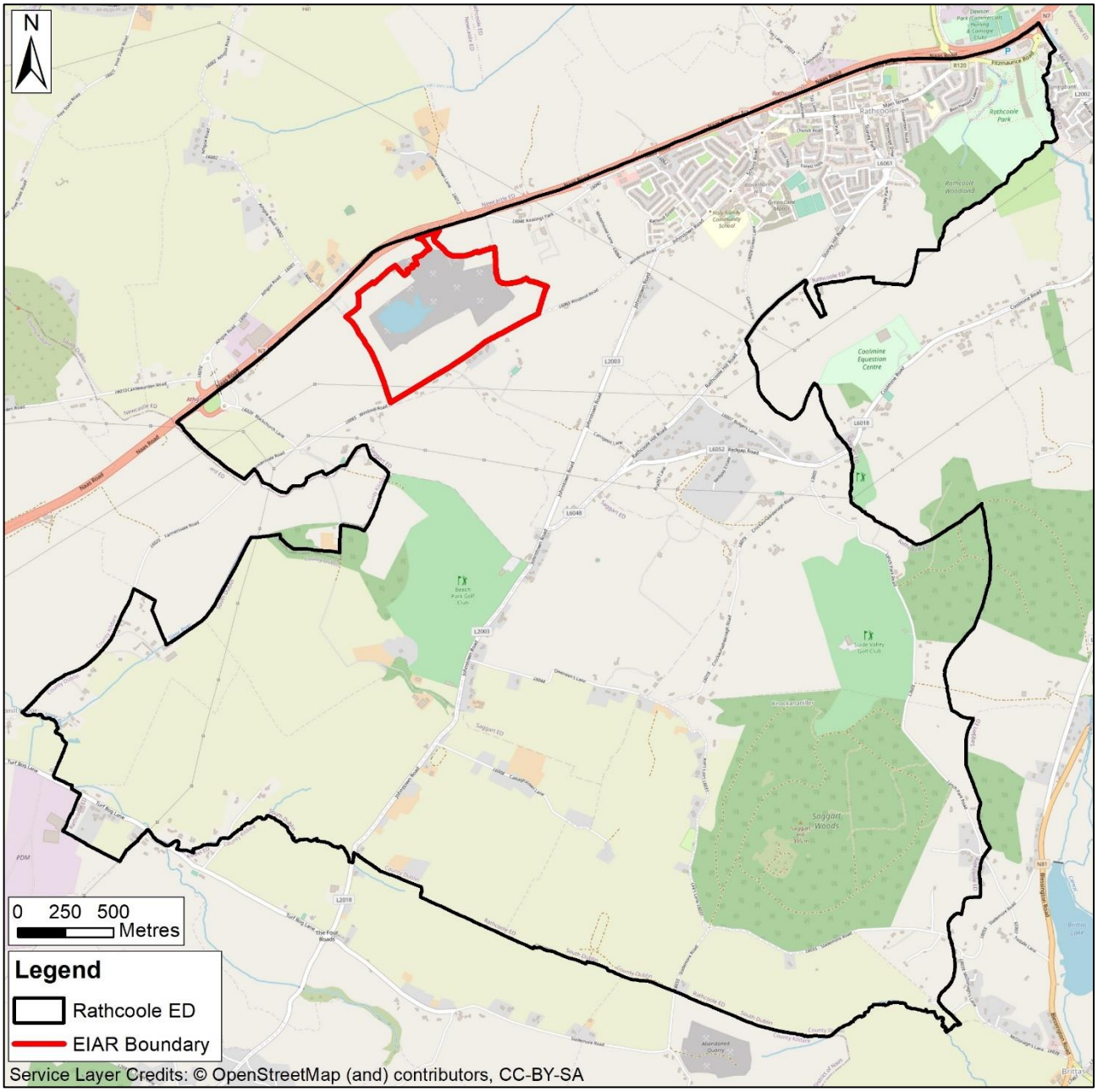


Figure 3.1: The EIA Project Site and Rathcoole ED boundary.

3.2.6 Planning Objectives

The Site is located within the administrative area of South Dublin County Council (SDCC) and is subject to the objectives and policies contained within the South Dublin County Development Plan 2016-2022 which has been the subject of 5 no. variations.

The Plan includes mapped land use zoning, specific, transport and conservation objectives for the Site displayed on Map no. 7. An extract of that map is at Figure 3.2. Objectives relating to the subject site are at Table 3.7 below Figure 3.2.

The EIA project boundary, to the south, includes conservation objectives related to Windmill Hill for the protection of A prospect and the architectural remains as part of Listed Buildings. These conservation objectives are reinforced by a specific local objective "*HCL3 SLO3: To secure the preservation of Windmill*

Hill, Rathcoole (RPS Ref. 358).” There is a further conservation objective to “*Protect and Preserve Significant Views” on* Windmillhill Road at the southern eastern corner of the EIAR project boundary.

In addition the EIA site includes, in its north western, quadrant a specific objective “*To provide for Traveller Accommodation Sites to be Selected*”. This specific objective is coupled with that “*To provide for Traveller Accommodation*” and therefore indicates that the specific objective within the EIAR project boundary refers to a location to be assessed. According to Section 2.1.4 of the Plan these mapped objectives reflected the then Traveller Accommodation Programme 2014 -2018 against which “*sites to be selected*” were presumed to be adjudged. The Plan also states that the programme would be reviewed at the Two Year Progress Report of the Development Plan in 2018.

At the time of writing of this EIAR, no proposal for traveller accommodation a been progressed in the vicinity of the specific objective within the EIAR project site. The Two Year Progress Report of the Development Plan refers to A Traveller Development Programme for 2019 -2023 then being prepared, of which the Traveller Accommodation Programme (TAP) 2019 – 2024 has formed part. This TAP includes a map of ‘Existing and Proposed/Indicative sites for Traveller Accommodation 2019-2024’ that records operational accommodation locations and the specific objective *“To provide for Traveller Accommodation”.* In this way, there is not, nor is it anticipated that there will be residential accommodation for travellers arising within the EIAR project boundary.

The application boundary for the proposal for development for a minor lateral northern extension of the extant quarry void and the deepening of that void from an average of 173 mAOD to 150 mAOD does not include any of the specific, transport or conservation mapped objectives of the Development Plan. The further quarrying proposed has been designed to be confined to the extant void and northern lateral extension for the protection of those objectives. Landscape and cultural heritage assessments are at Chapters 11 and 9 of this EIAR respectively.

The entire of the proposal and larger EIAR project sties hold land use zoning objective ‘RU’ *“To protect and improve rural amenity and to provide for the development of agriculture.”* Table 11.16 of the Plan set out those land uses permitted in principle, open for consideration and not permitted within areas holding the RU land use zoning objective. The full schedule of those uses are repeated at Table 3.6 below, with the uses of the existing quarry and proposed further quarrying proposal identified by underline.

Table 3.6: Repeat of Table 11.16: Zoning Objective ‘RU’ of South County Dublin Development Plan 2016 – 2022

USE CLASSES RELATED TO ZONING OBJECTIVE	
Permitted in Principle	Aerodrome/Airfield, Agriculture, Allotments, Cemetery, Concrete/ Asphalt Plant in or adjacent to a Quarry, Home Based Economic Activities[a], Industry-Extractive, Open Space, Public Services, Rural Industry-Food.
Open for Consideration	Abattoir, Advertisements and Advertising Structures, Bed & Breakfast[a], Boarding Kennels, Camp Site[h], Car Park[h], Childcare Facilities[b], Community Centre, Crematorium, Cultural Use[a], Doctor/ Dentist[b], Education, Embassy[a], Enterprise Centre[b], Fuel Depot[b], Funeral Home[b], Garden Centre, Guest House[a], Health Centre[b], Heavy Vehicle Park, Hotel/Hostel, Offices less than 100sq.m[b], Petrol Station[b], Place of Worship[b], Primary Health Care Centre[b], Public House[b], Recreational-Facility, Recycling Facility[b], Refuse Landfill/ Tip, Residential[c], Restaurant/Café, Service Garage[b], Shop-Local[b], Social Club, Sports Club/Facility, Stadium, Traveller Accommodation, Veterinary Surgery.

USE CLASSES RELATED TO ZONING OBJECTIVE	
Not Permitted	Betting Office, Caravan Park- Residential, Conference Centre, Hospital, Housing for Older People, Industry-General, Industry-Light, Industry-Special, Live-Work Units, Motor Sales Outlet, Nightclub, Nursing Home, Office-Based Industry, Offices 100 sq.m-1,000 sq.m, Offices over 1,000sq.m, Off-Licence, Outdoor Entertainment Park, Refuse Transfer Station, Residential Institution, Retail Warehouse, Retirement Home, Science and Technology Based Enterprise, Scrap Yard, Shop-Major Sales Outlet, Shop- Neighbourhood, Transport Depot, Warehousing, Wholesale Outlet, Wind Farm.
[a] In existing premises [b] In Villages to serve local needs [c] In accordance with Council policy for residential development in rural areas [f] In accordance with a Local Area Plan [h] For small-scale amenity or recreational purposes only	

In their County Development Plan SDCC identify that mineral extraction and the aggregate industry is an important economic sector that provides raw materials for the construction industry. SDCC also state that the processes involved in extraction can give rise to long-term environmental effects and significantly alter landscape character. These effects are stated to require consideration when identifying the suitability of areas for extraction.

Under Section 4.7.0 of the Plan, is the SDCC policy for, 'Policy 10 Mineral Extraction' as part of Economic Development and Tourism. Policy 10 Mineral Extraction states:

> *'It is the policy of the Council to support the sustainable extraction of aggregate resources at suitable locations within the County subject to appropriate environmental safeguards.'*

This section of the Plan refers to the Landscape Character Assessment for the county stating that the most environmentally sensitive high amenity areas of the county are a priority for protection. Chapter 11 of this EIAR of a landscape assessment of the proposal.

Specific objectives in this policy which are relevant to the Site include:

- **ET10 Objective 1:** To facilitate mineral extraction in suitable locations subject to the protection of amenity and environmental quality; and
- **ET10 Objective 3:** To ensure the satisfactory reinstatement and/or re-use of disused quarries and extraction facilities, where active use has ceased.

The Plan acknowledges that factors such as air pollution, water pollution, nuisance noise and vibrations can negatively affect human health, the environment and residential amenity.

Chapter 7 of the SDCC County Development Plan 2016 - 2022 provides policies and objectives related to 'Infrastructure and Environmental Quality'. In this chapter relevant policies which are related to the development and bio-physical factors (air, noise and water) which could affect human health include:

Policy 2 Surface Water and Groundwater:

> *'It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive.'*

Policy 7 Environmental Quality:

'It is the policy of the Council to have regard to European Union, National and Regional policy relating to air quality, light pollution and noise pollution and to seek to take appropriate steps to reduce the effects of air, noise and light pollution on environmental quality and residential amenity.'

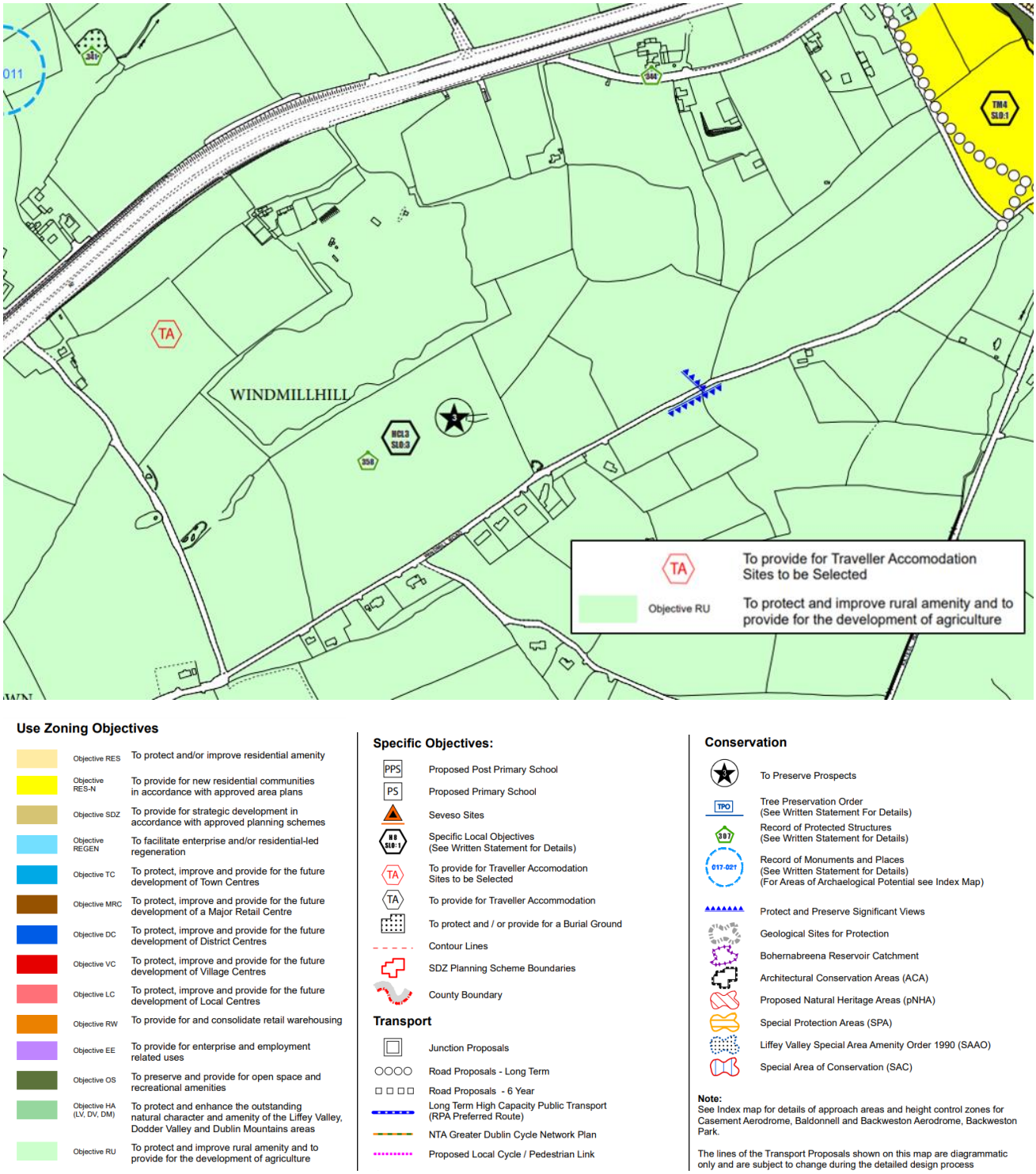


Figure 3.2: Indicative location for Traveller Accommodation, within the north-west area of the Site. Figure adapted from Map 7 of the SDCC County Development Plan 2016-2022, and includes approximate EIAR boundary.

Table 3.7: Mapped objectives of 2016 – 2022 South County Dublin Development Plan at the Site

Mapped Objectives Category	Objective
Land Use Zoning	'RU' *To protect and improve rural amenity and to provide for the development of agriculture*
Specific	HCL3 SLO:1 *Specific Local Objective HCL3 SLO:3 To secure the preservation of Windmill Hill, Rathcoole (RPS Ref. 358).* TA *To provide for Traveller Accommodation Sites to be Selected*
Transport	Low or medium importance and rarity, local scale.
Conservation	3 *To Preserve Prospects* 307 *Record of Protected Structures No. 358. Map ref. 358. RPS Ref. 358. Address / Location: Windmill House Rathcoole. Description: Stone Mill (Ruin) (Former Paper Mill)* *Protect and Preserve Significant Views*

The current Development Plan is scheduled for review in order it be replaced for the period 2022 -2028. That review is statutorily prescribed consisting of 3 no. public consultation periods ahead of final adoption: pre-draft, draft Plan, and material amendments to that Plan. The pre-draft phase of the new Plan has passed and the Draft Plan expected for public consultation in July 2021. The Pre-Draft stage was informed by local authority issues papers that do not specifically refer to the Site or the proposed quarrying land use. Pre-Draft Plan issues papers, in common with the Plan itself, defers to higher order policy documents. The Site is not identified for large-scale redevelopment in the higher order spatial planning policies primarily consisting of the National Planning Framework (NPF) and the Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region.

3.3 Baseline

3.3.1 Surrounding Environment

The Site is located in the south of County Dublin, east of the border with Co. Kildare. The Site is located within the townland of Windmillhill and located directly south of the M/N7 Dublin to Limerick road, ca. 2 km to the southwest of Rathcoole. As noted, the Site is located within Rathcoole ED, the boundary of which has been provided in Figure 3.1.

The lands surrounding the Site to the north, west and south can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Dry cattle, sheep rearing and grazing of horses are the main activities in the area, with further arable activities to the south-west. Suburban development has extended from more built up areas of Rathcoole along the N7 towards the east of the Site. The nearest school and church to the site is located within Rathcoole ca. 2 km to the east of the site.

The local residential and non-residential receptors surrounding the Site have been identified in Figure 3.3. Residential receptors have been identified with a circle icon, while non-residential receptors are indicated with a triangle icon. The numbers of each have been provided in Table 3.8. The non-residential receptors are commercial and industrial facilities. Three properties owned by the Applicant and located within their land holding have been identified.

Table 3.8: Local residential and non-residential receptors within various distances of the Site.

Year	0 - 250 m Residential	0 - 250 m Non-Residential	250 - 500 m Residential	250 - 500 m Non-Residential
1991	13	5	21	5
1994	13	5	21	5
2000	13	6	22	5
2004	15	6	22	5
2012	16	7	23	5
2016	16	7	23	5
2020	16	8	23	5

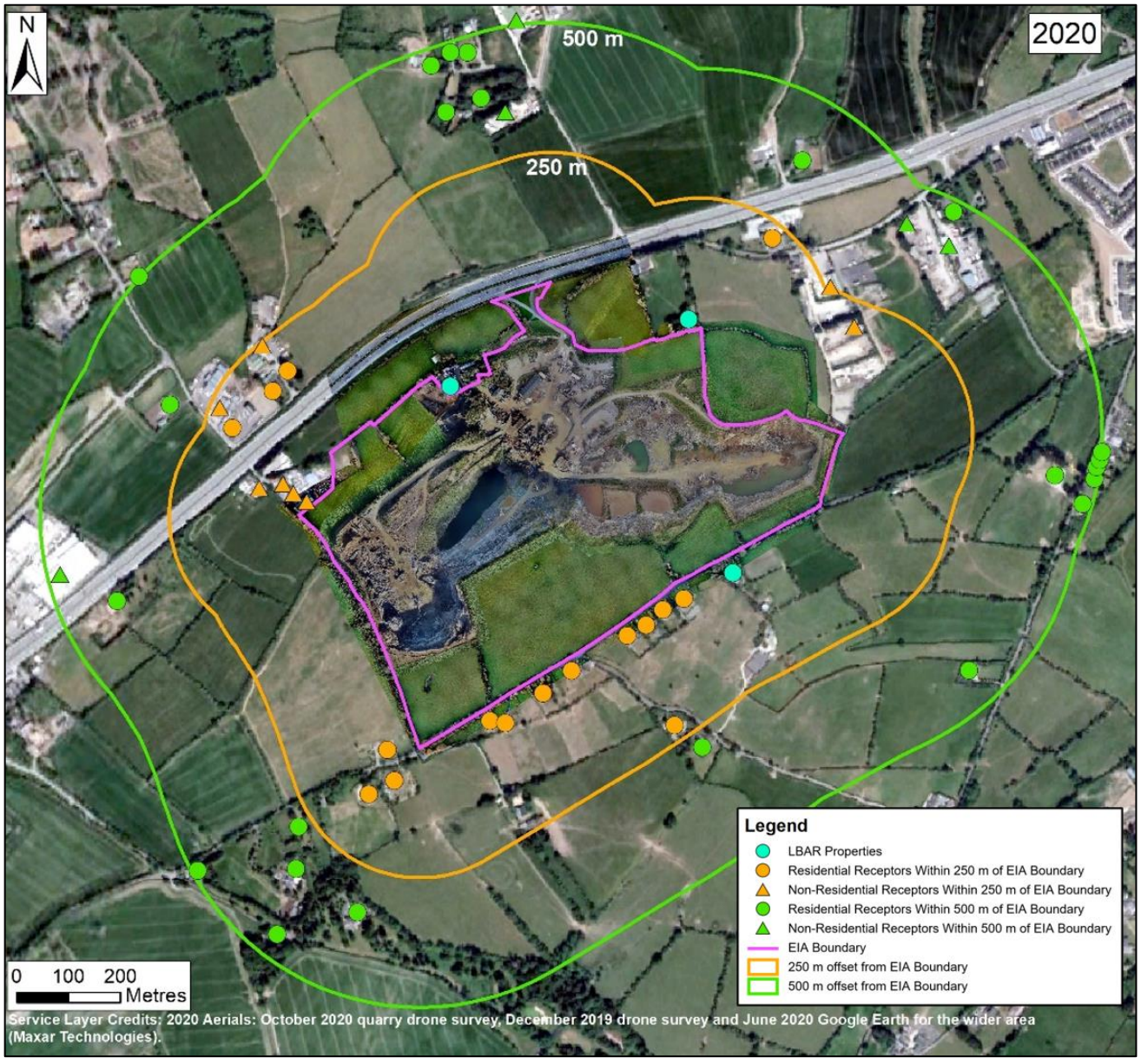


Figure 3.3: EIAR boundary with 2020 aerial image, and receptors within 250 m and 500m.

3.3.2 Population

The lands subject to this EIAR do not hold a resident population. Three properties owned by the Applicant have been identified within 250 m of the Site (which are within the Applicant's overall land holding).

The Site is located within the Electoral Division (ED) of Rathcoole (CSO Area Code ED 03021), which has an area of 15.6 km^2.

Table 3.9 and Table 3.10 summarises population statistics for the State, Leinster, South Dublin and the Rathcoole ED. The percentage population increase has been calculated between the Census periods of 1991, 1996, 2002, 2006, 2011 and 2016.

Generally consistent increases in population were observed in the State, Leinster and Co. Dublin over the Census periods. Subsequent lower rates of population increase were observed in the period of 2011 to 2016.

The population of Rathcoole ED decreased over the Census periods of 1991 to 2002. During these periods, the population increased in the county, regionally and nationally. Between 2002 and 2011 the population of Rathcoole ED increased by greater proportions than was observed in the county, regionally and nationally. An increase in population was observed between 2011 and 2016 within the Rathcoole ED which was consistent with increases in South Dublin, Dublin and Leinster for that period.

The higher rates of population increase observed between 2002 and 2011 can be attributed to the economic growth of the mid 2000s and the development within the surrounds of Rathcoole during that period.

Population data subsequent to 2016 is not available for the Rathcoole ED; however, it is anticipated that large increases of the local population have taken place due to the development of housing estates between the Site and Rathcoole Village.

Table 3.9: Populations recorded during the 1991 to 2016 census period (Central Statistics Office).

Area	1991	1996	2002	2006	2011	2016
State	3,525,719	3,626,087	3,917,203	4,239,848	4,588,252	4,761,865
Leinster	1,860,949	1,924,702	2,105,579	2,295,123	2,504,814	2,634,403
Dublin	1,025,304	1,058,264	1,122,821	1,187,176	1,273,069	1,347,359
South Dublin	208,739	218,728	238,835	246,935	265,205	278,767
Rathcoole ED	3,575	3,448	3,204	3,614	4,740	5,009

Table 3.10: Population dynamics (% change) from 1991 to 2016 (Central Statistics Office).

Area	1991 to 1996	1996 to 2002	2002 to 2006	2006 to 2011	2011 to 2016
State	2.85	8.03	8.24	8.22	3.78
Leinster	3.43	9.40	9.00	9.14	5.17
Dublin	3.21	6.10	5.73	7.24	5.84
South Dublin	4.79	9.19	3.39	7.40	5.11
Rathcoole ED	-3.55	-7.08	12.80	31.16	5.68

A total of 39 No. existing third-party residential dwellings are found to be currently within 500 m of the Site boundary, of these 16 No. receptors are located within 250 m of the Site boundary. The number of residences is based on a field survey, a review of aerial photography, DCCAE Eircode mapping and a local authority planning permission search.

Population Age Distribution

Table 3.11 summarises the percentage population distribution by age for the State, South Dublin and Rathcoole ED. The population age distribution percentages have been calculated for the available Census periods for the relevant population areas.

From a comparison of the increases in the age 0-14 and 30-44 demographics between 2006 and 2016 it is indicated that there was an increase in younger families within the area.

The size of the over 65 age group within the Rathcoole ED increased proportionally with those groups in the South Dublin area and the State as a whole for the same period. Decreases in the proportional size of the 15-29 age group were also evident across the Rathcoole ED, South Dublin and the State for the same period.

Table 3.11: Population Age Distribution, (Central Statistics Office)

Year	Area	% Aged 0-14	% Aged 15-29	% Aged 30-44	% Aged 45-64	% Aged 65+
2016	State	21.1	18.4	23.3	23.8	13.4
2011	State	21.3	20.5	23.7	22.7	11.7
2006	State	20.4	23.7	22.9	21.9	11.0
2002	State	21.1	24.4	22.1	21.2	11.1
1996	State	23.7	24.6	20.9	19.4	11.4
1991	State	26.7	24.0	20.2	17.6	11.4
2016	South Dublin	23.0	18.7	24.9	22.3	11.1
2011	South Dublin	23.1	21.8	24.3	22.1	8.7
2006	South Dublin	21.7	26.4	23.0	21.6	7.2
2002	South Dublin	22.5	27.8	22.9	20.6	6.3
1996	South Dublin	27.1	26.8	23.1	17.8	5.2
2016	Rathcoole ED	22.7	14.1	31.0	17.0	15.2
2011	Rathcoole ED	17.0	21.1	24.9	23.5	13.5
2006	Rathcoole ED	14.4	27.1	20.4	28.2	10

Population Density

Table 3.12 summarises population densities for the State, Leinster, Co. Dublin, South Dublin and the Rathcoole ED. The population densities have been calculated between the Census periods of 1991, 1996, 2002, 2006, 2011 and 2016.

As expected from the increased populations, the population densities also increased in the State, province and county areas of the Census periods. Proportionally larger increases were evident in Dublin, South Dublin and the Rathcoole ED owing to the influence of development in the greater Dublin area during this period.

The population density of the Rathcoole ED is still much higher than that observed in the state and Province and lower than Dublin County which reflects the semi-rural and semi suburban nature of the area as it is located on the outskirts of Dublin City.

Table 3.12: Population Density (persons per square kilometre) from 1991 to 2016 (Central Statistics Office)

Area	Size km^2	1991	1996	2002	2006	2011	2016
State	70,273	50.2	51.6	55.7	60.3	65.3	67.8
Leinster	19,800	94.0	97.2	106.3	115.9	126.5	133.1

Dublin	922.3	1,111.7	1,147.4	1,217.4	1,287.2	1,380.3	1,460.9
South Dublin	223.6	933.5	978.2	1,068.1	1,104.4	1,186.1	1,246.7
Rathcoole ED	15.8	226.3	218.2	202.8	228.7	300.0	317.0

Households

Table 3.13 summarises the number of households and persons per household for the State, South Dublin and the Rathcoole ED. The statistics have been calculated for the available Census periods of 2006 and 2016.

It can be noted that the increases and decreases in the average size of households are relatively consistent for the Rathcoole ED, South Dublin, and the State for the same periods.

Table 3.13: Households from 2006 to 2016 (Central Statistics Office)

Area	2006			2011			2016		
	Household	People	Avg. No. Persons per Household	Household	People	Avg. No. Persons per Household	Household	People	Avg. No. Persons per Household
State	1,469,521	4,123,318	2.81	1,654,208	4,510,409	2.73	1,702,289	4,676,648	2.75
South Dublin	80,631	244,462	3.03	90,019	263,723	2.93	92,523	277,168	3.00
Rathcoole ED	1,251	3,569	2.85	1,578	4,228	2.68	1,766	4,976	2.82

3.3.3 Employment / Local Economies

Employment at the Site

There is no consolidated methodology or practice for assessing the impact on employment in EPA guidance. The impacts of the Site on employment have therefore been assessed qualitatively based on the number of jobs which the Site has created. The Site has provided direct and indirect employment. Direct jobs include the workforce employed by the Developer and subcontracted directly at the Site. Indirect employment includes those created in the supply chain to provide input (e.g. fuels), specialist labour (e.g. contract drivers) and services (e.g. equipment maintenance) for the site and workforce.

The numbers of employees which the Site has directly employed over recent years has varied due to increases and decreases of demand for aggregate products from the construction industry. The Site has provided consistent employment for approximately 40 staff.

Principal Status

Table 3.14 summarises the employment status of the persons aged 15 years or older in South Dublin and the Rathcoole ED. As identified in Table 3.11 this equates to 77.0% (2016), 76.9% (2011) and 78.3% (2006) in South Dublin and 78.3% (2016), 83.0% (2011) and 85.6% (2006) in the Rathcoole ED. Similar and directly comparable data was unavailable for the period of 1990 to 2006, however it is considered that the cumulative employment status of the persons aged 15 years or older would be less than in 2006 with a gradual rise exhibited in the data from 1990. The rise in the principal economic status would be owing to the economic growth up to that period and its peak in 2006/2007 prior to the economic downturn.

Between the periods of 2011 and 2016 it is evident that the percentage of those ‘Unemployed having lost or given up previous job’ has decreased within the respective populations (Table 3.14). This is attributed to the rebound in the national economy following the banking crisis and recession prior to 2011.

Table 3.14: Principal Status of Persons 15 years and older in South Dublin and Rathcoole ED, in 2006, 2011 and 2016 (Central Statistics Office)

Status	South Dublin 2006 (%)	South Dublin 2011 (%)	South Dublin 2016 (%)	Rathcoole ED 2006 (%)	Rathcoole ED 2011 (%)	Rathcoole ED 2016 (%)
At work	61.7	52.2	55.5	65.0	54.2	59.9
Looking for first regular job	0.9	1.2	0.9	0.7	0.5	0.6
Unemployed having lost or given up previous job	5.2	11.6	7.6	3.6	10.2	4.8
Student	10.3	10.9	11.1	7.8	7.8	7.1
Looking after home/family	10.0	9.4	8.0	9.5	10.2	7.8
Retired	7.9	10.1	12.7	10.1	13.5	16.5
Unable to work due to permanent sickness or disability	3.8	4.3	3.9	3.1	3.3	3.0
Other	0.3	0.2	0.3	0.3	0.3	0.3

Employment Industry

Table 3.15, Table 3.16 and Table 3.17 summarise the percentage of persons aged 15 years or older per employment industry in the State, South Dublin and the Rathcoole ED. Given that South Dublin and the Rathcoole ED are suburban in the Greater Dublin Area it is expected that the percentage of the population involved in the 'agriculture, forestry and fishing' industries would be less than the national averages.

Employment industries where the percentage of persons in Rathcoole ED are above the national average include; 'building and construction', 'commerce and trade', and 'transportation and communications'. Other identified employment industries are in line with the national averages.

The 'Other' employment category was found to be lower in the Rathcoole ED when compared with the national and South Dublin averages, therefore it is considered that the employment industries of the working population of Rathcoole ED are better described in the defined criteria.

Similar and directly comparable data was unavailable for the period of 1990 to 2006, however it is considered that the relative distribution within the ED would be relatively consistent with the figures in Table 3.15, Table 3.16 and Table 3.17.

Table 3.15: Percentage persons in work by industry, 2016 (Central Statistics Office)

Industry	State (%)	South Dublin (%)	Rathcoole ED (%)
Agriculture, forestry and fishing	4.4	0.2	0.5
Building and construction	5.1	5.1	7.0
Manufacturing industries	11.4	8.8	11.0
Commerce and trade	23.9	27.9	28.8
Transport and communications	8.5	10.6	11.4
Public administration	5.3	5.8	5.1
Professional services	23.5	23.1	22.9
Other	17.8	18.5	13.3

Table 3.16: Percentage persons in work by industry, 2011 (Central Statistics Office)

Industry	State (%)	South Dublin (%)	Rathcoole ED (%)
Agriculture, forestry and fishing	5.1	0.2	0.8
Building and construction	4.8	4.6	5.5
Manufacturing industries	11.6	9.5	9.8
Commerce and trade	25.2	29.8	24.9
Transport and communications	8.1	10.6	9.3
Public administration	6.3	7.0	5.8
Professional services	23.5	23.6	19.6
Other	15.3	14.6	24.4

Table 3.17: Percentage persons in work by industry, 2006 (Central Statistics Office)

Industry	State (%)	South Dublin (%)	Rathcoole ED (%)
Agriculture, forestry and fishing	4.6	0.4	0.8
Building and construction	11.1	9.4	14.1
Manufacturing industries	13.6	11.3	13.7
Commerce and trade	27.1	33.5	27.9
Transport and communications	5.5	7.2	8.2
Public administration	5.2	6.2	5.3
Professional services	16.5	14.7	14.3
Other	16.3	17.3	15.7

Local Employment Centres

As previously described, the Site is situated close to the Kildare-Dublin border, just south of the N7 national road. The Site is in close proximity to the town of Rathcoole and due to the proximity to the N7 it is within a short commuting distance to Dublin City.

Public transport routes and the N7 road provide vital linkages and strengthen the area's status as a centre for economic investment and activity, and as a commuter zone. Using the N7 road, Dublin city centre is approximately 30 minutes away by car, while Naas can be reached in less than 15 minutes.

The Site is well positioned to serve the greater Dublin area and its location in a regional context has continued influence on the economic activity of the area. Such ease of access increases the attractiveness of the Site as a source of high value aggregate to meet the demands of the region. The ease of access also makes the area an ideal location for commuters. This is evident with the increases in population observed in Table 3.9.

There are a total of 8 No. existing non-residential industrial/commercial premises found to be currently within 250 m of the Site boundary. In addition, 5 commercial premisses were identified between 250 m and 500 m of the Site boundary. The number of these business premises is based on a field survey, a review of aerial photography, DCCAE Eircode mapping and a local authority planning permission search. It is considered that given the nature of these businesses they could continue to operate without substantial harm if they were affected by a disruption from the Proposed Development, (See Section 3.5.2).

3.3.4 Amenity

The subject lands do not offer amenity opportunities for the public being a private commercial enterprise. Please refer to Chapter 12.0 Landscape & Visual assessment for an assessment of the effect of the land use on the landscape of the area.

There are no community amenity lands or facilities within 500 m of the Site.

Infrastructure to the benefit of a wider population in the form of an upgraded N7 has been in place since 2007 and is described in Chapter 11.

Beech Park Golf Club is located ca. 600 m to the south of the Site while Slade Valley Golf Club is located ca. 2.0 km to the south east, and Castlewarden Golf Club is located 2.1 km to the west.

Other amenity areas surrounding the Site include the Slade Valley and Slievethoul walking trails located ca. 2.5 km to the south-east. A number of public open spaces, parks and sport pitches within the towns of Rathcoole and Saggart are located to the east (ca. 1.5 – 3.5 km from the Site).

The local clubs and amenity areas referenced above are utilised by the wider South Dublin and east Kildare communities and not just by the local population of the surrounding area.

There are no religious centres in the vicinity of the Site (1 km).

3.3.5 Land Use and Development Patterns

The EIA boundary for the Site is approximately 46.14 ha in area. This comprises lands which are currently used for quarrying activities and agricultural lands to the south. The Corine Landcover classification for the area bears the same Level 3 classification as the adjacent N7 (Road and Rail Network; Figure 3.4), however it is more appropriate to consider the area of land classified as 'Mineral Extraction Sites' which is typical of such rock quarries. The lands to the south, east and west are defined as 'Pastures'.

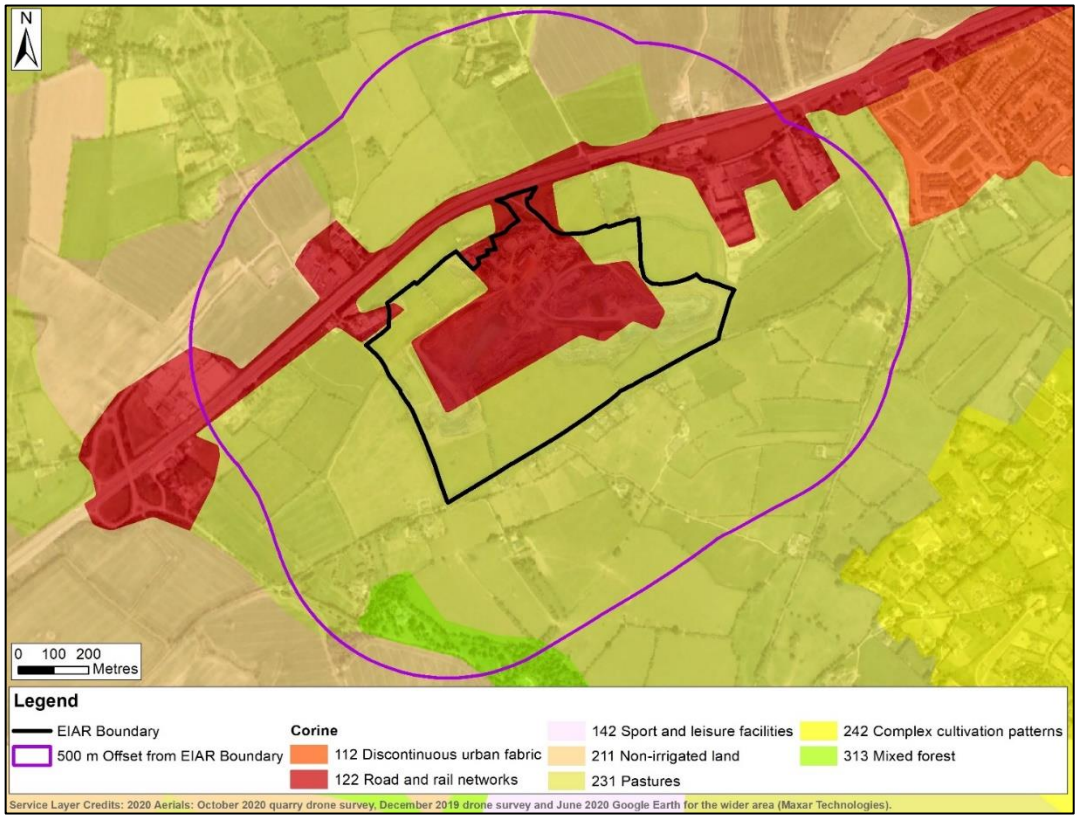


Figure 3.4: Corine Landcover classification for the Site.

The lands surrounding the Site to the north, west and south can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Dry cattle sheep rearing and grazing of horses are the main activities in the area, with further arable activities to the south-west. Suburban development has extended from more built up areas of Rathcoole along the N7 towards the east of the Site. The nearest school and church to the site is located within Rathcoole ca. 2 km to the east of the site.

The rural nature of the surrounding area with suburban influences to the east has been a consistent baseline in the area. More recently, residential development towards the east in Rathcoole has increased.

There are no waste licenced or IE/IPC Licenced facilities within 1 km of the Site. Within 5 km of the Site, there are 6 No. EPA regulated activities;

- Saint Gobain Building Distribution (ROI) Limited (EPA Licence No. P0325-02), ca. 3.3 km to the south-west. Original Application made in October 1997;
- Brittas Plastics Ltd (EPA Licence No. P0150-01), ca. 3.3 km to the east. Original Application made in May 1996;
- BBALP Limited (EPA Licence No. P0275-01), ca. 4.5 km north-east. Original Application made in June 1997;
- Starrus Eco Holdings Limited (Greenogue) (EPA Licence No. W0188-01), ca. 3.0 km north-east. Original Application made in June 2003;
- Rilta Environmental Limited (EPA Licence No. W0192-03), ca. 3.0 km north-east. Original Application made in September 2003; and
- Rilta Environmental Limited (EPA Licence No. W0185-03), ca. 3.2 km north-east. Original Application made in April 2003.

Within 5 km of the Site, there are 4 No. consented Section 4 discharges:

- Johnston Haulage Co. Ltd, WPW/11/16, ca. 600 m west;
- Castlewarden Golf & Country Club, S4008-14, ca. 2.6 km west;
- Teehill Management Company Ltd, WP218/05, ca. 3.7 km south;
- Callighstown Enterprises, WPW/498/025, ca. 2.3 km south;
- Cathal Declan & Shane Ryan, S4009-15, ca. 4 km north-west;
- Concast Building Ltd, WPW/434/018, ca. 4.6 km north; and
- H.S.E., St Brigid's Nursing Home, WPW/504/026, ca. 3.9 km south-east.

There are two SEVESO sites within 5 km of the Site, one upper tier and one lower tier site. The closest SEVESO site is Dascher Ireland Limited (formerly Johnston Logistics Ltd), which is an upper tier SEVESO site and is located approximately 600 m to the west of the site. Brenntag Chemical Distribution (IRE) Limited, which is a lower tier site, is located within Greenogue Business Park approximately 3.1 km to the north-east of the site. These sites have been registered since ca. 2015 with the implementation of the Seveso III Directive (2012/18/EU) through the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015), (the “COMAH Regulations”).

The intended development pattern for the Site and surrounding area is set out in the Development Plan for South Dublin County 2016 -2022, described at Section 3.2.6 and Figure 3.2, that indicate the underlying land use zoning objective as 'RU' (rural) with:

- Specific objectives for; Traveller Accommodation 'sites to be selected', and the preservation of the identified Windmill Hill Record Protected Structure (RPS) No. 358; and
- Conservation objectives for Widnmill Hill RPS No. 358, a Prospect at Windmill Hill, and protection of View on Windmill Hill Road.

The specific and conservation objectives are within he EIAR boundary but outside of the development proposal Site. The Plan for the period 2022-2028 is in preparation with a Draft due in July 2021. Having regard to the Issues Paper prepared to support the Draft plan and higher order NPF and RSES, it is not anticipated that the Site, EIA lands or EIA study area lands will be subject to designation for development of alternative land use as they lie outside identified settlement boundaries to which new development will be encouraged.

A remote search of planning applications within the EIA Study area in February 2021 has not identified any significant new or extended land uses.

3.3.6 Human Health

Table 3.18 summarises the general health of persons by percentage for the State, South Dublin and the Rathcoole ED for the 2016 and 2011 census periods. Similar and directly comparable data is unavailable for preceding years.

In the 2016 Census there was a greater percentage of persons in the Rathcoole ED (89.2 %) who classified themselves as being in 'Good' or 'Very Good' health in comparison with the average for the State (87.0%), or South Dublin (87.4 %). In 2011, this figure was comparatively lower in the Rathcoole ED, however it should be noted that the General Health was not disclosed by a greater percentage of the Rathcoole ED population (11.4 % 'Not stated'). The percentage of persons who classified themselves as being in 'Bad' or 'Very Bad' health in the Rathcoole ED in 2016 (0.9 %) was lower in comparison with the average for the State, or South Dublin (both 1.6 %). This figure was on parr for the State, South Dublin and the Rathcoole ED for the 2011 census period (all from 1.4 – 1.5 %).

Table 3.18: General Health percentage of the population, (Central Statistics Office)

General Health	2016 State (%)	2016 South Dublin (%)	2016 Rathcoole ED (%)
Very good	59.4	60.1	60.8
Good	27.6	27.2	28.4
Fair	8.0	7.4	7.2
Bad	1.3	1.3	0.9
Very bad	0.3	0.3	0.2
Not stated	3.3	3.7	2.5
General Health	**2011 State (%)**	**2011 South Dublin (%)**	**2011 Rathcoole ED (%)**
Very good	60.3	61.8	54.1
Good	28.0	27.3	26.1
Fair	8.0	7.1	7.0
Bad	1.2	1.2	1.3
Very bad	0.3	0.3	0.1
Not stated	2.2	2.4	11.4

3.3.7 Health and Safety

L. Behan Aggregates and Recycling Ltd. are committed to health and safety at their operations. The Site Manager is and has been responsible for safety management on the Site. The Manager is also responsible for the working environment, traffic management, emergency procedures, first-aid arrangements and safe systems of work.

The Site is required to meet conditions of existing consents and certain statutes. In particular, the relevant Health & Safety legislation (Safety, Health & Welfare at Work Act, 2005, the Mines and Quarries Act, 1965) and subsequent Health and Safety Regulations and Quarries Regulations relating to health and safety, training, and appropriate site management.

The Site has operated in accordance with a site specific safety statement and associated risk assessments (L. Behan Aggregates and Recycling Ltd, Safety Statement, Revision 08 January 2020).

The Site is fully fenced with any agricultural entrance permanently closed and locked. Boundaries have been inspected at regular intervals over the life of the quarry and the quarry manager would action repairs as appropriate.

The only vehicular entrance in operation is that from the N7. The lands are remotely secured via CCTV cameras with 24-hour monitoring. The site has alarm systems installed on the office, laboratory, workshop and other enclosed buildings. The entrance to the Site is secured by an electric gate. There is no requirement for lighting outside of the subject lands but within the lands, certain working hours (after dark in winter periods) necessitate lighting that is extinguished when the site is closed thus causing no external light pollution.

3.4 Characteristics of the Proposed Development

This Environmental Impact Assessment Report [EIAR] has been prepared to accompany a planning application to be made under S.37L of the Planning and Development Act, 2000 as amended for the continuation of extraction at an existing quarry at Windmillhill, Rathcoole, Co. Dublin.

The application for further development of the quarry is to be made concurrent with an application for substitute consent for the quarry that is accompanied by an rEIAR.

The lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The EIA project boundary is generally bounded by the N/M7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called ‘Four Winds’ that is within the ownership of the planning applicant to the east; and the former local Steelstown Road to the west.

At the centre of the EIAR project boundary is an existing quarry that covers an area of approximately 28.8 ha. with an average working depth of 173 mAOD. The existing quarry is roughly rectangular in shape with an east – west axis parallel to the N/M7 and local Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 5 ha.

The further quarrying development proposed involves a lateral northward extension of the current quarry void over approximately 5.16 ha west and east of an existing dwelling also in the applicant’s ownership and a deepening of the western and eastern side of the laterally extended void to a final working depth of 150 mAOD. The further development proposed is for quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area and the existing quarry access will be utilised.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.

3.4.1 Embedded Mitigation

The initial assessment of the significance of potential effects resulting from the Proposed Development takes into consideration any embedded design and implemented Site management practices undertaken at the Site. These elements of the Proposed Development design and good working practices that reduce the potential for impacts to the surrounding human environment include the following:

- Site operations are managed in accordance with relevant health and Safety legislation (Safety, Health & Welfare at Work Act (2005, as amended); and the Mines and Quarries Act (1965, as amended)) and subsequent Quarries Regulations relating to health and safety, training, and appropriate site management;
- Fencing is actively maintained at the Site to ensure that the risk of injury to the public and livestock is minimised. The entrance gate is locked and controlled by the site's management;
- Exposed edges in the quarry are fenced or protected with safety berms;
- Blasting takes place at the Site using licenced and experienced operators.
- Site management practices are implemented to mitigate the impact to air quality, as identified in Chapter 7 of this EIAR, including:
  - Use of wet suppression of dust during dry periods, and the maintenance of physical screening of activities.
  - The design and nature of the Development is such that the floor of the quarry has gradually lowered during the assessment period which has resulted in the quarry face and benches providing natural screening;
  - Use of wheel wash to minimise dust transmission from HGVs, and the covering of loads during drier periods
- The implementation of Site management practices to mitigate the impact to noise, as identified in Chapter 8 of this EIAR, including:
  - The design of internal haul roads is such as to have as low a gradient as possible so as to minimise excessive revving of vehicle engines on-site;
  - The use of vehicle horns was and is discouraged during the daytime period and was and is banned during the early morning periods before 10:00 am;
  - The maintenance of bunds, as appropriate, to mitigate noise impacts at surrounding sensitive receptors;
  - Plant and equipment is shut down when not in use;
  - The imposition of speed limits on site and the access road to reduce noise from moving plant and HGVs.
- The implementation of Site management practices to mitigate the impact to the water environment, as identified in Chapter 6 of this EIAR, including:
  - Safe storage and handling of hazardous substances;

  - Maintenance of equipment and plant to ensure there are no leakages of fuels, oils and potentially contaminating substances;

- The removal of soils is proposed to be conducted in phases and remain on site as formed berms to reduce the overall potential impact on the land use and underlying groundwater;
- The Site's traffic routes linked directly onto the N7 will be retained which mitigates the impacts on non-motorised road users as there is no need for HGVs and other vehicles to traverse local roads surrounding the Site, e.g. the L6065 to the south of the Site.

3.5 Potential Effects

The main potential impacts and associated effects considered in the assessment relate to the following:

- Activities or events that may impact size, density and composition of the local population or community;
- Activities or events which may impact or disrupt local employment and businesses surrounding the Site;
- Activities or events which may impact local amenity including: tourism attractions, local sport and recreation areas, designated and undesignated community lands, and religious centres;
- Activities or events which could impact local land use including agriculture, other industry and uses identified in local plans;
- Activities or events which could impact local populations or at-risk members of the local community. As identified in guidance documents from the European Commission and the Department of Housing, Planning and Local Government (DHPLG) the assessment of impacts on population and human health should focus on health issues and environmental hazards resulting from other environmental factors (those identified in Article 3(1) of the EIA Directive (2014/52/EU)), and does not require a wider consideration of human health effects which do not relate to those factors. The EPA's 2017 draft 'Guidelines on the information to be contained in environmental impact assessment reports' also identify that *'the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc'*;
- Activities or events which could impact persons employed at the site (direct staff and contractors) and members of the community, including non-motorised road users.

These potential impacts for the Proposed Development are considered and assessed in the following sections.

The occurrence of major accidents and disasters has been considered in Chapter 3 (Project Description) of this EIAR.

3.5.1 Population

Potential impacts from the Site which may affect local populations include nuisance from noise, vibration, dusts, landscape and visual impacts, and impacts to groundwater. The potential extent of these will be limited to the local community surrounding the Site. As identified in Section 3.2.5, the geographical study area for the assessment covers the development area and a buffer zone of 500 m from the EIAR study boundary. Assessment of potential impacts to the population of this local community has been based on residents living closest to the Site and within this 500 m buffer area. These potential impacts have been assessed in the respective chapters of: Soils and Geology (Chapter 5), Water (Chapter 6), Air Quality and Climate (Chapter 7), Noise and Vibration (Chapter 8); and Landscape and Visual (Chapter 10).

A total of 39 No. existing residential dwellings are found to be currently within 500 m of the Site boundary. Of those identified, 13 No. residential receptors are located within 250 m of the Site boundary. It is noted that residential development and population in the Rathcoole ED has increased since 1990, and in the latter years this has increased at faster rates than those seen regionally or in the State.

These receptors are valued with a 'High' sensitivity. Based on the assessment of environmental impacts (identified above) in other chapters of this EIAR it is considered that the magnitude of impact on the population dynamics of the local community from the Proposed Development will be **'low' and 'adverse'**.

The populations within the surrounding area have increased over recent years and it is considered that the Proposed Development will have a **negligible (adverse)** direct or indirect impact on the population size, age distribution, density and household composition in the study area or in the Rathcoole.

Employment levels at the Site have increased over recent years, however the potential direct impact from the Proposed Development on local population growth due to workers migrating to the area is **negligible and adverse**.

3.5.2 Employment

Employment at the Site

The receptor which has potential to experience employment effects is the workforce at the Site and the surrounding area. This includes the construction industry and the local supply chain. No sensitivity values are assigned to receptors with potential to experience employment effects.

The numbers of employees which the Site has directly employed has varied due to increases and decreases of demand for aggregate products from the construction industry. The Site has provided consistent employment for staff and currently the Site employs approximately 42 employees, including direct staff, contractors and truck drivers.

There is also indirect employment in the supply chain to provide material, specialist labour and services for the workforce. Based on the information available at present, it is not possible to quantify the extent of the indirect employment created, however, it is expected to have been in the order of 25 to 33% of direct employment, based on estimated additional jobs created in similar projects. In conclusion, given the size, nature, duration of the Site's operation, and the creation of long-term employment in the surrounding area, it is considered that the Proposed Development will have a **low and beneficial** impact on employment.

Local Businesses

A total of 13 commercial premisses were identified within 500 m of the Site boundary.

The commercial enterprises identified in the current surrounds of the Site include:

- Dascher Ireland Ltd;
- Hardware Association Ireland;
- A number of car service and repair business at Windmill View (west of the Site);
- MCD Landscapes;
- Barlett Tree Experts;
- Max Pallet Services;
- Blue Cat AdBlue Solutions; and
- Stanley Asphalt Ltd.

Given the distance from the Site and the nature of the small number of local businesses within the surrounding study area, it is considered that these businesses could continue to operate without substantial harm if affected by a disruption, thereby classifying them with a 'Low' environmental sensitivity value. It is considered that the magnitude of impact from the Proposed Development on these local businesses will be **negligible and adverse**.

Rural Enterprise

As there is no prescriptive guidance, a qualitative assessment of the potential impact of the Proposed Development on rural enterprises has been undertaken using professional judgement. The area is designated for rural development under its land use zoning objective. Several agricultural land holdings that operate as rural enterprises have been identified within the study area. The main potential impact is likely to be from noise, vibration and dust and potential disruption of field drainage systems. It is considered that these practices have a low sensitivity and are of a nature which could continue to operate without substantial harmed if affected by disruption from the Proposed Development.

The Proposed Development will not create permanent changes to the spatial relationship of rural enterprises to any key infrastructure which could result in damage to the enterprises and compromise their viability, therefore it is considered that the Proposed Development will have a **negligible and adverse** impact.

3.5.3 Amenity

As noted, factors such as air quality, noise nuisance, vibration, traffic and landscape and visual impacts can impact the amenity of an area. These issues have been assessed separately in the respective chapters of this EIAR. Specific impacts on surrounding Material Assets have also been assessed in a dedicated chapter.

There are no community amenity lands or facilities within 500 m of the Site. Community and amenity areas have been identified outside the study area. These lands include a number of golf clubs, public open spaces, parks and sport pitches.

These areas (which include local designated green space / community facilities) are considered valuable to the local communities and have been valued with a high environmental sensitivity. Given the distance of the amenity areas from the Proposed Development it is considered that they would experience a **negligible and adverse** magnitude of impact.

3.5.4 Land Use and Development Patterns

The subject quarry at Windmillhill was first developed in the 18th century and expanded in the 1960's when the Naas - Dublin dual carriageway construction work commenced. Quarrying activities at the Site have gradually increased in the subsequent years. With respect to social considerations, there will be little or no change to local activities in the vicinity of the Proposed Development as a result of the proposed continuation of quarrying activities. The mainstay of local activities will remain agriculturally based.

It is important to acknowledge that aggregate resources can only be worked where they naturally occur. The Proposed Development incorporates a limited land take from surrounding agricultural lands for extractive use. The CSO's Census of Agriculture 2020 identifies that the Utilised Agricultural Area (UAA) in the county of Dublin (excluding commonage) was ca. 37,963 ha. Given that the surrounding agricultural lands transcend the border of Dublin and Kildare the UAA in 2020 for Kildare was noted to be ca. 113,765 ha. (excluding commonage). The proposed extension of the Site into adjacent grassland and agricultural lands encompasses ca. 4.1 ha, (over a total area of ca. 5.16 ha to include screening berms).

These adjacent farmlands are compatible with arable crop production and grazing of livestock for dairy practices and have a 'Low' environmental sensitivity. The proposed loss of ca. 5.16 ha of agricultural lands represents less than ca. 0.0001 % of the UAA in Dublin, and 0.00003 % of the UAA in Kildare based on 2020 figures. This qualitative assessment of land-use impacts has been undertaken using professional judgement. Given the size

of lands proposed to be exploited for extraction and the wide availability of such lands in the locality it is considered that the magnitude of this impact would affect a small number of rural enterprises and would have little damage to these enterprises. The magnitude of impact has been classified as **negligible and adverse**.

As identified in Figure 3.2, the land use zoning objective for the Site and the EIA boundary old land use zoning objective 'RU' (rural). The proposed continued quarrying land use is not at odds with that land use zoning objective in principle. Other mapped objectives are indicted in the Plan, the proposed development extent and location does not impact these mapped objectives. Chapter 11 considers the landscape and visual impact of the proposal and includes consideration of the South Dublin land use assessment. It is considered that the proposed development will not negatively impact land use development objectives of the Plan. It is considered that the Proposed Development provides a considerable opportunity which would be difficult to achieve on an alternate greenfield site. Given the land use development objectives of the Plan in the SDCC County Development Plan 2016 – 2022, and the extent and location of the proposed development, it is considered that these lands have a low sensitivity. It is considered that the magnitude of impact is **low and adverse**.

3.5.5 Human Health, and Health and Safety

Human Health

Potential impacts to human health from the Proposed Development relating to the water environment surrounding the Site include discharges to the underlying groundwater. This could result in a change in water quality depending on the activities that are undertaken. There is the potential for impacted underlying groundwater to migrate to local groundwater wells and affect the users of such water supplies.

Potential impacts to human health with regards to air quality include dust generating activities on the Site. Other impacts include increased concentrations of airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles/equipment used on-site and other vehicles accessing the Site.

Impacts to human health from excess noise and vibration on-site may result in; hearing loss and various vibration syndromes of workers from high level occupational exposure. Off-site impacts include the annoyance and effects on mental health in the surrounding residential receptors.

The companion chapters of this EIAR define and asses the predicted impact of the Proposed Development and set out mitigation measures from the perspective of discreet environmental factors. These chapters have determined that the assimilative capacities of those environmental factors are sufficient, with mitigation measures, to accommodate the Proposed Development without significant negative impacts, and it is therefore considered that the human health will be protected. However, for this assumption to be drawn the mitigation measures set out in each chapter of the EIAR must be implemented.

Air Quality

Potential air quality impacts to human health from the Proposed Development have been assessed in Chapter 7 (Air Quality and Climate) of the EIAR. The factors relevant to human health considered in the assessment are the generation of fugitive and combustion emissions (dust, PM_{10}, $PM_{2.5}$, NO_2 and SO_2) from site activities.

Fine particulates such as $PM_{2.5}$ and PM_{10} have a potential for negative effects on human health and arise primarily from vehicle emissions and may thus arise during the operation of this proposal. Of these finer particulates, the IAQM (2016)[1] guidance states that quarries are more likely to experience suspended dust in the sub-coarse fraction (PM_{10}-$PM_{2.5}$) as opposed to the fine ($PM_{2.5}$) fraction. The suspension of fine particulates is proposed to be managed through the same mitigation measures employed for the management of deposited dust.

[1] IAQM; Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016;

A quantitative assessment of combustion emissions related to the asphalt manufacturing site was undertaken as part of the rEIAR submitted as part of the substitute consent application. Detailed dispersion modelling was undertaken using the latest version (Version 5.2.2) of CERC ADMS5 dispersion modelling software, to predict concentrations of NOx, NO_2, SO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors. The assessment concluded that the impacts from the operation of the plant on local receptors was Not Significant. As there are no proposed changes to the operation of the asphalt plant at the Site, impacts from the combustion emissions are considered to be not Significant and are therefore not considered further.

A traffic screening and quantitative operational phase assessment of effects from road traffic emissions has been undertaken in accordance with the Environmental Protection UK/Institute of Air Quality Management guidance document 'Land –Use Planning & Development Control: Planning for Air Quality' (EPUK/IAQM 2017), as part of the rEIAR submitted for the Site's Substitute Consent Application. Detailed dispersion modelling using ADMS-Roads was undertaken to determine the effect of the Proposed Development on traffic derived pollutants, nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), at nearby sensitive receptors. The assessment concluded that the impact of traffic on local receptors was not Significant. As there are no proposed changes to traffic flows associated with this application (and vehicle emissions are predicted to improve with time due to improvements in technology and emissions), impacts from traffic emissions are considered to be Not Significant and are therefore not considered further.

Considering the likelihood that most airborne particulates are deposited within 200 m (as presented in Chapter 7 (Air Quality)), and the conservative modelling carried out for the asphalt plant and traffic with the existing and Proposed Development, it is considered that impacts of air emissions from the Proposed Development on human health will be not significant.

Water

The main potential risks associated with the proposed continuation of quarrying activities at the Site to the water environment (and subsequently human health) are identified to be: the release of hydrocarbons to surface water and groundwater, and the use of the waste water facilities on-site. Deficient management of site activities during the assessment period have the potential to impact underlying groundwater and neighbouring residential groundwater supplies.

A total of four groundwater monitoring wells are used to monitor groundwater quality and levels across the Site. Water quality monitoring undertaken in 2020 is provided in Chapter 6 (Water). Whilst some parameters show elevated concentrations in the samples taken, there is no evidence of migration of contaminants from the Site in groundwater and therefore there is no perceived hydraulic connectivity or degradation of off-Site groundwater quality due to the proposed activities at the Site. It is also noted that hydrocarbons were not detected in any of the 2020-2021 samples indicating good practices with regards to fuel management and vehicle maintenance at the Site and it is proposed to continue such activities. Irish Water public mains water supply also passes under the Site entrance road but is not considered to be in hydraulic connectivity with the Site and will not be impacted by the Proposed Development activities.

It is therefore considered that there has will be no significant risk of water related impacts from the Site on the surrounding human health.

Noise and Vibration

The impact of the Proposed development in terms of noise and vibration is assessed in Chapter 8 of this EIAR. Noise and vibration can have direct impacts on human health (i.e. damage to hearing from long term exposure, and the development of vibration syndromes such as hand-arm vibration syndrome, vibration white finger or carpal tunnel syndrome). Such risks and impacts to employees will continue to be managed on-site through the health and safety management system and by the use of personal protective equipment during certain tasks (including hearing protection).

Noise and vibration from the Proposed Development can also have indirect impacts to surrounding residential developments through annoyance and effects on mental health. The noise environment monitored at the Site was identified to be dominated by road traffic on the N7 motorway, with a lesser contribution from the current operations at the quarry which were sporadic and only faintly audible.

In Chapter 8 (Noise and Vibration), a conservative worst-case scenario noise prediction was carried out for two scenarios to identify impacts from proposed operations:

- Scenario 1 – excavation and mobile processing of material; and
- Scenario 2 – loading and moving trucks.

The scenarios of excavating and processing materials are the typical daytime operations proposed at the Site. The loading and moving trucks scenarios are those activities which may take place earlier on the morning or after the main excavation activities have ceased for the day. Scenario 1 has been evaluated against the daytime target level, and Scenario 2 has been evaluated against the night-time target level. Predicted noise levels at all sensitive locations are below the respective daytime and night-time target levels for these conservatively predicted operational scenarios.

Vibration monitoring undertaken at the eastern and western boundary of the quarry determined there were no exceedances in the specified vibration limits. It should be noted that this vibration monitoring was close to the blasting activities, and actual vibration levels at receptors would be lower. Blasting management protocols and measures will be maintained on site and probability of adverse health effects due to blasting activities is low.

It is considered that with the employment of the proven mitigation measures at the Site, noise and vibration emissions from the proposed development will not have a significant effect on human health in the local environs.

Health and Safety

The Developer as business owner will be ultimately responsible for the health and safety management of the Proposed Development. The predominant health and safety concerns for the human environment surrounding the Proposed Development relates to the potential for humans and livestock to stray into the quarry area, and also from blast related activities.

With regard to the health and safety of workers on the Site, activities are subject to health and safety legislation such as the Safety, Health & Welfare at Work Act (2005, as amended), along with the secondary legislation or statutory instruments under that Act, including the Safety, Health and Welfare at Work (General Application) Regulations 2007- 2020, and the Safety, Health and Welfare at Work (Quarries) Regulations 2008.

Compliance with the HSA Safe Quarry Guidelines (Health and Safety Authority's (HSA; 2020) 'Safe Quarry. Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008') will limit the potential for unplanned events in the form of instability in the quarry faces. The Developer is committed to providing appropriate information, training and supervision to employees who will be operating at the Application Site, and their Safety Statement is reviewed annually at the Site. A visit was carried out by the HSA on 08 March 2021 which raised four items. These items were with regards to: work at heights, undertaking a geotechnical assessment of the quarry, providing an internal traffic management plan to the HSA, and including signage in certain areas to remind drivers to remain in cabs during loading. The Developer has commissioned work to address these site-visit findings and is compiling a response to the HSA. Any recommendation from these works will be implemented in the Proposed Development.

All site employees, contractors and subcontractors are required to wear a minimum personal protective equipment (PPE) whilst on-site, these are steel toed boots and a high visibility jacket or vest. Other task specific

PPE which will be used at the Application Site includes safety glasses/goggles, hard hats, gloves and hearing protection.

The Proposed Development is well located and can be easily served by emergency services if required. The closest Accident and Emergency unit operates out of Tallaght University Hospital, Dublin 24. Fire emergency services for the Site operate from the relevant on call units in the Rathcoole and Tallaght area.

These staff and local populations are both valued with a 'High' sensitivity receptors. Based on the assessment of impacts (identified above) and embedded management measures employed at the Site, it is considered that the Proposed Development will have a **negligible (adverse)** direct or indirect impact on health and safety.

Table 3.19: Evaluation of Initial Impacts and their Effect Significance

Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Operational Effects *
Local Populations / Communities	High	Change in local population community size, age distribution, density and household composition due to nuisance environmental emissions from the Site.	Negligible (adverse)	Slight
Local Populations / Communities	High	Change in local population community size, age distribution, density and household composition due to quarry workers migrating to the area.	Negligible (adverse)	Slight
Local Employment	High	Provision of continuing employment at the Proposed Development.	Low (positive)	Slight
Local Businesses	Low	Change and disruption to trading conditions for local commercial and industrial businesses.	Negligible (adverse)	Imperceptible
Rural Economies	Low	Impacts to rural enterprise from nuisance, changes in spatial relationship of such enterprises.	Negligible (adverse)	Imperceptible
Land Use and Development	Low	Land take from rural agricultural enterprises.	Negligible (adverse)	Imperceptible
Land Use and Development	Low	Land take from indicative Traveller Accommodation identification.	Low (adverse)	Slight
Amenity	Low	Nuisance impacts from factors such as air quality, noise, vibration, traffic and landscape and visual on community lands, sports and recreation areas, tourism and religious centres.	Low (adverse)	Slight
Employees / Contractors	High	Health and safety management practices which may impact direct employees and sub-contractors at the Proposed Development.	Negligible (adverse)	Slight

Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Operational Effects *
Local Populations / Communities / Non-motorised Road Users	High	Health and safety management practices which may impact members of the public including non-motorised road users.	Negligible (adverse)	Slight
Human Health	High	Discharges and the introduction of contamination to the underlying groundwater thereby changing water quality.	Negligible (adverse)	Slight
Human Health	High	The generation of fugitive and combustion emissions (dust, PM_{10}, $PM_{2.5}$, NO_2 and SO_2) from site activities thereby changing air quality.	Low (adverse)	Slight
Human Health	High	Noise and vibration from Site activities impacting surrounding residential receptors through annoyance and effects on mental health.	Low (adverse)	Slight

* Taking account of embedded mitigation

3.6 Cumulative Impacts

There are no similar extractive industries in the surrounds of the Proposed Development which may contribute to cumulative impacts.

Given the nature and scale of the N7 National Road it is considered that this dominates the baseline environment surrounding the Proposed Development. It is considered that the Site provides a contribution of effects to those of the roadway however it is considered that the potential cumulative air, noise and water effects on human health surrounding the Proposed Development are not significant.

Beyond the County Development Plan, that does not indicate significant alteration to current land uses in the study area, there have been no other relevant plans or projects identified in the vicinity of the Proposed Development, it is considered that in-combination effects as a result of the proposed works with regard to other plans or projects is not significant.

3.7 Do-Nothing Scenario

If consent was not achieved and no further works were carried out within the Site this would result in a cessation of any potential impacts from bio-physical factors affecting the human environment surrounding the Site (water, air quality, noise and vibration). It is considered that such impacts would be **negligible (positive)** and would result in **Slight** effects to the local populations and communities (high sensitivity).

The cessation of activities would also result in an adverse effect on those workers who are directly and indirectly employed by the Site. It is considered that such impacts would be **low (adverse)** and would result in **Slight** effects to this workforce (high sensitivity).

As noted previously, one of the predominant health and safety concerns for the environment surrounding the Proposed Development relates to the potential for humans and livestock to stray into the quarry. An incomplete and unrestored quarry may pose a number of hazards, such as unsafe rock faces and open water bodies. The complete cessation of activities in a do-nothing scenario would still require the Developer to maintain appropriately secure Site boundaries to restrict access. The impacts of the Site on the surrounding health and safety are therefore considered to be **low (adverse)** and would result in **Slight** effects to the local populations and communities (high sensitivity).

3.8 Mitigation Measures

No remedial measures other than those detailed in the below chapters of this EIAR are required:

- Chapter 5 – Land, Soils and Geology;
- Chapter 6 – Water;
- Chapter 7 – Air Quality and Climate;
- Chapter 8 – Noise and Vibration;
- Chapter 10 – Landscape and Visual Impact; and
- Chapter 11 – Traffic.

3.9 Monitoring

The chapters identified in the above Section 3.8 have included monitoring measures as appropriate (including water, air, noise, and vibration). On this basis, no specific monitoring is required in relation to population and human health during the operation of the Proposed Development.

3.10 Residual Effects

The assessment concludes that the Proposed Development will not give rise to significant adverse effects on human environment surrounding the Site. In all cases the residual effect will be **Not Significant and not greater than Slight.**

3.11 Difficulties Encountered

There is a lack of census data from the interim period of 2016 to the present. The next census was proposed to take place in 2021 however due to the Covid-19 pandemic this has been postponed to 2022.

No other particular difficulties were encountered in the preparation of this chapter of the EIAR.

3.12 References

Environmental Impact Assessments of Projects Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). European Commission 2018.

EU Environmental Impact Assessment Directive (Council Directive 2014/52/EU).

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of Environment, Community and Local Government, 2018.

Central Statistics Office, Census of Agriculture 2010 – Preliminary Results, February 2010.

Department of the Environment, Quarries and Ancillary Activities, Guidelines for Planning Authorities 2004.

Environmental Management in the Extractive Industry: Guidelines for Regulators 2006.

HSA's 'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008.

South Dublin County Council County Development Plan 2016 – 2022.

South Dublin County Council Development Plan, 2016-2022, Two year Progress Report, 2018;

South Dublin County Council Development Plan, 2022-2028, Issues paper, 2021;

South Dublin County Council Traveller Accommodation Programme 2019-2024.

Geological Heritage Guidelines for the Extractive Industry (Irish Concrete Federation, 2008).

Environmental Code (Irish Concrete Federation, 2005).

Environmental Management in the Extractive Industry (Non Scheduled Minerals) (Environmental Protection Agency, 2002).

Draft Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland. EPA. 2017.

Draft Advice Notes for preparing Environmental Impact Statements. Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland. EPA. 2015.

Design Manual for Roads and Bridges (January 2020). Volume 11, Section 3, LA112, Revision 1, Sustainability and environment. Appraisal. Population and human health

Safety, Health and Welfare at Work (Quarries) Regulations 2008, S.I. 28 of 2008.

Safety, Health and Welfare at Work General Application 2016, S.I. 36 of 2016.

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Central Statistics Office. Census Returns 1991, 1996, 2002, 2006, 2011 and 2016. http://www.cso.ie/en/census/, accessed 05 November 2020.

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Department of Health, Key Trends in Ireland, 2018.

Department of Communication, Climate Action and Environment (DCCAE) Eircode maps.

4.0 ECOLOGY AND BIODIVERSITY

4.1 Introduction

This assessment presents a summary of ecological features which are, or have the potential to be, ecological constraints to the Proposed Development (the Proposed Development is described in Chapter 2). This chapter evaluates the importance of the ecological resources present and defines the degree of significance of potential impacts resulting from the Proposed Development. The report also identifies appropriate mitigation measures and defines residual impacts.

A stage 1 screening report for Appropriate Assessment has been produced and is included in the Application. This report concludes that no significant impacts would occur to Natura 2000 sites as a result of the Proposed Development.

4.2 Policy and legislation context

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to biodiversity.

Legislation

- The Planning & Development Act 2000 & the Planning and Development (Amendment) Act, 2010 (as amended) hereafter referred to as the Planning Acts;
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act, 2000 (as amended) hereafter referred to as the Wildlife Acts;
- The EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU), the Planning and Development Acts 2000-2018, and the Planning and Development Regulations, 2001-2018;
- European Communities (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018);
- European Commission (EC) Habitats Directive 92/43/EEC (as amended);
- EC Birds Directive 2009/147/EC;
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) hereafter referred to as the Birds and Habitats Regulations;
- Flora (Protection) Order, 2015;
- Environment (Miscellaneous Provisions) Act 2011; and
- The Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act.).

Relevant Policies and Plans

- National Biodiversity Plan, 2017-2021;
- Ireland's National Strategy for Plant Conservation;
- All Ireland Pollinator Plan 2015 – 2020; and
- Draft Biodiversity Action Plan for South Dublin County - Connecting with Nature 2020 – 2026.

Relevant Guidance

- Invasive Species in Ireland (NPWS, 2004);

- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal Environments (CIEEM, 3rd Edition 2018);
- Circular Letter PL 1/2017 - Implementation of Directive 2014/52/EU on the Effects of Certain Public and Private Projects on the Environment (EIA Directive), 15 May 2017;
- Key Issues Consultation Paper - Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems, 2 May 2017;
- Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). European Commission of the European Union 2017;
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft, Environmental Protect Agency, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, 2018);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- NRA Environmental Assessment and Construction Series Guidelines (NRA, 2006- 2009);
- A Guide to Habitats in Ireland. (Fossitt, 2000);
- Bat Surveys: Good Practice Guidelines (Collins, 2016);
- Bat Mitigation Guidelines for Ireland, Irish Wildlife Manuals No. 25 (Kelleher & Marnell, 2006); and
- Bats & Lighting Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Ireland, December 2010).

4.3 Assessment methodology and significance criteria

Desktop survey

A desktop review was conducted of available published and unpublished information, including a review of data available on the National Parks and Wildlife Services (NPWS and National Biodiversity web-based databases), to identify key habitats and species that may be present, in particular those protected by legislation. To assess the likely current status of species in the vicinity of the Site, the search included relevant grid square searches around the Site boundary and was limited to records returned from within the last 20 years.

Designated nature conservation site assessment

Sites of international importance, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are collectively known as Natura 2000 sites. These sites contain examples of some of the most important natural and semi-natural ecosystems in Europe. Designated sites, which also include Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) were also searched for. The designated search area was 15 km from the Site boundary for Natura 2000 sites, and 5 km from the Site boundary for NHA and pNHA sites.

In the subsequent analysis of designated sites, particular attention was given to potential for the development to influence a designated site. In other words, potential ecological pathways were identified; these pathways

can be hydrological, hydrogeological, physically overlapping or exhibiting habitat and species synergies that could result in temporary or residual effects being afforded to a designated site.

4.4 Ecological survey

Habitats

The Site was surveyed by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM on the 25th and 26th January 2021 and 23rd February 2021 (O'Donnell, 2021) and an ecological walkover survey incorporating a Phase 1 habitat and flora assessment was carried out in accordance with the Heritage Council's guidelines (Smith *et al*. 2011). The dominant habitats present were classified according to Fossitt (2000) and key botanical species were identified. Any other records of interest (e.g. invasive plant species) were also marked on field maps and locations were recorded.

Aerial photographs and Site maps assisted the habitat survey. Habitats have been named and described following Fossitt (2000).

Ecological Survey methods were in general accordance with those outlined in the following documents:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping;
- Phase 1 Habitat Survey methodology (Joint Nature Conservation Committee (JNCC), 1990, revised 2010); and
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

Fauna

Bats

Daytime visual assessments were carried out to identify any bat roosting potential which may exist within the Site. Treelines within the Site contain mature trees which were considered to have potential as bat roosts. Winter is the optimal time for '*preliminary ground roost assessments'* of trees (Collins, 2016), due to greater visibility as a result of leaf fall and die back of ground level vegetation. The assessment was carried out on 25th and 26th January 2021 and 23rd February 2021 and followed guidance set out in Collins (2016). The survey was non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected from ground level to identify any evidence of bat roosting. Where accessible, potential roosting features were investigated using an endoscope. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc. Potential Roost Features (PRFs) are described according to the scheme outlined in Table 4.1 below (O'Donnell, 2021).

Table 4.1: Methodology for describing the potential suitability of features for bats[1].

Suitability	Description
Negligible	Negligible features which are likely to be used by roosting bats.
Low	A feature with one or more potential roost sites that could be used by individual bats opportunistically.

[1] *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)', Collins (2016).*

Suitability	Description
	Potential roost sites which do not provide appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to characteristics and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Avifauna

An assessment of the Site's ability to host breeding and foraging birds was undertaken. The likely bird assemblages were predicted by considering habitat composition of the Site and desk study data. Due to Covid-19 restrictions and Project timing appropriate surveys could not be conducted prior to the submission of the planning application. The applicant has engaged Lesley Lewis of Limosa Environmental[2] to undertake a breeding bird survey of the site during Spring 2021 and this is well underway. This will also be supplemented by a peregrine falcon management plan. Precautionary mitigation has been developed and is presented within this chapter in the absence of 2020 baseline data.

Mammals

Terrestrial mammal surveys were carried out by Tom O'Donnell during the course of ecological walkover surveys. Walkover surveys were carried out within the site boundary, and also extending to a distance of 150 meters of the Environmental Impact Assessment (EIA) study area in areas with potential to support underground mammal dwellings. Surveys involved a walkover of the site to identify any mammal species present or signs of mammal activity such as droppings, tracks, burrows etc. Observations were recorded using field notes and/or handheld GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

Camera traps were deployed at five locations throughout the Site (see Figure 4.1) and recording was carried out for 28 days and nights from 25th January to 23rd February 2021. The cameras were infra-red equipped to allow monitoring of activity by night as well as by day. The cameras were triggered by movement, at which point a photo was recorded and a 10 second recording delay was applied. The aim of the camera trap survey was to record evidence of terrestrial mammal activity to inform the ecological assessment. Cam_4 was removed during the study period and not recovered and therefore no imagery was returned from this location.

[2] https://www.limosaenvironmental.ie/

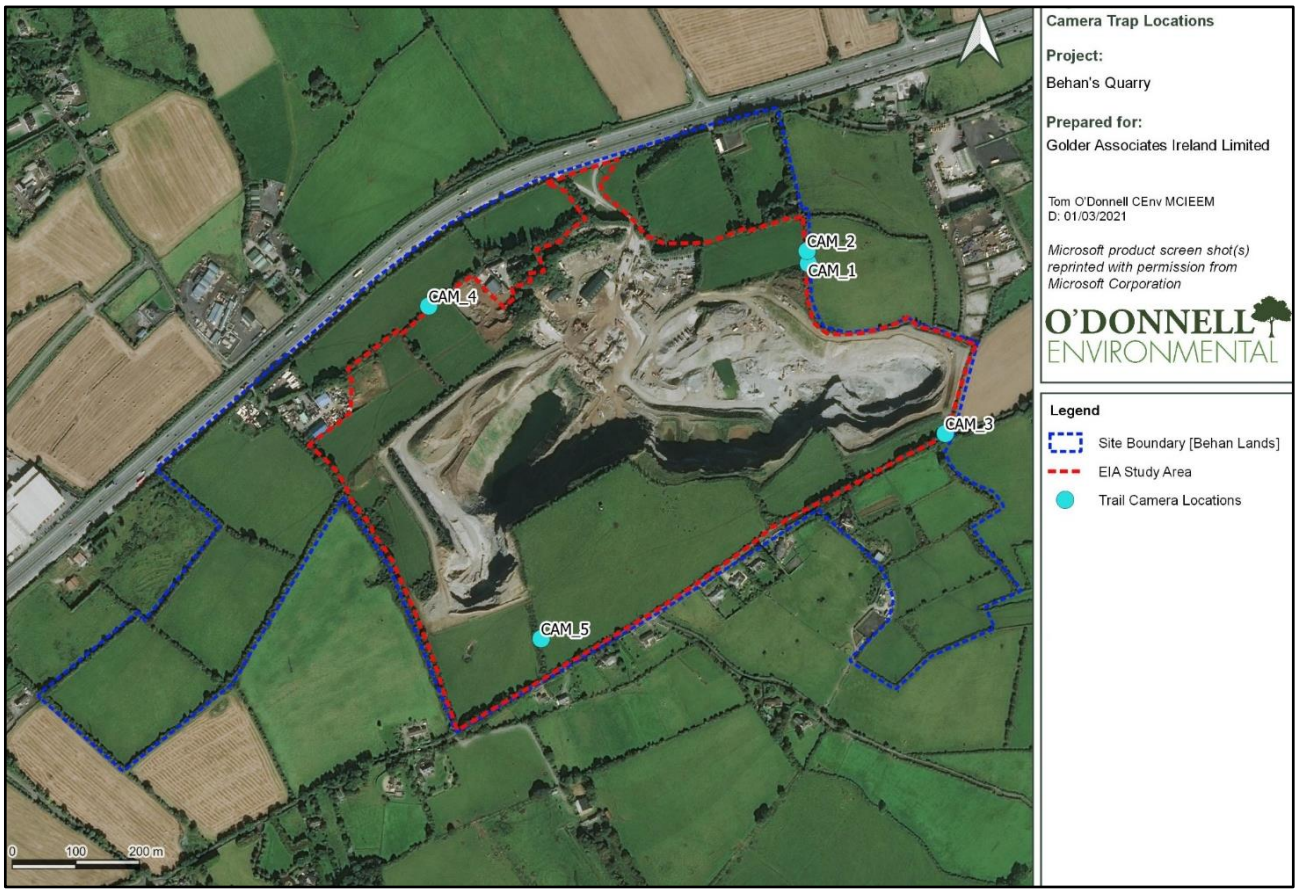


Figure 4.1: Camera Trap Locations

Herpetofauna and Invertebrates

An assessment of the Site's ability to host herpetofauna (reptiles and amphibians) and invertebrates was undertaken. The likely assemblages were predicted by considering desk study results, satellite mapping and habitat composition.

Aquatic ecology

The assessment considered the potential for hydrological connectivity between the Site and surface water features, and also considered what effects could be afforded to aquatic fauna and habitat receptors. It Is important to note that no ditches or streams cross the Site. The Site is located within the River Giffeen catchment which is part of the River Liffey system. The Highdown Hill stream leading to the River Giffeen is located approximately 1km to the north of the Site. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site.

4.4.1 Survey constraints or limitations

Habitats

It is acknowledged that due to the seasonality of various floral species, not all species will be apparent at any one time in the year. The habitat survey was not carried out in the optimal season for such work, though given the fairly ubiquitous habitats on Site this is not considered to be a constraint.

Invasive Species

Throughout survey work the opportunity was taken to record the presence of any invasive non-native species. However, the detectability of such species can vary throughout the year and depending on their life stage or recent management.

4.5 Impact assessment method

Habitats and species were assessed in accordance with the guidance contained in the document *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland* (CIEEM, 2018) which recommends that the value of an ecological resource be determined within a defined geographical context (Figure 4.2).

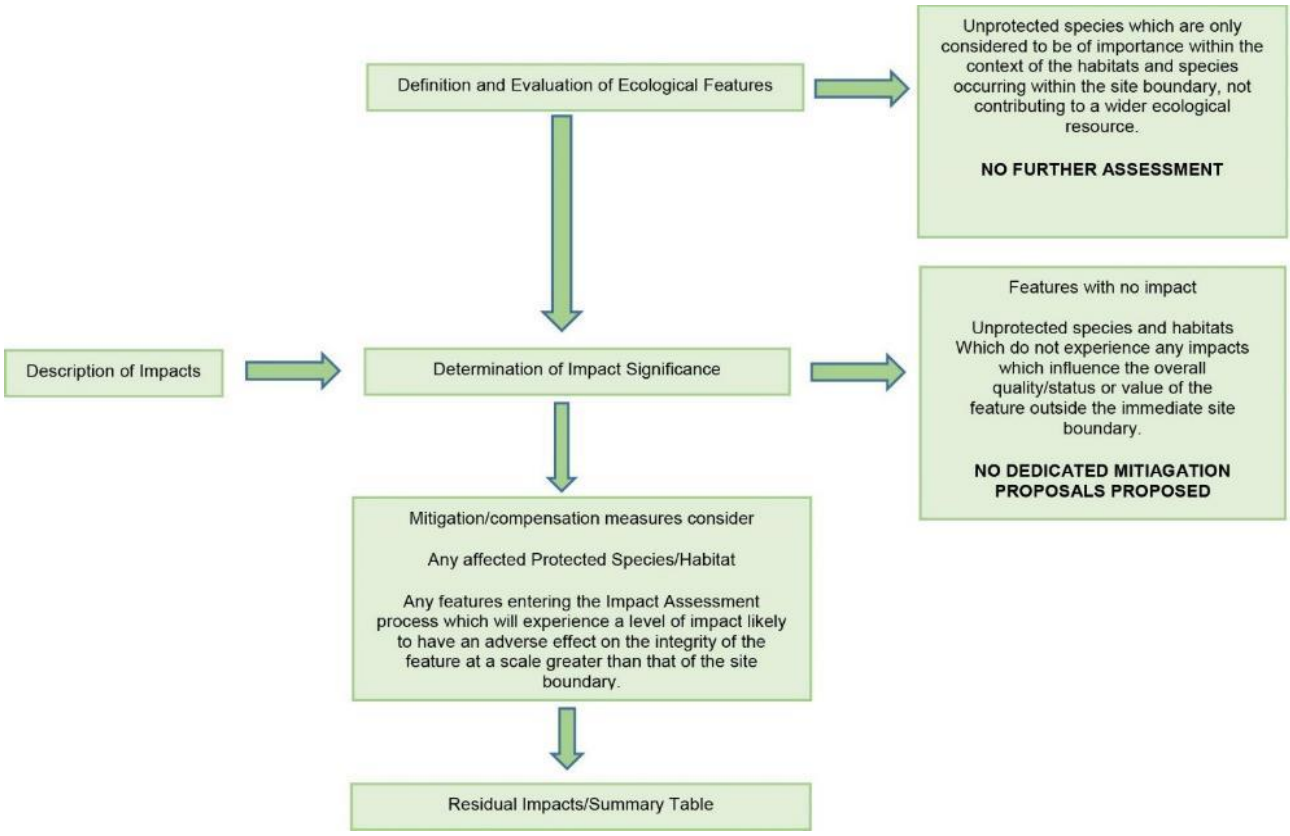


Figure 4.2: Impact Assessment Method

Defining Importance

The relative importance of each ecological feature has been defined on a geographical scale, from international importance, to having relevance only in the context of the site boundary. The definitions employed for the basis of the evaluation are presented in Table 4.3. It should be noted that professional judgement has been employed in the allocation of a level of importance to each feature **as it occurs on the site**. In other words, the value of the feature is presented in the context of its actual status within the site. **Therefore, a single individual of a species which is protected under the European Union (EU) Habitats Directive would not automatically be considered to be of European (international) Importance, but would be evaluated in the context of its relationship to the overall population and conservation status**.

Defining Impact

The impacts to ecological features are defined by their geographical significance in terms of the likely effect and the defined importance of the feature being affected. It is not possible in this system to have an impact greater than the overall geographical importance of the feature (e.g. the maximum possible impact to a feature of a regional importance would be one which is of regional significance). Impacts which do not have significance beyond the immediate area (the site) will be managed through the implementation of construction and habitat management plans. One exception to this is the case of impacts on Protected Species, where **any** impact would result in the implementation of mitigation measures.

Defining Magnitude of Change

Considering the potential for impacts as defined above, an assessment of the magnitude of change is arrived at. This is based on Table 4.2 below, and relies on professional subjective judgement in deciding the level of magnitude of change.

Table 4.2: Criteria for Assessing Magnitude of Change

Impact Level	Description
Severe Impact	Ecological effects of a scale or magnitude which would result in permanent, total loss of an irreplaceable species or habitat of international or national importance (occasionally of local importance), or which would result in the substantial loss of a protected/rare habitat or a population of a protected/rare species. They represent key factors in the decision-making process. Typically, mitigation measures would be unlikely to remove such effects.
Major Impact	These effects are likely to relate to permanent impacts at a regional or local level, or temporary impacts at an international or national level, and could be potential concerns to the project depending upon the relative importance attached to the issue during the decision making process. The effects are likely to be large in scale or magnitude, and result in substantial medium term loss of protected/rare species or habitats. Mitigation and detailed design work are unlikely to entirely eliminate all ecological effects.
Moderate Impact	These effects are usually only at local or regional level, and may be short or medium term only, or temporary impacts on a small part of an international site. However, the cumulative effects of such issues may lead to an increase in the overall effect on ecological features. They represent issues where effects will be experienced, but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected interests, but some residual effects will still arise.
Minor Impact	These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision making process. However, they are of relevance in enhancing the subsequent design of the development and consideration of mitigation measures.
Not Significant / No Impact	No perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation, within the margin of forecasting error, or impacting on exceptionally poor baseline conditions.
Beneficial / Positive Impact	These effects are those, which through implementation, would be anticipated to benefit the ecology of the site. They may advance the objectives of local, national or international species or habitats.

Outlining mitigation, compensation, and enhancement measures

Receptors subject to significant impacts (those which have the potential to affect the ecological resource outside of the immediate site boundary) are the focus of provision of mitigation measures which have been formulated according to the mitigation hierarchy (avoid, reduce / minimise, compensate). All proposed mitigation measures follow industry best practice. Those for protected species follow the prescribed regulatory protocols.

Defining residual impact

Following the application of mitigation measures, impacts to each ecological feature are reassessed, and any residual impacts are reported.

As stated by the Chartered Institute of Ecology and Environmental Management CIEEM guidance (2018), '*The importance of an ecological feature should be considered within a defined geographical context*'. Accordingly, each feature has been assessed based on the scale described in Table 4.3.

Table 4.3: Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species of habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local (Higher and Lower, NRA 2009)	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc. This may be split into higher and lower categories as per NRA, 2009.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the Site boundary.

4.6 Baseline Results

4.6.1 Desk Study

Designated Nature Conservation Sites

The internationally statutory designated nature conservation sites in the vicinity of the Site are shown in Figure 4.3 below.

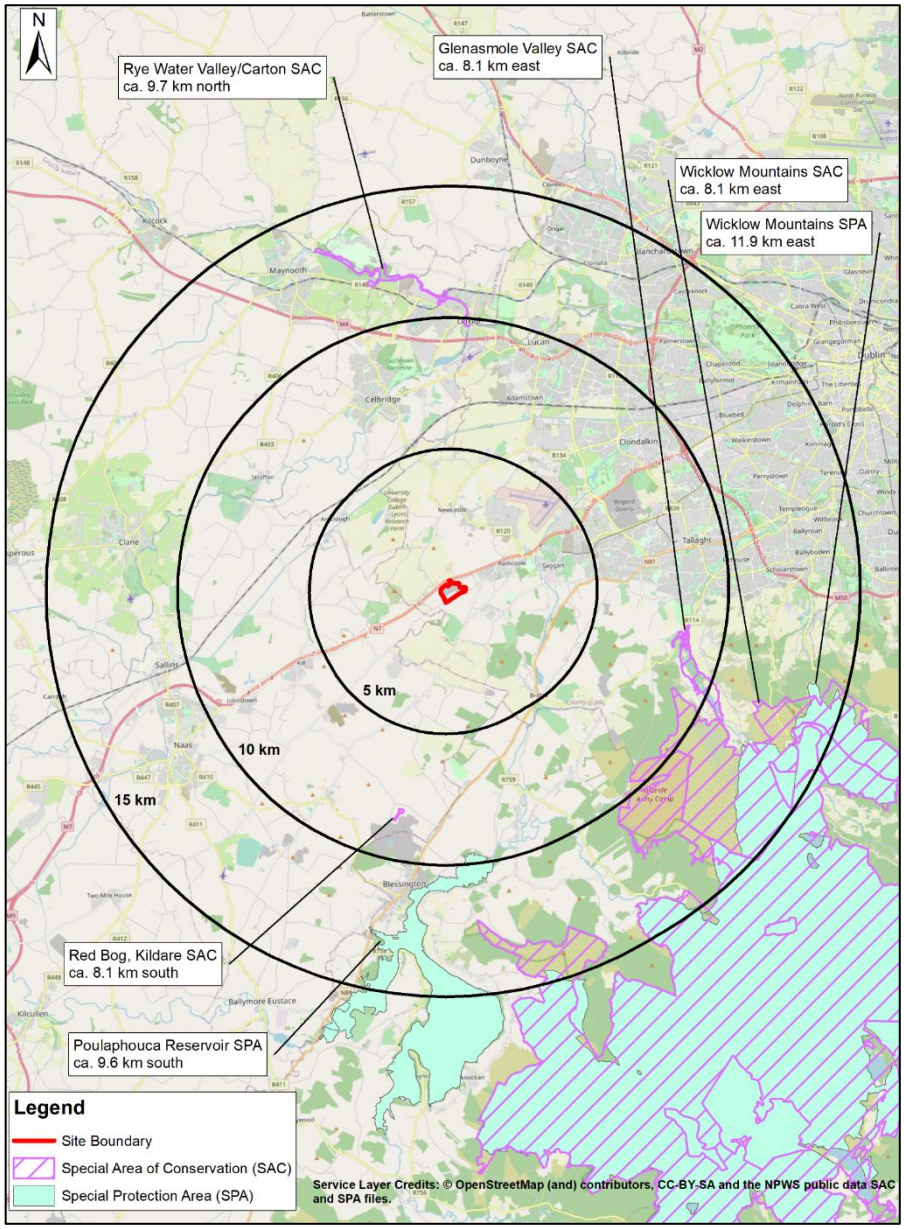


Figure 4.3: International Statutory Designations surrounding the Site, including 5, 10, and 15 km buffers.

International Designations (Natura 2000 sites)

There are six Natura 2000 sites located within 15 km of the Proposed Development, as listed below:

- Red Bog, Kildare SAC – (ca. 7.5 km south of the Site);
- Poulaphouca Reservoir SPA – (ca. 10 km south of the Site);
- Wicklow Mountains SAC (ca. 12 km south east of the Site);
- Wicklow Mountains SPA (ca. 12 km south east of the Site);
- Glensamole Valley SAC (ca. 7.5 km east of the Site); and
- Rye Water Carton SAC (ca. 10 km north of the Site.

A stage 1 screening for appropriate assessment has been prepared for this Project which evaluates the potential for significant effects on the integrity of these EU sites. Given that no element of the Proposed Development

will be undertaken within or directly adjacent to any Natura 2000 site, there is no potential for direct effects on the qualifying interests of any designated sites as a consequence of the development.

National Designations (NHAs) and pNHA

No Natural Heritage Areas (NHAs) were identified within 5 km of the Site. However, three proposed NHAs (pNHAs) were identified as shown on Figure 4.4 below.

- Kilteel Wood pNHA (c. 4 km South of the Site);
- Slade of Saggart And Crooksling Glen (c. 3 km south-east of the Site); and
- Grand canal (c. 4 km north-west of the Site).

All pNHA sites are on the relative periphery of the search area. The pNHA sites are all separated from the Site either by the N7 roadway, other smaller roads and open agricultural land, limiting any ecological connectivity. Accordingly, it is not anticipated that these pNHAs will be subject to any direct effects as a result of the development. Equally, given the distance and separation from the Site, it is considered unlikely that the development will result in any indirect effects on the pNHAs, such as from an increase in noise levels or dust deposition. Accordingly, it is considered highly unlikely that the development will result in any negative effects on the qualifying features of the pNHAs.

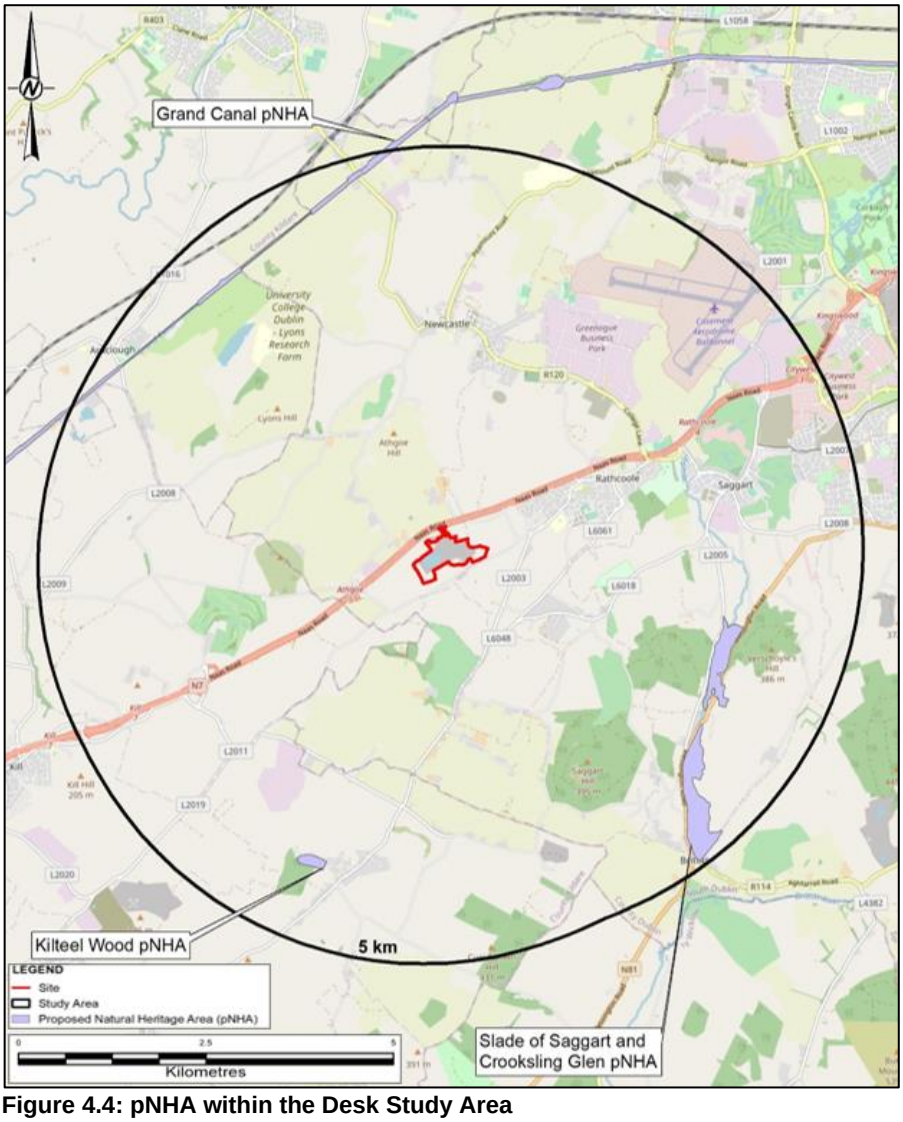


Figure 4.4: pNHA within the Desk Study Area

Fauna

The National Parks and Wildlife Service (NPWS)[3] and the National Biodiversity Data Centre (NBDC) databases were searched for records of protected species within the most appropriate 2 km grid square for the Site. The results are presented in Table 4.4 below.

Table 4.4: Protected species data within the most appropriate 2 km grid square for the Site

Species Group	Species Name	Count	Most recent record
Bird	Eurasian Jay (*Garrulus glandarius)*	1	31/12/2011
Flowering plant	Winter Heliotrope (*Petasites fragrans*)	3	26/01/2018
Insect - butterfly	Green-veined White (*Pieris napi*)	1	05/08/2013
Insect - butterfly	Large White (*Pieris brassicae)*	2	05/08/2013
Terrestrial mammal	Eastern Grey Squirrel (*Sciurus carolinensis*)	1	31/12/2011
Terrestrial mammal	European Rabbit (*Oryctolagus cuniculus*)	1	05/08/2013
Terrestrial mammal	Red Fox (*Vulpes vulpes*)	1	11/10/2016

It is noted that location information for a number of species is confidential and not provided on the database, including for golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), hen harrier (*Circus cyaneus*), marsh harrier (*Circus aeruginosus*), and white-tailed eagle (*Haliaeetus albicilla*).

The freely available desk study results should not be considered definitive data sets for the desk study area. An absence of desk study data does not necessarily dictate that a site is absent of notable flora or fauna in a historical or current context.

Habitats

The NPWS database did not return any records for protected habitats or flora from within or adjacent to the Site within grid square N92X.

4.6.2 Habitat Assessment

The habitats present within the boundary of the proposed Site are described below (Figure 4.5) and as further presented in Appendix 4.1 (O'Donnell, 2021).

Improved Agricultural Grassland (GA1)

The Site is dominated by improved agricultural grassland (GA1 - Fossitt (2000). For clarity and ease of use, GA1 is not mapped within Figure 4.5 and consists of all areas within the study area not otherwise mapped. This grassland is used for silage production as well as grazing by cattle. Improved agricultural grassland is a highly modified/improved grassland habitat, which is generally species poor, dominated by a typical agricultural species assemblage. Perennial Rye-grass (*Lolium perenne*) is the dominant grass species with Yorkshire Fog (*Holcus lanatus*) and Cocksfoot (*Dactylis glomerata*) also abundant. Other species noted include Ribworth Plantain (*Plantago lanceolata*), White Clover (*Trifolium repens*), Broad-leaved Dock (*Rumex obtusifolius*), Meadow Buttercup (*Ranunculus acris*) and Dandelion (*Taraxacum vulgaria*).

[3] www.npws.ie mapviewer [accessed 30/10/2020]

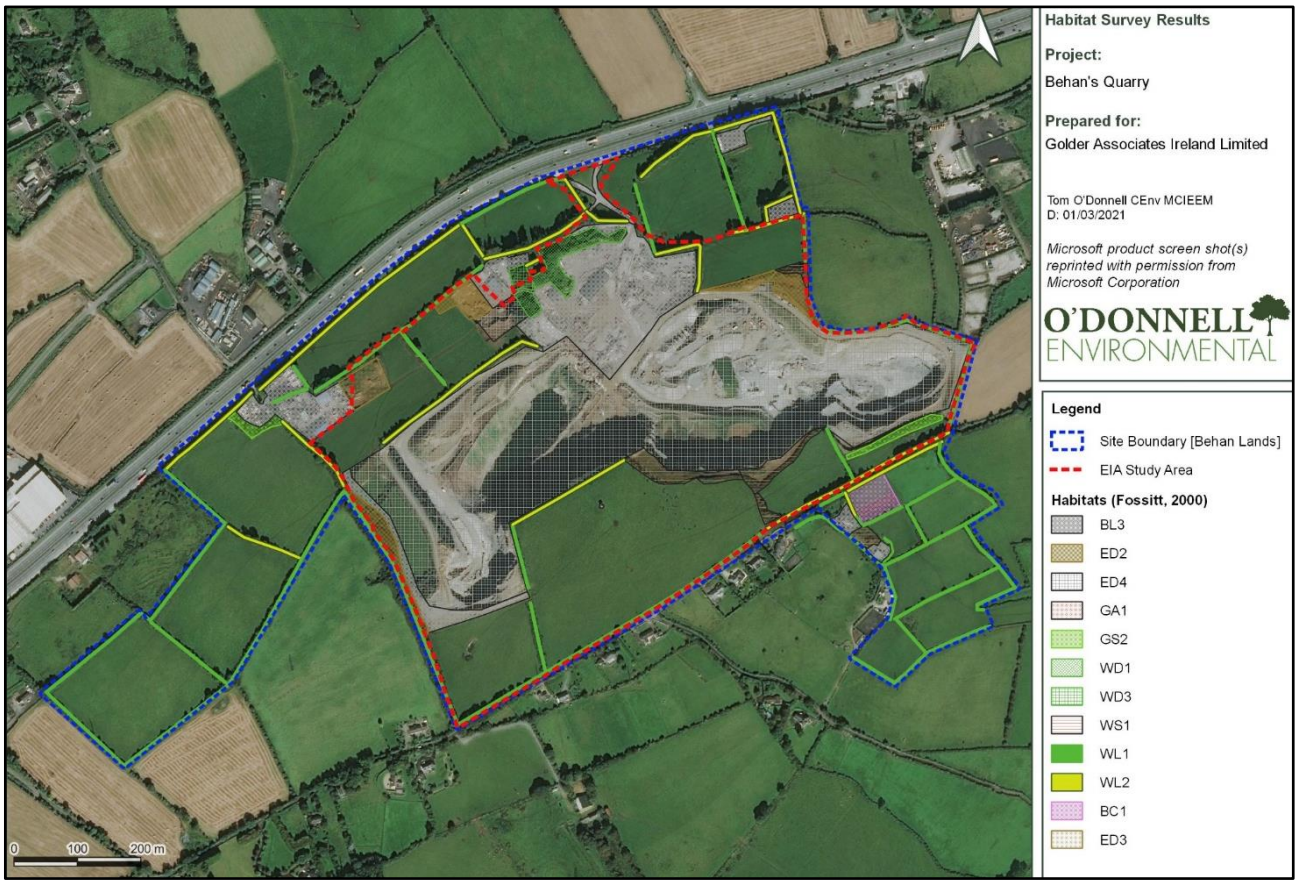


Figure 4.5: Habitat Baseline at the Site

Improved agricultural grassland (GA1) is a highly modified or improved grassland habitat which is subject to ongoing intensive management for agricultural purposes including the application of fertiliser. As such it supports limited floral diversity and local biodiversity potential (Figure 4.6).



Figure 4.6: Intensive Agricultural Grassland (GA1), Courtesy of O'Donnell, 2021.

Hedgerows (WL1)

A number of hedgerows are present within the Site. Locations of hedgerow habitats are represented by a 4-meter-wide strip in the Habitat Map, Figure 4.5. The Site, including its boundary, contains approximately 5.7km of hedgerows in total. The hedgerows within the Site are generally poorly managed and in many cases ingress by livestock occurs resulting in loss of ground level vegetation and a gappy/defunct hedgerow structure. Hawthorne, Elder and Gorse were the most common hedgerow species encountered overall. Bramble was also found to be abundant in hedgerows throughout the Site (Figure 4.7).

Hedgerows occasionally contain mature trees. On the western boundary of the Site a double hedgerow is present, and analysis of historic mapping shows this double hedgerow borders both sides of a disused roadway. A small section of hedgerow along the N7 roadway was historically 'laid' to increase the effectiveness of the hedgerow as a barrier to stock. The hedgerows of the Site offer some semi-natural habitat and ecological connectivity which is of some significance in a local context.



Figure 4.7: Hedgerow (WL1).

Treelines (WL2)

The Site, including its boundary, contains approximately 3.03km of treeline habitats in total. Treelines of different types and ages are present which reflects the various uses and ownership of the Site and adjoining areas over the years. At the main entrance to the quarry Site, in proximity to the reception yard, Leyland Cypress treelines provide screening from the nearby N7 roadway. Screening planting is also present on the northern and southern edges of the main open quarry face, this planting consists of Elder and Pine (*Pinus sp.*), while some Hawthorne and Gorse is also becoming established. Older treelines typically comprise mature Ash trees, Hawthorne and Elder. Beech is present occasionally. The treelines offer semi-natural habitat which has some significance in a local context (Figure 4.8).



Figure 4.8: Treeline (WL2) on north-east of Site.

Scrub (WS1)

Gorse and Elder dominated scrub are present primarily in proximity to the open quarry area, where berms and bare soil have recolonised naturally (Figure 4.9). Hawthorn and bramble are commonly associated with these scrub habitats. Buddleia, a common alien invasive species, was recorded in scrub above the southern side of the open quarry face. Scrub habitat often provides a number of important ecological functions including providing nesting habitat for birds, however this habitat is limited in scale and subject to disturbance effects.



Figure 4.9: Scrub (WS1) on southern quarry boundary of the Site.

Mixed Broadleaf Woodland (WD1)

A small area of ca. 0.6ha of mixed broadleaf woodland (WD1) occurs on the northern side of the quarry Site, proximal to an old residence and buildings associated with quarrying activities (Figure 4.10). The woodland was found to be dominated by sycamore. Understorey species consist of hawthorn and bramble. The WD1 habitat contains occasional rhododendron, which is associated with horticultural planting surrounding the old residence. The woodland currently has limited floral diversity, nevertheless it represents a valuable habitat in a local context with a degree of naturalness.



Figure 4.10: Mixed Broadleaf Woodland (WD1).

Mixed Conifer Woodland (WD3)

A small area ca. 0.11ha of mixed conifer woodland (WD3) is partially contained within the Site, on the eastern boundary of the Site. The WD3 habitat contains Sitka Spruce trees and abundant rhododendron, which is associated with horticultural planting surrounding 'Windmill House', a historic residence. Rhododendron, similar to Buddleia (described above) is an alien invasive species. This woodland is of low ecological value.

Buildings and Artificial Surfaces (BL3)

A variety of buildings and artificial surfaces are present within the Site associated with quarrying activities as well as agricultural and residential purposes. These areas are generally of low ecological significance. An old residence is located north of the existing quarry (and associated outbuildings) which is titled 'Windmill House' on OSI historic 6" mapping (Figure 4.11Figure 4.12). The base of a windmill, after which the townland is named, is located south of the quarry. These structures may be of importance to bats and nesting birds.



Figure 4.11: Buildings and artificial surfaces (BL3).



Figure 4.12: Buildings and artificial surfaces (BL3).

Arable Crops (BC1)

A small area of arable crops (BC1) was used in the previous growing season for the production of potatoes and turnips (Figure 4.13). This habitat is of low ecological value.



Figure 4.13: Arable Crops (BC1).

Other habitats within the Site, which are of low botanical importance, are:

- Active Quarries and Mines' (ED4). The area of 'active quarries and mines' is approximately 21.5 ha; and
- Spoil and Bare Ground' (ED2). This habitat occurs marginal to active quarrying areas and measures approximately 1.07 ha.

4.6.3 Fauna Assessment

The presence, or potential presence, of species on the Site was identified from the desk study and Habitat walkover survey. In addition, specific survey work was carried out in respect of roosting bats and mammals as outlined below.

Mammals

Walkover surveys and camera trapping were carried out to identify mammal species utilising the Site. Areas of habitat with suitability to host an underground dwelling for a protected mammal species were surveyed within the Site boundary and an area extending to 150m of the Site (refer Figure 4.14 below). Fox was observed during walkover surveys and was frequently encountered during the camera trapping survey. Rabbits are abundant at the Site and rabbit burrows are present almost ubiquitously within hedgerow and treeline habitats throughout the Site.

A badger sett was recorded immediately adjoining the Site boundary (see Figure 4.14). The location of the sett is of relevance to the current application, given the proximity of quarrying activities to the sett. The sett occurs in an area where scrub clearance has recently been undertaken using an excavator to scrape back bramble dominated scrub.

The sett appears to be well established and was in active use at the time of survey. A number of entrances were visible in the area which was scraped back, and further entrances may have been obscured by these works. A primary entrance was visible behind the existing fence line (i.e. immediately outside the area which was scraped). This entrance shows spoil associated with significant and ongoing excavation, and bedding was visible within the spoil. No latrines were noted but these may have been obscured within dense scrub or may have been removed by scrub clearance works.

The large size of the sett, the number of entrances visible and the presence of bedding within recently excavated spoil indicate that the sett is a 'main' sett and is likely used for breeding. The sett is located within a relatively sheltered location in a local context, being partially within a double hedgerow associated with a disused roadway.

Badgers are common and widespread in agricultural habitats across the Republic of Ireland (Sleeman *et al*. 2009). Badgers construct and use setts of different types (main, annex, subsidiary and outlier setts) (SNH 2001). Main setts are of the greatest conservation importance and are where breeding typically occurs. No additional setts could be found, including annex, subsidiary or outlier setts which may be associated with the main sett. No other evidence of badger activity within the Site could be found although badgers are highly likely to forage within the Site. Badgers were not recorded on any of the camera traps.

Bats

Daytime visual assessments were carried out to identify features with bat roosting potential which may exist within the Site. These ground level roost inspections were carried out in winter, which is the optimal time of year for such surveys. No known underground structures (such as caves, mines or icehouses) are present within the Site, and therefore relevant features consist of trees and buildings.

No roosting bats were encountered during the current survey, and no unoccupied roosts which contained signs of bats were encountered. While no bat roosts could be identified, a number of trees had features which are considered to have potential to support roosting bats. The trees are categorised according to their potential following Collins (2016) (see Table 4.5).

A total of 20 trees within the Site were considered to have some potential for bats. No 'high' potential tree roosts were identified. One tree was considered to have 'moderate' potential, while 19 trees were considered to have 'low' potential (see Table 4.5). Maternity roosts are of considerable conservation importance to bats. Based on ground level visual survey it is unlikely that any maternity roosts are present in trees within or adjoining the Site.

A number of Potential Roosting Features (PRFs) were identified in trees, and it is likely that some of these features will be used at least occasionally by day-roosting bats. Most of Ireland's bat species are known to exploit a wide variety of roosting opportunities with some being used infrequently. Over time, the value of many of these roosting features to bats may increase owing to the decay and damage to trees which may provide more PRFs.

Three structures (or discrete groups of structures) were considered to have potential to be used by roosting bats (B_01 to B_03, see Table 4.5 and Figure 4.14). Two features with 'moderate' potential to support roosting bats were identified, while one feature with 'low' potential was identified. Internal surveys were carried out in accessible areas of farm buildings and outbuildings associated with the residence. Internal surveys of the residence (e.g. attic space) were not carried out due to COVID restrictions.

Table 4.5: Description of features within the Site considered to have potential to support roosting bats.

Ref.	Bat Potential	Species	Comment
B_01	Moderate	N/A	Historic masonry residence and associated outbuildings. Slate roof.
B_02	Moderate	N/A	Masonry agricultural buildings.
B_03	Low	N/A	Windmill base. Suitable for crevice dwelling species but isolated and significant light and wind ingress.
T_01	Low	Beech	Semi-mature. Moderate ivy cover. Cluster of similar trees in this area.
T_02	Low	Ash	Mature. Heavy Ivy cover. No other PRFs visible.
T_03	Low	Ash	Semi-mature and nearby trees forming cluster. Moderate ivy cover.
T_04	Low	-	Standing dead tree. Some peeling bark and decay features.

Ref.	Bat Potential	Species	Comment
T_05	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_06	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_07	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_08	Low	Elder	Dense ivy cover. No other PRFs visible.
T_09	Low	Ash	Mature. Some minor PRFs visible at height. Heavy ivy cover.
T_10	Low	Ash	Mature. Moderate ivy growth with some thick interweaving stems. No other PRFs visible.
T_11	Low	Ash	Semi-mature. Moderate ivy cover.
T_12	Moderate	Ash	Mature. Visible minor PRFs include splits and rot-holes. Dense ivy cover with some thick and interweaving stems.
T_13	Low	Ash	Multi-stem. Dense ivy cover. No other PRFs visible.
T_14	Low	Ash	Dense ivy cover. No other PRFs visible.
T_15	Low	Beech	Moderate ivy cover. No other PRFs visible.
T_16	Low	Ash	Dense ivy cover. No other PRFs visible.
T_17	Low	Ash	Moderate ivy cover. No other PRFs visible.
T_18	Low	Ash	Semi-mature. Moderate ivy cover. No other PRFs visible.
T_19	Low	Ash	Semi-mature. Moderate ivy cover. No other PRFs visible.
T_20	Low	Various	Double treeline. Contains a number of trees with low potential.

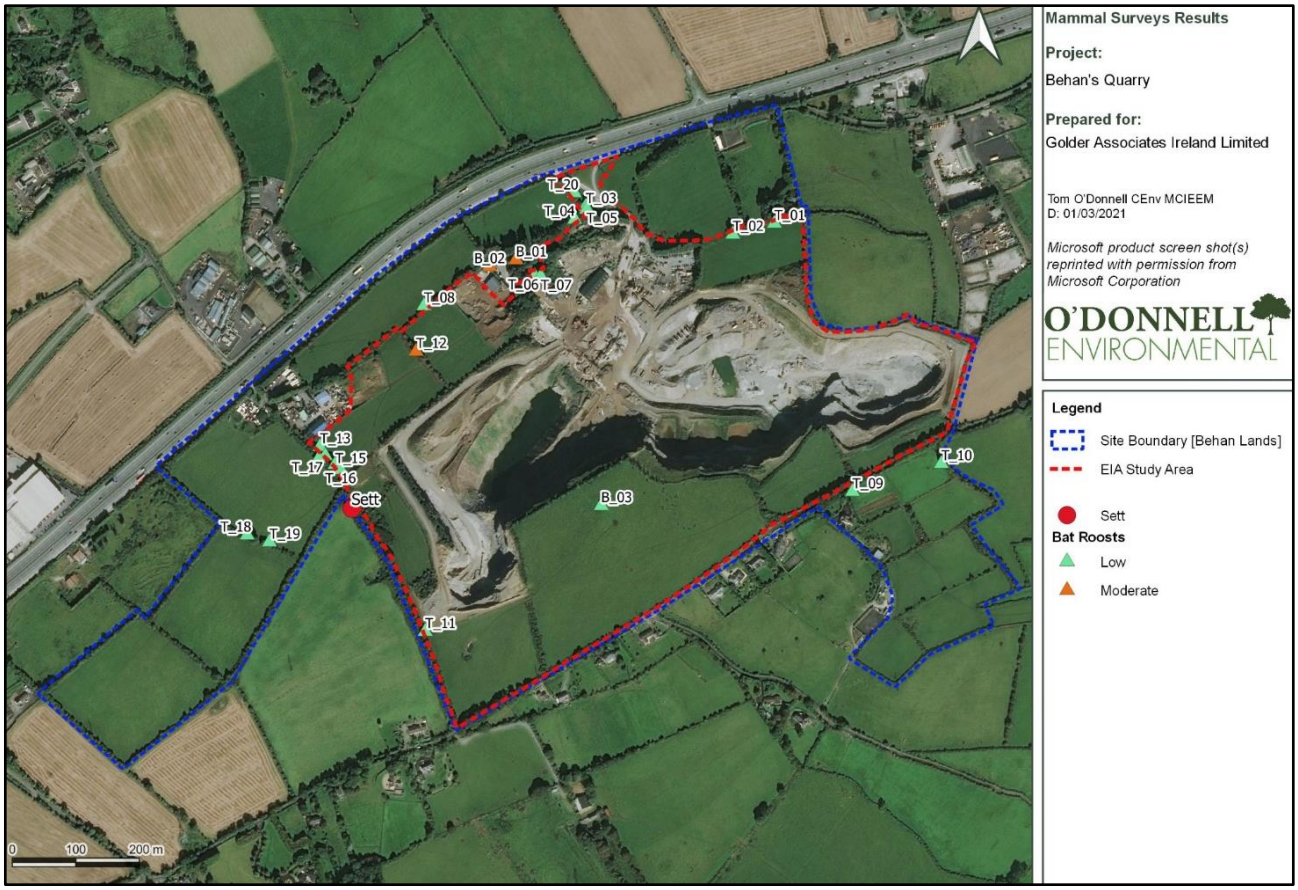


Figure 4.14: Mammal Survey Results

Avifauna

The Site periphery, including boundary features is likely to be used by general passerine and farmland species using the hedgerows surrounding the Site for nesting and foraging. It is possible that Site operations have created habitat for some bird species. In many cases species such as sand martins which often colonise quarry sites will benefit from the availability of stockpiled sand and aggregates.

In addition, Peregrine falcon (*Falco peregrinus*) are known to make use of cliffs that would have otherwise not existed at quarrying sites. The Peregrine falcon Falco peregrinus is listed on Annex I of the Birds Directive. As described in the ecology chapter within an EIAR for the Site in 2015 (Byrne Environmental, 2015) a single Peregrine was seen flying above the quarry Site to the west. It was subsequently seen to roost on the cliff face above the standing water. Due to the timing of this observation it cannot be concluded that breeding/nesting is occurring however, it strongly indicates that this may be the case. During the survey of 2010 documented by Byrne Environmental, 2015 (which also took place in November) Peregrine was not recorded although confirmation of its presence was made during both breeding and winter seasons as part of the 2007- 2011 Bird Atlas project (Balmer *et al*., 2013). Preliminary results for the 2021 breeding bird survey indicate that a female Peregrine is again at the Site sat on eggs. The presence of common and widespread bird species on the Site periphery is of Site importance. The potential presence of breeding peregrine at the Site is of Local/County importance.

Herpetofauna and Invertebrates

The Site generally exhibits a hostile environment for the herpetofauna and invertebrate groups. The Common Frog (*Rana temporaria*) and the Smooth Newt (*Lissotriton vulgaris*) are afforded protection under the Wildlife Act (1976) and Wildlife (Amendment) Act, 2000. The Common lizard (*Zootoca vivipara*) is also afforded protection under the Wildlife Act (1976) and Wildlife (Amendment) Act, 2000. As described by Byrne Environmental (2015) the lack of semi-natural habitat and in particular the absence of wet areas or standing water, precludes the presence of any amphibian species along the margins of the quarry Site. An area of standing water is present on the quarry floor, however it is unlikely that amphibians use this habitat for breeding due to the level of disturbance and the absence of any aquatic or marginal vegetation. Similarly, there is an absence of suitable semi-natural habitat for common lizard.

The relatively sterile habitats of the quarry floor at the Site extend upward toward peripheral boundary hedges, grassland and scrub habitat. This habitat is ubiquitous and not species-rich (Byrne Environmental, 2015) as such it is not considered to be optimal habitat for invertebrate species. The collective value of herpetofauna and invertebrates is of Site value only and impacts from operational disturbance are considered to be not significant e.g. no perceivable impacts on ecological features. Impacts may be beneath levels of perception, within normal bounds of variation, within the margin of forecasting error, or impacting on poor baseline conditions.

Aquatic ecology

As described by Byrne Environmental (2015) there are no water courses running through the Site or directly adjacent to it. Ordnance Survey maps show that the nearest stream lies to the east and drains into the Griffeen river, which itself joins the river Liffey in the centre of Lucan. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site. An area of open pooled water is noted on the quarry floor. This water has evidently collected from decades of precipitation and the absence of aquatic or marginal plants indicates that there is little or no residual biodiversity value in this feature. Given the absence of aquatic flora and fauna on Site and compounded by the fact that the Site has no hydrological connectivity with surface water features, aquatic receptors are scoped out of this assessment as described in the following sections.

Summary

The presence, or potential presence, of species on the Site was identified from the desk study which included an extensive review of secondary data gleaned from previous ecological assessments undertaken at the Site and also from baseline surveys undertaken in 2021 (O'Donnell, 2021).

Summary Table 4.6 lists the species which were considered likely to occur within the Site, on the basis of the presence of suitable habitat and/or the occurrence of recent records in the vicinity. The species, together with its legislative designation is listed.

The source(s) of information relating to each species could include:

- Existing records from desk study;
- Presence of suitable habitat identified during habitat survey;
- Results of specific survey work as applicable (i.e. relating to badger and bats); and / or
- Direct observation.

For each species with the potential to occur on Site, the final column of Table 4.6 presents a brief summary of the status of the species in relation to the Site itself. If the survey fails to record the species and the habitats are unsuitable, then it is concluded that the species is unlikely to occur, and it is not considered further within the assessment. If a species is confirmed as present, an indication of the likely population size/status within the Site is provided. This information is used in the evaluation presented in Table 4.6.

Table 4.6: Assessment of the potential for faunal species to occur within the site.

Species/Group	Status	Summary of status on site
Bats	Wildlife Acts (1976 – 2010) – EU Habitat Directive.	The peripheral area of the Site supports some suitable foraging and commuting habitat for bat species. A total of 20 trees and some buildings within the Site were considered to have some potential for bats. No 'high' potential tree roosts were identified. One tree was considered to have 'moderate' potential, while 19 trees were considered to have 'low' potential.
Mammals	Wildlife Acts (1976 – 2010)	A possible badger sett was identified on Site but no evidence of current presence was detected by the camera trapping survey. Some limited potential for common and widespread mammals such as rabbit and fox to use the Site periphery.
Avifauna	Wildlife Acts (1976 – 2010), EU Birds Directive, Birds of Conservation Concern (BoCC[4], Ireland).	The peripheral Site area supports some opportunities for foraging and nesting bird species. Common and widespread species were recorded on Site (Byrne Environmental, 2015). In addition, Peregrine falcon which is listed as an Annex 1 (EU Birds Directive) species was recorded possibly nesting on Site (Byrne Environmental, 2015).
Herpetofauna and Invertebrates	Wildlife Acts (1976 – 2010)	Limited available resources on the Site. Some limited potential to occur within the Site periphery in relation to scrub and hedgerows. Scoped out of the assessment.
Aquatic Fauna	Salmonids, Wildlife Acts (1976 – 2010) – EU Habitat Directive.	No available resource within the Site. Scoped out of the assessment.

[4] Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523–544.

4.7 Evaluation

The evaluation of ecological features (sites, habitats and species) which could be affected by the development is presented in Table 4.7. The table includes:

- Any statutory designated areas, with the exception of Natura 2000 sites, which are situated within 5 km of the project site that have potential ecological connection(s) with the Site;
- Any surface or groundwater bodies that have hydrological connectivity with the Site;
- Any habitat type recorded within the Site; and
- Any species of conservation importance which has been confirmed as occurring / has potential to occur within the Site.

The value of the feature is based upon how important the feature is in relation to its geographical context. In other words, at what level of geographical resolution would the feature contained within the Site (habitat or species) be recognised as contributing to biodiversity to a significant degree. The evaluation takes into account extent (or population size) within the Site compared to the resource elsewhere and whether it has characteristics which either elevate or depress its importance in comparison with a 'typical' example (for example, whether a habitat is particularly species rich, or depleted in species).

Common and widespread species or habitat, therefore, only have a level of importance in respect of the biodiversity of their immediate area (taken in this case to be represented by the boundary of the Site). Such features are not considered further within the Impact Assessment. Some protected species may, under certain circumstances (such as a single example occurring within the Site, as part of a much larger local population) be considered to only be of importance within the Site itself. Such species, on the basis of legal and planning regulation compliance, are included within the Impact Assessment and, (if necessary) dedicated impact mitigation measures are provided. Table 4.7 presents each feature occurring, together with the rationale for its evaluation.

Table 4.7: Classifying the geographical Importance of Key Ecological Features

Key Ecological Features	Importance	Rationale
Habitats		
Active Quarry and Hardstanding	Negligible	This habitat offers negligible biodiversity value. Not considered further in this assessment.
Buildings and Artificial Surfaces	Site	This habitat offers negligible biodiversity value. Whilst bats and birds may roost in these features, the features will not be impacted by the Development. Not considered further in this assessment.
Improved Grassland	Site	This habitat does not represent a valuable resource in terms of biodiversity given the Site is in an area with abundant farmland, and this type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.
Colonising Ground	Site	This type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.

Key Ecological Features	Importance	Rationale
Scrub (Site periphery)	Site	This habitat is not extensive within the Site and this habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.
Hedgerows and occasional trees	Local Importance (lower value) (following NRA, 2009)	These features are likely to represent a useful resource for fauna such as mammals, birds, and breeding birds in particular. This feature is carried forward into the design mitigation and impact assessment sections.
Arable Crops	Site	This habitat is not extensive within the Site and this habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.
Mixed Conifer Woodland	Site	This habitat is not extensive within the Site and this habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.
Mixed Broadleaved Woodland	Local Importance (lower value) (following NRA, 2009)	This discrete area of habitat is likely to represent a useful resource for fauna such as mammals, birds, and breeding birds in particular. However, this feature will not be affected by Project proposals. Not considered further in this assessment.
Species		
Bats	Local Importance (higher value) (following NRA, 2009).	The peripheral Site supports some suitable foraging and commuting habitat, some trees have low or moderate bat roosting potential. This feature (species group) is carried forward into the design mitigation and impact assessment sections.
Mammal	Local Importance (higher value) (following NRA, 2009).	The peripheral Site scrub, hedgerows, and trees may support a number of common and widespread mammal species. A badger sett has also been identified on Site. This species group is carried forward into the design mitigation and impact assessment sections.
Avifauna	Site and Local/County (Peregrine).	The peripheral Site scrub, hedgerows, and trees are likely to support a number of common and widespread bird species. Evidence of Peregrine on Site has also been recorded and is of Local/County significance. This species group (breeding birds) is carried forward into the design mitigation and impact assessment sections.

4.8 Impact Assessment

Given the nature of the assessment, the operational impacts are summarised below:

- Land take (permanent loss);
- Habitat modification through anthropogenic effects;
- Disturbance to habitats and species through noise from traffic and blasting;

- Individual species disturbance / mortality; and
- Impacts of dust as a result of extraction activities.

Potential direct and indirect impacts from water quality and quantity are as follows:

- Local (Site based) Impacts of dust and Site runoff (sediments, fuel, etc.) as a result of quarrying activities; and
- Impacts on surface water quality within the Site.

There are two areas for the proposed extensions at the Site that involve new land take, to the north west and north east (refer Figure 4.15 below). The land take combined area is ca. 5.19 ha (this includes out to the perimeter safety berms, shown as the cyan polygons).



Figure 4.15: Land Take for Project development in the Operational Phase

4.8.1 Hedgerows and Occasional Trees

Characterisation of Unmitigated Impacts

The potential for ecological impact to hedgerows and trees, in the absence of mitigation, focuses on the following factors:

- Permanent loss in accordance with the ca. 5.2 ha of land take described above;
- Potential un-planned encroachment of machinery and quarry footprint (impacts on root protection zones); and

- Dust deposition and subsequent changes in habitat composition.

Loss and damage to hedgerows and trees or modification would afford a negative impact. In the absence of mitigation, this may restrict this resource to fauna during the operational assessment timeframe.

Rationale for Prediction of Effect

Degradation of foraging habitat and potential habitat severance is less likely to cause stress to species associated with hedgerow habitat given the abundance of optimal habitat within the local setting. On a precautionary basis, it is considered certain that this impact will negatively affect the conservation status of these linear landscape features.

Effect without Mitigation

The unmitigated effect of this operation would result in a **minor** negative impact on habitat of **local (lower)** sensitivity and importance. These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision-making process. However, they are of relevance in enhancing the subsequent design of the restoration and consideration of mitigation measures.

4.8.2 Bats

Characterisation of Unmitigated Impacts

The potential for ecological impacts to bats as a result of the Site development focuses on the following factors:

- Permanent loss of potential bat roosting locations (trees) exhibiting low or moderate bat roosting potential;
- Loss or modification of ecological connectivity (hedgerows); and
- Increased noise, lighting and human activity along commuting routes and within foraging habitats on the Site periphery.

The removal of woody vegetation such as trees and scrub would permanently remove foraging and commuting habitat for bats. Potential effects to bat species include a negative biophysical effect to hedgerow, treeline, scrub and peripheral habitat which may inhibit bat commuting value. Linear landscape features, such as hedgerows, are important habitats for bats, providing flight paths between roosts and foraging sites and as foraging habitats (e.g. Verboom and Huitema 1997, Oakeley and Jones 1998, Russ and Montgomery 2002).

Noise effects associated with the operation of the quarry would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated to occur.

Rationale for Prediction of Effect

The trees that will be residually affected by the project exhibited negligible, low and a single moderate bat roosting potential result. As such, with the exception of the moderate tree no further assessment is considered appropriate. However, in accordance with best practice (Collins, 2016) good practice tree felling, that demonstrates a precautionary working principle, should be implemented.

The rationale for effect on bat species considers that a small number of low-status roosts may be affected by the Proposed Development (potentially present in the trees). The footprint of the Proposed Development is considered to be poor and relatively ubiquitous in terms of foraging value and the restoration of both roosting and foraging habitat is proposed within the mitigation section. On a precautionary basis, it is considered likely that these impacts could negatively affect the conservation status of the bat population.

Effect without Mitigation

The unmitigated impact of this development would result in **minor negative** effects to species of **Local (higher)** importance. These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision-making process. However, they are of relevance in enhancing the subsequent design of the restoration and consideration of mitigation measures.

4.8.3 Breeding Birds

Characterisation of Unmitigated Impacts

The potential for ecological impact to the breeding bird group, in the absence of mitigation focuses on the following factors:

- Operational noise (blasting and vehicle movements);
- Discrete vegetation and habitat removal (hedgerow, trees, scrub and grassland);
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging, breeding and commuting habitat); and
- Potential effects to bird species include a negative biophysical effect to vegetation availability which may disturb breeding birds and reduce available forage.

Potential losses of available nesting habitat as a result of the quarry operation would be discrete and dependant on habitat type. In the context of the available nesting habitat within the trees, cliffs and scrub vegetation at the Site periphery the impact can be considered minor. Noise effects associated with the operation of the quarry would be temporary and reversible.

Rationale for Prediction of Effect

The rationale for effect to bird species considers that discrete losses of available nesting habitat may occur and disturbance may occur to species protected at the National and European level (Peregrine falcon). The Site periphery is considered to exhibit some suitable breeding bird habitat for passerines and cliffs within the Site are known to support Peregrine falcon. It is considered that effects to treeline and hedgerow habitat are discrete and wholly reversible. Minor losses of scrub and trees, used for foraging and breeding, are unlikely to cause stress to this group given the abundance of habitat (mature trees, hedgerow and pasture) within the local setting. On a precautionary basis, it is considered likely that this temporary impact could negatively affect the conservation status of the bird populations on and adjacent to the Site.

Effect without Mitigation

The unmitigated impact on this feature would result in a **minor** effect to species of **site and Local/County** importance. The majority of bird species are protected under the Wildlife Acts (1976-2012) where it is an offence to hunt, interfere with or destroy their breeding or resting places unless authority is obtained via statutory licence provision. Peregrine Falcon is further protected by the Habitats Directive and listed as an Annex I species.

4.8.4 Mammals

Characterisation of Unmitigated Impact

The potential for ecological impact to the mammal group focuses on the following factors:

- Land take and encroachment toward a badger sett;
- Operational noise disturbance;
- Vegetation and habitat removal (hedgerow, tree, scrub, bare ground and grassland); and

- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging and commuting habitat).

The mammal group includes badger, fox, rabbit, stoat, pygmy shrew, and hedgehog. Although this group of species are generally mobile, operational impacts attributed to land take, noise disturbance, vegetation removal, loss of foraging habitat and dust deposition must be considered. Dust that settles on plants, can affect the plants' transpiration, respiration and other metabolic activity, by clogging pores and damaging waxy cuticles on the leaves, and by reducing available light. Dust can alter soil and water chemistry, structure and trophic status which may have impacts on the composition of plant and invertebrate communities. Dust can have direct impacts on insect and other invertebrate populations. Impacts on plant and invertebrate communities may result in effects further up the food chain (small mammals).

Rationale for Prediction of Effect

The variable effects associated with operational noise and potential habitat severance and loss at different distances from the source of disturbance, are very little understood for small to medium mammals. Habitat loss would be likely to afford a level of perceived stress and possible mortality, dependent on species mobility, though this is not certain. Minor losses of foraging habitat and potential habitat severance is less likely to cause stress to this species group given the availability of other suitable habitat (scrub, grassland) within the local setting. On a precautionary basis, it is considered likely that this impact could negatively affect the conservation status of the local mammal population including a badger sett.

Effect without Mitigation

The unmitigated effect to this group would result in **minor** impacts to species of **Local (higher)** importance. Small mammals such as stoat and hare are protected under the Wildlife Acts (1976-2010).

4.9 Mitigation, Compensation and Enhancement Measures

The principal objective of the ecological mitigation is to take measures to reduce negative effects of the Project. Details of committed mitigation, compensation and enhancement measures including the provision of a restoration plan are outlined in this section.

4.9.1 Hydrocarbons/Chemical Safeguards & Protection of Site water

Proposed mitigation measures are outlined as follows (these are already implemented at the existing quarry Site):

- All soil / overburden stockpiles will be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
- Restoration of topsoil and overburden will be carried out on a phased basis to speed up restoration biodiversity value as defined in the restoration plan;
- All plant and machinery will continue to be regularly serviced before being used on Site;
- Mobile plant fuelling will take place in a designated area of the Site with appropriate drip trays/nappies in place. Static plant or tracked excavators will refuel over a drip tray with an absorbent mat. In addition, spill kits will be maintained on site to deal with all spills and leaks, and spill training will be provided to relevant staff members;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel and oil containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;

- Containers and bunding for storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel mobile plant on Site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor and key personnel trained in their use.

4.9.2 Protection of Retained Habitat

To protect retained hedgerows and trees, such vegetation will be protected with secure fencing prior to the commencement of extractive works on Site. This protection will be designed following NRA guidance (NRA, 2005), in particular, with regard to root protection areas and fencing specifications (unless otherwise advised by a suitably qualified arboriculturalist). Dust suppression will be implemented in accordance with best practice guidance (CIRIA, 2016).

4.9.3 Habitat Compensation

Planting will be required to mitigate for required tree and hedge removal and a restoration plan will require replacement of any trees and shrub species removed on a “like for like” basis (as a minimum). Consideration will be given towards hawthorn, blackthorn mix with individual alder and birch (to form native tree hedges) and deciduous trees (native tree species include oak, alder, birch). Full details are provided in the accompanying restoration plan.

4.9.4 Mammals

Bat activity surveys including passive monitoring will be undertaken for a minimum of five nights and emergence surveys at structures identified with potential to host roosting bats (B_01 to B_03) will also be undertaken. Transect surveys will be carried out at emergence and/or re-entry to gather information on bat activity and to identify any activity which may indicate the presence of a roost or key commuting routes.

Monitoring will be carried out to understand the ecological context and significance of the identified main badger sett and the impact of further loss of badger foraging habitat, including a bait marking study. A camera trap survey at the sett will be carried out (under appropriate license) to seek to determine if breeding is occurring within the sett.

4.9.5 Birds

A breeding bird (including Peregrine Falcon) survey for the Site is currently being undertaken. Preliminary results indicate that a female Peregrine is again at the Site sat on eggs. The result of this work will form the basis of a Peregrine falcon management and monitoring plan for the Site.

4.9.6 Invasive Species

Measures will be implemented throughout Site works to safeguard against the spread of any invasive non-native species (such as buddleia, cotoneaster, Japanese knotweed or rhododendron). Indeed, where possible such plants will be removed from the Site (and disposed of appropriately, following an appropriate method statement). As such, an invasive species survey will be undertaken within the appropriate window for this type of work which is likely to be within the growing season (April to September inclusive).

4.9.7 Enhancement

The restoration plan for the Site offers opportunities for habitat enhancement over and above the existing situation. Such enhancement measures will be detailed in a formal restoration plan, and will be drafted in line with the following principles regarding enhancement measures for habitats and for fauna.

Habitat

New habitat provision under the restoration plan will include provisions for trees, hedgerow, and shrub planting over and above the current situation. Where possible, these will be planted in association with other habitats of elevated value, such as wildflower grassland. Planting should comprise native species of local provenance. Where this is not possible, plants should be selected for their fruit, berry, or nectar bearing qualities. All landscape planting within the site will be managed for the benefit of wildlife.

Fauna

To increase opportunities of roosting bats and nesting birds, a number of bat and bird boxes will be incorporated in the restoration plan for the Site, placed on trees of a suitable size. In addition, to increase opportunities for invertebrates within the Site, **i**nvertebrate boxes will be provided under the restoration plan. These boxes will be located in sheltered areas of new and retained vegetation, such as in association with hedgerows.

4.10 Residual effects

For the purposes of robust assessment, residual effects have been considered to be effects that were identified in the impact assessment process prior to the consideration of any additional mitigation, as full details of some of the additional mitigation are yet to be developed. These effects were all identified as being not significant to minor afforded to species of Site and Local (higher and lower) importance. The on-going operation of the quarry, committed delivery of mitigation measures and eventual restoration of the quarry is likely to result in all effects being considered to be not significant. In essence, this can be described as having no perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation. Depending on the efficacy of the restoration proposals at eventual closure of the Site, there may be an opportunity to provide a minor positive (net gain) for biodiversity value at the Site level.

4.11 Cumulative impacts and Safeguarding Zones

Golder have reviewed the planning portal websites and South Dublin County Development Plan in addition to being involved in projects where EIAR is required within South Dublin County and the broader region. It is noted that there are no extractive or sizeable industries in the surrounds of the Site which may contribute to cumulative effects. It is therefore considered that no significant cumulative impacts would occur.

Casement Aerodrome is ca. 3.5 km away from the Site. As defined in the County Development Plan '*It is the policy of the Council to safeguard the current and future operational, safety and technical requirements of Casement Aerodrome and to facilitate its ongoing development for military and ancillary uses, such as an aviation museum, within a sustainable development framework.*

IE8 Objective 4: To prohibit and restrict development in the environs of Casement Aerodrome in the following ways:

e) By controlling and assessing the locations of any activities which may be an attraction to birds[5]*.*

[5] https://www.sdcc.ie/en/download-it/publications/south-dublin-county-council-development-plan-2016-2022-written-statement.pdf

7.8.1 CASEMENT AERODROME Casement Aerodrome is in continuous aviation use and is the only fully equipped military airbase in the State and serves as the main centre of Air Corps operations.

The restoration plan for the Site will be cognisant of the safeguarding policies detailed above with an obligation placed upon the requirements to avoid colonisation of the Site by significant numbers of birds. This will be implemented via a habitat restoration selection and management process designed to avoid aggregations of birds at the Site.

4.12 Summary and Conclusions

This chapter has evaluated the importance of the ecological resources present and defined the degree of significance of potential impacts resulting from the Project proposals. The assessment approach has followed CIEEM (2018) and taken account of national planning policy and Local Plan policies in respect of nature conservation and protected species legislation in identifying impacts and has also defined appropriate avoidance, mitigation (including design mitigation) and compensation measures to be implemented.

The assessment has concluded that no nature conservation sites will be directly or indirectly affected by the Project.

The habitat survey of the Site identified the presence of some habitat of elevated ecological value; namely trees within the Site, and hedgerows at Site boundaries.

Specific faunal survey work carried out identified the use of the Site by a number of common and widespread species, whilst potential for the use of the Site by species protected under both national and European legislation was also identified. Accordingly, suitable mitigation and compensation measures have been outlined in this Chapter, to safeguard these species.

In addition to mitigation for any potential impacts of the development on local flora and fauna, the opportunity has been taken to incorporate a number of enhancement measures within the assessment, to improve habitat quality over and above the current situation, together with creating new opportunities for fauna within the Site. These enhancements focus on the restoration of the quarry. Habitat enhancements at minerals sites have the potential to enhance biodiversity and to provide a public benefit at the end of their working lives through restoration[6].

[6] https://service-rspb.boldlight.co.uk/app/uploads/sites/3/2016/03/Nature-After-Minerals-report.pdf

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APPENDIX 4.1

O'Donnell Environmental 2021, Ecological Report

1 Introduction

O'Donnell Environmental was commissioned by Golder Associates Ireland Limited to carry out ecological surveys and reporting required to support ecological and environmental reporting. Specifically, the following was carried out:

- Preliminary Phase 1 habitat survey
- Terrestrial mammal survey
- Preliminary bat roost survey.

1.1 STATEMENT OF COMPETENCE

Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM is a Chartered Environmentalist and a full member of the Chartered Institute of Ecology and Environmental Management. He was awarded a BSc in Environmental and Earth System Science [Applied Ecology] in 2007 and an MSc in Ecological Assessment in 2009, both from UCC. Tom has over 10 years professional experience in the environmental industry, including working on projects such as windfarms, overhead power lines, roads, cycleways and residential developments. Tom is licensed by NPWS for roost disturbance (Ref: DER/BAT 2021-04) and to capture bats (C181/2020).

2 Methodology

The site was surveyed by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM on the 25th and 26th January 2021 and 23rd February 2021 and an ecological walkover survey incorporating a Phase 1 habitat and flora assessment was carried out in accordance with the Heritage Council's guidelines (Smith *et al*. 2011). The dominant habitats present were classified according to Fossitt (2000) and key botanical species were identified. Any other records of interest (e.g. invasive plant species) were also marked on field maps and/or locations were recorded. Winter is a sub-optimal time of the year for the survey of habitats and flora, and therefore the survey is considered to be provisional, pending further survey during the summer period.

Terrestrial mammal surveys were carried out by Tom O'Donnell during the course of ecological walkover surveys. Walkover surveys were carried out within the site boundary, and also extending to a distance of 150 meters of the Environmental Impact Assessment (EIA) study area in areas with potential to support underground mammal dwellings. Surveys involved a walkover of the site to identify any mammal species present or signs of mammal activity such as droppings, tracks, burrows etc. Observations were recorded using field notes and/or handheld GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

Camera traps were deployed at five locations throughout the site (see **Figure 2.1**) and recording was carried out for 28 days and nights from 25th January to 23rd February 2021. The cameras were infra-red equipped to allow monitoring of activity by night as well as by day. The cameras were triggered by movement, at which point a photo was recorded and a 10 second recording delay was applied. The aim of the camera trap survey was to record evidence of terrestrial mammal activity in order to inform the ecological assessment. Cam_4 was removed during the study period and not recovered and therefore no imagery was returned from this location.

Daytime visual assessments were carried out to identify any bat roosting potential which may exist within the site boundary boundary. Treelines within the study contain mature trees which were considered to have potential as bat roosts. Winter is the optimal time for 'preliminary ground roost assessments' of trees (Collins, 2016), due to greater visibility as a result of leaf fall and die back of ground level vegetation. The assessment was carried out on 25th and 26th January 2021 and 23rd February 2021 and followed guidance set out in Collins (2016). The survey was non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected from ground level to identify any evidence of bat roosting. Where accessible, potential roosting features were investigated using an endoscope. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc. Potential Roost Features (PRFs) are described according to the scheme outlined in **Table 2.1**, below.

Table 2.1. Scheme for describing the potential suitability of features for bats.

Suitability	Description
Negligible	Negligible features which are likely to be used by roosting bats.
Low	A feature with one or more potential roost sites that could be used by individual bats opportunistically. Potential roost sites which do not provide appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to characteristics and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

After 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)', Collins (2016).

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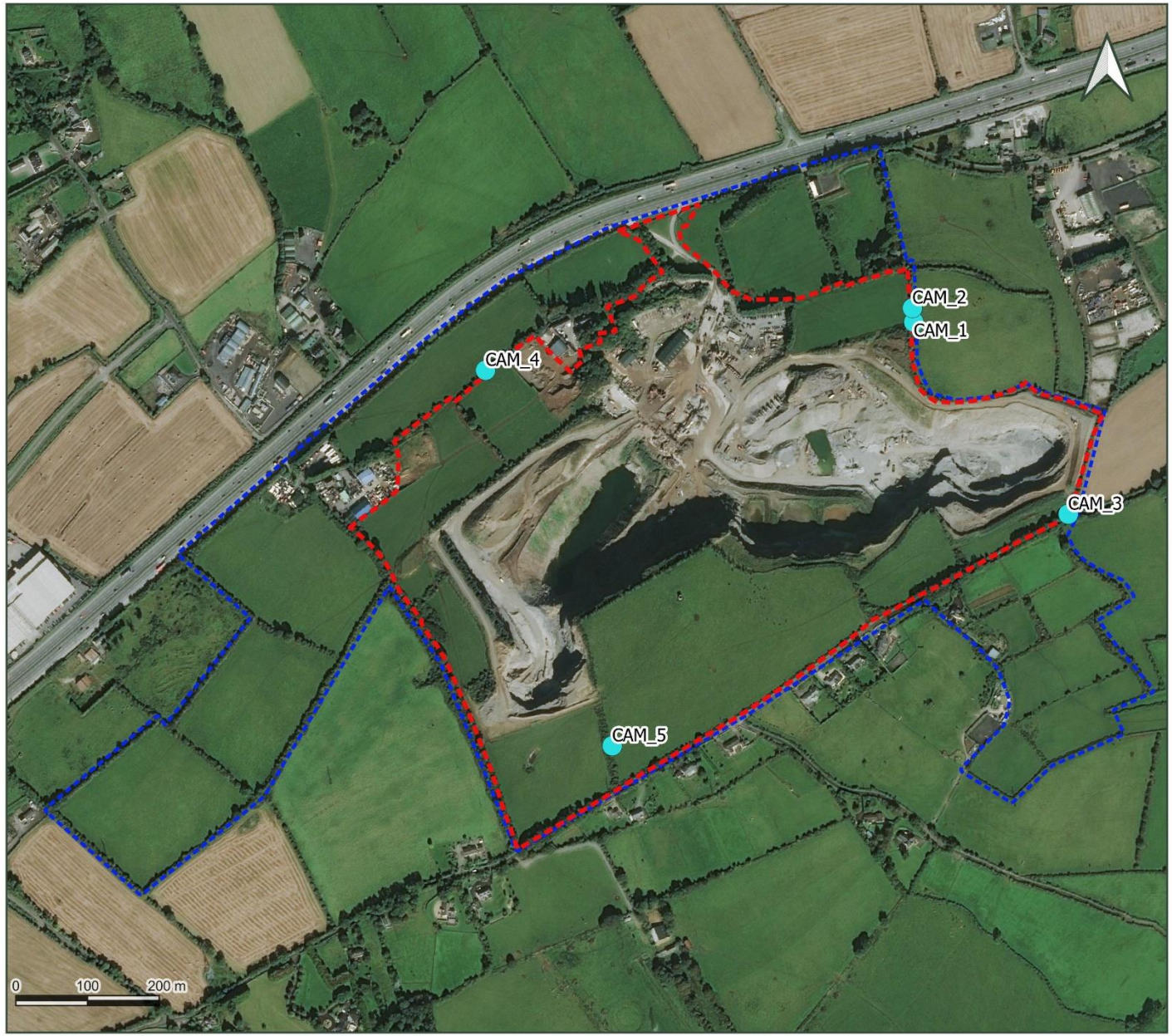


Figure 2.1
Camera Trap Locations

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Behan's Quarry

Prepared for:
Golder Associates Ireland Limited

Tom O'Donnell CEnv MCIEEM
D: 01/03/2021

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Legend

- Site Boundary [Behan Lands]
- EIA Study Area
- Trail Camera Locations

3 Results

3.1 HABITATS

The habitats present within the boundary of the proposed site are described below.

3.1.1 Improved Agricultural Grassland (GA1)

The site is dominated by 'improved' agricultural grassland (GA1 - Fossitt (2000). For clarity and ease of use, GA1 is not mapped within **Figure 3.1** and consists of all areas within the study area not otherwise mapped.

This grassland is used for silage production as well as grazing by cattle. Improved agricultural grassland is a highly modified/improved grassland habitat, which is generally species poor, dominated by a typical agricultural species assemblage. Perennial Rye-grass (*Lolium perenne*) is the dominant grass species with Yorkshire Fog (*Holcus lanatus*) and Cocksfoot (*Dactylis glomerata*) also abundant. Other species noted include Ribworth Plantain (*Plantago lanceolata*), White Clover (*Trifolium repens*), Broad-leaved Dock (*Rumex obtusifolius*), Meadow Buttercup (*Ranunculus acris*) and Dandelion (*Taraxacum vulgaria*).

Improved agricultural grassland (GA1) is a highly modified or improved grassland habitat which is subject to ongoing intensive management for agricultural purposes including the application of fertiliser. As such it supports limited floral diversity and local biodiversity potential.



Plate 3.1 - Intensive Agricultural Grassland (GA1).

3.1.2 Hedgerows (WL1)

A range of hedgerows are present within the study area. Locations of hedgerow habitats are represented by a 4-meter-wide strip in the 'Habitat Map', **Figure 3.1**. The study area, including its boundary, contains approximately 5.7km of hedgerows in total. The hedgerows within the study area are generally poorly managed and in many cases ingress by livestock occurs resulting in loss of ground level vegetation and a 'gappy' hedgerow structure.

Hawthorne, Elder and Gorse were the most common hedgerow species encountered overall. Bramble was also found to be abundant in hedgerows throughout the study area.

Hedgerows occasionally contain mature trees. On the western boundary of the proposed site a double hedgerow is present, and analysis of historic mapping shows this double hedgerow borders both sides of a disused roadway. A small section of hedgerow along the N7 motorway was historically 'laid' to increase the effectiveness of the hedgerow as a barrier to stock.

The hedgerows of the proposed site offer some semi-natural habitat and ecological connectivity which is of some significance in a local context.



Plate 3.2 - Hedgerow (WL1).

3.1.3 Treelines (WL2)

The study area, including its boundary, contains approximately 3.03km of treeline habitats in total. Treelines of different types and ages are present which reflects the various uses and ownership of the proposed site and adjoining areas over the years.

At the main entrance to the quarry site, in proximity to the reception yard, Leyland Cypress treelines provide screening from the nearby N7 roadway. Screening planting is also present on the northern and southern edges of the main open quarry face, this planting consists of Elder and Pine (*Pinus sp.*), while some Hawthorne and Gorse is also becoming established. Older treelines typically comprise mature Ash trees, Hawthorne and Elder. Beech is present occasionally.

The treelines offer semi-natural habitat which has some significance in a local context.



Plate 3.3 - Treeline (WL2) on north-east of study area.

3.1.4 Scrub (WS1)

Gorse and Elder dominated scrub are present primarily in proximity to the open quarry area, where berms and bare soil have recolonised naturally. Hawthorne and Bramble are commonly associated with these scrub habitats. Buddleia, a common alien invasive species, was recorded in scrub above the southern side of the open quarry face.

Scrub habitat often provides a number of important ecological functions including providing nesting habitat for birds, however this habitat is limited in scale and subject to disturbance effects.



Plate 3.4 - Scrub (WS1) on southern quarry boundary.

3.1.5 Mixed Broadleaf Woodland (WD1)

A small area, 0.6ha of mixed broadleaf woodland (WD1) occurs on the northern side of the quarry, proximal to and old residence and buildings associated with quarrying activities. The woodland was found to be dominated by Sycamore. Understorey species consist of Hawthorne and Bramble. The WD1 habitat contains occasional Rhododendron, which is associated with horticultural planting surrounding an old residence. The woodland currently has limited floral diversity is highly disturbed, nevertheless it represents a valuable habitat in a local context with a degree of naturalness.



Plate 3.5 - Mixed Broadleaf Woodland (WD1).

3.1.6 Mixed Conifer Woodland (WD3)

A small area, 0.11ha of mixed conifer woodland (WD3) is partially contained within the proposed site, on the eastern boundary of the site. The WD3 habitat contains Sitka Spruce trees and abundant Rhododendron, which is associated with horticultural planting surrounding 'Windmill House', a historic residence. Rhododendron, similar to Buddleia (described above) is an alien invasive species. This woodland is of low ecological value.

3.1.7 Buildings and Artificial Surfaces (BL3)

A variety of buildings and artificial surfaces are present within the proposed study area, associated with quarrying activities as well as agricultural and residential purposes. These areas are generally of low ecological significance. An old residence is located north of the existing quarry (and associated outbuildings) which is titled 'Windmill House' on OSi historic 6" mapping. The base of a windmill, after which the townland is named, is located south of the quarry. These structures may be of importance to bats and nesting birds.



Plate 3.2 - Buildings and artificial surfaces (BL3).



Plate 3.2 - Buildings and artificial surfaces (BL3).

3.1.8 Arable Crops (BC1)

A small area of 'arable crops' (BC1) was used in the previous growing season for the production of potatoes and turnips. This habitat is of low ecological value.



Plate 3.2 - Arable Crops (BC1).

Other significant habitats in the study area, which are of low botanical importance, are:

- 'Active Quarries and Mines' (ED4). The area of 'active quarries and mines' is approximately 21.5ha.
- Spoil and Bare Ground' (ED2). This habitat occurs marginal to active quarrying areas and measures approximately 1.07ha.

3.2 MAMMALS

Walkover surveys and camera trapping were carried out to identify mammal species utilising the proposed site. Areas of habitat with suitability to host an underground dwelling for a protected mammal species were surveyed within and the site boundary and an area extending to 150m of the EIA study area.

Fox was observed during walkover surveys and were frequently encountered during the camera trapping survey. Rabbits are abundant at the site and Rabbit burrows are present almost ubiquitously within hedgerow and treeline habitats throughout the study area.

A badger sett was recorded immediately adjoining the proposed site boundary (see **Figure 3.2**). The location of the sett is of relevance to the current application, given the proximity of quarrying activities to the sett. The sett occurs in an area where scrub clearance has recently been undertaken using an excavator to scrape back bramble dominated scrub.

The sett appears to be well established and was in active use at the time of survey. A number of entrances were visible in the area which was scraped back, and further entrances may have been obscured by these works. A primary entrance was visible behind the existing fenceline (i.e. immediately outside the area which was scraped). This entrance shows spoil associated with significant and ongoing excavation, and bedding was visible within the spoil. No latrines were noted but may be obscured within dense scrub or may have been removed by scrub clearance works.

The large size of the sett, the number of entrances visible and the presence of bedding within recently excavated spoil indicate that the sett is a 'main' sett and is likely used for breeding. The sett is located

within a relatively sheltered location in a local context, being partially within a double hedgerow associated with a disused roadway.

Badgers are common and widespread in agricultural habitats across the Republic of Ireland (Sleeman *et al*. 2009). Badgers construct and use setts of different types (main, annex, subsidiary and outlier setts) (SNH 2001). Main setts are of the greatest conservation importance and are where breeding typically occurs. No additional setts could be found, including annex, subsidiary or outlier setts which may be associated with the main sett. No evidence of badger activity within the study area could be found although badgers are highly likely to forage within the study area. Badgers were not recorded on any of the camera traps.

Table 2 – Images of relevance to the terrestrial mammal assessment.



Entrance to main sett. Significant excavation evident, with bedding visible in spoil.



Secondary entrances to main sett within area of scrub clearance.



Rabbit emerging from burrow. Cam_1.



Red Fox. Cam_2.



Pair of Red Fox. Cam_3.



Red Fox. Cam_5.

Daytime visual assessments were carried out to identify features with bat roosting potential which may exist within the site boundary. These ground level roost inspections were carried out in winter, which is the optimal time of year for such surveys. No known underground structures (such as caves, mines or icehouses) are present within the study area, and therefore relevant features consist of trees and buildings.

No roosting bats were encountered during the current survey, and no unoccupied roosts which contained signs of bats were encountered. While no bats roosts could be identified, a number of trees had features which are considered to have potential to support roosting bats. The trees are categorised according to their potential following Collins (2016) (see **Table 2.1**).

A total of 20 trees within the study area were considered to have some potential for bats. No 'high' potential tree roosts were identified. 1 tree was considered to have 'moderate' potential, while 19 trees were considered to have 'low' potential (see **Table 3.1**).

Maternity roosts are of considerable conservation importance to bats. Based on ground level visual survey it is unlikely that any maternity roosts are present in trees within or adjoining the study site, but this cannot be ruled out.

A number of Potential Roosting Features (PRF's) were identified in trees, and it is likely that some of these features will be used at least occasionally by day-roosting bats. Most of Irelands bat species are known to exploit a wide variety of roosting opportunities with some being used infrequently. Over time, the value of many of these roosting features to bats may increase.

Three structures (or discrete groups of structures) were considered to have potential be used by roosting bats (B_01 to B_03, see **Table 3.1** and **Figure 3.2**). Two features with 'moderate' potential to support roosting bats were identified, while one feature with 'low' potential was identified. Internal surveys were carried out in accessible areas of farm buildings and outbuildings associated with the Residence. Internal surveys of the Residence (e.g. attic space) were not carried out due to COVID restrictions.

Table 3.1 - Description of features within study area considered to have potential to support roosting bats.

Ref.	Bat Potential	Species	Comment
B_01	Moderate	N/A	Historic masonry residence and associated outbuildings. Slate roof.
B_02	Moderate	N/A	Masonry agricultural buildings.
B_03	Low	N/A	Windmill base. Suitable for crevice dwelling species but isolated and significant light and wind ingress.
T_01	Low	Beech	Semi-mature. Moderate ivy cover. Cluster of similar trees in this area.

T_02	Low	Ash	Mature. Heavy Ivy cover. No other PRFs visible.
T_03	Low	Ash	Semi-mature and nearby trees forming cluster. Moderate ivy cover.
T_04	Low	-	Standing dead tree. Some peeling bark and decay features.
T_05	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_06	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_07	Low	Sycamore	Large, multi-stem. Heavy ivy cover with some thick, interweaving ivy stems.
T_08	Low	Elder	Dense ivy cover. No other PRFs visible.
T_09	Low	Ash	Mature. Some minor PRF's visible at height. Heavy ivy cover.
T_10	Low	Ash	Mature. Moderate ivy growth with some thick interweaving stems. No other PRF's visible.
T_11	Low	Ash	Semi-mature. Moderate ivy cover.
T_12	Moderate	Ash	Mature. Visible minor PRF's include splits and rot-holes. Dense ivy cover with some thick and interweaving stems.
T_13	Low	Ash	Multi-stem. Dense ivy cover. No other PRFs visible.
T_14	Low	Ash	Dense ivy cover. No other PRFs visible.
T_15	Low	Beech	Moderate ivy cover. No other PRFs visible.
T_16	Low	Ash	Dense ivy cover. No other PRFs visible.
T_17	Low	Ash	Moderate ivy cover. No other PRFs visible.
T_18	Low	Ash	Semi-mature. Moderate ivy cover. No other PRFs visible.
T_19	Low	Ash	Semi-mature. Moderate ivy cover. No other PRFs visible.
T_20	Low	Various	Double treeline. Contains a number of trees with low potential.

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Figure 3.1
Habitat Survey Results

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Legend

- Site Boundary [Behan Lands]
- EIA Study Area

Habitats (Fossitt, 2000)

- BL3
- ED2
- ED4
- GA1
- GS2
- WD1
- WD3
- WS1
- WL1
- WL2
- BC1
- ED3

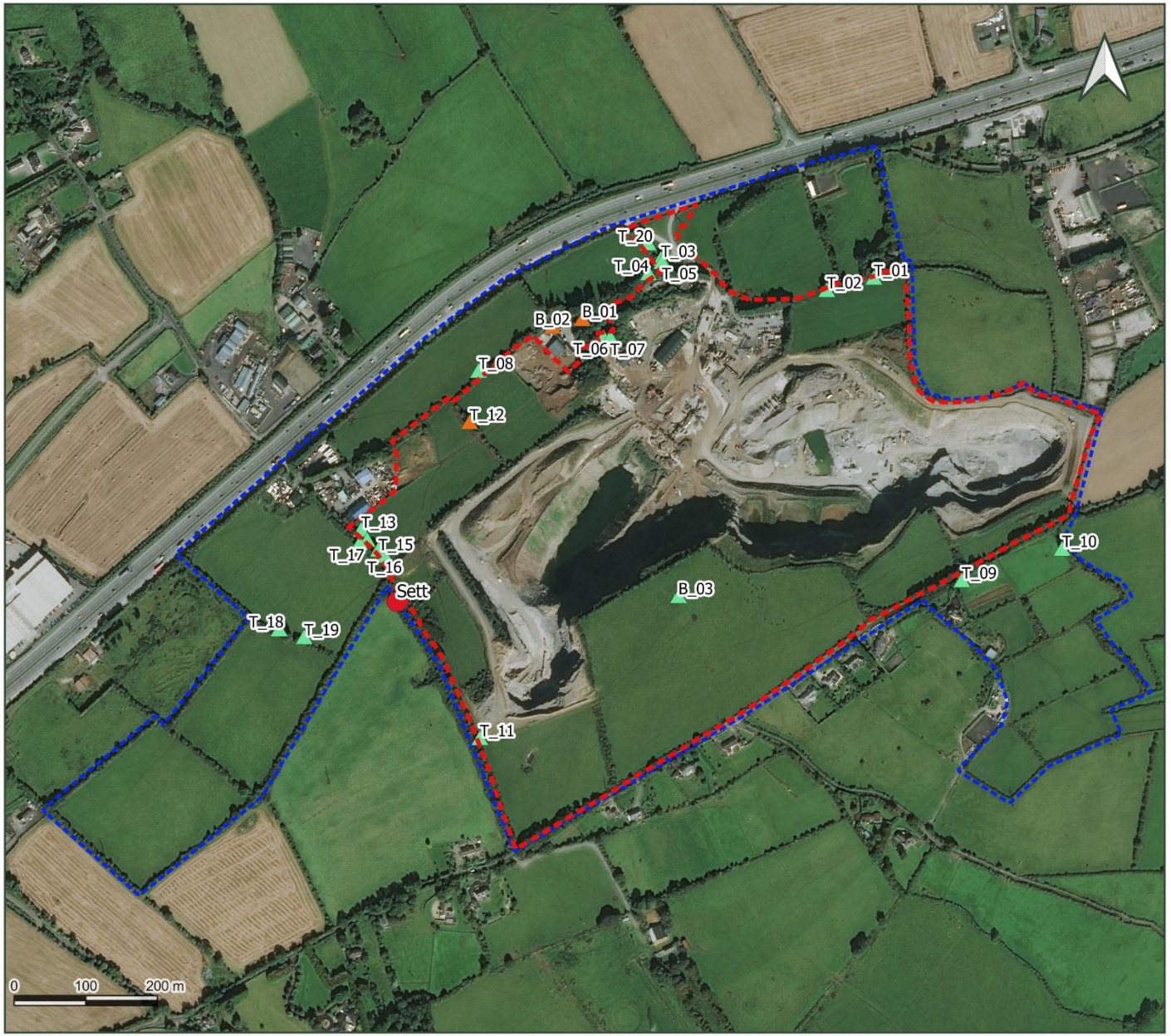


Figure 3.2
Mammal Surveys Results

Project:
Behan's Quarry

Prepared for:
Golder Associates Ireland Limited

Tom O'Donnell CEnv MCIEEM
D: 01/03/2021

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Legend

- Site Boundary [Behan Lands]
- EIA Study Area
- Sett

Bat Roosts

- Low
- Moderate

4 Discussion & Recommendations

Habitats & Botanical

Hedgerows were considered to be locally ecologically significant in terms of structure and habitat connectivity due to their age, structure botanical diversity and interconnectivity with other semi-natural habitats within the study area and locally.

Any semi-natural habitats including hedgerows and treelines which may be lost in any future expansion of the quarry should to be replaced along the margins of the proposed quarry extension area. The replacement linear woodland features will be connected to the existing hedgerow and treeline network within the site boundary. Replacement hedgerow and treeline structures should reflect species occurring naturally locally. All gaps within and between existing hedgerows within the study area should be planted to strengthen ecological connectivity within the site and to the surrounding landscape. Buddleia and Rhododendron, both alien invasive plant species, are present in the study area and should be controlled and eradicated.

In terms of ecological significance, hedgerows and treelines on site are considered to be of Local Importance (lower value) (following NRA, 2009). This is due to their limited botanical diversity overall and often diminished structural integrity. They do however provide the main source of ecological connectivity and transit for faunal species within the site.

Mammals

The main badger sett is likely to remain in constant use and to be used by badgers for breeding purposes. The proposed quarry extraction development may pose a risk to the underground network of the sett potentially resulting in collapse of tunnel networks due to vibration. NRA (2006) states that during the badger breeding season (December to June inclusive), no work should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts (regardless of the classification of the sett; main, outlier etc.).

Measures should be implemented to ensure that badgers within the identified sett are protected from disturbance. Should this not be possible, closure of a currently active sett should only be considered during the period of July to November (inclusive) in order to avoid disturbance during the badger breeding season (NRA, 2006) and a derogation license should be sought from NPWS to facilitate the removal of the sett. Should sett closure be required, a bait marking survey should be considered in order to delineate the existing territorial boundary of the badger family. This information would also help to inform an assessment of the impact of the loss of foraging habitat on badgers as a result of any future expansion of the quarry.

The badger sett is considered to be of 'Local Importance (higher value)' (following NRA, 2009). Should the badger outlier sett be permanently removed, its loss is likely to have a moderate negative effect on local badger populations in the short term (following EPA, 2017). An alternative main sett should be constructed in advance of the closure and the badger group in the short term (one to seven years) are likely to create further setts if required locally.

A number of potential bat roosting sites have been identified but no winter roosting was confirmed. It is not possible to assess the overall importance of the site to bats based on a winter survey alone.

4.1 FURTHER SURVEY

In order to inform a comprehensive ecological impact assessment, the following surveys are recommended:

- Breeding bird surveys (in combination with ongoing Peregrine Falcon surveys). Point counts and transect survey should be carried out.
- Bat activity survey including passive monitoring for a minimum of five nights and emergence surveys at structures identified with potential to host roosting bats (B_01 to B_03). Transect surveys should be carried out at emergence and/or re-entry to gather information on bat activity and to identify any activity which may indicate the presence of a roost or key commuting routes.

- Monitoring should be carried out to understand the ecological context and significance of the identified main sett and the impact of further loss of badger foraging habitat, including a bait marking study. A camera trap survey at the sett should be carried out (under appropriate license) to seek to determine if breeding is occurring within the sett.

5 References

Collins J. (Ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.

EPA (2017). Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

NRA (National Roads Authority, now TII) (2009). Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2, 1st June 2009. NRA, Dublin.

NRA (National Roads Authority, now TII) (2006) Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes. NRA, Dublin.

Sleeman D. P. & J. Davenport, J., More, J., Clegg, T.A., Collins, J.D., Martin, S.W., Williams D. H., Griffin J. M., & O'Boyle, I. (2009). How many Eurasian badgers *Meles meles L.* are there in the Republic of Ireland? European Journal of Wildlife Resources (online).

5.0 LAND, SOILS AND GEOLOGY

5.1 Introduction

This chapter addresses the magnitude of potential impacts to, and the significance of effects on, soils, land and geology. Associated impacts to the water environment and ecology are addressed in separate chapters (Chapters 6 and 4, respectively).

5.1.1 Technical Scope

The technical scope of this assessment is to consider the potential impacts and effects on soils, land and geology that can be reasonably foreseen as consequences of the normal construction and operation of the Proposed Development. The assessment considers the potential sources of change resulting from Proposed Development activities detailed in the project description (Chapter 2).

The loss of agricultural soils will also be considered, as will the potential impact on land quality. Associated secondary potential impacts from changes to land quality on human health are also considered. It should be noted that this assessment does not, however, constitute a contaminated land risk assessment, a geotechnical/geohazard risk assessment, or detailed quantitative human health risk assessment.

The potential effects associated with hydrogeological and hydrological receptors are considered in Chapter 6 (Water). The effects of the Proposed Development on population and human health are addressed in Chapter 3 (Population & Human Health), although as noted above the potential effects of land quality on human health are considered in the current chapter. Any secondary effects on ecology or biodiversity due to changes in land quality or habitat removal are considered in Chapter 4 (Ecology & Biodiversity).

5.1.2 Geographical and Temporal Scope

The geographical study area for the assessment is that defined by the EIA project boundary (Site) (identified on Figure 5.1) and a buffer zone of 500 m from the EIA boundary (i.e. the study area), because most potential effects to geological and soil receptors are anticipated to occur within the Proposed Development footprint or immediately adjacent to it. The Proposed Development area (26.87 ha.) is entirely contained within the EIA project boundary (Site) that encloses 46.14 ha. In the context of the EIAR, the Site boundary contains lands which form the existing quarry site, the proposed extension areas and some areas which extend beyond the working areas. The 37L application (the Planning Application) boundary is shown on the drawing set which accompanies the planning application.

The temporal scope of the assessment covers the current quarrying activities on the Site and the extension of these permitted activities into the future with the Section 37L application boundary. Given the phased nature of the extractive industry and the similarities between the construction and operational phases of the Proposed Development, these will be considered together in this chapter as the overall operational phase.

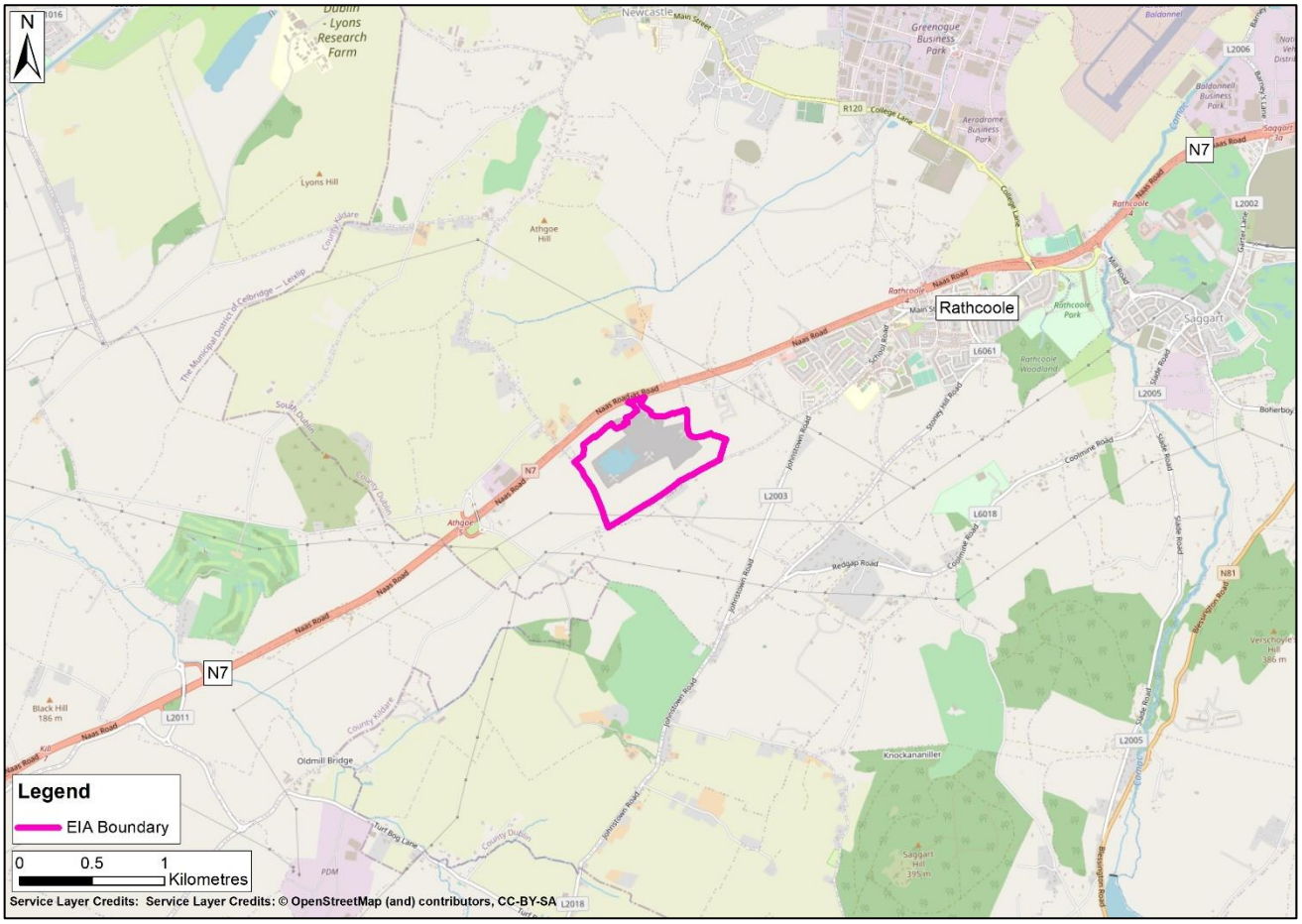


Figure 5.1: Location of the Site (EIA site boundary).

5.2 Legislative and Policy Context

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to soils, land and geology that has guided the focus of the assessment. The overarching EIA legislation under which this assessment is required is addressed separately in Chapter 1.

5.2.1 Legislation and Guidance

In addition to the Regulations that underpin the EIA process (see Chapter 1), this assessment has been made with cognisance to relevant guidance, advice and legislation, including, but not limited to:

- The European Communities (Environmental Liability) Regulations 2008 (as amended) - These Regulations (SI 547/2008) transpose EU Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage. The purpose of these Regulations is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Environmental Protection Agency (EPA) is designated as the competent authority for all aspects of these Regulations.
- The Environmental Protection Agency Act 1992 and the Protection of the Environment Act 2003 – which detail the requirements associated with general pollution control and activities that come under integrated pollution prevention and control.
- The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft, August 2017) – which presents key topics of interest, high-level information on the interactions that should be considered in relation to EIA legislation, and overviews on the recommended approach to

describing the baseline environment, completing impact assessments, describing effects, and addressing mitigation and monitoring.

- The EPA Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015).
- Department of Housing, Planning and Local Government. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).
- Gov.uk online guidance, Guidance on Land Contamination Risk Management (LCRM). Available at https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks. Uses a tiered approach to risk assessment, including preliminary risk assessment, generic quantitative risk assessment and detailed quantitative risk assessment.
- The National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (undated) in relation to aspects to be considered and assessment approach (including relative receptor importance and cross discipline interactions).
- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (April 2013).
- The National Roads Authority Guidelines for the Creation, Implementation and Maintenance of an Environmental Monitoring Plan (undated) in relation to impact mitigation.
- CIRIA C741: Environmental Good Practice on Site (2015, Fourth Edition) in relation to source of impact and mitigation.
- Scottish and Northern Irish Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs) – these, although not Irish guidance, provide environmental good practice guidance for activities such as oil and chemical storage, works in or near water, works on construction sites, and dealing with spills and pollution incidents.

5.2.2 Local Policy

The **National Planning Framework (Project Ireland 2040)** includes National Policy Objective 60 to “Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance”.

There is currently no local plan for Rathcoole, however the **South Dublin County Council Development Plan 2016-2022** incorporated the relevant policies and objectives for the area.

The area is included in Zoning Objective ‘RU’ of the South Dublin County Council Development Plan 2016-2022 which has the description *‘to protect and improve rural amenity and to provide for the development of agriculture’.*

Specific policies relating to the protection of the geological environment and land include the following:

- IE2 Objective 10: To require adequate and appropriate investigations to be carried out into the nature and extent of any soil and groundwater contamination and the risks associated with site development work, in particular for brownfield development.
- ET10 Objective 1: To facilitate mineral extraction in suitable locations subject to the protection of amenity and environmental quality.
- ET10 Objective 2: To limit the operation of the extractive industry and ancillary uses at environmentally sensitive locations and within areas designated with Zoning Objective ‘HA – DM’, ‘HA-LV’ and ‘HA-DV’

where extraction would result in significant adverse effects and/or prejudice the protection of the County's natural and built heritage. (The Site sits within Zoning Objective 'RU').

- ET10 Objective 3: To ensure the satisfactory reinstatement and/or re-use of disused quarries and extraction facilities, where active use has ceased.
- ET1 Objective 2: To promote enterprise and employment development at locations that are proximate to or integrated with transportation and other urban land uses, to promote compact urban development and sustainable transport.

5.3 Assessment Methodology and Significance Criteria

5.3.1 Introduction

This section presents the method used to assess the impacts and effects of the Proposed Development on soils, land and geology, and to secondary associated human health receptors. It establishes the stages of the assessment, and the qualitative criteria used to assess impact magnitude and determine the level of effect significance.

5.3.2 Qualitative Assessment Method

The assessment of potential effects has been undertaken using the qualitative assessment method outlined below, and is supported by the baseline condition information and the Proposed Development design. The assessment follows a staged approach. A summary of the stages involved is included below:

1) Confirm baseline conditions – determine baseline and develop conceptual site model by consideration of available records and data sets, site reports and published information.
2) Confirm the key receptors and their value/importance.
3) Qualitatively characterise the magnitude of impacts on the receptors – describe what potential changes could occur to each receptor as a result of the Proposed Development, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage takes into account embedded design mitigation, good practice in construction environment management and pollution prevention.
4) Determine the initial effect significance of each potential impact on each sensitive receptor.
5) Consider the need for additional mitigation if it is considered necessary to reduce the initial magnitude of the impact and associated effect significance further.
6) Assess the residual impact magnitude and residual effect significance after all mitigation is applied.

Stages 1 and 2 have been undertaken using published literature and guidance and available information specific to the Proposed Development, which is presented in Chapter 2. For the identification of receptor value/importance that completes Stage 2, and for the description of impact magnitude (Stage 3), a common framework of assessment criteria and terminology has been used based on the EPA's draft Guidelines on the Information to be Contained in EIARs (EPA, 2017), with some modifications made to increase clarity. The descriptions for value (sensitivity) of receptors are provided in Table 5.1 and the descriptions for magnitude of impact are provided in Table 5.2.

The potential for an impact to occur at a receptor has been determined using the understanding of the baseline environment and its properties and consideration of whether there is a feasible linkage between a source of impact and each receptor (i.e. a conceptual site model). This follows the method of preliminary risk assessment that is widely presented in some of the guidance documents listed in Section 5.2.

Table 5.1: Environmental value (sensitivity) and descriptions.

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution. For example: Global/European/National designation Large volumes of nationally or locally important peat Well drained and highly fertile soils Proven economically extractable mineral resource Human health.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. For example: Regionally important sites Moderately drained and/or moderate fertility soils.
Low	Low or medium importance and rarity, local scale. For example: Locally designated sites Poorly drained and/or low fertility soils.
Negligible	Very low importance and rarity, local scale.

Table 5.2: Magnitude of impact and typical descriptions.

Magnitude of impact (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. Significant harm to human health - death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Significant harm to buildings/infrastructure/plant - Structural failure, substantial damage or substantial interference with any right of occupation.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

The assessment of magnitude of impact considers whether the change that causes the impact is positive or negative, and whether the impact is direct or indirect, short- medium- or long-term, temporary or permanent, and if it is reversible.

For the purposes of this assessment, a direct impact is one that occurred as a direct result of the Proposed Development and was likely to have occurred at or near the Proposed Development itself. Indirect impacts (or secondary/tertiary impacts) are those where a direct impact on one receptor has another knock-on impact on one or more other related receptor(s) (e.g. the Proposed Development results in a change in land quality, which then has an indirect impact on human health). Indirect impacts can occur within the study area or away from the Proposed Development.

For the purposes of this assessment, the following definitions of duration have been used:

- Temporary – effect likely to last less than 1 year without intervention;
- Short term – effect likely to last 1 to 7 years without intervention;
- Medium term – effect likely to last 7 to 15 years without intervention;
- Long term – effect likely to last 15 to 60 years without intervention; and
- Permanent – effect likely to last over 60 years without intervention.

An irreversible impact is defined as a change to the baseline that would not reverse itself naturally. Such impacts will usually be long-term and irreversible, such as the removal of best and most versatile agricultural soils. A reversible impact is defined as a change to the baseline conditions that would reverse naturally once the source of the impact is exhausted or has stopped.

5.3.3 Significance Criteria

The approach followed to derive effects significance from receptor value and magnitude of impacts (Stage 4) is shown in Table 5.3. Where Table 5.3 includes two significance categories, reasoning is provided in the text if the lower of the two significance categories is selected. A description of the significance categories used is provided in Table 5.4.

Table 5.3: Significance Matrix.

	Magnitude of Impact (Degree of Change)				
Environmental value (Sensitivity)		Negligible	Low	Medium	High
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 5.4: Significance categories and typical descriptions

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significance Category	Typical Description
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

Residual adverse effects of 'large' or 'profound' significance are considered to be 'significant' for the purposes of this assessment.

If required following the assessment of the level of effect significance, additional mitigation measures are presented that will be used to avoid, prevent or reduce the magnitude of the potential impact (Stage 5). The significance of the effect taking into account the additional mitigation is then assessed (Stage 6) to give the residual effect significance. Any monitoring that will be required to measure the success of the mitigation is also presented in residual impacts and effects tables (Stage 7) (see Section 5.9).

The effects of the Proposed Development are also considered cumulatively with those that could foreseeably result from other known developments in the assessment study area that are going through the planning process.

5.4 Baseline Conditions

This Section presents baseline information on soils, land use, land quality and geology. Information about the water environment (including hydrogeology) is included in Chapter 6.

5.4.1 Land

According to the EPA 2017 EIA Draft Guidelines in referencing and describing 'land' it is clarified that the amended Directive introduces Land as a prescribed environmental factor; "*Recital 9 gives context to this addition, showing that it relates to the issue of 'land take'. This change aligns the Directive with proceedings of the United Nations Conference on Sustainable Development (Rio de Janeiro, 2012) and with Commission strategy.*"

The Environment Directorate-General of the European Commission sets down policies in relation to myriad environmental factors including 'land' opening as follows;

"Land is a finite resource. It is subject to competing pressures from urbanisation, infrastructure, increased food, feed, fibre and fuel production and the provision of key ecosystem services.

But it's also a shrinking resource. Almost 1000 km^2 of agriculture or natural land disappears every year in the EU, as it is converted into artificial areas. More EU land is affected by degradation all the time, and ecosystem services are lost as a result.

This is a global problem. The EU contributes to land degradation in third countries, as we are a net "importer" of land embedded into imported products. Demand for areas to settle, grow food and biomass is rising around the world, and climate change is likely to impact on land demand, availability and degradation.

But the EU is taking action. The 2011 Road Map for Resource-Efficient Europe, part of Europe 2020 Strategy has the following aim: "By 2020, EU policies take into account their direct and indirect impact on land use in the EU and globally, and the rate of land take is on track with an aim to achieve no net land take by 2050"."

The total S37L application site area is 26.87 ha., the lateral extent of the proposed void is 4.1 ha. and it is estimated that total of 5 ha. of land will be disturbed in the course of this application (combination of lateral void

and formation of screening bunds). The majority of the Proposed Development relates to a deepening of the existing void area form an average of 173 mAOD to 150 mAOD.

5.4.2 Land Use

The Site area is ca. 46.14 ha in size and contains agricultural fields, the existing quarry areas (including extraction areas and plant) and the proposed extension areas.

A review of available OSI historical mapping and site walkovers during 2019, 2020 and 2021 has been undertaken to assess the land use within the area.

There are a number of historical maps available for the area (Ordnance Survey of Ireland (2021), Google Earth (2021) and GSI (2021)) which relate to the Site and study area:

- 6" historical map (1837-1842);
- 25'' OSI maps (1888-1913);
- 6" Cassini Map (1830s to 1930s);
- 19th February 1991, 30th May 1994, 6th May 2000 and 8th September 2004 aerial imagery (OSI);
- 24th March 2012, 17th March 2016 and 1st June 2020 aerial imagery (Google Earth);
- December 2019 drone survey of the quarry area (Murphy Surveys);
- October 2020 drone survey of the quarry area (Shannon Valley); and
- GSI's (2021) aggregate potential mapping online viewer (historical quarries layer).

A review of the 6" historical map (1837 -1842) identifies two small quarries within the Site area. One was located to the west of the existing pit, along the unidentified local road and the other was located to the south of the existing pit, along the local road (L6065). Neither quarry was located within the footprint of the existing pit. Neither of these quarries are identified on the Cassini Map. The 25" inch map (1837 – 1842) identifies the western quarry only and it appears to have expanded eastwards towards what is now the existing western pit area. A review of the GSI's aggregate potential mapper identifies a cluster of four historical pits where the western pit was identified on earlier maps. Three of these quarries are considered to be Early to Mid-20th Century quarries and one is a Mid-19th Century quarry, most likely that identified on the older maps.

The oldest available aerial for the area is a 1991 OSI orthophotography survey, with further aerial photography available up to 2020.

Three main land uses have been identified within the Site and the study area (500 m from the EIA boundary), these are agricultural and single-house residential lands, N7 road network and the quarry site. The lands to the north, west, south and east can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Dry cattle, sheep rearing and grazing of horses are the main activities in the area, with further arable activities to the south-west.

Between the period 1991 and 2020 the N7 road and agricultural and single-house residential land use has remained unchanged. Some additional housing is accommodated in the landscape during this period, but the overall land use remains unchanged. The extraction area expanded from an initial approximate area of just over 10 ha in 1991 (Table 5.3) to the current 28.8 ha. The extraction area expanded over this period first in a westerly direction up to 2000, then both western and eastern expansion occurs between 2000 and 2020. The current land usage identified from 2020 aerial photography and site visits is presented in Figure 5.2, below.



Figure 5.2: Existing land use based on Google Earth 2020 aerial photography, a December 2019 drone survey of the quarry and an October 2020 drone survey of the quarry.

The Corine landcover classification (EPA, 2018) has also been considered in this assessment (Figure 5.3). This classification dataset is representative of ca. 2018. The classification for the area bears the same Level 3 classification as the adjacent N7 (Road and Rail Network), however the area of land should be classified as 'Mineral Extraction Sites' which is typical of such rock quarries. The lands to the south, east and west are defined as 'Agricultural Areas' and 'Pastures'.

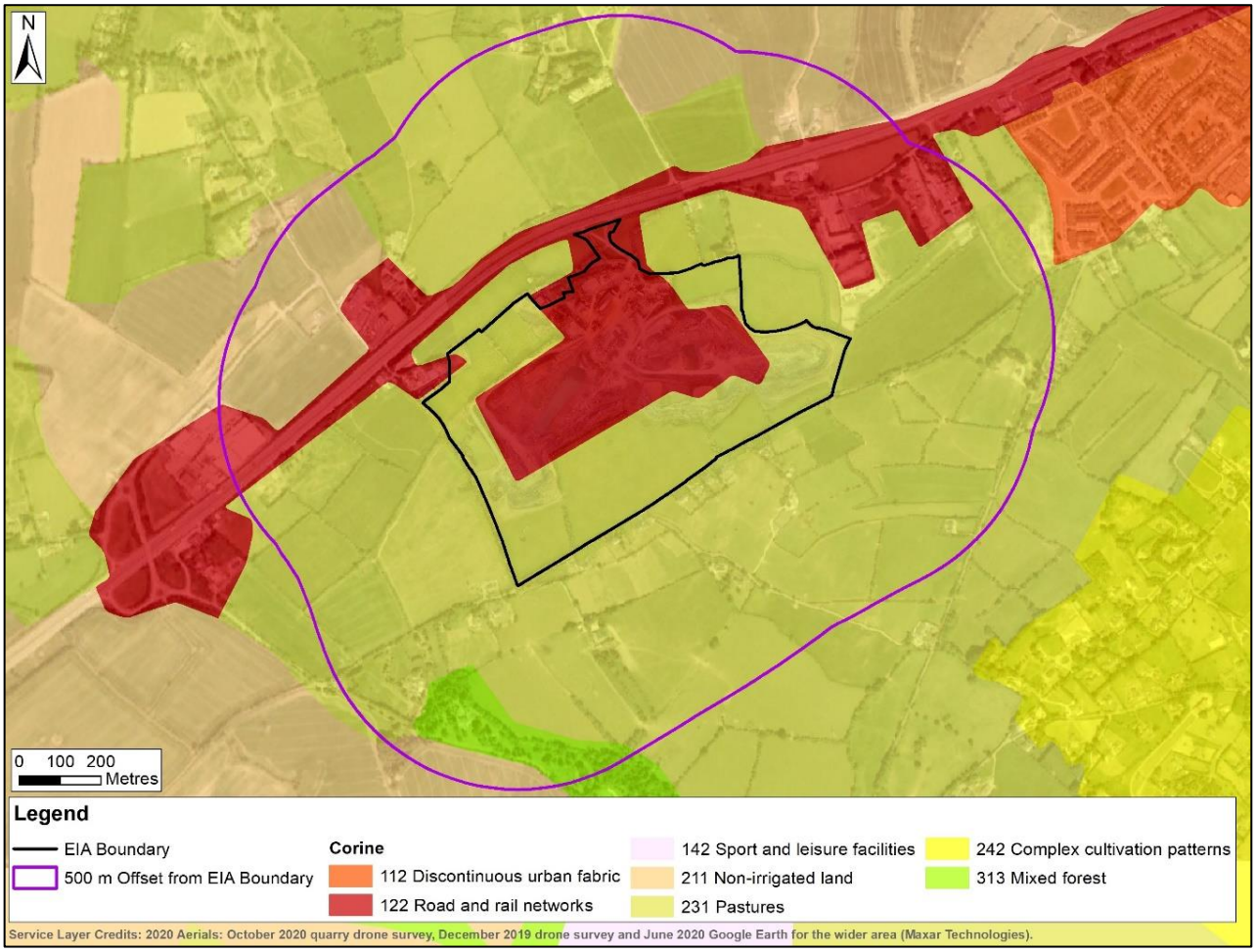


Figure 5.3: Corine land use mapping (EPA, 2018).

A review of the South Dublin County Council Development Plan (2016 – 2022) indicates that the proposed north western extraction area is listed as a site 'to provide for Traveller Accommodation Sites to be Selected'. The Draft South Dublin County Council Traveller Accommodation Plan 2019 – 2024 further identifies that the site is an indicative location with sites to be selected depending on need. The South Dublin County Council Development Plan also identifies the Site sits within an area designated as 'Rural' in which extractive industry is 'Permitted in Principle' while Traveller Accommodation is 'Open for Consideration'.

5.4.3 Superficial Geology (Soils)

There are no soils remaining in-situ in the existing extraction area due to historical extraction activities onsite. The plant area is composed of Made Ground (e.g. concrete pads, hard standing and concrete foundation areas for the plant area) overlying natural ground (soils). The northern, southern and western parts of the Site containing agricultural fields are underlain by natural ground.

A review of the EPA's online map viewer (EPA, 2021) maps soil cover over the entire Site area, however, as stated previously some of this soil cover is no longer in-situ, therefore this soil map is more representative of the original baseline soils prior to extraction activities. The Irish Soil Information System layer (EPA, 2021) indicates that soils on the Site were once compositionally uniform across much of the EIA study area, prior to extraction activities. Superficial deposits were comprised of a clayey drift with siliceous stones and these currently remain in-situ in the proposed north western and north eastern extension areas. These superficial deposits are described as glacial tills derived from the Silurian bedrock. Further north, by the Site entrance from the N7, the soil cover is indicated as fine loamy over shale or slate bedrock.

Teagasc (2021) classifies the soils over the Site as ‘Drumkeeran’, which is a ‘heavy’ soil commonly composed of Surface-water Gleys (EPA, 2014).



Figure 5.4: Location of boreholes drilled in March 2020 on the Site.

Subsoils are mapped by the EPA (2021) as being sandstone and shale tills which have a clayey texture and are derived from Lower Paleozoic parent material around the northern perimeter of the Site and underlying the majority of the wider study area. The majority of subsoils underlying the quarry area have been mapped by the EPA (2021) as bedrock which is at surface, this extends into the south, west and east of the study area.

The GSI has created an aggregate potential map database for Ireland. This mapping database identifies overburden scores, and the database was developed during the period November 2007 and October 2013 (GSI, 2021). Within the Site the overburden score is indicated as ‘10’, with no sand and gravel or aggregate potential identified due to the shallow depth to bedrock (noted as 0 – 1 m).

Four wells were installed in March 2020 (Figure 5.4), and borehole logs for these wells identified a very thin soil cover (ca. 0.5 – 1 m thick) before encountering the bedrock interface composed of a weathered/fractured greywacke which becomes very competent with depth. The very thin soil thickness observed in the boreholes is in line with the GSI’s subsoil mapping which identified bedrock at surface over the majority of the Site and it is also in line with the GSI’s low score for overburden potential as no sand and gravel or aggregate potential has been identified on the Site.

The proposed extension areas, to the northwest and northeast, are currently agricultural fields. Borehole BH1 located at the north western corner of the existing extraction area (Figure 5.4) encountered a very thin 0.5 m soil layer. BH3, to the north of the existing plant, encountered no superficial deposits as this area had already been stripped.

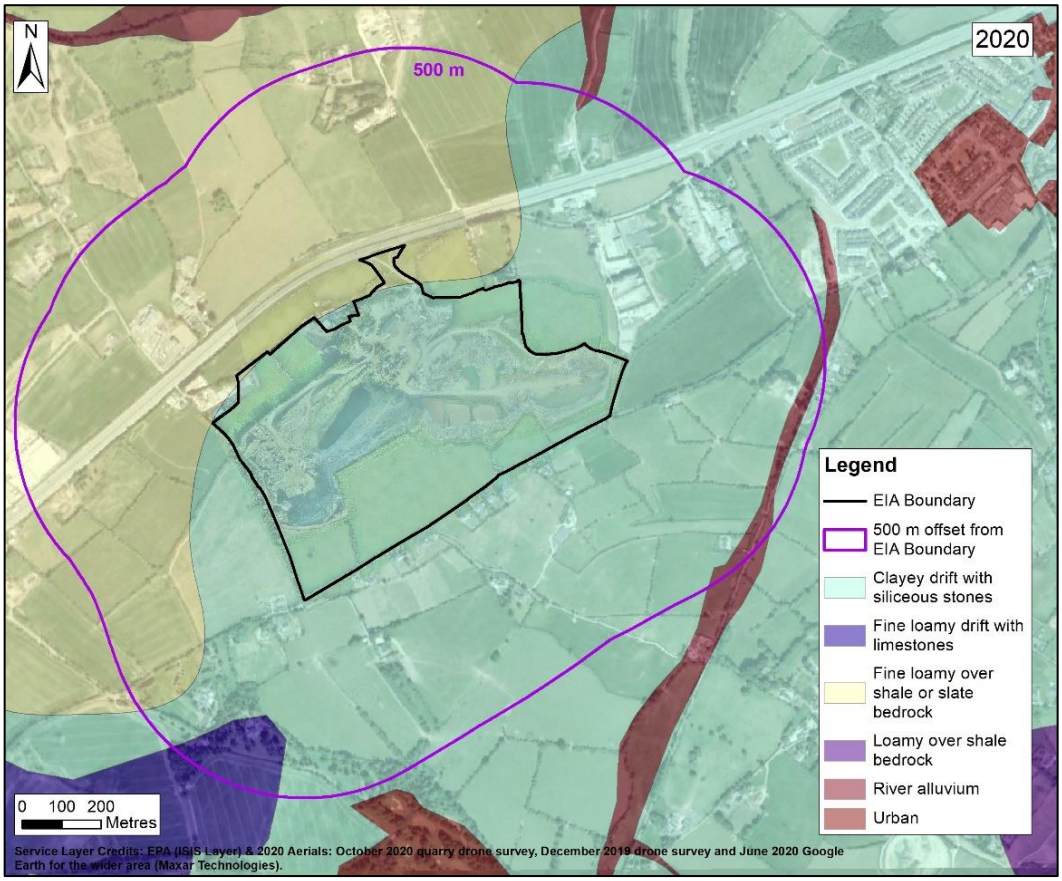


Figure 5.5: Soil mapping (EPA, 2021) overlain on the 2020 aerial imagery.

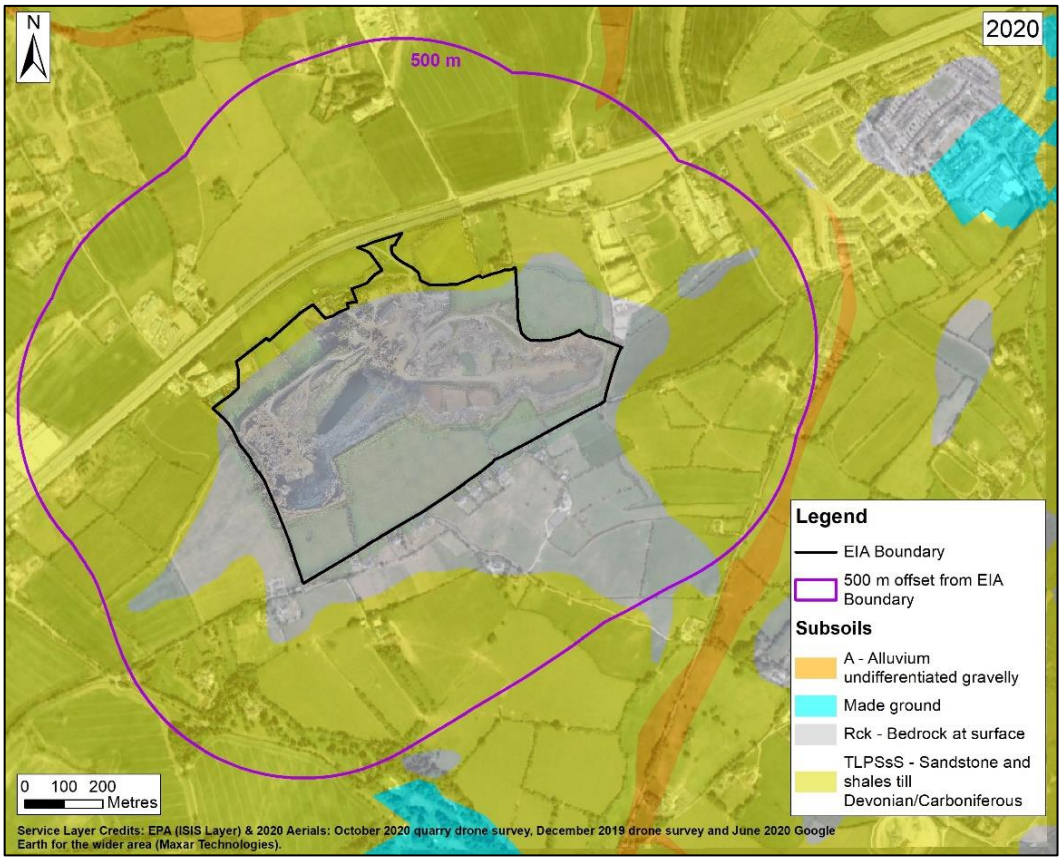


Figure 5.6: Subsoil mapping (Irish Soil Information System, EPA, 2021) overlain on the 2020 aerial imagery.

5.4.4 Bedrock Geology

The regional setting is one of large-scale northeast-southwest trending upward (anticline) and downward (syncline) fold features which are dissected by (predominantly) northwest-southeast trending faults. No faults are shown to cross the Site (GSI, 2021).

The Site is located on the northern limb of a syncline which dips around 50° to the south east. The Site is underlain by the Carrighill formation of Silurian calcareous greywacke, siltstone and shale (Figure 5.7). This is the youngest and most fine grained of the Kilcullen group bedrock unit.

During a previous drilling programme (Cross, 2013), the rock encountered was described as a greywacke, with calcite present within the quarry area and blue/brown shale within the adjoining lands. The quarry faces are described as varying from weathered in the upper faces to some slight weathering in the lower faces. The rock is described as thin to medium bedded, weathered to moderately strong, fine grained greywacke with localised inter- banding of siltstone. Zones of deformed rhyolitic rocks have been identified in the west part of the quarry.

Drilling of four water wells in 2019 on the Site identified very shallow bedrock (ca. 0.5 – 1 mbgl) with the superficial deposit – bedrock interface composed of a weathered greywacke profile which becomes very competent and tight with depth (Appendix 5.1).

The current visible floor of the existing quarry is at ca. 150 mAOD, and a water body in the existing western extraction area has a water level of ca. 149 mAOD and a floor of 120 mAOD (Cross, 2013).

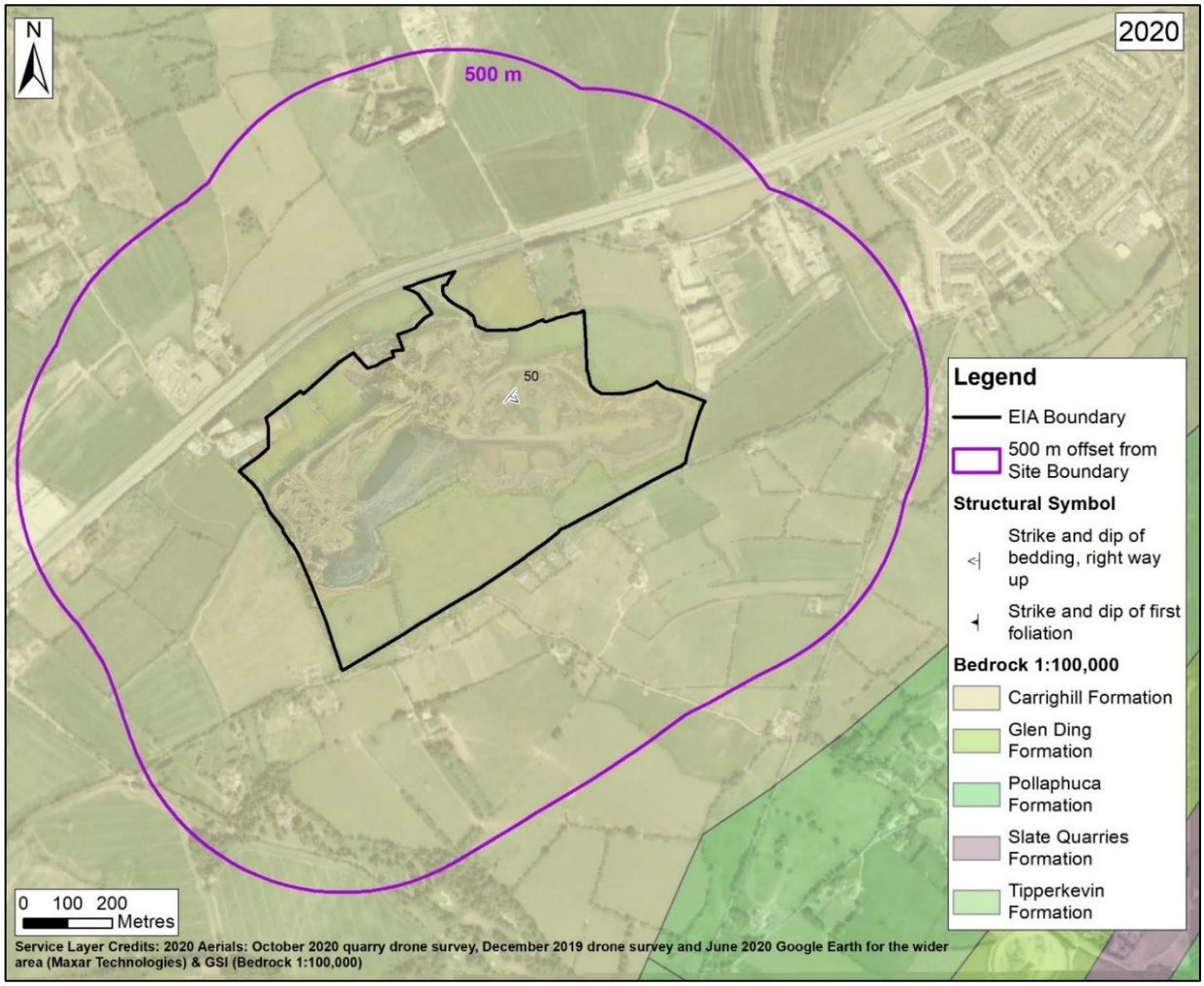


Figure 5.7: Bedrock Geology 1:100,000.

5.4.5 Geological Assets and Heritage

A review of available aerial photography indicates that the Site is the only extraction operation within the study area and no other designated geological assets or heritage sites are identified within the study area.

5.4.6 Geohazards

A review of the GSI's landslide susceptibility classification layer (GSI, 2021) indicates that the majority of the Site area has a classification of Moderately Low to High susceptibility. In the wider study area, the classification is Low.

The risk of instability of soils and/or bedrock which would result in a partial collapse of material can occur in a quarry environment.

In general, adequate protection bunds/berms have been put in place along the crests (top of faces/benches) of excavations. Toe protection (catch-berms) is required to be put in place along the bottoms of the majority of non-active/production faces. Non-active/production faces should have their access blocked off with berms/bunds and relevant warning signage.

Silt from the water treatment plant is deposited in a series of silt ponds located in southern part of the quarry floor. These are constructed from rock and overburden materials recovered on the Site. The ponds are filled with silt sequentially to ensure even settlement within the ponds.

5.4.7 Radon

The Radon Map for Ireland (EPA, 2021) indicates that the Site and study area are located in an area where between 1% and 5% of homes are estimated to be above the radon reference level. A High Radon Area is classified by the EPA as any area where it is predicted that 10% or more of homes will exceed the Reference Level of 200 becquerel per cubic metre (Bq/m^3).

5.4.8 Designated Geological Sites

There are no geological sites of interest at, or within 0.5 km of the Site (GSI, 2021).

5.4.9 Selection of Sensitive Receptors

The Proposed Development involves the extension of extraction activities in a north-westerly and north-easterly direction. This will result in agricultural land loss in these areas as these lands are currently used for agriculture. However, the soils are quite thin and there is limited potential for intensive farming given that soils in this area are Surface-water Gleys which are considered a heavy soil for agricultural uses. The lands within the proposed north western extension area have a separate designation with the South Dublin County Council Development Plan (2016 – 2022) that the lands may be developed for Traveller Accommodation. Land will be considered further in this assessment in the context of loss of agricultural lands and potential loss of lands for Traveller Accommodation.

No geological heritage sites have been identified as part of the baseline. Therefore, the impacts to, and effects on, geological sites have not been considered further in this assessment.

The superficial deposits are very thin, isolated to the north western and north eastern proposed extraction areas and are of low local importance and have low economic value. The bedrock geology beneath the Site is of medium/high economic value both locally and regionally and provided material for several developments within the area, including the N7 roadway. However, the bedrock has no special designation and is ubiquitous in the area.

Human receptors within the area (including workers onsite) have the potential to be impacted by the proposed activities and will be considered in the context of the human health receptor.

Taking account of the above and the receptor classification method described in Section 5.3, the receptors carried forward in this assessment and their assigned importance are presented in Table 5.5.

Table 5.5: Soil, Land and Geology Receptors.

Receptor	Importance and Reasoning
Superficial deposits (soil/sub-soils) at the Site and within the study area	Negligible (no designation, no rarity, local importance)
Bedrock Geology at the Site and within the Study Area	Medium (no designation, no rarity, medium/high economic importance)
Land (agricultural land and potential Traveller Accommodation)	Low (indicative location to provide for Traveller Accommodation dependent on need, low potential and value for agricultural uses)
Human health at the Site and within the Study Area	High (human health receptor)

5.5 Characteristics of the Proposed Development

The Proposed Development consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. over a total of 5.16 ha. to accommodate screening berms and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. A restoration plan to return the application site and existing administration and processing plant area to agricultural and amenity use upon completion of proposed extraction has been prepared and is proposed to be implemented upon cessation of extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years depending on market conditions, and a further 2 - 5 years for restoration.

The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to a central plant area for washing, grading and processing. The further development of the quarry relates to further extraction only and is to utilise the extant existing administration and processing plant area and quarry access that are included in a concurrent application for substitute consent.

5.5.1 Embedded Mitigation

This initial assessment of the significance of potential effects resulting from the Proposed Development takes into consideration any embedded design and commonly undertaken good practice mitigation. The elements of the Proposed Development design and good working practices that reduce the potential for impacts to soils and geology include the following:

- The design of Proposed Development extension area follows the Health and Safety Authority's *'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008*, (as amended), and will be extracted in accordance with the proposed design;
- Site operations will be managed in accordance with relevant health and Safety legislation (Safety, Health & Welfare at Work Act (2005, as amended); and the Mines and Quarries Act (1965, as amended)) and subsequent Quarries Regulations relating to health and safety, training, and appropriate site management;

- Fencing will be maintained at the Site to ensure that the risk of injury to the public and livestock is minimised. The entrance gate is locked and controlled by the Site's management;
- Exposed edges in the quarry will be protected with safety berms;
- Blasting will continue to take place at the Site using licenced and experienced operators. Site management give advance notification of blast events to nearby residents as is standard procedure for the existing quarry;
- Site management practices will be implemented to mitigate the impact to the water environment, as identified in Chapter 6 of this EIAR, including:
  - Safe storage and handling of hazardous substances;
  - Maintenance of equipment and plant to ensure there are no leakages of fuels, oils and potentially contaminating substances;
- The removal of soils will be conducted in a phased basis to reduce the overall potential impact on the land use and underlying groundwater;
- Mobile plant on the Site will be regularly maintained, and where plant is damaged or leaking, it will either be removed from the Site for repair or removed to an on-site maintenance shed for maintenance and/or repair (depending on the extent of the damage to the plant). Damaged or leaking plant will be fixed or replaced immediately, as part of the operational management of the Site;
- Overburden will only be removed in favourable environmental conditions. In addition, restoration activities will also occur during favourable environmental conditions;
- Re-handling of the topsoil will be kept to a minimum to preserve the integrity of the material;
- Stockpiles will be evaluated and monitored and kept stable for safety and to minimise erosion;
- Groundwater monitoring of existing wells on site will continue to be undertaken (refer to Chapter 6, Water); and
- The quarry manager will continue to ensure compliance with relevant safety and statutory legislation and best practices recommended by the Irish Concrete Federation (ICF) and National/EU Legislation (and Guidelines).
- Refuelling and the addition of hydraulic oils or lubricants to vehicles or generators will take place on-site only in designated areas.

5.6 Potential Effects

The main potential impacts and associated effects that will be considered in the assessment relate to the following:

- Activities or events that might impact land quality (e.g. leaks and spills from machinery or stored substances, or discharges);
- Change of land use/land take (i.e. loss of agricultural lands and loss of potential lands for Traveller Accommodation);
- Loss of superficial deposits and bedrock; and
- Destabilisation and/or subsidence of unconsolidated soils, sub-soils or rock faces;

These are considered and assessed in the following sections.

5.6.1 Land Quality

Fuel and other substance leaks or spills from stored substances or from machinery/equipment used during the Proposed Development could affect the chemistry of the soil (where it is still in-situ) or could infiltrate to the groundwater through the bedrock. A review of water quality during the assessment period (refer to Chapter 6, Section 6.4.10) indicates that groundwater quality is generally good.

The magnitudes associated with the potential groundwater and surface water impacts at the Site were assigned as negligible or low in Chapter 6 due to:

- Limited off-site hydraulic connectivity of groundwater has limited the migration of contaminants from the Site and localised the drawdown to areas immediately adjacent to the excavated areas;
- Low or undetected concentrations of hydrocarbons in groundwater and surface water and the presence of embedded mitigation to prevent contaminant migration;
- No exceedances of surface water EQS threshold values for inland waters and generally good quality of water in the River Griffeen observed;
- The estimated low volumes of discharge to the culvert

As a result, the predicted potential impact on human health is **negligible (adverse).**

5.6.2 Change of Land Use/Land Take

Superficial deposits will be removed in the north western and north eastern areas of the Site and stockpiled for future site restoration throughout the life of the quarry. Superficial deposits are primarily a very thin, surface-water Gley which is considered a heavy soil for agricultural usage and not highly productive. The existing land occupied by the quarry (including extraction areas, plant and ancillary areas) is ca. 28.8 ha. The Proposed Development will see a further development of void over ca. 4.1 ha. and associate disturbance and bunding to a total area of ca. 5 ha.

Given the low productivity and value of the land as an agricultural resource and the resource potential of the underlying rock for use in the extractive industry, the impact on agricultural land loss is considered to be **low (adverse).**

The loss of potential lands due to the Proposed Development will remove the potential for this land to be used as a future site providing Traveller Accommodation, however, two alternative sites exist within close proximity which could be suitable alternative sites, if they are required. The impact on potential land to be used to provide Traveller Accommodation is therefore considered to be **low (adverse).**

5.6.3 Loss of Superficial Deposits and Bedrock

The nature of the Proposed Development involves the removal and storage of superficial deposits. The impact on these can be considered temporary in nature, as they will be stored for reuse as a fundamental part of the Site's restoration. The superficial deposits are very thin (ca. 0.5 – 1 m) and of low value locally, ca. 47,400 m^3 soil will be removed from its current location as part of the Proposed Development. The removed soils will remain in the immediate area as they are to be utilised at the margins of the disturbed area as screening berms. The magnitude of the impacts on superficial deposits is considered to be **low (adverse).**

By the nature of quarrying the underlying deposit of rock will be removed which will result in a direct and irreversible impact on the Site, and the deposit has a medium/high resource potential and will be used in construction projects for the greater Dublin region with ca. 5 Mt to be extracted. The magnitude of the impact of the loss of bedrock at the Site is considered to be **medium (adverse)**.

5.6.4 Geotechnical Instability

General earthworks (e.g. excavation, soil movement, ground compaction, stockpiling, reprofiling) have the potential to affect human health of workers if they were to become unstable. Stability issues may also arise during the excavation of the quarry faces and the construction and management of the silt ponds.

The extraction plan for the proposed extension has incorporated industry standard for slope design, thus mitigating any potential geotechnical / geohazard risks and the existing quarry is well maintained and managed.

The management of the existing quarry faces, and silt ponds will be in accordance with the Health and Safety Authority's *'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008*, (as amended),and the recommendations of geotechnical appraisals carried out on site.

The stability of excavations and stockpiles will be monitored and managed, so the potential impact is predicated to be **negligible (adverse)**.

5.6.5 Evaluation of Effects

The evaluation of effects takes into account the predicted impact magnitude combined with receptor sensitivity. The evaluation of effect significance for each of the receptors (taking account of embedded mitigation) discussed above is presented in Table 5.6. As can be seen from Table 5.3, any negligible initial impact magnitude will result in a slight, not significant or imperceptible level of effect significance, which are all 'not significant'. Therefore, Table 5.6 only includes those sources of impact that may result in a low to high initial impact magnitude.

Table 5.6: Evaluation of Initial Impacts and their Effect Significance.

Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect *
Superficial deposits (soil/sub-soils) at the Site and within the Study Area	Negligible	Removal of superficial deposits at the Site	Low (adverse)	Slight
Bedrock Geology at the Site and within the Study Area	Medium	Removal of bedrock at the Site	Medium (adverse)	Moderate
Land	Low	Change in land use by the advancement of the extraction area through time and a loss of agricultural lands	Low (adverse)	Slight
		Potential loss of land which may be provided as future Traveller Accommodation by the advancement of the extraction area through time	Low (adverse)	Slight

* Taking account of embedded mitigation

5.7 'Do-Nothing' Scenario

In the event that the Proposed Development does not progress (i.e. no further extraction takes place), there are unlikely to be further impacts on the geological, land or soil environment in the area of the Project Site.

5.8 Mitigation and Management

5.8.1 Mitigation

Additional mitigation and/or management is intended to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment. The initial assessment of potential effects (taking into account embedded mitigation) has not identified any significant adverse effects. However, to further mitigate the initial effects associated with land, soils and geology, the following additional mitigation will take place:

- If evidence of previously unidentified potential contamination (either visual or olfactory) is identified during works, construction good practice and management procedures will be followed that may include investigation and assessment works;
- The management of the existing quarry faces, and silt ponds will be in accordance with the Health and Safety Authority's *'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008*, (as amended),and the recommendations of geotechnical appraisals carried out on site; and
- The Applicant will maintain a Complaints Register. This register will record complaints of an environmental nature related to the operation. In each entry the Applicant will record the date and time of the complaint, the name of the complainant (if provided), and will give details of the nature of the complaint. A record shall also be kept of any response made in the case of each complaint.

5.8.2 Monitoring

The monitoring programme at the Site will include regular stability surveys of the quarry faces and regular monitoring of groundwater quality in monitoring wells.

5.9 Residual Effects

A summary of the sources of impact, predicted magnitudes of residual impact (accounting for embedded mitigation and additional mitigation) and subsequent residual effect significance is presented in Table 5.7.

In all cases the residual effect is Not Significant and not greater than imperceptible.

The assessment concludes that the Proposed Development will not give rise to significant adverse effects on the land, soil or geology at or surrounding the Site. In all cases the residual adverse effect is **Not Significant and not greater than Slight** and no additional mitigation measures are required (although some have been proposed to further reduce any residual impacts).

5.10 Cumulative Impacts

The nearest extraction operation to the Proposed Development is Belgard Quarry, ca. 7 km northeast of the Site. Given the distances between the developments it is considered that there will be no cumulative effects of their activities on land, soils and geology.

Table 5.7: Evaluation of Predicted Residual Impacts and their Effect Significance.

Receptor (importance)	Potential Source of Impact	Direct or Indirect	Duration*	Reversible or Irreversible	Summary of Combined Mitigation (embedded and additional)	Residual Magnitude of Impact (direction)	Residual Effect Significance
Superficial deposits (soil/sub-soils) at the Site and within the Study Area	Removal of superficial deposits at the Site	Direct	Medium - Long term	Reversible	Soils will be reinstated on the Site during restoration works	Negligible	Not significant/ Imperceptible
Bedrock Geology at the Site and within the Study Area	Removal of bedrock at the Site	Direct	Permanent	Irreversible	Soils will be reinstated on the Site during restoration works, and where possible, bedrock will be dressed with soil cover	Low (adverse)	Slight
Land	Change in land use by the advancement of the extraction area through time and a loss of agricultural lands	Direct	Permanent	Irreversible	Soils will be reinstated in areas of the Site during restoration works. Restoration design for the pit floor proposes to include a groundwater body across the lower areas of the quarry void.	Low (adverse)	Slight

Receptor (importance)	Potential Source of Impact	Direct or Indirect	Duration*	Reversible or Irreversible	Summary of Combined Mitigation (embedded and additional)	Residual Magnitude of Impact (direction)	Residual Effect Significance
	Potential loss of land which may be provided as future Traveller Accommodation by the advancement of the extraction area through time	Direct	Medium - Long Term	Reversible	Soils will be reinstated on the Site during restoration works resulting in lands being returned to use.	Negligible	Not significant/ Imperceptible

** Maximum duration without intervention*

5.11 References

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Irish Soil Information System – Synthesis Report. Report Number 130 (2014). EPA.

Department of the Environment, Quarries and Ancillary Activities, Guidelines for Planning Authorities 2004.

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Geological, Groundwater and Hydrological Assessment (2020). Viridus.

APPENDIX 5.1

Borehole Logs

Drillhole ID:	**BH1**	**Client**	**Behan's Quarry**
Collar Easting	699,497.30	**Status:**	Drilling
Collar Northing	725,650.80	**Start date:**	16-Mar-20
Collar Elev_mAOD	174.75	**Finish date:**	17-Mar-20
Dip (deg)	-90	**EOH (m)**	33.0 m

Driller: Leo Dempsey

From (m)	To (m)	Interval (m)	Code	Description
0.00	0.50	0.50	OB	**OB** - clayey drift with siliceous stones
0.50	2.50	2.00	wGW	**Weathered Greywacke** - thin to medium bedded, weathered, fine grained greywacke with localised inter-banding of siltstone.
2.50	33.00	30.50	GW	**Greywacke** - thin to medium bedded, moderately strong to strong, fine grained greywacke with localised inter- banding of siltstone.
				Water make at ca. 26 m (ca. 200 gallons/hr)
				Installation: 6.5m solid at base, followed by 6m screen from 26.5m, followed by 20.5m of solid screen, backfilled with pea gravel & bentonite seal
33.00				**Final Depth**

GOLDER

Drillhole ID:	**BH2**	**Client**	**Behan's Quarry**
Collar Easting	700,126.80	**Status:**	Drilling
Collar Northing	725,954.30	**Start date:**	18-Mar-20
Collar Elev_mAOD	174.91	**Finish date:**	19-Mar-20
Dip (deg)	-90	**EOH (m)**	72.0 m

Driller: Leo Dempsey

From (m)	To (m)	Interval (m)	Code	Description
0.00	0.75	0.75	OB	**OB** - clayey drift with siliceous stones
0.75	1.50	0.75	wGW	**Weathered Greywacke** - thin to medium bedded, weathered, fine grained greywacke with localised inter-banding of siltstone.
1.50	72.00	70.50	GW	**Greywacke** - thin to medium bedded, moderately strong to strong, fine grained greywacke with localised inter- banding of siltstone.
				Water make at ca. 64 m (ca. 400 gallons/hr)
				Installation: 6m solid at base, followed by 6m screen from 66m, followed by 60m of solid screen, backfilled with pea gravel & bentonite seal
72.00				**Final Depth**

GOLDER

Drillhole ID:	**BH3**	**Client**	**Behan's Quarry**
Collar Easting	699,691.40	**Status:**	Drilling
Collar Northing	725,930.40	**Start date:**	20-Mar-20
Collar Elev_mAOD	160.64	**Finish date:**	23-Mar-20
Dip (deg)	-90	**EOH (m)**	36.0 m

Driller: **Leo Dempsey**

From (m)	To (m)	Interval (m)	Code	Description
0.00	0.00	0.00	OB	**OB** - clayey drift with siliceous stones
0.00	1.50	1.50	wGW	**Weathered Greywacke** - thin to medium bedded, weathered, fine grained greywacke with localised inter-banding of siltstone.
1.50	36.00	34.50	GW	**Greywacke** - thin to medium bedded, moderately strong to strong, fine grained greywacke with localised inter- banding of siltstone.
				Water make at ca. 22 m (ca. 300 gallons/hr)
				Installation: 11m solid at base, followed by 6m screen from 25m, followed by 19m of solid screen, backfilled with pea gravel & bentonite seal
36.00				**Final Depth**

GOLDER

Drillhole ID:	**BH4**	**Client**	**Behan's Quarry**
Collar Easting	700,211.40	**Status:**	Drilling
Collar Northing	725,611.60	**Start date:**	24-Mar-20
Collar Elev_mAOD	194.57	**Finish date:**	26-Mar-20
Dip (deg)	-90	**EOH (m)**	146.0 m

Driller: **Leo Dempsey**

From (m)	To (m)	Interval (m)	Code	Description
0.00	0.50	0.50	OB	**OB** - clayey drift with siliceous stones
0.50	2.00	1.50	wGW	**Weathered Greywacke** - thin to medium bedded, weathered, fine grained greywacke with localised inter-banding of siltstone.
2.00	146.00	144.00	GW	**Greywacke** - thin to medium bedded, moderately strong to strong, fine grained greywacke with localised inter- banding of siltstone.
				Water make between 75-80m (ca. 10-20 gallons/hr)
				Installation: No piezometer - steel casing to 6m, then OH to 146m
146.00				**Final Depth**

GOLDER

6.0 WATER

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the hydrological (surface water) and hydrogeological (groundwater) aspects of the Windmill Hill Quarry (the 'Site') in support of the 37L application for continuation and extension of quarrying activities at the Site. The assessment characterises the pre-extension baseline conditions and gives consideration to the potential effects of extension and restoration upon the surrounding surface water and groundwater environments.

6.1.1 Technical Scope

The technical scope of this assessment is to consider the potential impacts and effects that extension of the quarry and post-operational restoration (as detailed in Chapter 2.0, Project Description) may have on the water environment (see Section 6.1.2). The assessment considers the potential sources of change resulting from potential future activities at the Site on hydrological and hydrogeological receptors. It considers water levels, flow regimes, water resources and uses, water quality, flood risk and water management.

The assessment also identifies potential secondary effects on land, people, ecology and infrastructure as appropriate. The potential effect of secondary changes in the water environment to impact land, people, ecology (including water dependent habitats or ecological receptors) and infrastructure are considered further in the following chapters of the EIAR:

- Chapter 3.0 – Populations and Human Health;
- Chapter 4.0 – Ecology and Biodiversity;
- Chapter 12.0 – Material Assets; and
- Chapter 13.0 – Interactions.

This chapter also addresses the potential secondary effects of changes in land quality on water quality. As such, it draws on the assessment presented in the Land, Soils and Geology section of this report (Chapter 5.0).

6.1.2 Geographical and Temporal Scope

The temporal scope of the assessment covers 'baseline conditions' as the Site is at present (May 2021) also drawing on available information as far back as 1990. The assessment aims to establish the baseline water environment conditions at the Site and then assess what impacts the proposed extension of quarrying activities and subsequent restoration will have on the Site and surrounding environment.

Under the programme of the Proposed Development, the extraction phase will last for 10 - 15 years which will provide for fluctuations in market demands for the aggregate extracted from the Site. The duration of the extraction phase is therefore classified as 'medium-term' by the EPA's 2017 draft 'Guidelines on the information to be contained in environmental impact assessment reports' (seven to fifteen years).

The restoration phase of the Proposed Development will follow the extraction phase and will be 2 - 5 years in duration, which is 'short-term' (those lasting from one to seven years).

The geographical study area for the assessment covers the area within the Site boundary and a buffer zone that nominally extends to 0.5 kilometres (km) from the boundary (Figure 6.1). However where deemed appropriate, the buffer zone is increased to allow for identification of downstream or downgradient hydraulic connectivity with off-site water features or users that may be affected by changes associated with the Site activities.

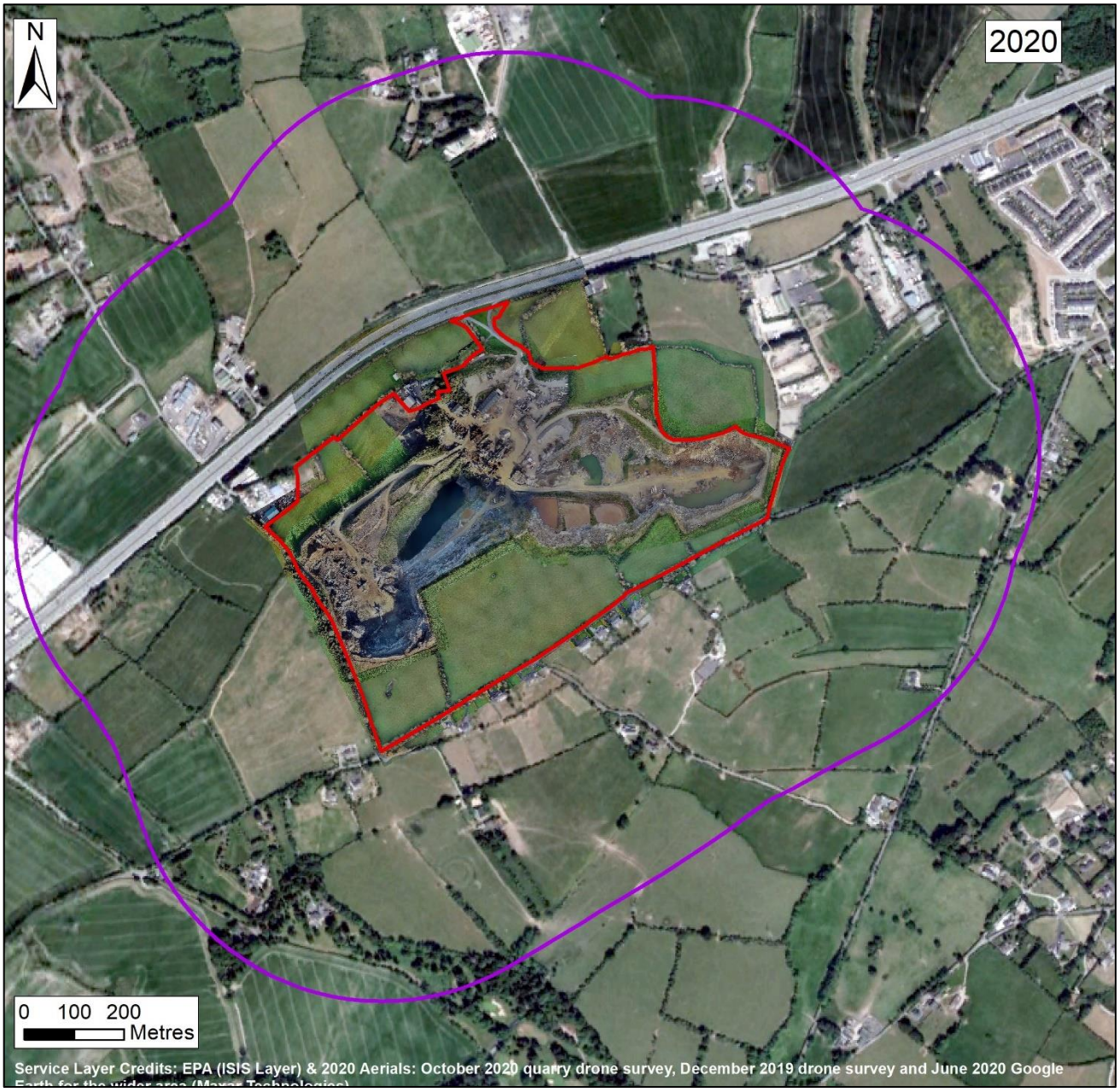


Figure 6.1: Site Boundary (red) and 500 m Buffer Zone (purple).

6.2 Legislative and Policy Context

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to the water environment that has guided the focus of the assessment. The overarching EIA legislation under which this assessment is required is addressed separately in Chapter 1.0, Introduction.

6.2.1 Legislation and Guidance

In addition to the Regulations that underpin the Environmental Impact Assessment (EIA) process (see Chapter 1.0, Introduction), this assessment has been made with cognisance to relevant guidance, advice and legislation relating to the water environment, which have been used to steer the focus of the baseline information collection, the categorisation of receptor sensitivities, and the mitigation measures that have been included.

- The Local Government (Water Pollution) Act 1977 (as amended) and associated Statutory Instrument Regulations made under that Act outline the general prohibition of entry of polluting matter to water, the requirement to licence both trade and sewage effluent discharges, licencing of water abstractions, controlling discharges to aquifers, and notification of accidental damages.
- The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) is the European legislation that establishes a framework for the protection of groundwater and surface water, including the establishment of river basin districts, the requirement to prevent further deterioration by preventing or limiting inputs of pollutants into groundwater, reducing pollution and promoting sustainable water use. The Groundwater Daughter Directive (GWDD) (2006/118/EC) sits beneath the WFD and relates to water protection and management. It establishes measures to prevent and control groundwater pollution, including criteria for assessing good chemical status and identifying trends.
- The WFD and GWDD has been transposed into Irish law by means of many Regulations. These Regulations cover governance, the shape of the WFD characterisation, monitoring and status assessment programmes in terms of assigning responsibilities for the monitoring of different water categories, determining the quality elements and undertaking the characterisation and classification assessments. They include, but are not limited to, the following:
  - European Communities (Water Policy) Regulations 2003 and its subsequent amendments;
  - European Communities Environmental Objectives (Surface Waters) Regulations, 2009 and its subsequent amendments;
  - European Communities Environmental Objectives (Groundwater) Regulations, 2010 and its subsequent amendments; and
  - European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations 2011.

  Many of these regulations contain threshold values or environmental quality standards which, when exceeded, can reflect a degradation in water quality. A degradation in water quality can be reflective of negative effects caused by the development, but it should be noted that a poor water quality can be naturally occurring due to the environmental setting.
- The EU Directive on the Assessment and Management of Flood Risks (2007/60/EC) is transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations 2010 and its subsequent amendment. The aim of the legislation is to reduce the adverse consequences of flooding on human health and the environment, and it outlines the requirements for flood risk assessments to be completed as part of the planning process.

Guidance relating to the EIA process that has been used to guide the assessment of potential impacts to the water environment and the identification of relevant mitigation include:

- Environmental Protection Agency Ireland (EPA) Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015).
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency (Draft, August 2017).
- Department of Housing, Planning and Local Government Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment (August 2018).

- Land contamination risk management[1] (LCRM) (October 2020), formerly Contaminated Land Report (CLR) 11 Model Procedures for the Management of Contaminated Land (2004), which presents guidance on the management of land contamination and the risk assessment needed to estimate its severity. The guidance details the concept of source-pathway-receptor linkages and the use of generic assessment criteria that are used in this assessment.
- National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) in relation to aspects to be considered and assessment approach (including relative receptor importance and cross discipline interactions).
- NRA Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (2007) in relation to impact mitigation.
- Institute of Geologists of Ireland (IGI) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013)
- CIRIA C532: Control of water pollution from construction sites. Guidance for consultants and contractors (2001).
- CIRIA C741: Environmental Good Practice on Site (2015, Fourth Edition) in relation to source of impact and mitigation.
- CIRIA C750: Groundwater control – design and practice (2016, Second Edition).
- Scottish and Northern Irish Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs) – these, although not Irish guidance, provide environmental good practice guidance for activities such as oil and chemical storage, works in or near water, works on construction sites, and dealing with spills and pollution incidents.

6.2.2 National and Local Policy

The National Planning Framework (Project Ireland 2040) includes National Policy Objective 60 to “Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance”.

At a national level, the River Basin Management Plan (RBMP) for Ireland 2018-2021 (Department of Housing, Planning and Local Government, 2018) outlines the measures that will be taken to improve the water quality in Ireland’s groundwater and surface water. This plan focuses on the following priorities:

- Ensuring compliance with relevant EU legislation;
- Preventing deterioration;
- Meeting the objectives for designated protected areas;
- Protecting high-status waters; and,
- Implementing targeted actions and pilot schemes in focused sub-catchments aimed at targeting water bodies close to meeting their objectives and addressing more complex issues that will build knowledge for the next cycle in the RBMP.

There is currently no local plan for Rathcoole, however the South Dublin County Council Development Plan 2016-2022 incorporated the relevant policies and objectives for the area. The area is included in Zoning

[1] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm, accessed January 2021.

Objective 'Ru' of the South Dublin County Council Development Plan 2016-2022 which has the description *'to protect and improve rural amenity and to provide for the development of agriculture'.* Specific policies relating to the protection of the water environment and management of surface water and groundwater include the following:

- IE2 Objective 1: To maintain, improve and enhance the environmental and ecological quality of our surface waters and groundwater by implementing the programme of measures set out in the Eastern River Basin District River Basin Management Plan.
- IE2 Objective 2: To protect the regionally and locally important aquifers within the County from risk of pollution and ensure the satisfactory implementation of the South Dublin Groundwater Protection Scheme 2011, and groundwater source protection zones, where data has been made available by the Geological Survey of Ireland.
- IE2 Objective 10: To require adequate and appropriate investigations to be carried out into the nature and extent of any soil and groundwater contamination and the risks associated with site development work, in particular for brownfield development.

6.3 Assessment Methodology and Significance Criteria

This section presents the method used to assess the impacts and effects of the proposed activities at the Site on the water environment, and to identify potential secondary effects from changes to the water environment. It establishes the stages of the assessment, and the qualitative criteria used to assess impact magnitude and determine the level of effect significance.

6.3.1 Sources of Information

The assessment has been carried out using the following sources of information:

- Site walkovers of the Site and inspection of the surrounding area in 2020 and 2021;
- Field monitoring and sampling campaigns carried out in 2020 and 2021;
- Field survey of the off-site drainage system in 2021;
- Correspondence with the Applicant/Site Owner and Site staff;
- Desktop reviews of previous impact assessments by Byrne Environmental (2013a; 2015) and Viridus Consulting (2020);
- Desktop reviews of literature and publicly available information (including interactive mapping services);
- Review of historic surface water monitoring information provided by the EPA;
- Review of historic planning applications for the Site and surrounding area; and
- Review of available aerials imagery (1991, 1994, 1995, 2000, 2004, 2012, 2016 and 2020).

A full list of references are provided in Section 6.15.

6.3.2 Qualitative Assessment Method

The assessment of potential effects has been undertaken using the qualitative assessment method outlined below. The assessment is supported by the available baseline condition information, historical records of site activities, previous hydrological and hydrogeological studies, historical monitoring data and recent monitoring and survey data collected to supplement the historical dataset. The assessment follows a staged approach. A summary of the stages involved is included below:

1) Confirm baseline conditions for the Site – using available recent monitoring data supported by historical monitoring data where available. Develop conceptual site model by consideration of available records and data sets, site reports and published information.

2) Confirm the key receptors and their value/importance.

3) Qualitatively characterise the magnitude of impacts on the receptors – describe what potential changes may occur to each receptor as a result of the Site activities, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage takes into account embedded design mitigation, good practice in construction environment management and pollution prevention.

4) Determine the initial effect significance of each potential impact on each sensitive receptor.

5) Consider the need for mitigation measures if it is considered necessary to reduce the initial magnitude of the impact and associated effect significance further.

6) Assess the residual impact magnitude and residual effect significance after all mitigation measures are applied.

7) Identify any monitoring that may be required to measure the success of the mitigation measures.

Stages 1 and 2 have been completed using available information specific to the Site, published literature and guidance, historical records, datasets and studies and additional monitoring data collected specifically to support this EIAR chapter. For the identification of receptor value/importance that completes Stage 2, and for the description of impact magnitude (Stage 3), a common framework of assessment criteria and terminology has been used based on the EPA's draft 2017 Guidelines on the Information to be Contained in EIARs and adapted based on the additional guidance outlined in Section 6.2.1, such as those by the NRA and IGI. The descriptions for value (sensitivity) of receptors are provided in Table 6.1 and the descriptions for magnitude of impact are provided in Table 6.2.

The potential for an impact to have occurred at a receptor has been determined using the understanding of the baseline environment and its properties and consideration of whether there is a feasible linkage between a source of impact and each receptor (i.e. a conceptual site model). This follows the method of preliminary risk assessment that is widely presented in some of the guidance documents listed in Section 6.2.1, such as the LCRM guidance.

Table 6.1: Environmental Value (Sensitivity) and Descriptions.

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution. For example: Global/European/National designation - or supports an internationally important feature. WFD river designation of 'High' and in hydraulic connectivity with the Site. Human health receptors. Regionally important aquifer with multiple wellfields. Inner source protection area for a regional resource. Regionally important potable water source supplying >2500 homes (surface water or aquifer). Floodplain protecting more than 50 residential or commercial properties or nationally important infrastructure (e.g. motorways/national roads) from flooding.

Value (sensitivity) of receptor / resource	Typical description
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. For example: Regionally important sites. Regionally important aquifer. WFD river designation of 'Good' or 'Moderate'" and in hydraulic connectivity with the Site. Outer source protection area for a regional resource. Locally important potable water source supplying >1000 homes (surface water or aquifer). Floodplain protecting between 6 and 50 residential or commercial properties or regionally important infrastructure (e.g. regional roads) from flooding.
Low	Low or medium importance and rarity, local scale. For example: Locally important aquifer. WFD river designation of 'Poor' or 'Bad' and in hydraulic connectivity with the Site. Outer source protection area for a local resource. Local potable water source supplying >50 homes (surface water or aquifer). Floodplain protecting between 2 and 5 residential or commercial properties or locally important infrastructure (e.g. local roads) from flooding.
Negligible	Very low importance and rarity, local scale. Environmental equilibrium is stable and is resilient to impacts that are greater than natural fluctuations, without detriment to its present character. Poorly productive aquifer. Any WFD river quality designation not in hydraulic connectivity with the Site. Local potable water source supplying <50 homes (surface water or aquifer). Floodplain protecting up to 1 residential or commercial properties from flooding.

Table 6.2: Magnitude of Impact and Typical Descriptions.

Magnitude of impact (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. Significant harm to human health - death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Significant harm to buildings/infrastructure/plant - Structural failure, substantial damage or substantial interference with any right of occupation. Significant pollution of the water environment, which is defined by: ■ A breach of, or failure to meet, any statutory quality standard for the water environment at an appropriate pollution assessment point. ■ A breach of, or a failure to meet, any operational standard adopted by EPA for the protection of the water environment.

Magnitude of impact (change)		Typical description
		■ Pollution results in an increase in treatment required for an existing drinking water supply. ■ Pollution results in an increased level of treatment required of water abstracted for industrial purposes. ■ Pollution results in deterioration in the status of a water body, failure to meet good status objectives defined by the Water Framework Directive, or failure of a protected drinking water area to meet its objectives as defined by the Water Framework Directive. ■ There is a significant and sustained upwards trend in concentration of pollutants in groundwater being affected by the land in question. There is a material and adverse impact on the economic, social and/or amenity use associated with a particular water environment.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

The assessment of magnitude of the impact considers whether the change that causes the impact is positive or negative, and whether the impact is direct or indirect, short- medium- or long-term, temporary or permanent, and if it is reversible.

For the purposes of this assessment, a direct impact is one that occurs as a direct result of the Proposed Development and is likely to occur at or near the development itself. Indirect impacts (or secondary/tertiary impacts) are those where a direct impact on one receptor has another knock-on impact on one or more other related receptor(s) (e.g. the Proposed Development results in a change in groundwater quality, which then has an indirect impact on surface water quality and/or users of the water, such as human health or ecology). Indirect impacts can occur within the study areas or away from the Proposed Development.

For the purposes of this assessment, the following definitions of duration have been used:

- Temporary – effect likely to last less than 1 year without intervention;
- Short term – effect likely to last 1 to 7 years without intervention;
- Medium term – effect likely to last 7 to 15 years without intervention;
- Long term – effect likely to last 15 to 60 years without intervention; and
- Permanent – effect likely to last over 60 years without intervention.

An irreversible impact is defined as a change to the baseline that would not reverse itself naturally. Such impacts are usually long-term or permanent and irreversible, such as changes to the groundwater flow regimes caused by changes to the properties of the subsurface.

A reversible impact is defined as a change to the baseline conditions that would reverse naturally once the source of the impact is exhausted, removed or has stopped. For example, impacts to groundwater quality from contamination only last as long as the source of the impacts is present. If it is removed, groundwater quality may naturally improve or could be remediated.

6.3.3 Significance Criteria

The approach followed to derive effects significance from receptor value and magnitude of impacts (Stage 4) is shown in Table 6.3. Where Table 6.3 includes two significance categories, supporting evidence is provided in the topic chapters to support the reporting of a single significance category is reported. A description of the significance categories used is provided in Table 6.4.

Table 6.3: Significance Matrix.

	Magnitude of Impact (Degree of Change)				
Environmental value (Sensitivity)		Negligible	Low	Medium	High
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 6.4: Significance Categories and Typical Descriptions.

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

Following the assessment of the level of effect significance, mitigation measures are presented that will be used to further avoid, prevent or reduce the magnitude of the potential impact (Stage 5). If necessary, the significance of the effect taking into account the mitigation measures is then assessed (Stage 6) to give the residual effect significance. Any monitoring that will be required to measure the success of the mitigation measures is also presented in Section 6.10 (Stage 7).

Residual effects of 'large' or 'profound' significance are considered to be 'significant' for the purposes of this assessment.

The effects of the Proposed Development are also considered cumulatively with those that could foreseeably result from other known developments in the assessment study area that are going through the planning process (see Section 6.11).

6.4 Baseline Conditions

This Section presents a summary of the baseline conditions for the water environment (hydrology, hydrogeology and flooding). Detailed information about land use, soils and geology and ground conditions at the Site is included in Chapter 5.0, Land, Soils and Geology.

6.4.1 Site Setting

Behan Quarry is located on the hillside at Windmill Hill, Rathcoole, County Dublin. Windmill Hill, located immediately south of the Site, is located at a topographical highpoint of circa (ca.) 219 mAOD. Quarrying activities have been permitted at the Site since 1968. Aerial photography which shows the quarry, and the surrounding land use are presented in Figure 5.2 of Chapter 5.0, Land, Soils and Geology. Access to the Site is via the N7, which is located north of the Site and connected to the Site entrance.

The land surrounding the Site is predominantly used for agricultural pasture and it is likely that the Site was also used for agricultural purposes prior to the commencement of any quarrying activities. Some commercial and single-house residential properties are also located in the immediately surrounding area (as presented on Figure 3.2 in Chapter 3.0, Populations and Human Health).

Regionally, the nearest town is Rathcoole which is located approximately 800 m to the northeast of the Site. Beyond this there are several other small towns and suburbs of Dublin. Other notable land uses in the regional vicinity of the Site are Greenogue Business Park and Casement Aerodrome located further to the northeast of the Site (approximately 2.6 km and 3.5 km respectively).

6.4.2 Site Layout

A detailed description of the Site layout and infrastructure is presented in Chapter 2.0 (Project Description), with only key information relevant to the water environment detailed below.

The Site is comprised of three main areas: a northern area with buildings, parking and storage areas (including a fuel storage and refuelling area); a central plant area with a concrete plant (not active), asphalt plant, water treatment plant and plant used for the screening, washing and bagging of excavated material; and a southern area where material is subject to extraction, crushing and screening.

The Site covers an area of ca. 46.14 ha, with ca. 28.8 ha classed as a worked area. The northern and central plant area is ca. 5 ha in size. The extraction activities at the Site are in two distinct areas: the east quarry and west quarry with ponding of water observed at the base of each pit. Silt settlement ponds are located in the southern area between the western and eastern pits.

6.4.3 Site Topography

The Site is situated on the northern flank of Windmill Hill, which reaches a peak of ca. 219 mAOD close to the southern boundary of the Site and is elevated in comparison to the surrounding area. The peak of Windmill Hill forms a topographical divide, with the ground surface sloping radially away from this peak (e.g. south flank slopes towards the south).

In general, the topography at the Site boundary is higher in the south, peaking at around 210 mAOD along the southern boundary and sloping to the north to a minimum elevation of ca. 142 mAOD at the Site entrance. This is shown on the Section 37L Planning Application Drawing No. 03. Currently two pits are present on the Site, the larger west pit and smaller east pit both to a maximum depth of ca. 150 mAOD. During the planned extension, the lateral extent of these two pits will be extended as shown on the Section 37L Planning Application Drawing No. 04.

The existing and planned changes to topography are presented in cross-sections on Section 37L Planning Application Drawing No. 05. The existing ground level in north-south cross sections (transect lines A and C) show the excavations in the western and eastern pits to ca. 150 mAOD with the topography rising on either side of the pit extents. Planned extension along these transects lowers the presently un-excavated materials from an elevation of 160-180 mAOD to ca. 150 mAOD.

West-east cross sections (transect line B and D) crosscut areas of the site which are not included in the current (2021) pit extents but will be included in the planned extension. Generally, the existing topography within the application boundary will be excavated from 166-180 mAOD to ca. 150 mAOD during the next phase of the quarry extension.

Post-extension of the quarry, the Site will be restored as per the Site Restoration plan. This involves allowing the groundwater levels to rebound and flood the quarried areas, creating a habitat for roosting and nesting birds. The central and northern areas will remain at an elevation of ca. 158-160 mAOD (i.e. above water level) with plant to be removed.

6.4.4 Site Water Requirements and Management

A summary of the 2021 Site water requirements and management scheme, as derived from walkovers carried out in 2020 and 2021, is shown in Figure 6.2 and Figure 6.3. An on-site well supplies water to the office buildings for toilet flushing and handwashing and is also used to supply the four wheelwash facilities located at the weighbridge area. The Applicant reports that bottled water has been used for on-site supply of drinking water.

The wheel wash facility near the weighbridge is a static system which sprays high pressured water as the vehicles pass through. The system uses a water storage recycling tank allowing for minimum usage of water. This is topped up as necessary from the on-site water supply.

An operational water supply is also required at the Site for use in the washing plant. The concrete plant is noted to not yet be in use and therefore no water is required for concrete batching. Operational water is pumped from the pond in the flooded western pit area for use in the central plant area. Following periods of prolonged rainfall water is periodically discharged to a culvert located adjacent to the Site entrance. Overflow from the water tank is returned to the flooded pit area as necessary.

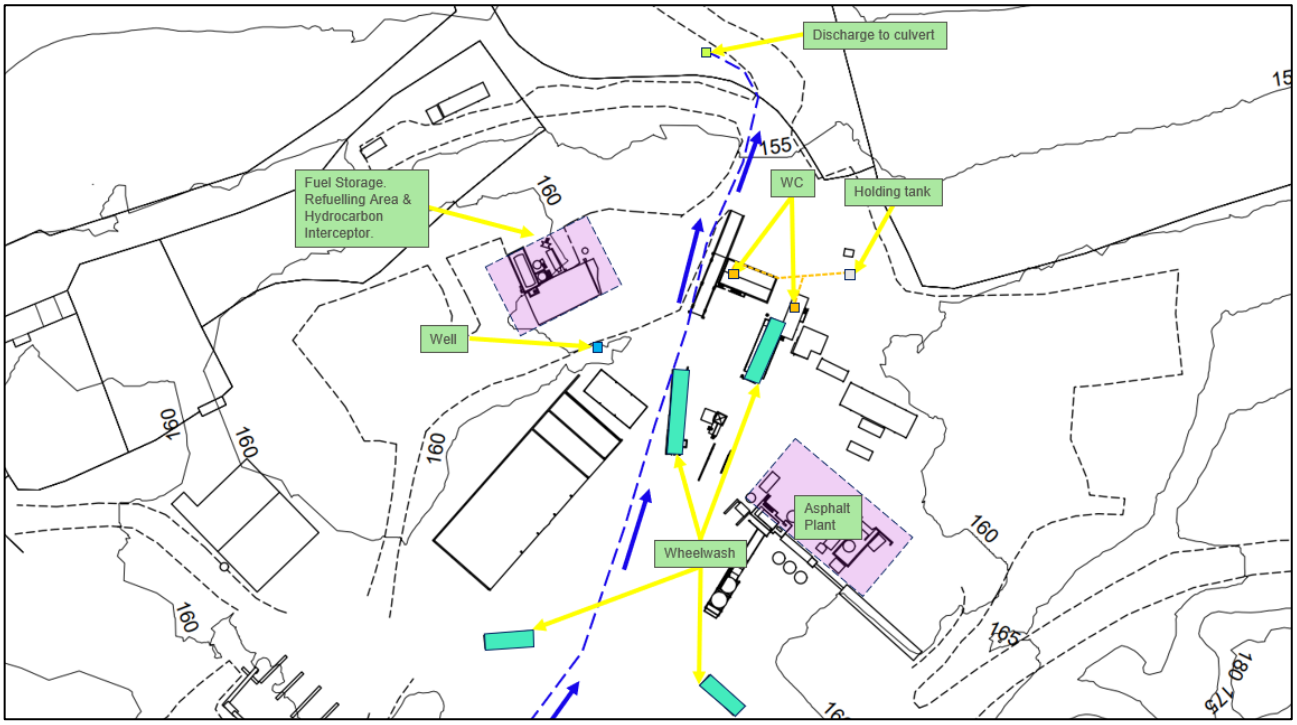


Figure 6.2: 2021 Site Layout, Key Infrastructure and Water Management in the Northern Area of the Site.

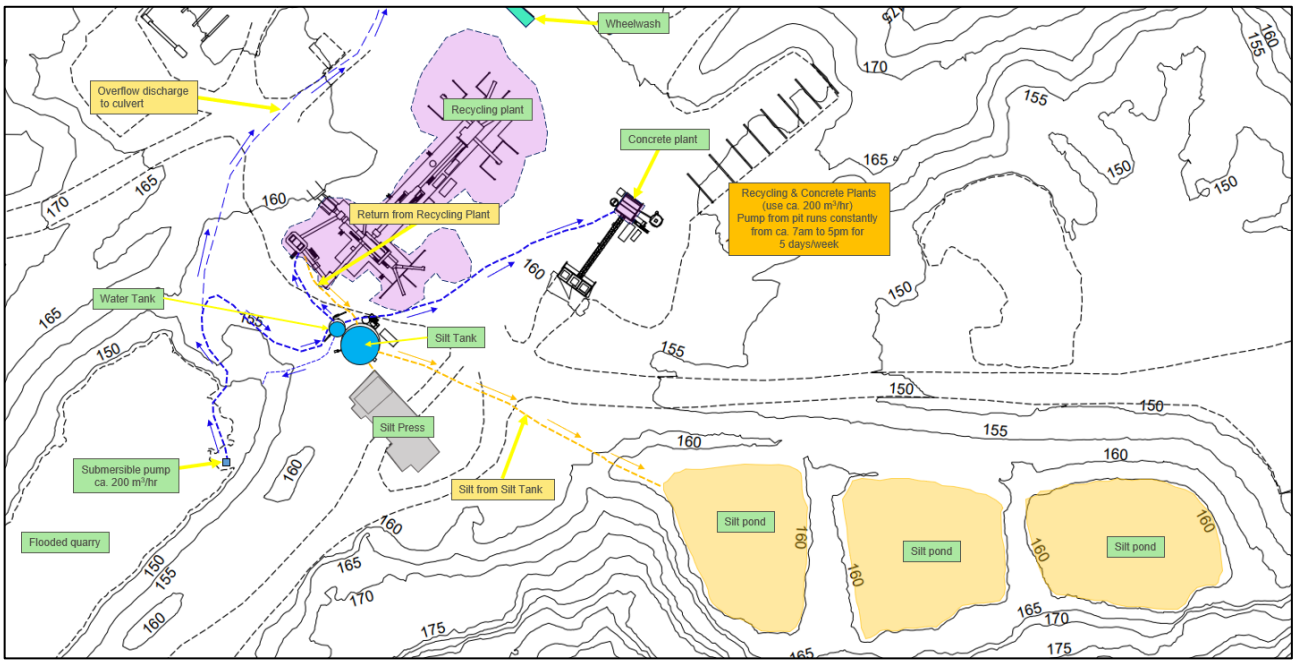


Figure 6.3: 2021 Site Layout, Key Infrastructure and Water Management in the Central and Southern Areas of the Site.

A drainage survey of the culvert used for periodic discharge was carried out in 2021 and identified a piped flow path north towards the N7 dual carriageway, where it joins the road's drainage system. The discharge culvert is not connected to the Irish Water public supply mains which runs adjacent to the Site boundary near the entrance (see Section 6.4.10 for further information regarding this water mains).

Wastewater is generated at the Site via welfare facilities and is handled separately to the operational and well water supplies. Welfare wastewater is discharged to a holding tank in the northern area of the Site, and is periodically emptied by a contractor. Water generated from the washing plant is pumped to a silt tank, where

flocculant is added. The flocculant used by the Applicant is Pollygold A260 (supplied by Abbey Water Limited in Cork) with ca. 15 kilograms used per day. The silt laden water is then transferred to either the silt press or the contained silt ponds, these are shown on Figure 6.3. In the silt ponds, the silt settles from the water and the water is either allowed to evaporate or discharge to ground. It is expected that the settlement of silt in these ponds will limit the amount of wastewater infiltration to ground.

6.4.5 Geology

The geology of the Site is presented .in detail in Chapter 5 of this EIAR (Land, Soils and Geology). Borehole logs are also provided in Chapter 5.0.

6.4.5.1 Superficial Deposits

The cover of superficial deposits on the Site has been progressively removed due to quarrying activities and in 2021 these are observed to have been largely removed across the Site footprint but remaining present adjacent to the worked areas of the Site.

Superficial deposits on the Site are comprised of glacial tills derived from the Silurian bedrock (EPA, 2021).

Subsoils are mapped as being sandstone and shale tills which have a clayey texture and derived from Lower Palaeozoic parent material around the northern perimeter of the Site and underlying the majority of the wider study area (EPA 2021). The majority of subsoils underlying the quarry area have been mapped by the EPA (2021) as bedrock which is at surface, this extends into the south, west and east of the study area.

A thin organic topsoil, typically 100 mm to 200 mm thickness was identified around the perimeter of the site during the site walkover (Viridus Consulting, 2020) which would be typical in this type of agricultural grassland.

6.4.5.2 Bedrock

GSI mapping (GSI, 2021) indicates that the Site is underlain by the Carrighill Formation of Silurian calcareous greywacke, siltstone and shale. This is the youngest and most fine grained of the Kilcullen Group bedrock unit. There are no karst features in the immediate vicinity of the Site, with the nearest feature located approximately 10.8 km to the north of the Site.

The regional setting is one of large-scale northeast-southwest trending upward (anticline) and downward (syncline) fold features which are dissected by (predominantly) northwest-southeast trending faults. The site is located on the northern limb of a syncline which dips around 50° to the south east. No faults are shown to cross the site, with the closest fault located approximately 0.8 km from the Site (GSI, 2021).

Bedrock has progressively been extracted at the Site to be processed and sold commercially.

6.4.5.3 Made Ground

There are small areas of made ground in the form of concrete pads and other concrete/tarmacadam hard standing areas located around the quarry processing area, offices, and parking areas.

6.4.6 Surface Water- Hydrology

6.4.6.1 Rainfall and Climate Data

Table 6.5 presents rainfall data recorded at the Brittas (Glenaraneen) meteorological station (number 7923) which is located approximately 6 km to the south of the Site, for the period 1990-2020 (Met Eireann, 2021).

The rainfall recorded at the Brittas meteorological station consistently fluctuates through the dataset, with a calculated average of 1,022.6 mm/a and a range of 783.8 (1991) to 1,317.5 (2009) mm/a. There is no increasing or decreasing trend in rainfall over this timeframe.

Evaporation or evapotranspiration data is not available at Brittas (Glenaraneen) meteorological station, with the closest available data at Dunsany, located ca. 20 km north of the Site.

GSI mapping (2021) indicates an effective rainfall (rainfall minus actual evapotranspiration) of approximately 416 mm/year across the Site footprint and the surrounding areas.

Table 6.5: Yearly Rainfall Data for Brittas (Glenaraneen) station no 7923 (Met Eireann, 2021).

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rainfall (mm/a)	1009.1	783.8	746.5	1208.6	1040.2	965.2	1028.8	790.8	1197.3	1084.6	1140.5
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Rainfall (mm/a)	817.0	1258.2	814.7	926.7	895.5	924.7	1071.7	1231.8	1317.5	943.7	990.7
Year	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Rainfall (mm/a)	1258.5	852.4	1300.1	1097.2	1011.9	987.1	998.7	1121.4	884.6		

Note: Yearly data is based on monthly rainfall data measured at Brittas meteorological Station. Full 12 months of data not available for years 1997, 2003, 2004, 2008, 2019 and 2020.

1 in 100 year storm event rainfall data was presented in previous reporting for the Site (Byrne Environmental, 2013b) and is summarised as follows:

- 15 minutes = 22 mm rainfall;
- 60 minutes = 34.5 mm rainfall; and
- 1440 minutes (1 day) = 87 mm rainfall.

6.4.6.2 Local Surface Water Flow Directions

On-Site Surface Water Flows

There are no surface water features (e.g. streams, rivers) located within, or immediately adjacent to the Site boundary. Based on the layout and topography of the Site in 2021, any precipitation falling on the Site would either directly infiltrate the ground or flow towards the existing topographic low points: the two areas of excavation or the entrance to the Site.

The area in the northern portion of the Site where the office buildings and welfare facilities are located is relatively flat at ca. 158-160 mAOD. Around the perimeter of this area, which is still vegetated, the ground elevation can be slightly higher. From this point, the Site entrance to the N7 roadway decreases in elevation by around 15 m to reach a ground elevation of ca. 142 mAOD at the roadway intersection.

It is interpreted from the topographical survey that some informal bunding is used on the Site to control any surface water flows from higher elevation areas and prevent the movement of water off of the Site via the entrance way. Without the raised vegetated area between the access road and the storage and car park area

any runoff from this area may flow directly downgradient onto the N7 roadway. Instead, any rainfall that does not infiltrate to ground is redirected into one of the topographical low-points of the Site.

Additionally, it was noted during a Site walkover carried out by Golder during heavy rainfall that there were no surface flows along the length of the entrance road. The entrance road was observed to camber, directing any rainfall which does not infiltrate at surface to infiltration gullies located at either side of the roadway.

Local Surface Water Features

Local surface water features are predominantly fed by rainfall runoff from higher topographical areas which collect in natural gullies and form headwaters for tributaries to larger streams and rivers. The river network in the area surrounding the Site is shown in Figure 6.4.

The Site is located within the broader River Griffeen catchment which forms part of the wider River Liffey system. The Highdown Hill stream is located approximately 0.8 km to the north of the Site and flows northeast. The Tootenhill Stream is located approximately 0.5 km to the south-east of the Site and flows in a north-easterly direction. The Highdown Hill and Tootenhill Streams converge approximately 1.5 km northeast of the Site to become the River Griffeen, eventually joining the Liffey River system.

To the south of the Site (ca. 1.2 km) several small streams flow into the Kill East River with flows in a north-westerly direction to join the Painestown River ca. 5.7 km to the west of the Site. Flow continues in a north-westerly direction before joining the River Morell approximately 7.5 km to the west of the Site.

The River Camac is located approximately 1.8 km to the east of the Site and flows north.

Previous reporting for the Site (Viridus, 2020) reported no evidence of overland surface water drainage out of the quarry or connectivity between the surface water pond features in the quarry and any local surface water features. Current 2021 conditions are consistent with this assessment.

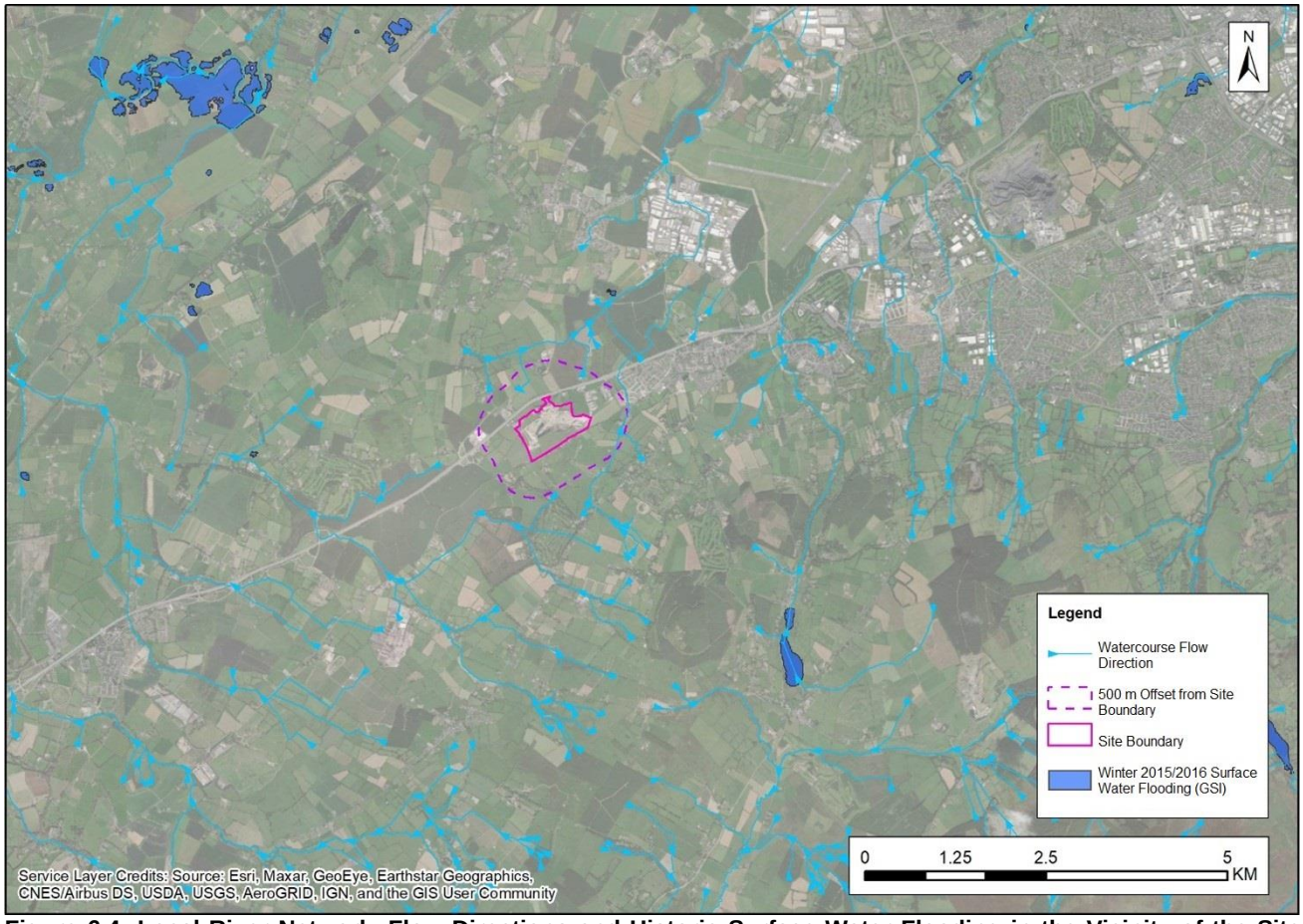


Figure 6.4: Local River Network, Flow Directions and Historic Surface Water Flooding in the Vicinity of the Site (after GSI, 2021).

Note: Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND 4.0) International Licence.

6.4.6.3 Local Surface Water Quality

The local surface water quality has been derived using a combination of publicly available data, historic monitoring records requested from the EPA and Site-specific monitoring carried out at select locations between 2006 and 2021.

Publicly Available Water Quality Data

The WFD Status and River Quality (Q) values of each of the rivers, as assigned by the EPA, are shown spatially in Figure 6.5 and summarised in Table 6.6.

To the north and the east of the Site the River Griffeen (which is a tributary of the Liffey River system) is classified as ‘good’ under the River Waterbody WFD 2013-2018 system. The most recent river quality (Q Value) status was recorded at the College Road Station as 2-3 (‘poor’) in 1991.

Approximately 3.8 km to the southwest of the Site the River Painestown is classified as ‘poor’ under the River Waterbody WFD 2013-2018 system. At the Painestown Brook station the river quality (Q value) status is 4 (‘good’) in 2019 which has improved since 1991 when the Q value was 1-2 (‘bad’).

The River Morell is located to the south and west of the Site (minimum 810 m) and is classified as ‘moderate’ under the River Waterbody WFD 2013-2018 system. There is no available river quality data (Q value) until the Painestown Bridge (north of Alasty) monitoring station (Station number P010450), located after the River Painestown joins with the River Morell. The Q value here is 3 (‘poor’) and was last recorded in 1991.

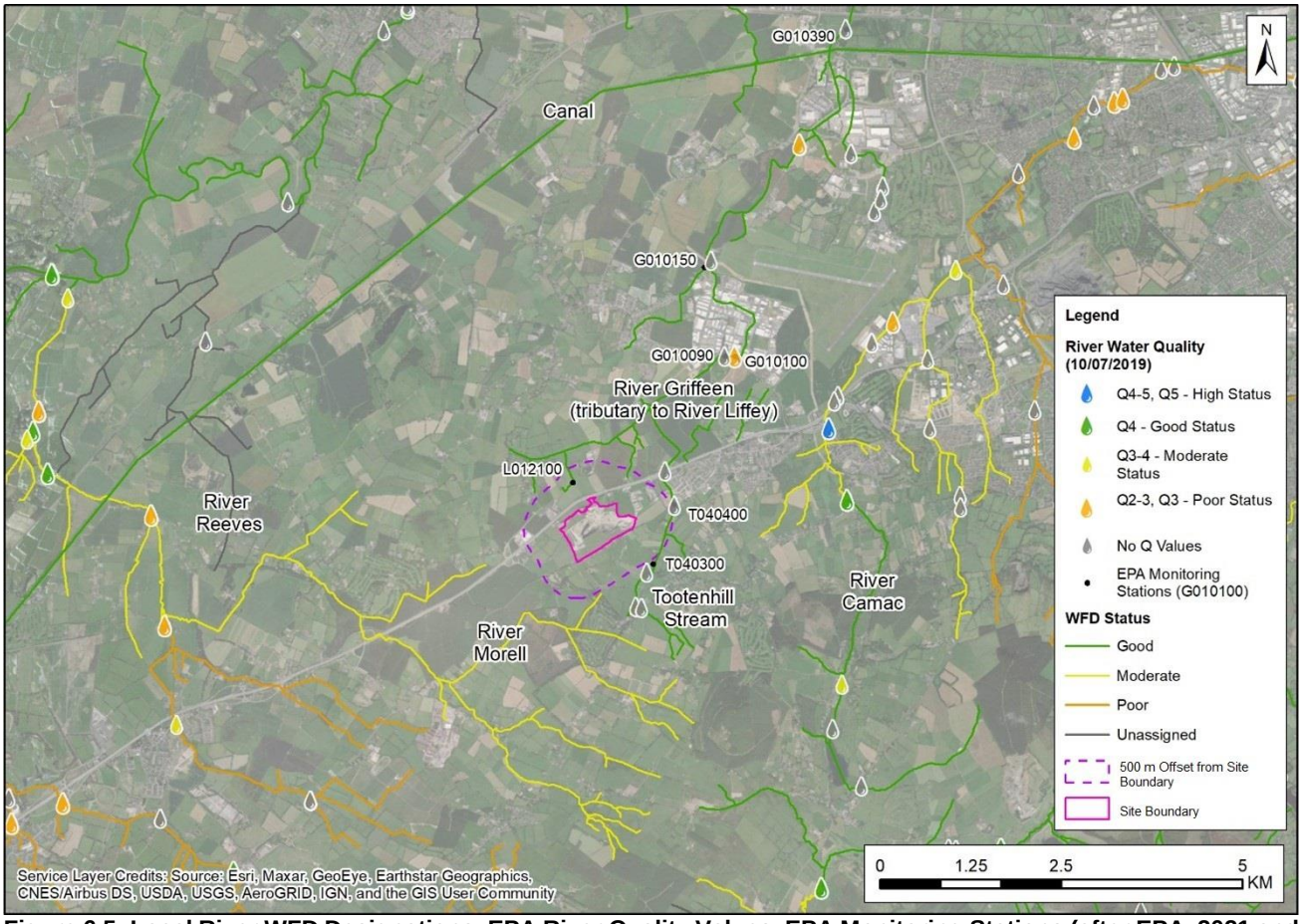


Figure 6.5: Local River WFD Designations, EPA River Quality Values, EPA Monitoring Stations (after EPA, 2021 and GSI, 2021)

The closest branch of the River Camac is 1.8 km to the east of the Site. The River Waterbody WFD 2013-2018 classifies this section of the river as ‘moderate’. The River Q value along this stretch of river is available at four stations. The most upstream station (C020050) recorded a Q value of 3-4 (‘moderate’) in 1986, this decreases to 3 (‘poor’) by the monitoring station closest to the Site (C020100). Further downstream as the river flows through Rathcoole and adjacent to the Aerodrome, the Q value is recoded as 4-5 (‘high’) in 1991 and 2 (‘bad’) in 1998 at the two monitoring stations respectively. It is noted that this area receives urban wastewater discharge from the Rathcoole and Newcastle areas (EPA, 2021).

EPA surface water quality monitoring data from 1995 to 2003 is available from three monitoring stations along the River Griffeen: 09G010090 and 09G010100 located downstream of the Site but upstream of Greenogue Business Park and Casement Aerodrome and 09G010350 located further downstream before Adamstown.

The EPA dataset includes a small range of parameters for assessing the surface water quality: biological oxygen demand (BOD), conductivity, dissolved oxygen, nitrates, nitrites, ortho-phosphate, pH, temperature, total oxidised nitrogen (TON), total ammonium, un-ionised ammonia and ammonia. A tabulated and graphical summary of this data by year is presented in Appendix 6.1.

The dataset is small and surface water screening criteria for these analytes are generally not available, however the following observations are made:

- Conductivity in the samples throughout the monitoring period from 1995 to 2003 is generally consistent and ranges between 582 µS/cm and 708 µS/cm across all of the monitoring stations;

- Concentrations of nitrate, nitrite and ortho-phosphate showed higher concentrations in samples from all three monitoring stations in the data prior to 2000 before showing a decreasing trend towards 2003 (the end of the monitoring period); and
- pH concentrations showed very little variability over the monitoring period or between monitoring stations ranging between 8.09 and 8.32.

Table 6.6: Summary of WFD Status and River Q Value in Surface Water Features Close to the Site (EPA, 2021).

River Name	WFD Status (2013-2018)	Station Code	River Q Value (and year recorded)	
River Liffey_170	Good	G010100/ Griffeen	2-3 – Poor (1991)	
River Camac_010	Good	C020050/ Camac	3-4 – Moderate (1986)	
		C020100/ Camac	3 – Poor (2019)	4– High (1991)
River Camac_020 (downstream)	Moderate	C020150/ Camac	4-5 – High (1991)	
		C020200/ Camac	2 – Bad (1998)	2 – Bad (1990)
River Painstown_010	Poor	P010400/ Painestown	4 – Good (2019)	1-2– Bad (1990)
River Morell_040	Moderate	P010450/ Painestown	3 – Poor (1991)	

2006-2013 Surface Water Quality Investigations

As part of previous investigations at the quarry site, surface water monitoring was carried out in 2006, 2008 and 2013 (Byrne Environmental, 2015) on the nearby waterbodies. These water quality assessments were carried out to assess the quality of the surface waters within the vicinity of the quarry site.

The results of the surface water sampling were compared by Byrne Environmental against guideline values from the European Communities Surface Water Regulations, 2009 (Statutory Instrument (S.I.) No. 272/2009) or the Surface Water Quality for Salmonid Waters Regulations (S.I. No. 293/1988). The water quality was found to be good with generally low levels of BOD, COD, suspended solids and nutrients. Phosphate levels were found to be slightly elevated in SW2 and SW3, but this may also be as a result of agricultural run-off from the surrounding land. Sample SW2 is reported to have been collected from Tootenhill stream, the location of samples SW1 and SW3 is unknown.

2020-2021 Surface Water Quality Investigations

During the 2020-2021 monitoring period surface water samples were taken by Golder from the following locations (see Figure 6.5):

- L012100 – Athgoe Stream EPA monitoring station, tributary of the River Griffeen. Located north of the Site (downslope of the Site).
- T040300 – Tootenhill Stream EPA monitoring station, tributary of the River Griffeen. Located southeast of the Site (upstream).

- T040400 – Tootenhill Stream EPA monitoring station, tributary of the River Griffeen. Located east of the Site (upstream).
- G010100 – Griffeen River EPA monitoring station. Located north east of the site (downstream).
- G010150 – Griffeen River EPA monitoring station. Located north-northeast of the site (downstream).
- SW1 – On-Site, western pond. Sample taken in the vicinity of the submersible pump area (Figure 6.3).

The western pond area (SW1) is considered to be a mixture of rainfall and groundwater and is periodically pumped following periods of prolonged rainfall to a discharge culvert near the Site entrance. The discharge culvert drains to the N7 drainage system, where it is assumed for the purpose of this assessment, to discharge untreated to a tributary of the Griffeen close to Rathcoole.

Samples from SW1 were collected in June 2020 and January 2021. All other surface water samples were collected during January 2021. Each sample was tested at UKAS accredited Element Materials Technology laboratory for the following parameters:

- Dissolved metals: Arsenic, Boron, Cadmium, Calcium, Chromium, Copper, Lead, Magnesium, Mercury, Nickel, Potassium, Selenium, Sodium (2021 only), and Zinc;
- Total Hardness (Dissolved as $CaCO_3$);
- MTBE. Benzene, Toluene, Ethylbenzene, m/p Xylene, o-Xylene;
- Extractable Petroleum hydrocarbons (C8-C40);
- Sulphate;
- Chloride;
- Nitrate as NO_3;
- Nitrite as NO_2;
- Orthophosphate as PO_4;
- Total Oxidised Nitrogen;
- Ammoniacal Nitrogen as NH_4;
- Total Alkalinity as $CaCO_3$;
- Dissolved Oxygen (2020 only);
- Electrical Conductivity (2020 only);
- pH (2020 only);
- Total Organic Carbon; and
- Total Dissolved Solids.

The results of the groundwater and surface water quality analysis at the Site are presented in Appendix 6.1 (locations presented in Figure 6.5) and compared with the Environmental Quality Standards (EQS) for inland surface waters, as outlined in the European Communities Environmental Objectives (Surface Water) Regulations S.I. No.272/2009 including amendment S.I. No.386/2015. The maximum allowable concentration (MAC) for inland water EQS values have been applied as more than two samples would be required to establish

an average (AA) concentration for comparison against the AA EQS values. Where a screening value does not exist the UK EQS were applied (Freshwaters specific pollutants and operational EQS and Freshwaters priority hazardous substances, priority substances and other pollutants[2]). Full screening results are presented as Appendix 6.2. The laboratory certificates for the results are included in Appendix 6.3.

Surface water is generally shown to be of good quality in 2020-2021 with no exceedances of the MAC EQS values during the 2020 and 2021 monitoring period, although it should be noted that the limit of detection for dissolved mercury (0.1 mg/l) exceeds the MAC of 0.07 mg/l. Dissolved mercury was found to be less than the limit of detection in all of the samples.

For completeness, the surface water data presented in Byrne Environmental (2015) was also compared against the same surface water screening values as the most recent 2020-2021 set of samples. No exceedances were found. A full summary of the data is also presented in Appendix 6.2.

6.4.7 Groundwater- Hydrogeology

6.4.7.1 Local Aquifers and their Properties

The clayey superficial deposits in the vicinity of the Site are not designated as an aquifer by the GSI, with the closest gravel aquifer located ca. 7 km to the south-west (GSI, 2021).

The GSI aquifer designation (GSI, 2021) for bedrock underlaying the Site is shown in Figure 6.6. Bedrock underlying the footprint of the Site (Carrighill Formation) falls within the catchment of the Kilcullen groundwater body which is defined as ‘good’ water quality under the WFD and has a designation of ‘Pu’ or ‘poorly productive bedrock’ (GSI, 2021). A ‘Pu’ poor aquifer is described by the GSI (GSI, 2017) as:

- Generally unproductive with generally few poorly connected fractures, fissures and joints;
- Having a shallow weathered zone of slightly higher permeability (top few m’s), which decreases with depth;
- Having poor aquifer storage, short flow paths (tens of m’s) and low recharge acceptance;
- The presence of higher permeability fault zones is rare; and
- Groundwater baseflow contribution to surface water features is very limited.

Bedrock of the Tipperkevin Formation is located ca. 1.1 km to the south of the Site and is classified as a ‘Pl’ poor aquifer, which is described as generally unproductive except for local zones. Bedrock of the Lucan Formation is located approximately 1.7 km to the north of the Site and is classified a ‘Ll’ locally important aquifer, which is described as moderately productive only in local zones. Due to the unproductive nature of the Carrighill Formation, the Site is not interpreted to be in hydraulic connectivity with the aquifers of the Tipperkevin and Lucan Formations.

[2] https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit#screening-tests-freshwaters

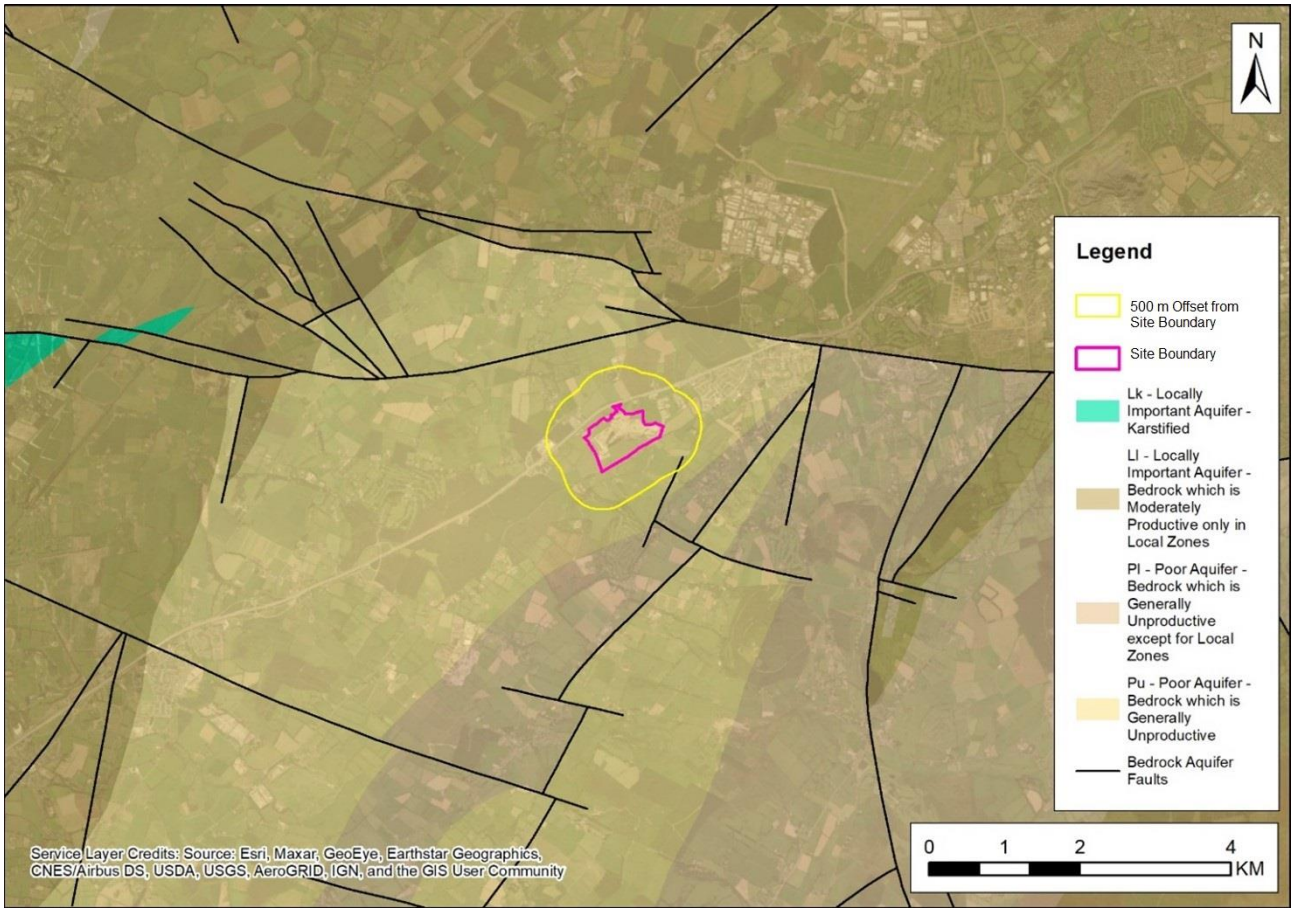


Figure 6.6: GSI Bedrock Aquifer Designations (after GSI, 2021)

There are no records for estimated values for hydraulic conductivity at the Site, although values for bedrock geology similar to the Carrighill Formation can be found in the literature. Table 6.7 summarises the hydraulic conductivity for shale and cemented sandstone as found in Driscoll (1986), and Kelly *et al*. (2015) report a geomean transmissivity value of 5.5 m^2/day for 'Pu' aquifers.

Table 6.7: Hydraulic Conductivity Values (Driscoll, 1986)

Rock Type	Hydraulic Conductivity Ranges	
	Minimum	Maximum
Sandstone (cemented)	$1.00x10^{-5}$ m/d **$1.16x10^{-10}$ m/s**	$1.00x10^{-3}$ m/d **$1.16x10^{-8}$ m/s**
Shale	$1.00x10^{-9}$ m/d **$1.16x10^{-14}$ m/s**	$1.00x10^{-4}$ m/d **$1.16x10^{-9}$ m/s**

Groundwater Vulnerability (DELG/EPA/GSI, 1999) defines how easily groundwater may be contaminated by human activities. According to the GSI online mapping tool (GSI, 2021) the footprint of the Site is classified as 'Rock at or near Surface or Karst' (Figure 6.7). This is appropriate due to the presence of only thin superficial cover or exposed bedrock across much of the Site; the area immediately surrounding the Site generally has a groundwater vulnerability classification of 'high' to 'extreme' for the same reason.

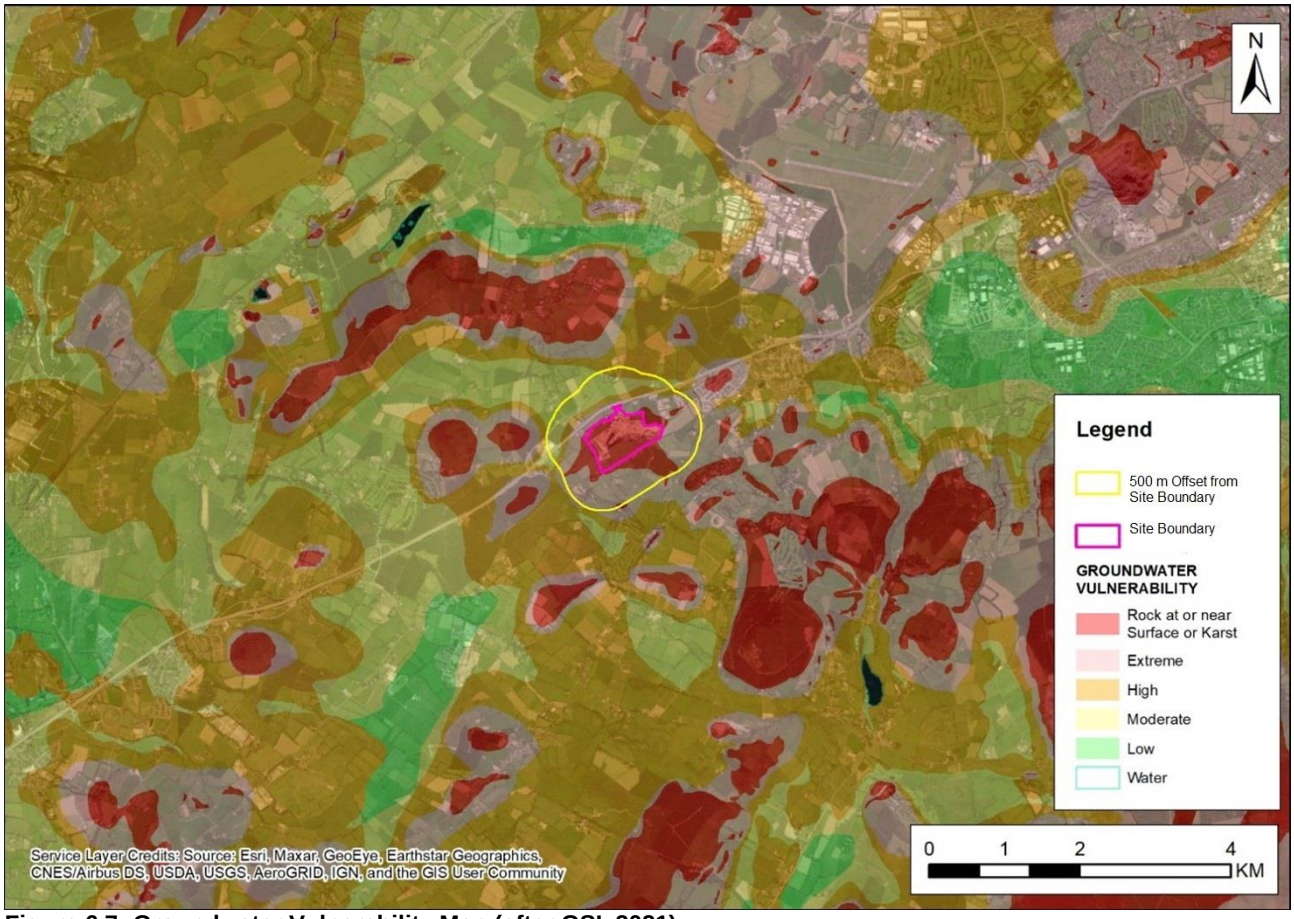


Figure 6.7: Groundwater Vulnerability Map (after GSI, 2021).

Soils and subsoils under the footprint of the Site are classified by GSI mapping as being bedrock outcrop and subcrop with a potential recharge coefficient of 85%. However, the ability of the bedrock aquifer to accept all available groundwater recharge is considered to be low and therefore the groundwater recharge map presents a maximum allowable estimated recharge to bedrock of 100 mm/year (GSI,2021).

Subsoils and shallow bedrock at the Site were reported to accept drainage rates of between ca. 5 to 9 mm/min in site suitability assessments carried out in 2013 (Trinity Green, 2013).

6.4.7.2 Local Groundwater Elevation

Aerial photography from 1991 (Figure 6.8) suggests that there was no pond formation in the areas of extraction activities and therefore significant quantities of groundwater had not yet been encountered at the Site. The lowest elevation of the quarry floor at this time is estimated to be ca. 158-160 mAOD and therefore the potential piezometric surface across the quarried area is assumed to have an elevation of less than 158 mAOD.

Whilst it is considered likely that small quantities of groundwater seepages may have been encountered within fractures or bedding planes at the southern extent of the quarry (which would have been operating below the elevation of upgradient groundwater), there is no evidence of groundwater pooling (Figure 6.8). It is therefore thought that any seepage volumes were small and recharged to unsaturated ground close to the quarry face. There are two small areas where ponded water may potentially be observed on the 1991 aerial photography (circled red on Figure 6.8); however, these are considered to be areas of rainfall runoff collected at a topographical low point (area circled in red t), and therefore not groundwater.



Figure 6.8: Area of Extraction Activities in 1991 (southern extent of Site, quarry floor is ca. 158-160 mAOD). Circled areas indicate potential locations of ponded water. Source of aerial imagery: Ordinance Survey Ireland.

In 2016, it can be seen that substantial flooding of the west pit had occurred. A bench in the southern pit wall can be seen in both 2016 and 2020 aerial photography (Figure 6.9) and is estimated from the 2020 topographical survey to be at an elevation of ca. 160 mAOD (Figure 6.10).

The ponded water level is estimated from the 2016 aerial photography to be at an elevation approximately 5 m below this bench (ca. 155 mAOD). It is not known whether pumping was employed at this time, however, given the unsaturated nature of the quarry in 1990, which had an elevation of ca. 158-160 mAOD, this pond elevation is likely to represent unmanaged (i.e. rest) groundwater. This water elevation of ca. 155 mAOD represents the elevation that the groundwater is expected to rebound to in the post-pumping restoration phase.



Figure 6.9: West Pond Area in 2016 and 2020. Circled Area = Bench ca. 160 mAOD. Source of Aerial Imagery: Google Earth.

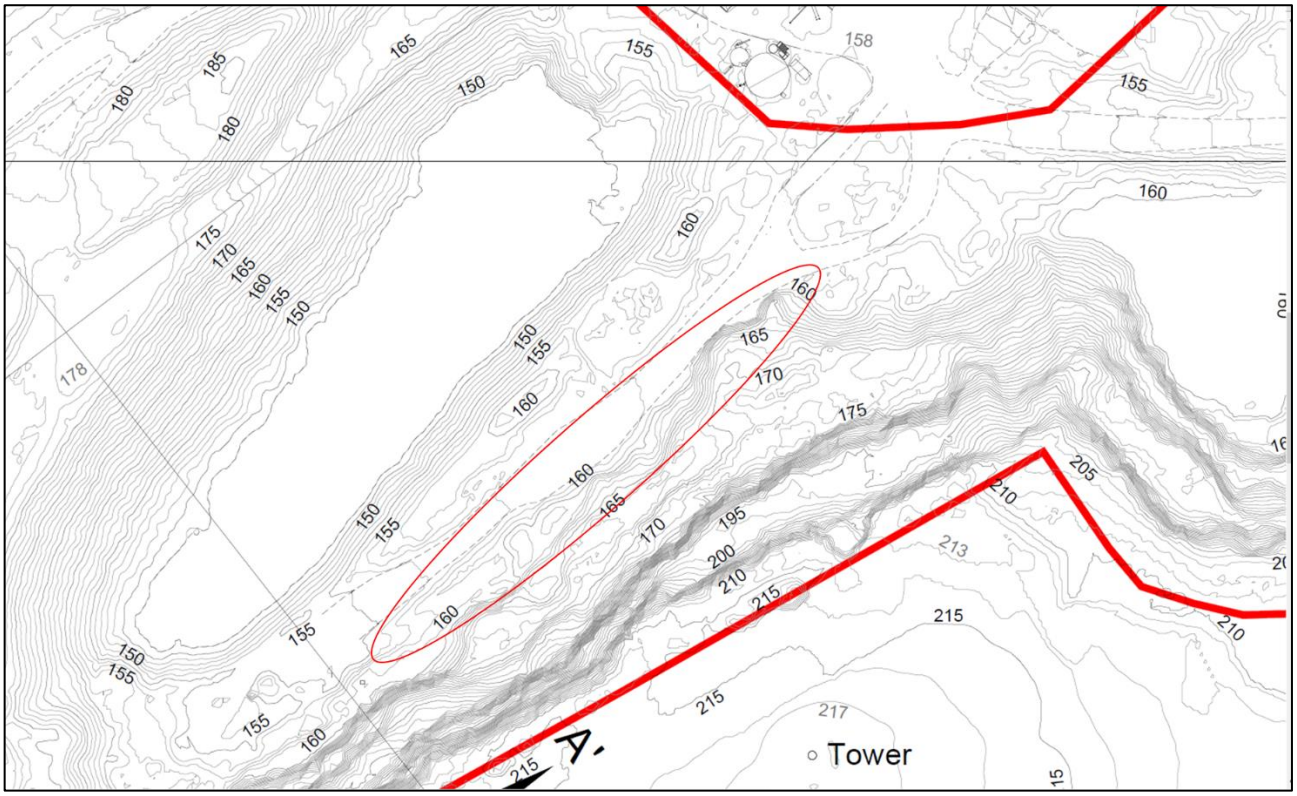


Figure 6.10: Site Topography Contours in 2020. Elevations are shown in mAOD. Circled Area = Bench ca. 160 mAOD.

2006-2018 Groundwater Elevation Investigations

There were four groundwater boreholes within the Site boundary reported in the previous studies by Byrne Environmental (2013a; 2015) and Viridus Consulting (2020): the office well, workshop well (later referred to as 'chipping plant well'), MW1 and MW2. An additional five groundwater monitoring locations were reported to be adjacent to the Site: Farm Well (appears to be a groundwater fed trough or spring), Yard Well (appears to be a groundwater fed trough or spring), L. Behan House Well (domestic well), Well A and Well B. The approximate locations of these groundwater monitoring locations are shown in Figure 6.11. It should be noted than no coordinates are available for these locations and therefore have been approximately positioned using available mapping.

Groundwater elevations in boreholes within and immediately adjacent to the Site were recorded as part of two previous investigations: Byrne Environmental (2015) measured groundwater elevation in six of the boreholes around the Site in October 2007 and April 2008 and Viridus Consulting (2020) monitored groundwater in four of the boreholes during April 2018.

The 2007 to 2018 elevations are summarised in Table 6.8. Whilst fluctuations in groundwater elevations are not unexpected within the Carrighill Formation due to its limited storage potential and low bulk permeability (KCC and GSI, 2002), it is noted that all locations were installed with pumping infrastructure and may have been subject to active pumping at the time of measurement.

It is also noted that whilst the same boreholes could not be monitored during the 2007, 2008 and 2018 investigations for direct comparison, groundwater elevations remain broadly similar across the Site ranging from ca. 134 mAOD in the northwest of the Site and between ca. 180-200 mAOD in the southeast area of the Site.



Figure 6.11: Location of Groundwater Wells Within and Immediately Adjacent to the Site 2006 to 2018 (Source of Aerial Imagery: Google Earth. Year: 2020).

Table 6.8: Summary of Previous Groundwater Elevation Monitoring (Byrne Environmental, 2015; and Viridus Consulting, 2020).

Borehole ID	Groundwater Elevation (mAOD)		
	October 2007	April 2008	April 2018
Well A	134.65	134.70	134.57
Well B	137.13	137.00	-
Office Well 2007	149.00	-	-
Workshop Well / Chipping Plant Well[1]	176.68[2]	168.10[2]	147.53
L. Behan House Well	196.18	200.50	189.30
MW2	-	-	146.95

[1] Based on mapping and borehole names associated with previous reports, some changes to the naming conventions for boreholes is thought to have occurred. Byrne Environmental (2015) references to 'Workshop Well' are interpreted to become 'Chipping Plant Well' in the Viridus Consulting (2020) report.

[2] Mapping presented in Byrne Environmental 2015 shows the 'Workshop Well' to be located in the central area of the Site. However, the groundwater elevations reported in 2007 and 2008 are reported to be ca. 8 to 16 m above the surrounding ground elevation in this area and therefore the measurements are assumed to be incorrect.

During the 2018 investigation the west pond water level at the base of the excavations in the central area of the Site was recorded as 147 m (+/- 0.5m). This pond elevation level is included on groundwater elevation contours derived using borehole monitoring data from the same monitoring round in Figure 6.12. The groundwater

contours show a consistent drop across the Site and do not show evidence of groundwater drawdown in the area of the western pit. It is inferred that the water in the pond is likely to be reflective of the groundwater table with contribution from ponding rainfall during precipitation events.

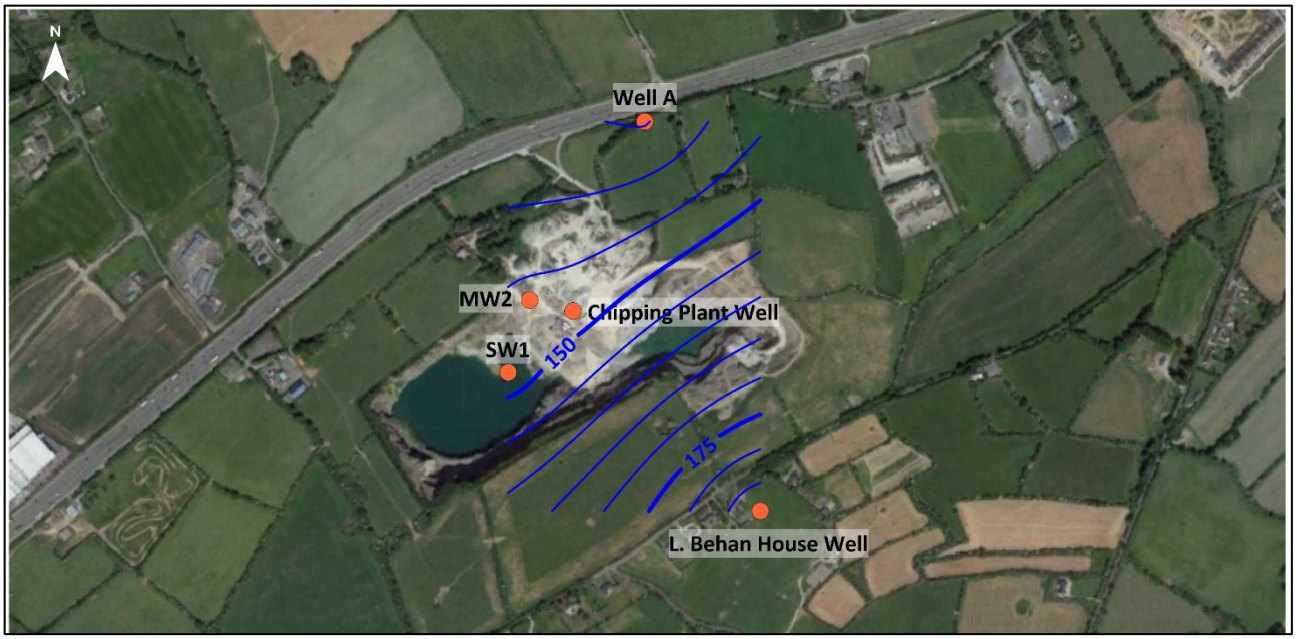


Figure 6.12: Groundwater Elevation Contours, Including West Pond Water Elevation (SW1), April 2018 (aerial imagery from 2016). Groundwater elevations given in mAOD.

2020-2021 Groundwater Elevation Investigations

A Site walkover was carried out by Golder in March 2020 to establish which groundwater boreholes remained on and immediately adjacent to the Site. Since the previous studies were conducted, the Office Well borehole identified in 2007 has been replaced by a new Office Well. MW1, Well B and the Workshop/Chipping Plant Well have been lost. Well A, Farm Well and Yard Well were noted to be in existence and fitted with pumping headworks, prohibiting monitoring of groundwater level or sampling. L. Behan House Well was also found to remain in use, however the headworks were flooded with surface water runoff and leaf litter and groundwater elevation could also not be monitored at this location.

Four new groundwater monitoring boreholes (BH1-BH4) were installed at the Site in March 2020 and groundwater elevations were recorded in these boreholes periodically by Golder from March 2020 to February 2021. Borehole logs for these wells are presented in Chapter 5, Land, Soils and Geology. A hydrograph of the groundwater elevations in the boreholes over this period is shown in Figure 6.13 and tabulated monitoring data is provided in Appendix 6.4. A seasonal variation of approximately 4-11 m is observed between summer and winter groundwater levels, again not unexpected within the Carrighill Formation (KCC and GSI, 2002).

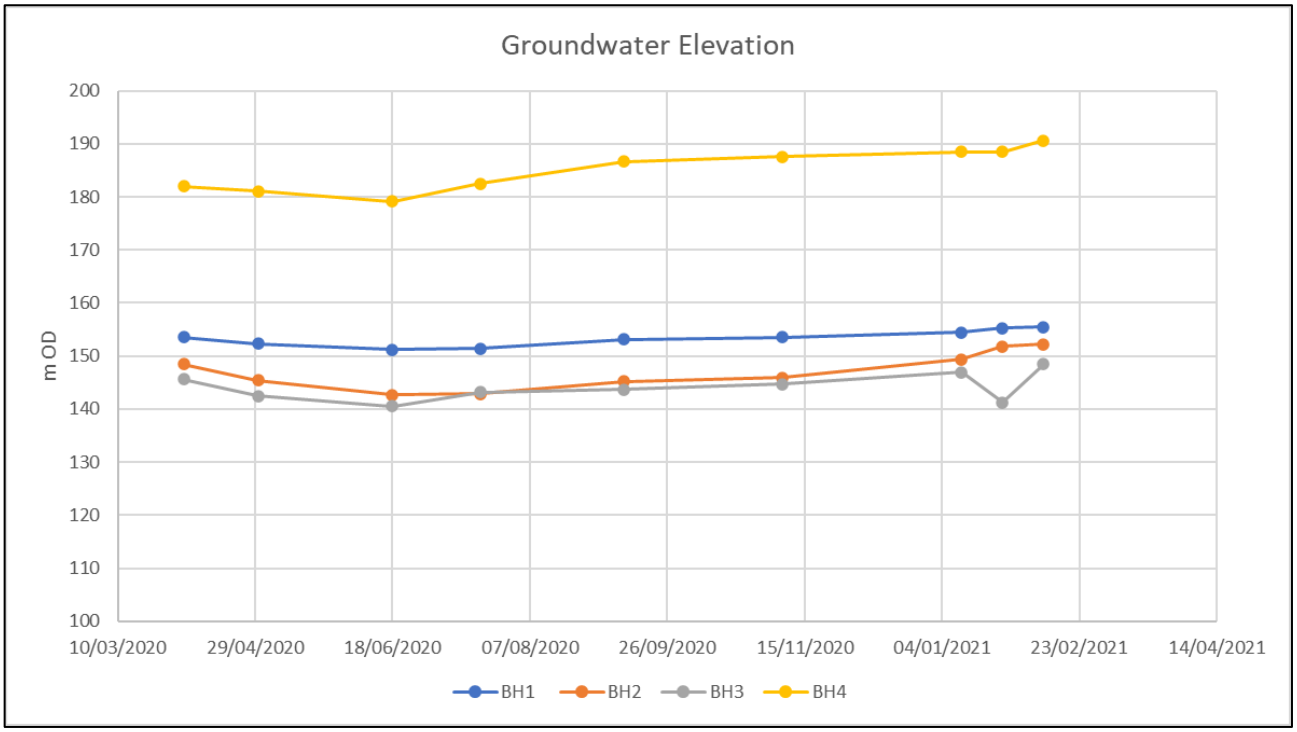


Figure 6.13: Groundwater Elevation 2020-2021

Groundwater elevation contours for this monitoring period for boreholes BH1-BH4 are shown in Figure 6.14 and Figure 6.15. The groundwater flow direction is from the southeast towards the northwest across the Site. This was found to be consistent across the 2020-21 monitoring period and in line with that observed in the previous 2015 and 2020 reports. Based on this flow direction BH4 is an upgradient borehole, BH1 is cross-gradient and BH2 and BH3 are downgradient of the Site.

During the 2020-21 monitoring period, the elevation of the water level in the western pond (SW1) has been recorded twice and the elevation of the eastern pond (SW2) measured once. Water elevations at SW1 and SW2 were both measured in October 2020 during a drone survey when the water level was recorded as 149 mAOD for both ponds. SW1 was measured again in February 2021 when the water level was recorded as 149.9 mAOD during a GPS survey of the monitoring locations. Water levels in the quarry ponds are still thought to be a reflection of the groundwater table with contribution from ponding rainfall during precipitation events.

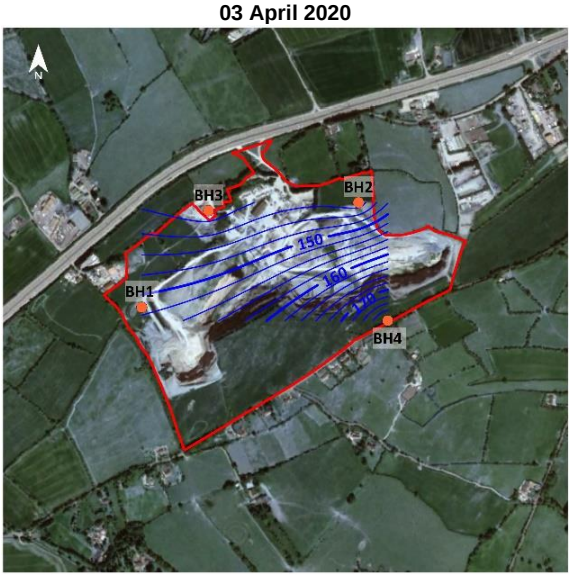
Figure 6.16 presents groundwater contours which include the elevation of SW1 and SW2 with the borehole groundwater elevations from the closest available dataset. It is interpreted from the contours that whilst there is drawdown of the groundwater table in the vicinity of the west and east pond areas due to pumping within the west pond, this drawdown is localised to the excavated areas and does not appear to impact the groundwater elevation in the surrounding natural ground. This is in line with the limited connectivity of an unproductive ('Pu') aquifer with hydraulically connected flow paths of tens of metres only (see Section 6.4.7.2).



03 April 2020



30 April 2020



16 June 2020



20 July 2020



10 September 2020



07 November 2020

Figure 6.14: Groundwater Contours 2020 (aerial imagery from 2020). Groundwater elevations given in mAOD.



11 January 2021



26 January 2021



10 February 2021

Figure 6.15: Groundwater Contours 2021 (aerial imagery from 2020). Groundwater elevations given in mAOD.



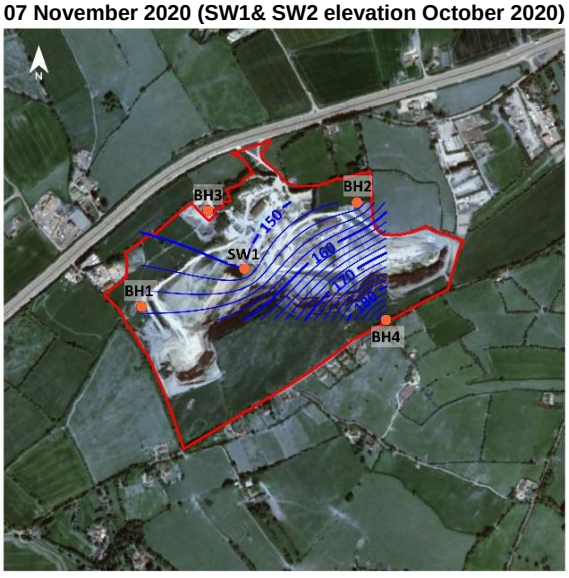
10 September 2020 (SW1 & SW2 elevation October 2020)



07 November 2020 (SW1& SW2 elevation October 2020)



26 January 2021 (SW1 elevation February 2021)



10 February 2021 (SW1 elevation February 2021)

Figure 6.16: Groundwater elevation contour plots including water level in west and east quarry pond (SW1 and SW2 respectively) in 2020 and west quarry pond (SW1) in 2021. Aerial imagery from 2020, groundwater elevations given in mAOD.

6.4.7.3 Local Groundwater Quality

Baseline groundwater quality has been reported during previous investigations by Byrne Environmental (2015) and Viridus Consulting (2020). Golder supplemented this groundwater quality data through a sampling campaign carried out in 2020 and 2021.

2006-2018 Groundwater Quality Investigations

Groundwater quality at the Site has been presented in two previous investigations carried out on the Site: Byrne Environmental (2015) sampled groundwater from eight boreholes within or adjacent to the Site sporadically between 2006 and 2013 and Viridus Consulting (2020) sampled groundwater from four boreholes during 2018. Monitoring data is presented in Appendix 6.2 and monitoring locations are shown on Figure 6.11.

Groundwater samples collected during these investigations were analysed for a suite of metals, nitrates, nitrites, coliforms as well as generic water quality indicators such as pH, and conductivity.

Groundwater results from 2007 to 2013 were compared by Byrne Environmental (2015) to the relevant thresholds presented in the European Council Environmental Objectives (Groundwater) Regulations, 2010 (S.I. 9/2010). Byrne Environmental (2015) found one exceedance of the groundwater threshold values for nitrate as N in one groundwater sample collected from borehole MW1 in 2007 at a concentration of 13 mg/l compared to a threshold value of 8.5 mg/l. However, this threshold limit is incorrect, with a threshold of 37.5 mg/l reported in S.I. No.9/2010. The threshold value for arsenic was exceeded on four occasions in samples collected from MW2, Office Well, and the Chipping Plant Well in 2007 and Well A in 2013. Concentrations ranged from 10 mg/l to 35 mg/l compared to a threshold value of 7.5 mg/l. The elevated arsenic concentrations are interpreted by Golder to be naturally occurring rather than related to plant or facilities at the Site. Arsenic is often naturally elevated in groundwater hosted in greywacke or shales, with poorly productive bedrock having increased probability of higher concentrations (McGrory *et al*., 2017).

All other parameters were reported by Byrne Environmental to be within normal values expected for groundwater. Ammonia, nitrate, metals and hydrocarbon levels were found to be low and there was limited evidence to suggest that the activities existing on the Site at the time of the investigation were impacting the underlying groundwaters.

As part of the Viridus Consulting (2020) study samples were collected from four locations on the Site: MW2 in the quarry, Well A to the north and the L. Behan House Well to the south. The water trough at the Farm Well, located to the north of the quarry was also sampled (although the water origin is unknown as no borehole was identified at the time). The results were not screened against any published standards at the time. The groundwater quality was generally found to be 'good'. Trace qualities of mineral oil were identified in the samples collected from L. Behan House Well, Well A and MW2 which concentrations of 0.02 mg/l, 0.10 mg/l and 0.03 mg/l reported for each respectively (lab detection level 0.01 mg/l). The Farm Well sample showed some detected bacteria and also had a low mineral oil concentration (0.31 mg/l). The water in this sample has a higher pH and a lower alkalinity and conductivity compared to the samples from the other wells.

Viridus Consulting (2020) found no evidence that the quarry area was the source of the mineral oil contamination: Well A and the Farm Well are both located adjacent to the N7 roadway which is another potential source of hydrocarbons. Metals in the groundwater results did not show any elevated parameters originating from the quarry area.

For completeness, the groundwater results from the two previous investigations (2015 and 2020) have also been screened by Golder against current groundwater threshold values. EPA Interim Guideline Values for Groundwater Protection[3] were applied for parameters where thresholds were not identified in groundwater regulations S.I. No. 9/2010 or amendment S.I. No. 366/2016. A summary of the exceedances are presented in Table 6.9 and Table 6.10.

In the 2007-2013 data from Byrne Environmental (2015) a range of metals exceeded the guideline values, most frequently arsenic, barium and total coliforms (Table 6.9). Slightly elevated concentrations of iron, magnesium, manganese and potassium were also found when compared to the EPA interim guidelines and, similarly to arsenic, are also thought to be naturally occurring.

In the samples from 2018 (Viridus, 2020) exceedances of the guideline values for metals (naturally occurring), orthophosphate, hydrocarbons and total coliforms were similarly observed. As reported by Viridus Consulting, the exceedances of hydrocarbons are thought to be due to off-site sources rather than the activities occurring at the Site. Orthophosphate is similarly thought to derive from off-Site sources, such as the application of fertilisers by farmers, due to a lack of on-Site sources.

[3] Towards Setting Guideline Values for the Protection of Groundwater in Ireland- Interim Report, EPA, 2003

Table 6.9: Summary of screening exceedances from previous investigation data (Byrne Environmental, 2015).

Parameter	Units	Guideline Value	MW1		MW2	Office Well		Chipping Plant Well	Well A			Well B	L. Behan House		Yard Well
			2007	2010	2007	2007	2013	2007	2006	2007	2013	2007	2007	2013	2013
Potassium	mg/l	5	1.8	<2.34	3.5	2.5	5	6.4	-	0.9	<1	-	0.5	3	2
Magnesium	mg/l	50	25	<0.036	38	32	53	37	13.2	23	20	17.1	13	31	3
Arsenic	µg/l	7.5	7	-	35	10	3	20	-	2	10	-	7	5	<1
Barium	µg/l	100	130	-	141	110	-	621	-	50	-	-	66	-	-
Iron	mg/l	0.2	<0.1	-	<0.1	<0.1	-	<0.1	0.049	<0.1	-	0.218	<0.1	-	-
Manganese	µg/l	50	4	0.479	<2	174	-	3626	6	3	-	1	<2	-	-
Lead	µg/l	7.5	11	1.52	10	16	<1	11	-	11	<1	-	11	<1	<1
Total Coliforms	MPN/100ml	0	-	-	-	-	12	-	-	-	1	-	-	19	1
Faecal Coliforms	MPN/100ml	0	-	-	-	-	2	-	0	-	0	0	-	1	0

Table 6.10: Summary of screening exceedances from previous investigation data (Viridus, 2020).

Parameter	Units	Guideline Value	L. Behan Well	Well A	MW2	Farm Well
			2018			
Phosphate (Ortho/MRP) as P	mg/l	0.035	<0.005	0.046	0.041	0.017
EPH >C8 to <C40	mg/l	0.0075	0.02	0.01	0.03	0.31
EPH >C10 - C20	mg/l	0.01	<0.01	0.08	0.01	0.22
EPH >C20 - <C40	mg/l	0.01	0.02	0.02	0.02	0.09
Manganese- Dissolved	mg/l	0.05	<1.0	1.1	100	6.9
Arsenic- Dissolved	ug/l	7.5	12.4	5.2	3.5	-
Total Coliforms	MPN/100ml	0	0	0	0	10

2020-2021 Groundwater Quality Investigations

Groundwater samples were collected by Golder from the four newly installed boreholes on the Site (BH1-BH4) during June 2020 and January 2021. Additional samples were also collected from L. Behan House Well and Silt Pond 2 during the January 2021 sampling round. Each sample was tested at UKAS accredited Element Materials Technology laboratory for the following parameters[4]:

- Dissolved metals: Arsenic, Boron, Cadmium, Calcium, Chromium, Copper, Lead, Magnesium, Mercury, Nickel, Potassium, Selenium, Sodium (2021 only), and Zinc;
- Total Hardness (Dissolved as $CaCO_3$);
- MTBE. Benzene, Toluene, Ethylbenzene, m/p Xylene, o-Xylene;
- Extractable Petroleum Hydrocarbons (EPH, C8-C40);
- Sulphate;
- Chloride;
- Nitrate as NO_3;
- Nitrite as NO_2;
- Orthophosphate as PO_4;
- Total Oxidised Nitrogen;
- Ammoniacal Nitrogen as NH_4;
- Total Alkalinity as $CaCO_3$;
- Dissolved Oxygen (2020 only);
- Electrical Conductivity (2020 only);
- pH (2020 only);
- Total Organic Carbon; and
- Total Dissolved Solids.

[4] Some parameters were only analysed in one sampling round: either June 2020 or January 2021

The results of the groundwater quality analysis at the Site are presented below and compared with the European Communities Environmental Objectives (Groundwater) Regulations regarding groundwater status, S.I. No.9/2010, including amendment S.I. No.366/2016; where a screening value does not exist, the EPA Interim Guideline Values for Groundwater Protection is applied. Full screening results are presented as Appendix 6.2 and a summary of the exceedances are presented in Table 6.11. The laboratory certificates for the results are included in Appendix 6.3.

Samples from BH4 upgradient of the site had the most exceedances of the screening values. In the June 2020 sampling results dissolved arsenic and nickel and orthophosphate exceeded the screening criteria as well as hardness in the 2020 and 2021 sampling rounds. Ammoniacal nitrogen in samples from BH4 also exceeded the screening value in 2021. L. Behan House well is also located upgradient of the Site. This sample also showed elevated levels of arsenic and hardness. Elevated hardness is expected due to the nature of the surrounding bedrock.

BH2 and BH3 are considered to be downgradient of the Site. Dissolved arsenic concentrations exceeded in all samples, whilst hardness exceeds in both samples for BH2, ammoniacal nitrogen exceeds in BH3 during 2020 and orthophosphate in BH3 during in 2021. Elevated arsenic and hardness are thought to be naturally occurring. Ammoniacal nitrogen can be caused by blasting activities, however, the presence in upgradient groundwater suggests this may be caused by off-Site activities, such as applying fertiliser to agricultural land, similar to orthophosphate.

The sample from Silt Pond 2 was screened against the groundwater criteria as material from this facility may be in connectivity with the underlying groundwater, although it is noted that the accumulation of silt at the base of the silt ponds is likely to limit the infiltration to ground from these ponds. The sample exceeded the screening guidelines for dissolved potassium, hardness, sulphate, nitrite, orthophosphate and ammoniacal nitrogen.

Samples from SW1 are included in this screening assessment due to the potential connectivity between the water in the quarry ponds and the groundwater underlying the Site. The samples from SW1 exceeded groundwater screening guidelines in 2020 and 2021 for arsenic, potassium, hardness, sulphate and ammoniacal nitrogen as well as orthophosphate in 2020 and nitrite in 2021. Most analytes were found to be in the same order of magnitude as the groundwater samples, however potassium, hardness and sulphate were found to be slightly elevated compared to the groundwater samples.

The higher concentrations reported in the SW1 and Silt Pond 2 samples are not unexpected given the higher total dissolved solids reported for the samples, which is thought to derive from the elevated leaching from fine fragments of crushed rock contained in these waters. Whilst concentrations are elevated in these pond samples, these are noted to be higher than any of the samples taken from the boreholes upgradient, cross-gradient and downgradient of the Site, highlighting the limited potential for contaminant migration from the Site. On-Site water supply wells are not suitable for drinking water supply and it is noted by the Applicant that bottled water is used for drinking on-Site.

In summary, whilst some parameters show elevated concentrations in the samples taken, there is no evidence of migration of contaminants from the Site in groundwater and therefore there is no perceived degradation of off-Site groundwater quality due to the activities at the Site. It is also noted that hydrocarbons were not detected in any of the 2020-2021 samples indicating good practices with regards to fuel management and vehicle maintenance at the Site.

Table 6.11: Summary of Groundwater Screening Exceedances (2020-2021).

Parameter	Units	LOD	Guideline Value	BH01	BH02	BH03	BH04	L. Behan House	Silt Pond 2	SW1
June 2020										
Dissolved Arsenic	ug/l	<2.5	7.5	4.7	33.9	13.7	471.3	-	-	32.6
Dissolved Nickel	ug/l	<2	15	4	2	4	42	-	-	4
Dissolved Potassium	mg/l	<0.1	5	0.7	0.9	4	3.7	-	-	14.3
Total Hardness Dissolved (as $CaCO_3$)	mg/l	<1	200	187	255	165	264	-	-	437
Sulphate as SO_4	mg/l	<0.5	187.5	16	62.8	58.5	20.2	-	-	326
Ortho Phosphate as PO_4	mg/l	<0.06	0.035	<0.06	<0.06	<0.06	0.07	-	-	<0.06
Ammoniacal Nitrogen as NH_4[1]	mg/l	<0.03	0.065	0.1	0.05	0.09	<0.03	-	-	0.16
January 2021										
Dissolved Arsenic	ug/l	<2.5	7.5	12.7	17.4	24.8	7.2	13.3	6.1	69.9
Dissolved Potassium	mg/l	<0.1	5	0.5	0.7	3.4	0.5	0.5	6.2	13.4
Total Hardness Dissolved (as $CaCO_3$)	mg/l	<1	200	192	324	184	229	219	298	441
Sulphate as SO_4	mg/l	<0.5	187.5	7.1	98	37.5	7.6	9.4	283.5	346.7
Nitrite as NO_2	mg/l	<0.02	0.375	<0.02	<0.02	0.02	0.04	<0.02	0.42	0.53
Ortho Phosphate as PO_4	mg/l	<0.06	0.035	<0.06	<0.06	0.12	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as NH_4[1]	mg/l	<0.03	0.065	<0.03	<0.03	0.03	0.14	<0.03	0.15	0.94

1. Ammoniacal Nitrogen as NH4 screened against lower range of overall threshold value range for Ammonium.

6.4.8 Designated Sites

The Site is located in the WFD (Water Framework Directive) Kilcullen Groundwater body (which is generally described as poorly productive and of 'good' water quality) and the WFD surface water catchment for Liffey and Dublin Bay via the River Griffeen. The River Griffeen is not designated as a salmonid river (EPA, 2021) but is known to contain large trout (IFI, 2019).

Natura 2000 sites encompass sites of international importance, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The closest Natura 2000 Site are:

- Red Bog SAC (site code 000397) – located 8.1 km to the south of the Site;
- Glenasmole Valley SAC (site code 001209) – located 8.1 km to the east of the Site;
- Wicklow Mountains SAC (site code 002122) – located 8.1 km to the east of the Site; and
- South Dublin Bay SAC (site code 000210) and South Dublin Bay and River Tolka SPA (site code 004024) – located 34 km measured in terms of possible hydrological pathway.

Further details on these Natura 2000 sites are included in the Stage 1 Screening for Appropriate Assessment (Golder, 2021), although due to their distance from the Site are not considered to be hydraulically connected.

6.4.9 Flood Risk

Surface water flood risk maps published by the Office of Public Works ('OPW') show that the Site is not located within a potential flood plain (OPW, 2021). This is expected given the elevated hillside location of the Site in relation to nearby watercourses. The closest waterbody to the Site (Tootenhill Stream, ca. 0.5 km east of the Site) is noted to have a limited potential flood plain of ca. 50 to 100 m distance from the stream under 1 in 1000 flood event scenarios (OPW, 2021). The closest reported areas for recurring historic flood events are located 2.8 km north-east of the Site in Rathcoole and ca. 3.1 km north of the Site in Newcastle Demesne.

GSI mapping (GSI, 2021) does not identify any areas of predicted or historic groundwater flooding in the vicinity of the Site, with the closest area at risk located ca. 12 km to the west of the Site. The closest areas identified by GSI mapping to have been subject to fluvial (river) or pluvial (rainfall) flooding are located ca. 1.8 km and ca. 9.5 km to the north and south-east respectively (see Figure 6.4).

Within the Site boundary, exposed groundwater and captured rainfall have been observed to pond at the topographical low points of the excavated area (see Section 6.4.6.2). The depth and spatial extent of the ponded areas have varied over time with changes to the geometry of the quarry floor and pumping regime.

In 2021, the pond areas in the east and west pits are maintained at an elevation of ca. 149 mAOD via pumped abstraction to meet Site water demands. These pond elevations are:

- 25 to 60 m lower than the surrounding natural topography of the western pit, which is ca. 174 mAOD and 209 mAOD to the north and south respectively;
- 25 to 35 m lower than the surrounding natural topography of the eastern pit, which is ca. 174 mAOD and 184 mAOD to the north and south respectively; and
- 9 to 11 m lower than the central and northern areas of the Site, which have an elevation of ca. 158 to 160 mAOD.

The lower pond elevation relative to the higher elevation surrounding areas has mitigated the risk of accidental discharges of large volumes of water from the Site to surrounding areas. There have been no reports found to indicate flooding from the Site to areas external to the Site boundary.

As part of the Restoration Phase, pumping of groundwater will cease and the quarry floor will be allowed to flood. It is expected that the pond elevation will rebound to the rest groundwater elevation of ca. 155 mAOD (see Section 6.4.7.2).

6.4.9.1 Extreme Weather Events

Extreme rainfall return periods for the Site are provided in Section 6.4.6.1 For storage of incident rainfall calculations, the runoff from a rainfall return event with a 1,440 minute (1 day), 1 in 100 year return period (87 mm) is taken to represent a worst case scenario. Over the ca. 28.8 ha operational area, the rainfall event will generate ca. 25,056 m^3 of water over the course of this period (assuming no percolation or evaporation during the event).

Under current pumped conditions, sufficient short-term water storage capacity is provided in the west pond alone, which has an area of ca. 1.3 ha and an available volume of 91,000 m^3 below a conservative spill height of 157 mAOD (assumes pumped pond elevation of 150 mAOD).

Pumping is assumed to cease at the end of the operation, at which point, the water level in the excavated areas is assumed to rebound to ca. 155 mAOD during the Restoration Phase. The combined surface area of the east and west pits at an elevation of 155 mAOD is ca. 146,155 m^2. Assuming a conservative spill height of 157 m OD and rebounded water level of 155 mAOD, there is an estimated attenuation capacity of at least 292,310 m^3 across the Site in the post-pumping scenario. It is also noted that the pond elevation in the flooded quarry has the potential to rise a maximum of 0.17 m during a 1,440 minute storm event and therefore sufficient attenuation capacity is also considered to be available under this post-pumping restoration scenario.

6.4.10 Local Water Users and Wastewater Systems

On a regional scale, GSI mapping (2021) indicates that there are no groundwater source protection zones within the Site boundary. The nearest groundwater source protection zones are located approximately 3.8 km to the south of the Site - the Kilteel Group Water Scheme (See Figure 6.17; GSI, 2021).

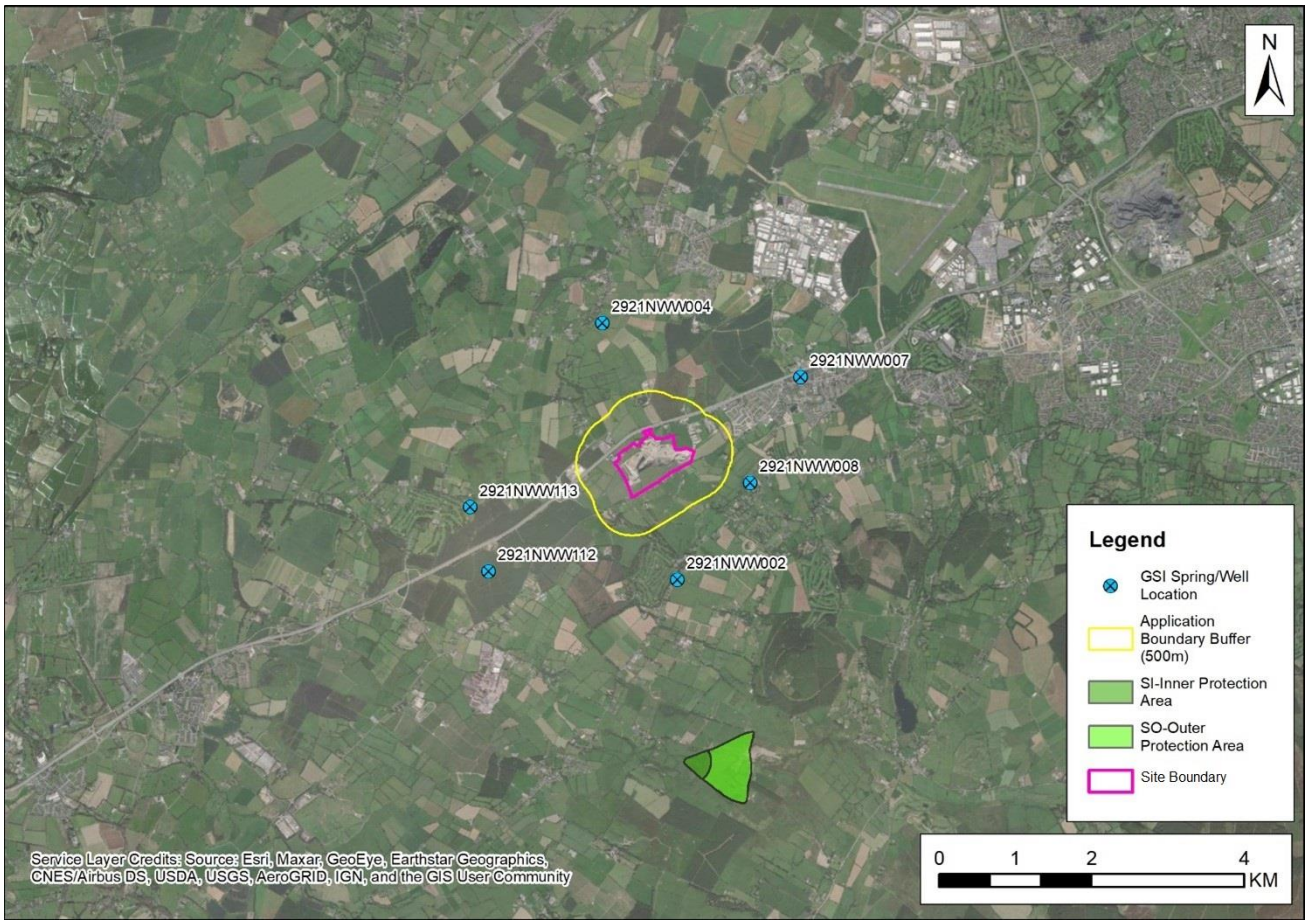


Figure 6.17: Regional Groundwater Source Protection Zones, Abstraction Boreholes and Springs (after GSI, 2021).

On-Site water supply wells and wastewater infrastructure is described in Section 6.4.4. In 2013, it was reported that there were three private wells located on land immediately adjacent to the Site: Well A, Well B and Yard Well (Byrne Environmental, 2015; see Figure 6.11). Viridus Consulting (2020) again identified the presence of these three wells, as well as a farm trough reportedly fed by groundwater located north of the quarry adjacent to the N7 roadway and an additional well located to the south of the Site at L. Behan's House. In 2021, only one on-Site well is identified (Figure 6.2).

In addition to the aforementioned water users, the location of the current local Irish Water network, associated residential/commercial supplies and foul water discharges are shown on Figure 6.18. Records of public planning applications for the local area have been used to identify private water supply wells and wastewater treatment facilities (e.g. septic tanks). Where water supply wells or wastewater systems could not be identified using planning records, these have been inferred where residential properties exist. These public records and interpreted water supply wells and wastewater treatment systems are also shown on Figure 6.18.

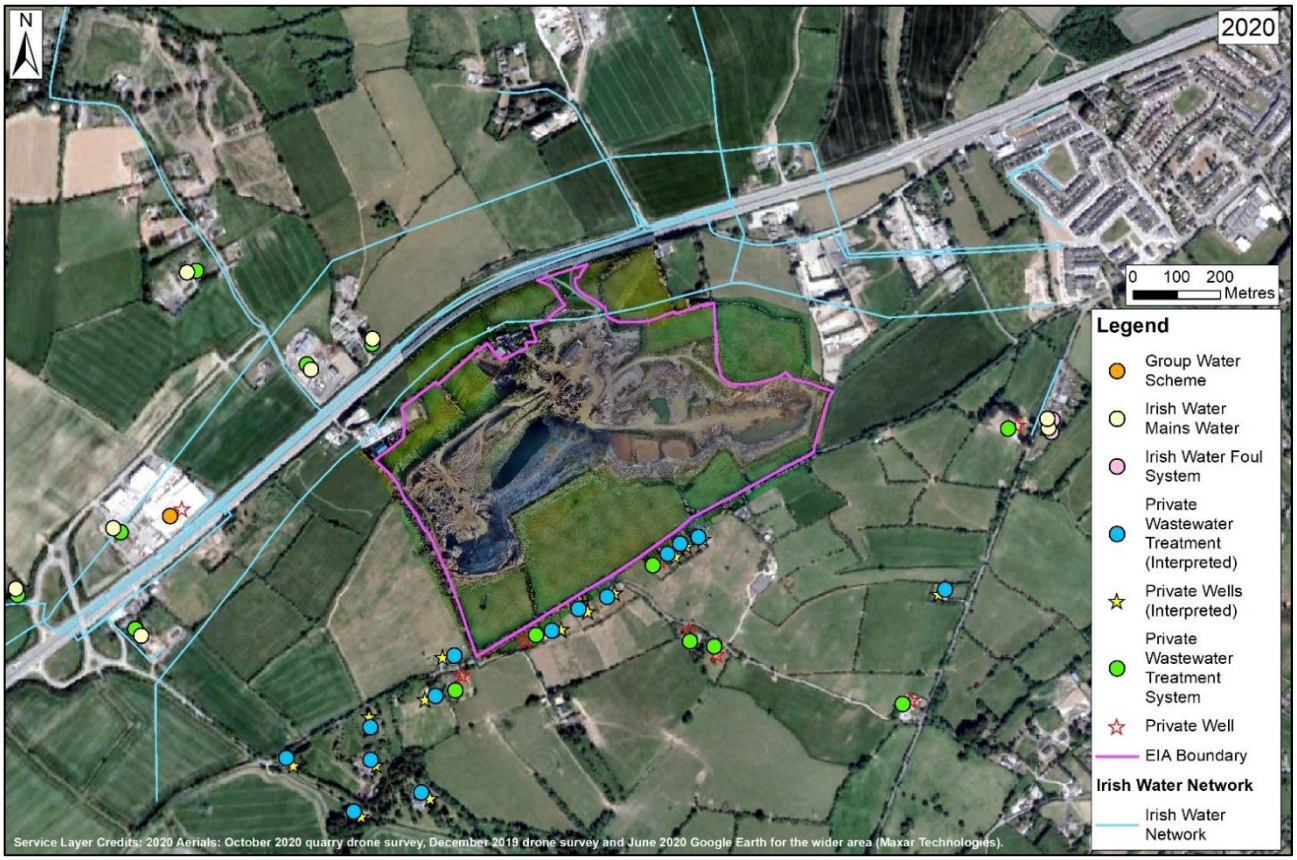


Figure 6.18: Local Water Mains (Irish Water), Foul Water Systems (Irish Water), Private Water Supply Wells and Private Wastewater Treatment Systems (in 2021, aerial imagery is from 2020).

Groundwater is used locally for domestic water supply in areas not serviced by the public mains water. There is interpreted to be a number of private wells located along the county roadway to the south of the Site. The closest interpreted water users are located approximately 0.3 km south (and upgradient) of the Site. The remaining area to the northeast and west of the Site are serviced by the public main water. This is consistent with local conditions reported in 2015 (Byrne Environmental, 2015) and aerial photography suggests that most residences were already present in 1990.

Additional to the above sources, the GSI online mapping tool (GSI, 2021) also holds records of groundwater boreholes or springs in the surrounding area; the location of wells identified within a 2.5 km radius are shown on Figure 6.17. Where information is available, these boreholes or springs are typically reported as have poor yield (ca. 21-28 m^3/day) and are used as agriculture or domestic supplies. GSI records held for these wells or springs state they were all in existence prior to 1990, with the exception of borehole 2921NWW002 (GSI reference), which is noted to have been drilled in 1999.

It is noted that, the active quarrying areas have remained at least 100 m away from the Irish Water public mains supply (also referred to as the Liffey Aqueduct Arterial Culvert in Byrne Environmental, 2013a) which runs underneath the Site entrance road and within the Site boundary. The mains water is reported to be buried at a depth of more than 3 m below ground (Trinity Green, 2013). The proposed extension to the Site activities is noted to be within 40 m of this Irish Water public mains. Potential impacts of the Site upon this mains water infrastructure is considered further in the Material Assets chapter (Chapter 12.0).

6.4.11 Water Balance

As discussed in Section 6.4.4, in 2021 groundwater is used at the Site for various activities. Detailed records of water usage on Site are not available, however using professional judgement and following discussion with the Applicant, estimates of operational water requirements are provided in Table 6.12.

Table 6.12: Estimated Site Operational Water Usage.

Site Use	Abstraction Source	Estimated Usage (m^3/day)	Estimated Usage (m^3/year)*
Hand washing and toilet flushing	Office Well	2	520
Wheel wash facilities	Office Well	2	520
Aggregate washing	West Pond	250	65,000
Total Volumes Required		254	66,040

**Assumes operational use of 5 days a week, 260 days per year.*

An estimate of the groundwater flow into the western pit under pumped conditions has been calculated using Darcy's Law (Oxford Reference, 2021) and is presented in Table 6.13. The calculated groundwater inflows to the west pit of 0.4 m^3/day and 146 m^3/year are noted to be low and whilst not unexpected for a poorly productive aquifer, there is potential for actual inflows to be up to an order of magnitude higher.

Table 6.13: Estimate of Groundwater Flow into the Western Pond Under Pumped Conditions.

Parameter	Value	Units	Source of Value
Hydraulic Conductivity (K)	$1.00x10^{-3}$	m/d	Maximum of range for cemented sandstone presented in Table 6.7 (Driscoll, 1986). Maximum used to reflect potential for localised enhanced hydraulic conductivity due to blasting.
Area (A)	6,235	m^2	Upgradient pond wall (pond depth multiplied by pond length)
Hydraulic Gradient (i)	0.063	-	Estimated based on 2021 contours
Depth of pond (D)	30	m	Assumes pond elevation of 150 mAOD and base elevation of 120 mAOD
Length of pond (L)	215	m	Upgradient pit wall length
Flow (Q) into pond	0.4	m^3/day	Calculated using Darcy's Law (Q=KAi)
Flow (Q) into pond	146	m^3/year	Calculated using Darcy's Law (Q=KAi)

A simplistic Site-wide water balance is presented in Table 6.14 and estimates that after Site water requirements are met, then an additional 97 m^3/day of water may be required to be managed by the Site (e.g. via ponding or discharge to the culvert) to maintain a pond water level of ca. 150 mAOD following periods of prolonged rainfall. It is however noted that operational water use is not well defined and recorded measurements would provide greater insight.

Table 6.14: 2021 Site-Wide Water Balance.

Parameter		Value	Units	Source
1	Average rainfall	1,023	mm/year	As per Table 6.5
2	Effective rainfall	416	mm/year	GSI Mapping (GSI, 2021)
3	Recharge to groundwater	100	mm/year	GSI Mapping (GSI, 2021)

Parameter		Value	Units	Source
4	Available rainfall (after recharge)	316	mm/year	(2) minus (3)
5	Groundwater flow into west pond	146	m^3/year	As per Table 6.13
6	Operational site area	288,000	m^2	Operational area in 2021
7	Available water	91,154	m^3/year	(4) multiplied by (6) + (5)
8	Site operational usage	66,040	m^3/year	As per Table 6.12
9	Residual water discharged to culvert	25,114	m^3/year	(7) minus (8)
10	Residual water discharged to culvert	97	m^3/day	Operates periodically following periods of prolonged rainfall

6.4.12 Commentary on the Future Baseline and Climate Trends

Future climate change could alter the water environment at the Site by changing temperatures, recharge rates, flood risk and sea levels, and by affecting demand from public water supplies.

Current climate trends indicate a potential increase in annual rainfall in northern and western areas of Ireland and decreases or small increases in the south and east (EPA, 2005).

Predictions associated with future climate change indicate that the future baseline might involve warmer average summer and winter temperatures, higher sea levels, and changes in rainfall patterns, volume and intensity. The Proposed Development is unlikely to be directly affected by sea level change. However, changes in rainfall patterns could alter run-off and discharge patterns, groundwater recharge, the mobilisation of suspended solids and flooding. It is noted that the Site likely offers considerable attenuation capacity during storm events (see Section 6.4.9.1)

Longer drier periods combined with higher temperatures could lead to increased potential for drought that could also affect future water resource availability, and changes in population (specifically increases) could result in more demand on water resources and water shortages in summer months. Changes in future water resource availability and demand could increase the relative importance of groundwater and surface water that either currently, or could in the future, provide water supplies. It is also noted that future potable water supplies may move towards a centralised water mains system and away from single household supply wells.

6.5 Hydrological and Hydrogeological Conceptual Model

This section describes the hydrogeological conceptual model for the Site summarising the information contained in Section 6.4 of this report.

Water enters the Site through direct rainfall precipitation and via the movement of groundwater through the subsurface which predominantly flows from southeast to northwest, coincident with local topography. In the excavated areas of the Site in the eastern and western areas, water is present at the lowest elevations of the pits. The excavations on the Site intersect the groundwater table and therefore ponds are considered to be a mix of both groundwater and rainfall. Once present in the pit the water will be subject to evaporation and will provide some recharge to the underlying bedrock. Rainfall on other areas of the Site will predominantly infiltrate

the ground where it will be subject to evapotranspiration or become groundwater. The stripping and/or removal of unsaturated ground will have lowered the ability of the Site to accept recharge to ground in excavated areas.

Flow in the bedrock is likely to be predominantly confined to bedding planes, faults and fractures due to the fine-grained, low porosity nature of the bedrock. The Site is located on the northern limb of a syncline which dips around 50° to the south east which is anticipated to restrict flow along bedding planes. No faults are reported to cross the Site, with the closest fault located approximately 0.8 km from the Site. Connectivity of fracture sets within the bedrock is expected to be low, with limited lateral connectivity (tens of meters from the Site) and decreasing hydraulic conductivity with depth as weathering of the rock reduces. There may be zones of increased hydraulic conductivity in the unexcavated upper weathered zones (or shallow zones subject to blasting) which can allow for rapid infiltration of rainwater.

Local surface water features are predominantly fed by rainfall runoff from higher topographical areas which collect in natural gullies and form headwaters for tributaries to larger streams and rivers. The topography of the Site and the surrounding area means that surface water runoff from the Site (e.g. in the event of flooding from the Site) could eventually reach the N7 roadway or contribute to the River Griffeen.

As part of the water management system on the Site, water abstracted from the western quarry pit is periodically discharged following periods of prolonged rainfall to a culvert located on the northern portion of the Site adjacent to the N7 roadway. Water from this culvert is discharged into the road's drainage system. It is unknown where the water in the road's drainage system flows to from this point and it may discharge untreated to a tributary of the River Griffeen near Rathcoole.

It is possible that relic and current infrastructure on the Site may form potential pathways between the ground surface and the groundwater table. Boreholes from previous water abstraction points are thought to still be present on the Site and may not be backfilled or decommissioned. As such these present a potential contamination pathway from surface.

6.6 Selection of Sensitive Receptors

Taking into account the conceptual model for the site presented in Section 6.4.12 and the methodology for assessment presented in Section 6.3, the receptors and their assigned importance are presented in Table 6.15.

Table 6.15: Water Receptors.

Receptor	Reasoning	Sensitivity
Groundwater – quality and availability due to use as a resource and wider regulatory requirement to maintain good quality status	Bedrock under the Site is classified as a poorly productive aquifer with limited fracture connectivity (tens of metres). Local supplies are generally low yield, supporting single household domestic properties. Abstraction is shown to only cause dewatering close to the pit due to limited off-Site hydraulic connectivity.	**Negligible**
Surface Water – quality and availability due to use as a resource and wider regulatory requirement to maintain good quality status.	Downgradient river (River Griffeen) is classified as Good by WFD and likely in hydraulic connectivity with the Site via discharge to N7 roadway drainage system.	**Medium**
Flooding – changes in presence and water flows on	N7 roadway is of national importance but not in flood risk area.	**Low**

Receptor	Reasoning	Sensitivity
infrastructure immediately adjacent and downstream of the Site.	Site is not at risk of flooding under pumped conditions. Sufficient attenuation capacity is noted for the Site when pumping at the Site ceases. Potential exists for discharge from the Site to enter a tributary of the River Griffeen close to Rathcoole during the operational phase. Local area is predominantly at low risk of flooding, with floodplains of limited extent (ca. 50-100 m) and limited residential or commercial development. Discharge volumes from the Site are unlikely to change flood risk.	
Flooding – changes in presence and water flows for on-Site plant and infrastructure.	Local importance, Site not in surface water flood risk area. Site is not at risk of flooding under pumped conditions. Sufficient attenuation capacity is noted for the Site when pumping at the Site ceases.	**N/A (no pathway)**
Human Health – existing off-site water users, water availability and quality	Bottled water is used to supply drinking water on Site. Existing water well users are located adjacent to the Site but are not considered to be in hydraulic connectivity with the Site. Irish Water public mains water supply also passes under the Site entrance road but is not considered to be in hydraulic connectivity with the Site.	**N/A (no pathway)**
Natura 2000 Designated Sites – degradation of protected sites due to changes in water quality or quantity (South Dublin Bay SAC and South Dublin Bay and River Tolka SPA)	Designated SAC/SPA site located 34 km from Site, measured in terms of possible hydrological pathway. Distance and dilution along pathway would mitigate against effects.	**High**
Natura 2000 Designated Sites – degradation of protected sites due to changes in water quality or quantity	Nearest SAC sites are 8.1 km from the Site and not considered to be in hydraulic connectivity with the Site.	**N/A (no pathway)**

6.7 Characteristics of the Development

The characteristics of the current development with regards to water are outlined in Sections 6.4.1 to 6.4.4. The Phased Restoration Plan for the Site is presented in Chapter 2.0, Project Description.

6.7.1 Proposed Development Plans

Current plans for the quarry involve two further stages of work:

- Operational Phase - extension and deepening of the west and east quarry pits in the next phase of extraction at the Site; and,
- Restoration Phase - restoration of the Site in-line with the proposed restoration plan.

The extension phase of the development will extend the quarry area by 26.87 ha. largely coinciding with the existing operational quarry void currently at an average working depth of ca. 173 mAOD and final floor of ca.150 mAOD.

Areas of the Site to be targeted in the next phase of the excavation are shown in Section 37L Planning Application Drawing No. 04. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. (and 5.16 ha to accommodate screening berms) and to also extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. During the extraction phase, stockpiles of crushed material will be temporarily stored on the quarry floor prior to transport to market.

During the phased development of the quarry extension topsoil and overburden materials will be used to construct berms around the perimeter of the quarry area. Screening berms will be vegetated to minimise wind and rain erosion.

The restoration proposal includes for restoration to agricultural and amenity use upon completion of proposed extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years, depending on market conditions and a further 2 -5 years for restoration.

Plant, ancillary storage tanks, infrastructure and buildings in the central area are expected to be removed as part of the restoration works. Materials from the silt ponds are planned to be used during restoration of the Site.

6.7.2 Embedded Mitigation

To avoid or minimise potential impacts to the water environment during the Operational Phase, embedded design and commonly undertaken good practice mitigation measures have been and will be in place at the Site, these include:

- A holding tank and portable toilets are used on Site, and are appropriately managed and maintained to prevent leaks to ground and the water environment. Equally welfare facilities on the Site and all plumbing are well maintained;
- Wheel washing is undertaken on the Site to reduce the deposition of material on the surrounding road network that could get into the water environment. Maintenance is undertaken to desilt the wheel wash facilities and avoid overflows of wash water. Wastewater from the wheel washes is contained within concrete/metal structures rather than disposed of directly to ground;
- Wash water generated by the crushing, washing, screening and bagging plant is directed towards a water treatment tank where flocculant is added prior to discharging to the silt press and contained silt ponds;
- A concrete plant is present on the Site which by design is constructed such that no direct discharges to ground are allowed;
- Several storage tanks for diesel and bitumen are associated with the asphalt plant. These are bunded with reinforced concrete and are secured to prevent vandalism (Byrne Environmental, 2013a);
- Refuelling takes place on hardstanding in a designated area of the Site and plant is well maintained to prevent uncontained releases of hydrocarbons to the ground (as confirmed by water quality results). It is noted that a hydrocarbon interceptor is installed at the Site;

- With specific reference to EPA guidance[5] on private well protection, there is a minimum of 30 m between potable wells and any sewage holding (septic) tanks or fuel storage, and a minimum of 5 m between a potable well and chemical storage;
- Bottled water is used for drinking water supply on-Site. Abstracted groundwater is only used for operational use in plant or for toilet flushing and hand washing in the offices;
- Runoff from the floor (and faces) of all areas of the extraction area slope towards a low elevation point on the Site to prevent any surface water run-off flowing from the Site;
- Pumping is employed to reduce the water level within the excavated areas and thereby reduces flood risk;
- Pumped water is only discharged at the discharge culvert following periods of prolonged rainfall. Discharged water does not come into contact with 'dirty' water from the washing plant; and
- Generally, works outside of the excavation areas are undertaken above the groundwater table limiting the connectivity of the groundwater with any potential sources.

During the Restoration Phase, the following additional embedded mitigation will be in place:

- Central and northern areas will remain at an elevation of ca. 158-160 mAOD;
- Infrastructure and plant (including hydrocarbon storage tanks) will be removed from the northern and central areas;
- Pumping will cease and the quarried areas (floor level of ca. 150 mAOD) will be allowed to flood to ca. 155 mAOD, which remains below both the central/northern area and the surrounding natural ground level;
- Installation of protective fencing around the areas of open-water; and
- There will be no importation of off-site materials during the Restoration Phase.

When assessing and evaluating the potential effects of this Development on the water environment, these embedded mitigation measures are taken into consideration.

6.8 Potential Effects

The main activities which have been conducted during the development of the Site and may cause an impact upon the water environment are as follows:

- Earthwork activities (e.g. excavation of quarry, movement of material);
- Pumping and dewatering of the quarry pits;
- Blasting of rock using explosives;
- Crushing and washing of excavated rock;
- Use and parking of mechanical plant on the Site for excavation activities;
- Storage of hydrocarbons associated with the refuelling and asphalt production;
- Mixing and production of asphalt; and
- Use of welfare facilities and holding tank.

[5] http://kildare.ie/CountyCouncil/Environment/SepticTanksorDomesticWasteWaterTreatmentSystems/SS%20Wells%20Web.pdf

It is anticipated that these activities will remain constant during the next phase of operations at the Site.

During the planned Restoration Phase the potential activities are as follows:

- Earthwork activities (e.g. movement of material and vegetation planting);
- Removal of the silt ponds and associated material;
- Removal of plant, ancillary storage tanks, infrastructure and buildings; and
- Cessation of pumping and flooding of the excavated areas.

Without mitigation additional to that which is already embedded in the Site infrastructure and design, the Site has the potential to cause the following impacts during the Operational Phase:

- Changes in groundwater or surface water due to rock blasting, crushing or washing activities;
- Changes in surface water and groundwater due to releases from the asphalt or washing plant;
- Changes in surface water and groundwater from wastewater generated by on-Site welfare, holding tank and wheel wash facilities;
- Changes in surface water and groundwater from uncontrolled material storage;
- Changes in surface water and ground water quality caused by hydrocarbon leaks from fuel storage tanks or the unmanaged spillage of fuels or lubricants from Site plant or vehicles;
- Changes in groundwater levels and flow directions as a result of pumping; and
- Increased flooding risk due to off-site discharge of pumped water via the Site discharge culvert.

Without mitigation additional to that which is already embedded in the restoration design, the Site has the potential to cause the following impacts during the Restoration Phase:

- Changes in groundwater or surface water quality during and post removal of plant and infrastructure in the northern and central areas;
- Changes in groundwater or surface water quality during and post removal of the silt pond infrastructure;
- Changes in groundwater level within the quarry pond associated with the cessation of pumping; and
- Changes in Site discharge volumes associated with the cessation of pumping.

6.8.1 Evaluation of Potential Effects

Using the methodology set out in Section 6.3 and the potential effects detailed above, an evaluation and assessment of the potential effects on the identified sensitive receptors is presented in Table 6.16. This assessment takes consideration of the embedded mitigation.

The magnitudes associated with the potential impacts at the Site are assigned as negligible or low due to:

- Limited off-site hydraulic connectivity of groundwater has limited the migration of contaminants from the Site and localised the drawdown to areas immediately adjacent to the excavated areas;
- Low or undetected concentrations of hydrocarbons in groundwater and surface water and the presence of embedded mitigation to prevent contaminant migration;
- No exceedances of surface water EQS threshold values for inland waters and generally good quality of water in the River Griffeen observed (Appendix 6-2);

- The estimated low volumes of discharge to the culvert.

Combined with the negligible, low or medium sensitivity of the identified receptors, the potential adverse effects caused by the Site are **imperceptible or slight.**

It is also noted that there may be potential benefits during the Restoration Phase associated with the cessation of pumping, cessation of rock crushing / washing and removal of the silt pond infrastructure. However, these potential beneficial effects during restoration are also considered to be **imperceptible or slight.**

Table 6.16: Evaluation of Initial Impacts and their Effect Significance.

Project Phase	Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect*
Operational	Groundwater	Negligible	Change in groundwater quality due to rock blasting, crushing and washing activities.	Low (adverse), direct, short term, reversible	Imperceptible or slight
			Change in groundwater quality due to releases from the asphalt plant.	Negligible (adverse), direct, short term, reversible	Imperceptible
			Change in groundwater quality from wastewater generated by on-Site welfare units, holding tank and wheel wash facilities.	Negligible (adverse), direct, short term, reversible	Imperceptible
			Change in groundwater quality from uncontrolled material storage.	Negligible (adverse), direct, short term, reversible	Imperceptible
			Change in groundwater quality caused by hydrocarbon leaks from fuel storage tanks or the unmanaged spillage of fuels or lubricants from plant or vehicles.	Low (adverse), direct, short term, reversible	Imperceptible or slight
			Changes in groundwater levels and flow directions as a result of pumping.	Low (adverse), direct, temporary, reversible	Imperceptible or slight
	Surface Water	Medium	Change in surface water quality due to rock blasting, crushing or washing activities.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Change in surface water quality due to releases from the asphalt plant.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Change in surface water quality from wastewater generated by on-Site welfare units, holding tank and wheel wash facilities.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight

Project Phase	Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect*
			Change in surface water quality from uncontrolled material storage.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Change in surface water quality caused by hydrocarbon leaks from fuel storage tanks or the unmanaged spillage of fuels or lubricants from plant or vehicles.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
	Flooding	Low	Increased flooding risk due to off-Site discharge of pumped water via the Site discharge culvert.	Negligible (adverse), indirect, temporary, reversible	Imperceptible
	SAC/SPA	High	Change in surface water quality due to rock blasting, crushing or washing activities.	Negligible (adverse), indirect, short term, reversible	Slight
			Change in surface water quality due to releases from the asphalt, concrete plant.	Negligible (adverse), indirect, short term, reversible	Slight
			Change in surface water quality from wastewater generated by on-Site welfare units, holding tank and wheel wash facilities.	Negligible (adverse), indirect, short term, reversible	Slight
			Change in surface water quality from uncontrolled material storage.	Negligible (adverse), indirect, short term, reversible	Slight
			Change in surface water quality caused by hydrocarbon leaks from fuel storage tanks or the unmanaged spillage of fuels or lubricants from plant or vehicles.	Negligible (adverse), indirect, short term, reversible	Slight
Restoration	Groundwater	Negligible	Changes in groundwater quality during removal of plant and infrastructure in the northern and central areas.	Negligible (adverse), direct, short term, reversible	Imperceptible

Project Phase	Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect*
			Changes in groundwater quality post removal of plant and infrastructure in the northern and central areas.	Negligible (beneficial), direct, permanent, reversible	Imperceptible
			Changes in groundwater quality during the removal of the silt pond infrastructure.	Negligible (adverse), direct, short term, reversible	Imperceptible
			Changes in groundwater quality post removal of the silt pond infrastructure.	Negligible (beneficial), direct, permanent, reversible	Imperceptible
			Changes in groundwater level within the quarry pond associated with the cessation of pumping.	Low (beneficial), direct, permanent, reversible	Imperceptible or slight
	Surface Water	Medium	Changes in surface water quality during removal of plant and infrastructure in the northern and central areas.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Changes in surface water quality post removal of plant and infrastructure in the northern and central areas.	Negligible (beneficial), indirect, permanent, reversible	Imperceptible or slight
			Changes in surface water quality during the removal of the silt pond infrastructure.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Changes in surface water quality post removal of the silt pond infrastructure.	Negligible (beneficial), indirect, permanent, reversible	Imperceptible or slight
	Flooding	Low	Changes in Site discharge volumes associated with the cessation of pumping	Negligible (beneficial), indirect, permanent, reversible	Imperceptible
	SAC/SPA	High	Changes in surface water quality during removal of plant and infrastructure in the northern and central areas.	Negligible (adverse), indirect, short term, reversible	Slight

Project Phase	Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect*
			Changes in surface water quality post removal of plant and infrastructure in the northern and central areas.	Negligible (beneficial), indirect, permanent, reversible	Imperceptible or slight
			Changes in surface water quality during the removal of the silt pond infrastructure.	Negligible (adverse), indirect, short term, reversible	Imperceptible or slight
			Changes in surface water quality post removal of the silt pond infrastructure.	Negligible (beneficial), indirect, permanent, reversible	Slight

* Taking account of embedded mitigation

6.8.2 'Do-Nothing' Scenario

In the event that the Proposed Development does not progress (i.e. the Site remains at the current footprint), there are unlikely to be perceptible changes upon the existing impacts on the water environment in the area of the Site.

If consent is not achieved and no further works were carried out within the Site this would only result in an earlier cessation of impacts and effects. Considering that these effects are classified as **negligible** or **slight** then there is limited benefit gained under a 'do-nothing' scenario.

6.9 Mitigation Measures Required

Whilst the potential effects are shown to be **imperceptible or slight** (Section 6.8), in order to further mitigate the effects associated with the development as it currently stands on the water environment and human health, the following additional mitigation measures should be carried out:

- Sludge from the wheel washes should be continue to be collected and disposed of correctly, if there are any concerns over potential contamination in the sludge, this should be tested to determine an appropriate disposal route. Wastewater from the wheel washes should be discharged via the on-site hydrocarbon interceptor;
- Waste production on-site should be continue to be minimised and all residual waste is handled in accordance with relevant legislation and is removed from the Site by licensed hauliers;
- Vehicles and plant on Site should continue to be well maintained, vehicle check should be carried out to assess the condition, fuelling should take place in the refuelling area with appropriate drip trays/ nappies;
- Maintenance of vehicles and plant on Site should be carried out on hardstanding in the refuelling area where the hydrocarbon interceptor is located;
- An emergency spill kit (including absorbers) should be available for use in the event of an accidental spill on the quarry floor and key personnel trained in its use;
- Whilst it is acknowledged that potential contaminant migration pathways are short (tens of metres), any disused / redundant boreholes on the Site should be properly decommissioned so as to not pose additional potential pathways for surface contamination to reach the groundwater table;
- Discharges to the on-Site culvert should be further delineated to determine the flow path once it has been discharged from the Site and joined the N7 roadway drainage system;
- Welfare facilities and sewage holding tank should continue to be well maintained to reduce the potential for leaks;
- Dewatering and pumping from the quarry pits should be kept to a minimum (volume and duration) to minimise changes to the groundwater elevation and flow direction and to further protect the supply for other water users;
- Bottled water should continue to be used for drinking water on-Site;
- Screening berms constructed of topsoil and overburden should be covered until vegetation is established to minimise the risk of rain/wind erosion and sediment loading of quarry ponds;
- Stockpiles other than those used in production of aggregate should be covered to minimise the risk of rain/wind erosion and potential migration of material, if storage is for long time periods (i.e. not temporary);

- The Silt ponds should be inspected regularly for structural defects that may cause a leak of material or collapse of the infrastructure;
- The cessation of pumping from the quarry pond should happen prior to removal of infrastructure from the northern and central areas to limit the off-site migration of potential contaminant spillages; and
- Adhere to the Environmental Management Plan (EMP) for the Site and establish good record keeping of incidents and water use including pumping rates during future activities.

6.10 Residual Effects

The assessment concludes that the existing Development has not given rise to significant adverse effects on the water environment at or surrounding the Site. In all cases the residual adverse effect is **not significant and not greater than slight.**

6.11 Cumulative Effects

At the time of writing, there are no known applications for off-Site proposed developments which may cause cumulative effects with the Site. There is potential for the effects caused by the Site to have cumulative effects with the following activities:

- Groundwater abstraction could combine with adjacent residential properties to dewater the aquifer;
- Hydrocarbons and suspended solids captured in the pond and discharged via the culvert could combine with sources arising from runoff from the N7 roadway; and
- Effects on surface water quality or flood risk in the River Griffeen could combine downstream with discharges from Rathcoole, Greenogue Business Park or Casement Aerodrome.

However, due to the predominant lack of hydraulic connectivity and **imperceptible or slight** nature of the effects assessed, there is not considered to be any potential for cumulative impacts to occur.

6.12 Monitoring

The following water monitoring is recommended to be carried out at the Site going forward, so as to monitor and allow mitigation of any future effects caused by continuation of the works:

- Groundwater level – groundwater levels should be monitored at the four borehole locations (BH1-BH4) and also at the on-Site ponds (SW1-SW2) on a minimum of a bi-annual basis to monitor the effects of pumping and dewatering from the excavated areas;
- Groundwater quality – groundwater quality should be monitored on a minimum of a bi-annual basis to capture any off-Site migration of impacts on water quality. As a minimum, monitoring should be completed at the four borehole locations (BH1-BH4) and also at the on-Site ponds (SW1-SW2);
- Discharge water quality – monthly quality samples should be collected at the culvert discharge point to assess the quality of water leaving the Site. Reassessment of the effect should be carried out if quality exceeds surface water EQS threshold values for inland waters; and
- Abstraction, usage and discharge volumes – daily records of abstractions, discharges and on-Site water usage should be kept going forward, in order to appropriately characterise water movements on-Site and off-Site.

The above recommendations should be incorporated into the proposed EMP for the Site.

6.13 Difficulties Encountered

During this assessment the following have been noted which have caused difficulty is assessing the impacts on the water environment, although they are not considered likely to have affected the outcome of the assessment:

- The pre-quarrying groundwater elevation is not known, and an estimated 'rest' groundwater elevation is based on interpretation of aerial photography and topographical surveys; and
- Water abstraction, use and discharge rates are not measured on-Site and are therefore estimated.

6.14 Summary and Conclusions

This assessment considers the potential impacts and effects on the water environment over the period of Operational and Restoration Phases at the quarry site.

Efforts were made to establish baseline conditions and any changes in the quality of the water environment at the Site during the existing operational period through desk-based review of available groundwater and surface water data, accessing publicly available data, interrogation of recent groundwater and surface water quality data and intrusive investigations (in the form of monitoring wells).

The main receptors that could be affected by changes to the water environment due to activities undertaken at the Site were identified and potential effects were assessed. Receptor linkages are limited by the low potential for hydraulic connectivity of groundwater (owing to the nature of the Site's bedrock geology) at the Site with the surrounding area. Identified receptors in hydraulic connectivity with the Site were on-site groundwater, off-site surface water and off-site flood risk areas. Receptor pathways for Natura 2000 sites and human health were not identified.

Known design and embedded mitigation measures were considered during the initial assessment of impacts and effects. Where additional mitigation measures could be incorporated to reduce the impacts and effects further, these were identified. A residual assessment of impacts and effects was not required and there were no potential cumulative effects identified.

A small number of difficulties were encountered during this assessment (such as lack of early baseline data) and recommendations for ongoing monitoring at the Site have been presented.

In summary, the significance of effects arising to selected receptors resulting from the different potential impact sources are predicted to be **negligible or slight and therefore not significant** in terms of this assessment.

6.15 References

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APPENDIX 6.1

River Quality Data Summary Table

Table 6-1: Summary of Available River Quality Data 1995-2003

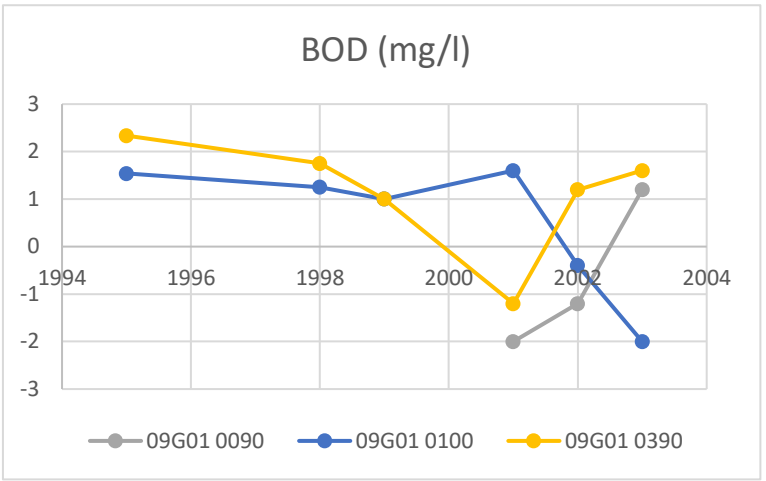
River Monitoring Station	Year	Analyte	No of Samples	Minimum	Average	Maximum	Units
09G01 0090	2001	BOD	5	-2	-2	-2	mg/l
09G01 0090	2002	BOD	6	-2	-1.2	2	mg/l
09G01 0090	2003	BOD	8	-2	1.2	2	mg/l
09G01 0090	2001	Conductivity @25 °C	5	555	582	598	µS/cm
09G01 0090	2002	Conductivity @25 °C	6	581	626	654	µS/cm
09G01 0090	2003	Conductivity @25 °C	8	512	618	676	µS/cm
09G01 0090	2001	Dissolved Oxygen	5	93	106	139	% Sat
09G01 0090	2002	Dissolved Oxygen	6	92	98	107	% Sat
09G01 0090	2003	Dissolved Oxygen	8	91	101	115	% Sat
09G01 0090	2001	Dissolved Oxygen	5	9.5	11.2	14.2	mg/l
09G01 0090	2002	Dissolved Oxygen	6	9.4	10.4	11.1	mg/l
09G01 0090	2003	Dissolved Oxygen	8	9.3	10.7	11.8	mg/l
09G01 0090	2001	Nitrate	5	1.08	3.19	4.65	mg/l
09G01 0090	2002	Nitrate	6	2.59	3.88	5.32	mg/l
09G01 0090	2003	Nitrate	8	2.65	3.83	5.32	mg/l
09G01 0090	2001	Nitrite	5	-0.01	0.009	0.017	mg/l
09G01 0090	2002	Nitrite	6	0.023	0.033	0.043	mg/l
09G01 0090	2003	Nitrite	8	0.021	0.032	0.044	mg/l
09G01 0090	2001	Ortho-Phosphate	5	0.02	0.06	0.18	mg/l
09G01 0090	2002	Ortho-Phosphate	6	0.03	0.09	0.17	mg/l
09G01 0090	2003	Ortho-Phosphate	8	0.03	0.09	0.2	mg/l
09G01 0090	2001	pH	5	7.9	8.1	8.2	pH Units
09G01 0090	2002	pH	6	7.9	8.2	8.4	pH Units
09G01 0090	2003	pH	8	7.9	8.2	8.4	pH Units
09G01 0090	2001	Temperature	5	6.5	10.9	15.3	°C
09G01 0090	2002	Temperature	6	5.9	10.5	15.3	°C
09G01 0090	2003	Temperature	8	5.8	10.6	15.2	°C
09G01 0090	2001	Total Ammonium	5	0.04	0.05	0.07	mg/l
09G01 0090	2002	Total Ammonium	6	0.07	0.08	0.1	mg/l
09G01 0090	2003	Total Ammonium	8	0.09	0.12	0.17	mg/l
09G01 0090	2001	Total Oxidised Nitrogen (TON)	5	2.84	3.49	4.4	mg/l
09G01 0090	2002	Total Oxidised Nitrogen (TON)	6	1.79	3.25	4.61	mg/l
09G01 0090	2003	Total Oxidised Nitrogen (TON)	8	1.98	3.10	4.36	mg/l
09G01 0090	2001	Un-ionised Ammonia	5	0.000845	0.0023953	0.0047727	mg/l
09G01 0090	2002	Un-ionised Ammonia	6	0.001767	0.0028822	0.0043566	mg/l
09G01 0090	2003	Un-ionised Ammonia	8	0.002477	0.0036144	0.0055827	mg/l
09G01 0100	1995	Ammonia	3	0.049	0.208	0.327	mg/l
09G01 0100	1998	Ammonia	2	0.072	0.142	0.212	mg/l
09G01 0100	1999	Ammonia	2	0.151	0.196	0.241	mg/l
09G01 0100	2000	Ammonia	15	0.11811	0.302271	0.538409	mg/l
09G01 0100	1995	BOD	3	1.19	1.54	2.05	mg/l
09G01 0100	1998	BOD	4	1	1	2	mg/l
09G01 0100	1999	BOD	1	1	1	1	mg/l
09G01 0100	2001	BOD	5	-2	2	3	mg/l
09G01 0100	2002	BOD	6	-2	0	2	mg/l
09G01 0100	2003	BOD	8	-2	-2	-2	mg/l
09G01 0100	1995	Conductivity @ 20°C	3	589	633	662	µS/cm
09G01 0100	1998	Conductivity @ 20°C	4	642	673	736	µS/cm
09G01 0100	1999	Conductivity @ 20°C	3	664	680	703	µS/cm
09G01 0100	2000	Conductivity @ 20°C	16	565	659	694	µS/cm
09G01 0100	2001	Conductivity @25 °C	5	558	653	698	µS/cm
09G01 0100	2002	Conductivity @25 °C	6	587	672	716	µS/cm
09G01 0100	2003	Conductivity @25 °C	8	555	582	598	µS/cm
09G01 0100	1995	Dissolved Oxygen	2	89	95	100	% Saturation
09G01 0100	1998	Dissolved Oxygen	3	92	107	118	% Saturation
09G01 0100	1999	Dissolved Oxygen	3	91	94	98	% Saturation
09G01 0100	2000	Dissolved Oxygen	19	11.48	81.10	108.3	% Saturation

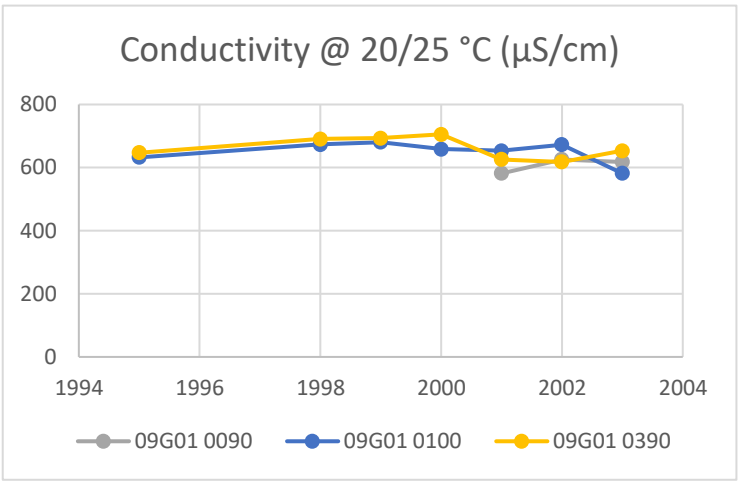
River Monitoring Station	Year	Analyte	No of Samples	Minimum	Average	Maximum	Units
09G01 0100	2001	Dissolved Oxygen	5	95	101	112	% Sat
09G01 0100	2002	Dissolved Oxygen	6	96	102	114	% Sat
09G01 0100	2003	Dissolved Oxygen	8	93	106	139	% Sat
09G01 0100	2001	Dissolved Oxygen	5	9.7	10.6	11.5	mg/l
09G01 0100	2002	Dissolved Oxygen	6	9.8	10.8	11.5	mg/l
09G01 0100	2003	Dissolved Oxygen	8	9.5	11.2	14.2	mg/l
09G01 0100	1995	Nitrate	3	2.817	4.442	5.353	mg/l
09G01 0100	1996	Nitrate	1	7.268	7.268	7.268	mg/l
09G01 0100	1998	Nitrate	3	27.2888	28.7743	31.4973	mg/l
09G01 0100	1999	Nitrate	2	29.81833	30.75306	31.68779	mg/l
09G01 0100	2000	Nitrate	1	26.8901	26.8901	26.8901	mg/l
09G01 0100	2001	Nitrate	5	2.34	3.39	4.74	mg/l
09G01 0100	2002	Nitrate	6	2.2	3.2	4.7	mg/l
09G01 0100	2003	Nitrate	8	1.08	3.19	4.65	mg/l
09G01 0100	1998	Nitrite	3	0.25584	0.29192	0.3444	mg/l
09G01 0100	1999	Nitrite	2	0.246	0.41492	0.58384	mg/l
09G01 0100	2000	Nitrite	15	0.105353	0.1834414	0.2797359	mg/l
09G01 0100	2001	Nitrite	5	0.025	0.031	0.036	mg/l
09G01 0100	2002	Nitrite	6	0.02	0.028	0.032	mg/l
09G01 0100	2003	Nitrite	8	-0.01	0.009	0.017	mg/l
09G01 0100	1995	Ortho-phosphate	2	0.079	0.174	0.268	mg/l
09G01 0100	1997	Ortho-phosphate	16	0.108	0.269	0.57	mg/l
09G01 0100	1998	Ortho-phosphate	4	0.063	0.119	0.164	mg/l
09G01 0100	1999	Ortho-phosphate	2	0.095	0.126	0.156	mg/l
09G01 0100	2000	Ortho-phosphate	15	0.07591	0.135133	0.218295	mg/l
09G01 0100	2001	Ortho-phosphate	5	-0.01	0.08	0.16	mg/l
09G01 0100	2002	Ortho-phosphate	6	-0.01	0.08	0.16	mg/l
09G01 0100	2003	Ortho-phosphate	8	0.02	0.06	0.18	mg/l
09G01 0100	1995	pH	3	8.15	8.27	8.4	pH units
09G01 0100	1998	pH	4	8.17	8.22	8.27	pH units
09G01 0100	1999	pH	3	7.98	8.09	8.2	pH units
09G01 0100	2000	pH	16	8.03	8.24	8.45	pH units
09G01 0100	2001	pH	5	7.9	8.3	8.4	pH Units
09G01 0100	2002	pH	6	8.1	8.3	8.4	pH Units
09G01 0100	2003	pH	8	7.9	8.1	8.2	pH Units
09G01 0100	1995	Phosphorous	3	0.079	0.507	1.174	mg/l
09G01 0100	1995	Suspended Solids	3	7	18	32	mg/l
09G01 0100	1995	Temperature	2	6.1	12.1	18.1	°C
09G01 0100	1998	Temperature	3	7.2	9.7	13.1	°C
09G01 0100	1999	Temperature	3	7.7	8.0	8.1	°C
09G01 0100	2000	Temperature	16	4.9	7.3	8.9	°C
09G01 0100	2001	Temperature	5	6.4	11.5	16.4	°C
09G01 0100	2002	Temperature	6	6.4	11.6	16.3	°C
09G01 0100	2003	Temperature	8	6.5	10.9	15.3	°C
09G01 0100	2001	Total Ammonium	5	0.08	0.32	1.03	mg/l
09G01 0100	2002	Total Ammonium	6	0.07	0.17	0.34	mg/l
09G01 0100	2003	Total Ammonium	8	0.04	0.05	0.07	mg/l
09G01 0100	2001	Total Oxidised Nitrogen (TON)	5	1.38	2.48	3.95	mg/l
09G01 0100	2002	Total Oxidised Nitrogen (TON)	6	1.49	2.52	3.82	mg/l
09G01 0100	2003	Total Oxidised Nitrogen (TON)	8	2.84	3.49	4.4	mg/l
09G01 0100	2001	Un-ionised Ammonia	5	0.002952	0.0098670	0.0304748	mg/l
09G01 0100	2002	Un-ionised Ammonia	6	0.002827	0.0080992	0.0230386	mg/l
09G01 0100	2003	Un-ionised Ammonia	8	0.000845	0.0023953	0.0047727	mg/l
09G01 0390	1995	Ammonia	3	0.026	0.126	0.273	mg/l
09G01 0390	1998	Ammonia	2	0.248	0.250	0.252	mg/l
09G01 0390	1999	Ammonia	2	0.129	0.187	0.244	mg/l
09G01 0390	2000	Ammonia	2	0.09	0.18	0.27	mg/l
09G01 0390	1995	BOD	3	1.76	2.34	3.49	mg/l
09G01 0390	1998	BOD	4	1	2	3	mg/l

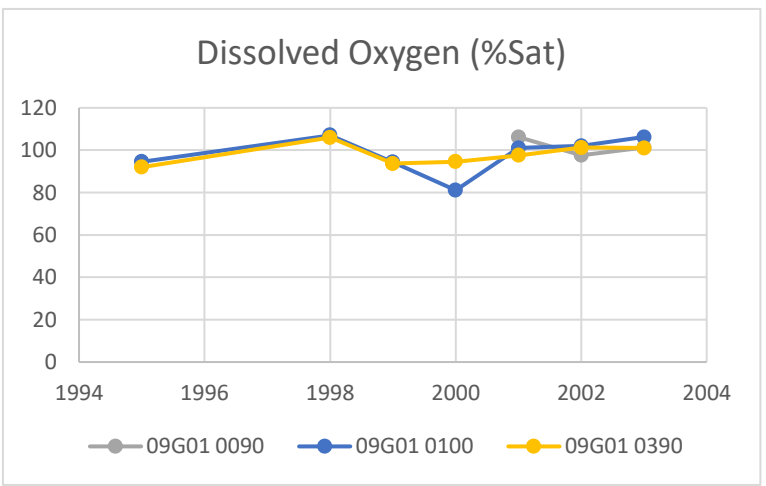
River Monitoring Station	Year	Analyte	No of Samples	Minimum	Average	Maximum	Units
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09G01 0390	2001	BOD	17	-2	-1	2	mg/l
09G01 0390	2002	BOD	18	-2	1	2	mg/l
09G01 0390	2003	BOD	20	-2	2	3	mg/l
09G01 0390	1995	Conductivity @ 20°C	3	594	648	689	µS/cm
09G01 0390	1998	Conductivity @ 20°C	4	655	691	757	µS/cm
09G01 0390	1999	Conductivity @ 20°C	3	688	693	697	µS/cm
09G01 0390	2000	Conductivity @ 20°C	2	699	706	712	µS/cm
09G01 0390	2001	Conductivity @ 25°C	17	581	626	654	µS/cm
09G01 0390	2002	Conductivity @ 25°C	18	512	618	676	µS/cm
09G01 0390	2003	Conductivity @ 25°C	20	558	653	698	µS/cm
09G01 0390	1995	Dissolved Oxygen	2	83	92	101	% Saturation
09G01 0390	1998	Dissolved Oxygen	3	94	106	114	% Saturation
09G01 0390	1999	Dissolved Oxygen	3	92	94	95	% Saturation
09G01 0390	2000	Dissolved Oxygen	2	94	95	95	% Saturation
09G01 0390	2001	Dissolved Oxygen	17	92	98	107	% Sat
09G01 0390	2002	Dissolved Oxygen	18	91	101	115	% Sat
09G01 0390	2003	Dissolved Oxygen	20	95	101	112	% Sat
09G01 0390	2001	Dissolved Oxygen	17	9.4	10.4	11.1	mg/l
09G01 0390	2002	Dissolved Oxygen	18	9.3	10.7	11.8	mg/l
09G01 0390	2003	Dissolved Oxygen	20	9.7	10.6	11.5	mg/l
09G01 0390	1995	Nitrate	3	1.941	4.109	5.394	mg/l
09G01 0390	1996	Nitrate	1	7.346	7.346	7.346	mg/l
09G01 0390	1998	Nitrate	3	26.87681	28.69459	31.8517	mg/l
09G01 0390	1999	Nitrate	2	29.93794	30.70876	31.47958	mg/l
09G01 0390	2000	Nitrate	2	25.6054	28.0198	30.4341	mg/l
09G01 0390	2001	Nitrate	17	2.59	3.88	5.32	mg/l
09G01 0390	2002	Nitrate	18	2.65	3.83	5.32	mg/l
09G01 0390	2003	Nitrate	20	2.34	3.39	4.74	mg/l
09G01 0390	1998	Nitrite	3	0.31816	0.35096	0.3772	mg/l
09G01 0390	1999	Nitrite	2	0.2952	0.43788	0.58056	mg/l
09G01 0390	2000	Nitrite	2	0.1312	0.1312	0.1312	mg/l
09G01 0390	2001	Nitrite	17	0.023	0.033	0.043	mg/l
09G01 0390	2002	Nitrite	18	0.021	0.032	0.044	mg/l
09G01 0390	2003	Nitrite	20	0.025	0.031	0.036	mg/l
09G01 0390	1995	Ortho-phosphate	2	0.095	0.122	0.148	mg/l
09G01 0390	1997	Ortho-phosphate	16	0.115	0.315	0.658	mg/l
09G01 0390	1998	Ortho-phosphate	4	0.117	0.148	0.2	mg/l
09G01 0390	1999	Ortho-phosphate	2	0.095	0.126	0.156	mg/l
09G01 0390	2000	Ortho-phosphate	3	0.08	0.1	0.1	mg/l
09G01 0390	2001	Ortho-Phosphate	17	0.03	0.09	0.17	mg/l
09G01 0390	2002	Ortho-Phosphate	18	0.03	0.09	0.2	mg/l
09G01 0390	2003	Ortho-Phosphate	20	-0.01	0.08	0.16	mg/l
09G01 0390	1995	pH	3	8.17	8.29	8.37	pH units
09G01 0390	1998	pH	4	8.23	8.26	8.28	pH units
09G01 0390	1999	pH	3	7.97	8.12	8.2	pH units
09G01 0390	2000	pH	2	8.1	8.1	8.1	pH units
09G01 0390	2001	pH	17	7.9	8.2	8.4	pH Units
09G01 0390	2002	pH	18	7.9	8.2	8.4	pH Units
09G01 0390	2003	pH	20	7.9	8.3	8.4	pH Units
09G01 0390	1995	Phosphorous	3	0.095	0.494	1.239	mg/l
09G01 0390	1995	Suspended Solids	3	6	11	18	mg/l
09G01 0390	1995	Temperature	2	6	12.3	18.6	°C
09G01 0390	1998	Temperature	3	7.3	9.8	13.2	°C
09G01 0390	1999	Temperature	3	7.7	8.0	8.2	°C
09G01 0390	2000	Temperature	2	4.6	6.4	8.1	°C
09G01 0390	2001	Temperature	17	5.9	10.5	15.3	°C
09G01 0390	2002	Temperature	18	5.8	10.6	15.2	°C
09G01 0390	2003	Temperature	20	6.4	11.5	16.4	°C

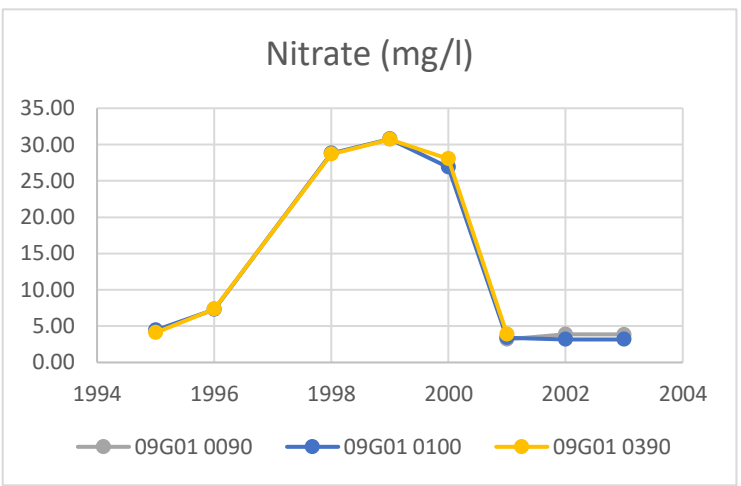
River Monitoring Station	Year	Analyte	No of Samples	Minimum	Average	Maximum	Units
09G01 0390	2001	Total Ammonium	17	0.07	0.08	0.1	mg/l
09G01 0390	2002	Total Ammonium	18	0.09	0.12	0.17	mg/l
09G01 0390	2003	Total Ammonium	20	0.08	0.32	1.03	mg/l
09G01 0390	2001	Total Oxidised Nitrogen (TON)	17	1.79	3.25	4.61	mg/l
09G01 0390	2002	Total Oxidised Nitrogen (TON)	18	1.98	3.10	4.36	mg/l
09G01 0390	2003	Total Oxidised Nitrogen (TON)	20	1.38	2.48	3.95	mg/l
09G01 0390	2001	Un-ionised Ammonia	17	0.001767	0.0028822	0.0043566	mg/l
09G01 0390	2002	Un-ionised Ammonia	18	0.002477	0.0036144	0.0055827	mg/l
09G01 0390	2003	Un-ionised Ammonia	20	0.002952	0.0098670	0.0304748	mg/l

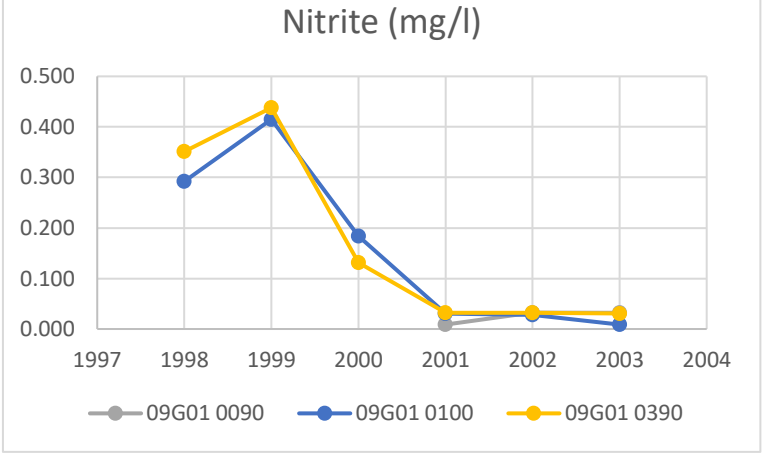
Figure 6-1: Time Series Graphs of Key Water Quality Parameters

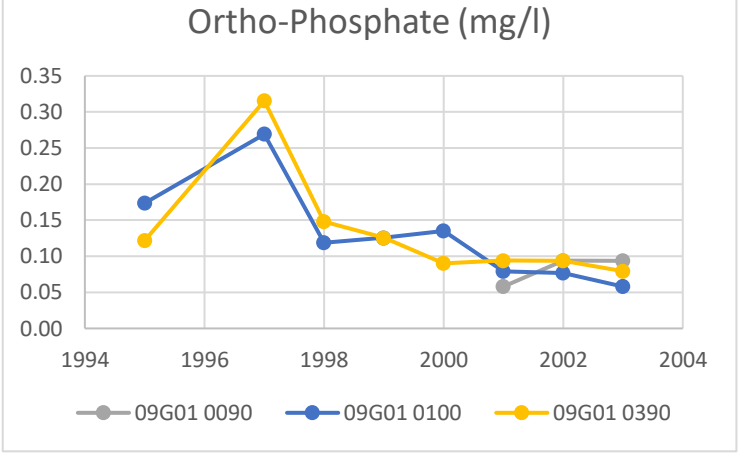


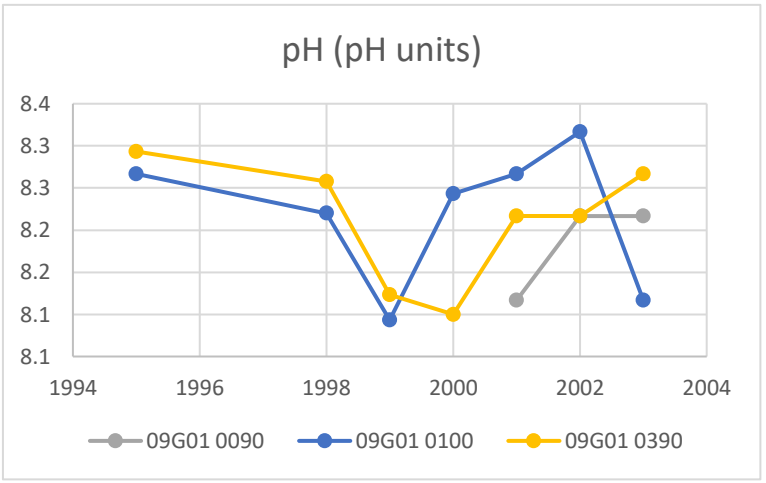












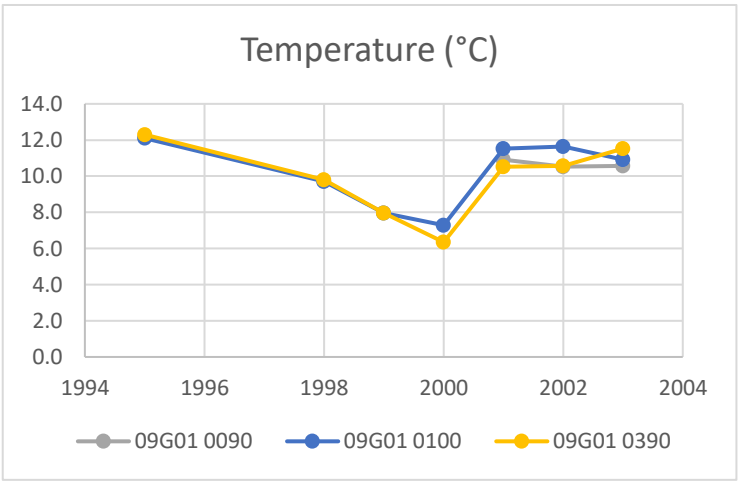
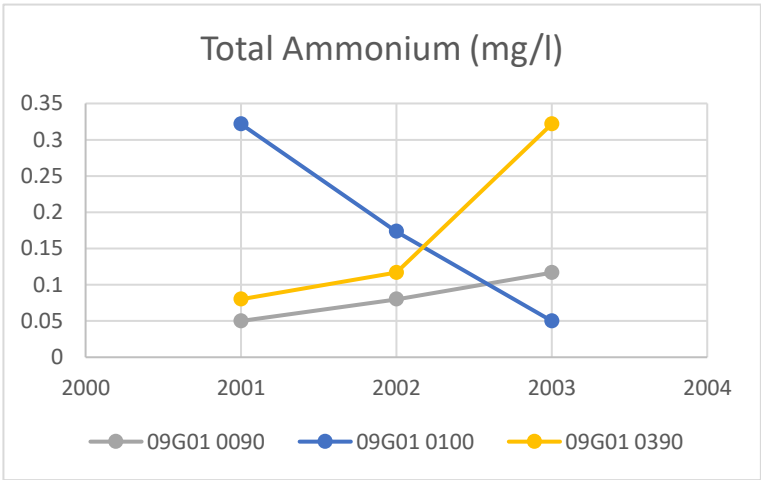
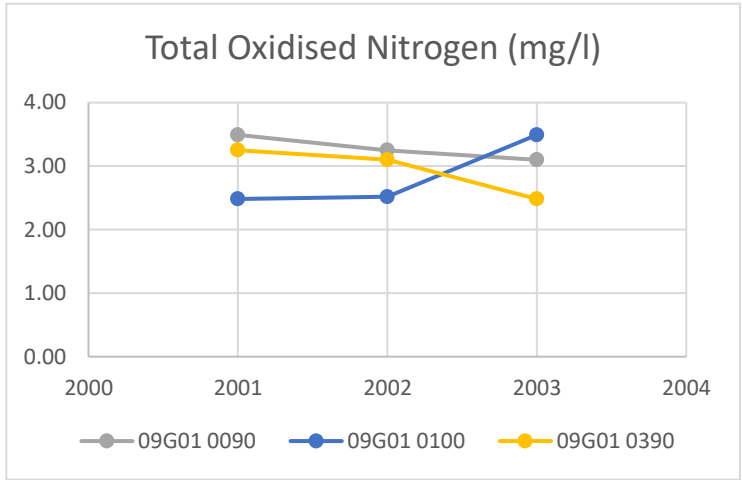
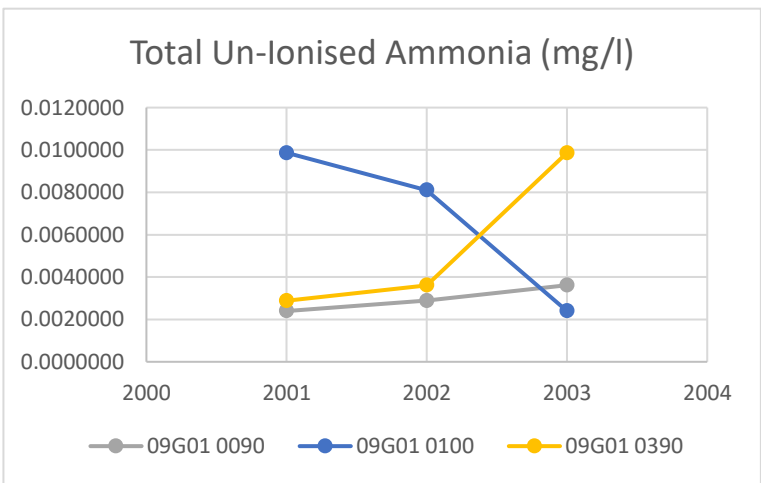


Figure 6-1: Time Series Graphs of Key Water Quality Parameters (cont.)







APPENDIX 6.2

GW and SW Screening Table

Table 1: Screening of 2020-2021 Surface Water Samples

Test	Units	LOD	Sample ID				SW1	SW1	L012100	T040400	T040300	G010100	G010150
			Description				On Site pit water		Headwater of River	Monitoring Station	Monitoring Station	Monitoring Station	Monitoring Station
			Sampled Date				18/06/2020	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
			Maximum Allowable Concentration (MAC)										
			SI 272 of 2009 EQS for Inland SW	SI 286 of 2015 EQS for Inland SW	UK EQS Freshwater Specific Pollutants	UK EQS Freshwater Priority Hazardous Substances							
Dissolved Arsenic	µg/l	<2.5	-	-	-	-	32.6	69.9	10.3	3.3	6.2	7.8	10
Dissolved Boron	µg/l	<12	-	-	-	-	51	51	22	15	14	26	18
Dissolved Cadmium [1]	µg/l	<0.5	**Variable**	**Variable**	-	**Variable**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l	<0.2	-	-	-	-	141.1	143	111.4	72.8	71.7	98.2	103.4
Total Dissolved Chromium [2]	µg/l	<1.5	**32**	-	**32**	-	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Copper	µg/l	<7	-	-	-	-	<7	<7	<7	<7	<7	<7	<7
Dissolved Lead	µg/l	<5	-	**14**	-	**14**	<5	<5	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l	<0.1	-	-	-	-	20.1	19.8	13.8	5.3	5.2	6.9	9.4
Dissolved Mercury	µg/l	<1	**0.07**	**0.07**	-	**0.07**	<1	<1	<1	<1	<1	<1	<1
Dissolved Nickel	µg/l	<2	-	**34**	-	**34**	4	5	<2	<2	<2	<2	<2
Dissolved Potassium	mg/l	<0.1	-	-	-	-	14.3	13.4	5.5	1.2	1.3	2	1.9
Dissolved Selenium	µg/l	<3	-	-	-	-	<3	<3	<3	<3	<3	<3	<3
Dissolved Sodium	mg/l	<0.1	-	-	-	-	-	29.6	15.7	10.2	10.2	16.8	15.1
Dissolved Zinc	µg/l	<3	-	-	-	-	10	4	3	<3	<3	3	3
Total Hardness Dissolved (as CaCO3)	mg/l	<1	-	-	-	-	437	441	336	204	201	274	298
Methyl Tertiary Butyl Ether	µg/l	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/l	<0.5	**50**	**50**	-	**50**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/l	<5	-	-	**380**	-	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	µg/l	<1	-	-	-	-	<1	<1	<1	<1	<1	<1	<1
m/p-Xylene	µg/l	<2	-	-	-	-	<2	<2	<2	<2	<2	<2	<2
o-Xylene	µg/l	<1	-	-	-	-	<1	<1	<1	<1	<1	<1	<1
EPH (C8-C40)	µg/l	<10	-	-	-	-	<10	<10	<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	<0.5	-	-	-	-	326	346.7	24.3	13.8	13.6	28.3	24.4
Chloride	mg/l	<0.3	-	-	-	-	32.9	28.5	42.3	17.2	17.4	33.2	30.9
Nitrate as NO3	mg/l	<0.2	-	-	-	-	30.9	33.6	16.3	12.8	12.9	14.2	21.4
Nitrite as NO2	mg/l	<0.02	-	-	-	-	0.18	0.53	<0.02	<0.02	<0.02	0.05	<0.02
Ortho Phosphate as PO4	mg/l	<0.06	-	-	-	-	<0.06	<0.06	0.16	<0.06	<0.06	0.1	<0.06
Total Oxidised Nitrogen as N	mg/l	<0.2	-	-	-	-	7	7.7	3.7	2.9	2.9	3.2	4.8
Ammoniacal Nitrogen as NH4	mg/l	<0.03	-	-	-	-	0.16	0.94	0.04	<0.03	0.04	0.07	0.04
Total Alkalinity as CaCO3	mg/l	<1	-	-	-	-	108	114	286	182	182	236	242
Dissolved Oxygen	mg/l	<1	-	-	-	-	9	-	-	-	-	-	-
Electrical Conductivity @25C	uS/cm	<2	-	-	-	-	1029	-	-	-	-	-	-
pH	pH units	<0.01	-	-	**6-9**	-	8.12	-	-	-	-	-	-
Total Organic Carbon	mg/l	<2	-	-	-	-	8	5	<2	<2	<2	<2	<2
Total Dissolved Solids	mg/l	<35	-	-	-	-	741	725	449	263	256	369	484

Exceeds Screening Value

'-' No Value

1. Screening value is variable dependent on the hardness of the water as CaCO3 (mg/l)

2. Screened against standard for Chromium III

Table 2: Retrospective Screening of 2006-2013 Surface Water Samples

Test	Units	Maximum Allowable Concentration (MAC)				Sample ID	SW1	SW2 Tootenhill Stream		SW3
						Sampled Date	Jun-06	Jun-06	Sep-13	Feb-08
		SI 272 of 2009 EQS for Inland SW	SI 286 of 2015 EQS for Inland SW	UK EQS Freshwater Specific Pollutants	UK EQS Freshwater Priority Hazardous Substances					
pH	pH Units	-	-	**6-9**	-		8.4	7.9	8.06	7.95
TSS	mg/l	-	-	-	-		<5	<5	2	<10
BOD	mg/l	-	-	-	-		<2	<2	<2	<2
COD	mg/l	-	-	-	-		<10	<10	8	<15
Ammonia as N	mg/l	-	-	-	-		<0.2	<0.2	<0.02	<0.2
TOC	mg/l	-	-	-	-		-	-	4.2	-
Nitrate as N [1]	mg/l	-	-	-	-		3.83	6.3	1.4	5.51
Chloride	mg/l	-	-	-	-		16	21	14.7	-
Phosphate	mg/l	-	-	-	-		0.02	<0.02	0.08	0.24
Calcium	mg/l	-	-	-	-		82	99	109	-
Sodium	mg/l	-	-	-	-		7.9	8.7	14	-
Magnesium	mg/l	-	-	-	-		6.1	15	9	-
Potassium	mg/l	-	-	-	-		0.4	0.9	2	-
Zinc	mg/l	-	-	-	-		-	-	<1	-
Arsenic	mg/l	-	-	-	-		-	-	3	-
Cadmium [2]	mg/l	Variable	Variable	-	Variable		-	-	<1	-
Chromium [3]	mg/l	**32**	-	**32**	-		-	-	<1	-
Nickel	mg/l	-	**34**	-	**34**		-	-	<1	-
Lead	mg/l	-	**14**	-	**14**		-	-	<1	-
Total Petroleum Hydrocarbons	mg/l	-	-	-	-		-	-	<50	-

Exceeds Screening Value

'-' No Value

1. Screened against standard for Nitrate as NO3

2. Screening value is variable dependent on the hardness of the water as CaCO3 (mg/l)

3. Screened against standard for Chromium III

Table 3: Screening of 2020-2021 Groundwater Samples

Test	Units	LOD	SI 9 of 2010, inc. SI 366 of 2016	EPA Interim GW Values	Sample ID	BH01	BH02	BH03	BH04	BH01	BH02	BH03	BH04	L.BEHAN HOUSE	SILT POND 2	SW1	SW1
					Sampled Date	18/06/2020	18/06/2020	18/06/2020	18/06/2020	26/01/2021	26/01/2021	26/01/2021	26/01/2021	26/01/2021	27/01/2021	18/06/2020	27/01/2021
																On Site pit water	
Dissolved Arsenic	µg/l	<2.5	7.5	10		4.7	33.9	13.7	471.3	12.7	17.4	24.8	7.2	13.3	6.1	32.6	69.9
Dissolved Boron	µg/l	<12	750	1000		18	15	32	16	17	21	23	<12	14	25	51	51
Dissolved Cadmium	µg/l	<0.5	3.75	5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l	<0.2	-	200		53.3	55.3	49.9	39.6	54.8	88.1	54.8	60.7	68	112.2	141.1	143
Total Dissolved Chromium	µg/l	<1.5	37.5	30		<1.5	<1.5	12.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	1.5	<1.5
Dissolved Copper	µg/l	<7	1500	30		<7	<7	<7	<7	<7	<7	<7	<7	13	<7	<7	<7
Dissolved Lead	µg/l	<5	7.5	10		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l	<0.1	-	50		12.9	27.9	9.5	39.3	13.1	24.8	11.3	18.3	11.6	4.1	20.1	19.8
Dissolved Mercury	µg/l	<1	0.75	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Nickel	µg/l	<2	15	20		4	2	4	42	<2	<2	<2	2	<2	<2	4	5
Dissolved Potassium	mg/l	<0.1	-	5		0.7	0.9	4	3.7	0.5	0.7	3.4	0.5	0.5	6.2	14.3	13.4
Dissolved Selenium	µg/l	<3	-	-		<3	<3	16	<3	<3	<3	<3	<3	<3	<3	<3	<3
Dissolved Sodium	mg/l	<0.1	150	150		-	-	-	-	6.9	14.8	11.5	6.6	8.3	9.2	-	29.6
Dissolved Zinc	µg/l	<3	75000	100		5	5	<3	5	<3	4	<3	13	24	<3	10	4
Total Hardness Dissolved (as CaCO3)	mg/l	<1	-	200		187	255	165	264	192	324	184	229	219	298	437	441
Methyl Tertiary Butyl Ether	µg/l	<0.1	10	30		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/l	<0.5	0.75	1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/l	<5	525	10		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	µg/l	<1	-	10		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m/p-Xylene	µg/l	<2	-	10		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	µg/l	<1	-	10		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
EPH (C8-C40)	µg/l	<10	7.5	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	<0.5	187.5	200		16	62.8	58.5	20.2	7.1	98	37.5	7.6	9.4	283.5	326	346.7
Chloride	mg/l	<0.3	187.5	30		10.9	14.1	17.6	11.6	10.6	18.9	15	8.5	11.8	7.4	32.9	28.5
Nitrate as NO3	mg/l	<0.2	37.5	25		33.6	17.3	23.7	8.9	15.8	35.2	23.2	14	19.3	1.3	30.9	33.6
Nitrite as NO2	mg/l	<0.02	0.375	0.1		<0.02	<0.02	0.3	0.12	<0.02	<0.02	0.02	0.04	<0.02	0.42	0.18	0.53
Ortho Phosphate as PO4	mg/l	<0.06	-	0.03		<0.06	<0.06	<0.06	0.07	<0.06	<0.06	0.12	<0.06	<0.06	<0.06	<0.06	<0.06
Total Oxidised Nitrogen as N	mg/l	<0.2	-	NAC*		7.6	3.9	5.4	2	3.6	7.9	5.2	3.2	4.4	0.4	7	7.7
Ammoniacal Nitrogen as NH4 [1]	mg/l	<0.03	0.065	-		0.1	0.05	0.09	<0.03	<0.03	<0.03	0.03	0.14	<0.03	0.15	0.16	0.94
Total Alkalinity as CaCO3	mg/l	<1	-	NAC*		158	176	130	260	180	212	140	218	206	32	108	114
Dissolved Oxygen	mg/l	<1	-	NAC*		9	9	7	7	-	-	-	-	-	-	9	-
Electrical Conductivity @25C	uS/cm	<2	1875	1000		415	527	447	512	-	-	-	-	-	-	1029	-
pH	pH units	<0.01	-	6.5 - 9.5		8.17	8.25	8.21	8.31	-	-	-	-	-	-	8.12	-
Total Organic Carbon	mg/l	<2	-	NAC*		<2	<2	4	<2	<2	<2	4	<2	<2	6	8	5
Total Dissolved Solids	mg/l	<35	-	1000		271	357	335	333	229	441	278	247	271	476	741	725

Exceeds Screening Value

'NAC' No Abnormal Change

'-' No Value

SW1 samples screened against groundwater standards in additon to surface water standards due to the potential for direct discharge to groundwater.

[1] *Screened against lower range of overall threshold value range for Ammonium*

Table 3: Retrospective Screening of 2007-2018 Groundwater Samples

Test	Units	Report Reference		Byrne (2015)												
		Sample ID		MW1		MW2	Office Well		Chipping Plant Well	Well A			Well B	L. Behan House		Yard Well
		Sampled Date		2007	2010	2007	2007	2013	2007	2006	2007	2013	2007	2007	2013	2013
		SI 9 of 2010, inc. SI 366 of 2016	EPA Interim GW Values													
Conductivity	uS/cm	1875	1000	634	540	763	800	724	748	621	624	478	536	503	546	160
pH	pH Units	-	6.5 - 9.5	7.9	7.6	7.7	7.7	7.31	7.6	7.3	7.7	7.4	6.99	7.6	7.2	7.72
Ammonia as N [1]	mg/l	0.175	-	<0.02	<0.2	<0.02	<0.02	<0.02	0.1	0.001	<0.02	<0.02	0.011	0.07	<0.02	<0.02
Ammonium as NH4 (calc) [2]	mg/l	0.065	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/l	187.5	30	19.4	18.8	24.1	31.7	11.8	22.1	10.1	28.8	9.4	-	11.6	15.9	6.4
Nitrate as N [3]	mg/l	37.5	25	13	3.2	5.1	5.3	1.0	<0.05	4.09	4.2	2.8	2.5	5.9	2.2	0.8
Nitrite as N [4]	mg/l	0.375	0.1	<0.03	<0.015	<0.03	<0.03	0.008	<0.03	0.019	<0.03	0.006	0.027	<0.03	0.007	0.008
Sulphate	mg/l	187.5	200	75	65.7	70.6	98.3	-	55	-	69.7	-	-	13.9	-	-
Calcium	mg/l	-	200	81	<0.012	90	99	82	78	-	75	73	-	82	92	39
Potassium	mg/l	-	5	1.8	<2.34	3.5	2.5	5	6.4	-	0.9	<1	-	0.5	3	2
Magnesium	mg/l	-	50	25	<0.036	38	32	53	37	13.2	23	20	17.1	13	31	3
Sodium	mg/l	150	150	12	<0.076	15	23	28	16	-	21	11	-	5.8	30	13
Arsenic	µg/l	7.5	10	7	-	35	10	3	20	-	2	10	-	7	5	<1
Barium	µg/l	-	100	130	-	141	110	-	621	-	50	-	-	66	-	-
Chromium	µg/l	37.5	30	<2	8.13	<2	<2	<1	<2	-	<2	<1	-	<2	<1	<1
Cadmium	µg/l	3.75	5	<2	0.108	<2	<2	<1	<2	-	<2	<1	-	<2	<1	<1
Cobalt	µg/l	-	-	<2	-	<2	<2	-	3	-	<2	-	-	<2	-	-
Copper	µg/l	1500	30	<2	123	<2	<2	-	<2	-	<2	-	-	2	-	-
Iron	mg/l	-	0.2	<0.1	-	<0.1	<0.1	-	<0.1	0.049	<0.1	-	0.218	<0.1	-	-
Manganese	µg/l	-	50	4	0.479	<2	174	-	3626	6	3	-	1	<2	-	-
Nickel	µg/l	15	20	<2	-	<2	<2	2	5	-	<2	<1	-	<2	<1	<1
Lead	µg/l	7.5	10	11	1.52	10	16	<1	11	-	11	<1	-	11	<1	<1
Tin	µg/l	-	-	50	-	48	51	-	49	-	49	-	-	50	-	-
Zinc	µg/l	75000	100	5	-	<2	2	3	<2	-	10	3	-	2	7	10
Mercury	µg/l	0.75	1	<1	-	<1	<1	-	<1	-	<1	-	-	<1	-	-
Cyanide	µg/l	37.5	10	<0.01	-	<0.01	<0.01	-	0.01	-	<0.01	-	-	<0.01	-	-
Phosphate (Ortho/MRP) as P	mg/l	0.035	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfide	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH	µg/l	7.5	10	<10	<46	<10	<10	<10	<10	-	<10	<50	-	<10	<50	<50
EPH >C8 to <C40	mg/l	0.0075	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C8 - C10 (Petrol Range)	mg/l	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C10 - C20 (Diesel Range)	mg/l	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH >C20 - <C40 (Motor Oil Range)	mg/l	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness-Dissolved (CaCO3)	µg/l	-	200000	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3: Retrospective Screening of 2007-2018 Groundwater Samples

Test	Units	Report Reference		Byrne (2015)												
		Sample ID		MW1		MW2	Office Well		Chipping Plant Well	Well A			Well B	L. Behan House		Yard Well
		Sampled Date		2007	2010	2007	2007	2013	2007	2006	2007	2013	2007	2007	2013	2013
		SI 9 of 2010, inc. SI 366 of 2016	EPA Interim GW Values													
Manganese- Dissolved	mg/l	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium- Dissolved	mg/l	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium- Dissolved	mg/l	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium- Dissolved	mg/l	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium- Dissolved	mg/l	150	150	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic- Dissolved	µg/l	7.5	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium- Dissolved	µg/l	3.75	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium- Dissolved	µg/l	37.5	30	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper- Dissolved	mg/l	1.5	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead- Dissolved	µg/l	7.5	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel- Dissolved	µg/l	15	20	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc- Dissolved	µg/l	75000	100	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury- Dissolved	µg/l	0.75	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Coliforms	MPN/100ml	-	0	-	-	-	-	12	-	-	-	1	-	-	19	1
Faecal Coliforms	MPN/100ml	-	0	-	-	-	-	2	-	0	-	0	0	-	1	0
BOD	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COD	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E.coli	MPN/100ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suspended Solids	mg/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity Total (R2 pH 4.5) (CaCO3)	mg/l	-	NAC*	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids (TDS)	mg/l	-	1000	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. *Screened against standard for Ammonium as N*
2. *Screened against lower range of overall threshold value range for Ammonium*
3. *Screened against standard for Nitrate as NO3*
4. *Screened against standard for Nitrite as NO2*

Table 3: Retrospective Screening of 2007-2018 Groundwater Samples

Test	Units	Report Reference		Viridus (2020)			
			Sample ID	Behan Well	Well A	MW2	Farm Well
			Sampled Date	2018	2018	2018	2018
		SI 9 of 2010, inc. SI 366 of 2016	EPA Interim GW Values				
Conductivity	uS/cm	1875	1000	520	610	793	155
pH	pH Units	-	6.5 - 9.5	7.4	7.3	7.4	7.8
Ammonia as N [1]	mg/l	0.175	-	<0.005	0.009	<0.005	0.020
Ammonium as NH4 (calc) [2]	mg/l	0.065	-	<0.006	0.011	<0.006	0.026
Chloride	mg/l	187.5	30	22	19	36	12
Nitrate as N [3]	mg/l	37.5	25	6.1	2.4	3.0	0.57
Nitrite as N [4]	mg/l	0.375	0.1	<0.005	<0.005	<0.005	<0.005
Sulphate	mg/l	187.5	200	13	85	110	22
Calcium	mg/l	-	200	-	-	-	-
Potassium	mg/l	-	5	-	-	-	-
Magnesium	mg/l	-	50	-	-	-	-
Sodium	mg/l	150	150	-	-	-	-
Arsenic	µg/l	7.5	10	-	-	-	-
Barium	µg/l	-	100	-	-	-	-
Chromium	µg/l	37.5	30	-	-	-	-
Cadmium	µg/l	3.75	5	-	-	-	-
Cobalt	µg/l	-	-	-	-	-	-
Copper	µg/l	1500	30	-	-	-	-
Iron	mg/l	-	0.2	-	-	-	-
Manganese	µg/l	-	50	-	-	-	-
Nickel	µg/l	15	20	-	-	-	-
Lead	µg/l	7.5	10	-	-	-	-
Tin	µg/l	-	-	-	-	-	-
Zinc	µg/l	75000	100	-	-	-	-
Mercury	µg/l	0.75	1	-	-	-	-
Cyanide	µg/l	37.5	10	-	-	-	-
Phosphate (Ortho/MRP) as P	mg/l	0.035	0.03	<0.005	0.046	0.041	0.017
Sulfide	mg/l	-	-	0.05	<0.03	<0.03	<0.03
TPH	µg/l	7.5	10	-	-	-	-
EPH >C8 to <C40	mg/l	0.0075	0.01	0.02	0.10	0.03	0.31
EPH >C8 - C10 (Petrol Range)	mg/l	-	0.01	<0.01	<0.01	<0.01	<0.01
EPH >C10 - C20 (Diesel Range)	mg/l	-	0.01	<0.01	0.08	0.01	0.22
EPH >C20 - <C40 (Motor Oil Range)	mg/l	-	0.01	0.02	0.02	0.02	0.09
Hardness-Dissolved (CaCO3)	µg/l	-	200000	270	310	440	60

Table 3: Retrospective Screening of 2007-2018 Groundwater Samples

Test	Units	Report Reference		Viridus (2020)			
			Sample ID	Behan Well	Well A	MW2	Farm Well
			Sampled Date	2018	2018	2018	2018
		SI 9 of 2010, inc. SI 366 of 2016	EPA Interim GW Values				
Manganese- Dissolved	mg/l	-	0.05	<1.0	1.1	100	6.9
Calcium- Dissolved	mg/l	-	200	84	79	110	21
Magnesium- Dissolved	mg/l	-	50	14.7	27.7	41.1	1.7
Potassium- Dissolved	mg/l	-	5	0.6	1.2	2.7	0.8
Sodium- Dissolved	mg/l	150	150	10.8	20.2	23.4	7.9
Arsenic- Dissolved	µg/l	7.5	10	12.4	5.2	3.5	-
Cadmium- Dissolved	µg/l	3.75	5	<0.1	<0.1	<0.1	-
Chromium- Dissolved	µg/l	37.5	30	<1.0	<1.0	<1.0	-
Copper- Dissolved	mg/l	1.5	0.03	0.004	<0.003	<0.003	-
Lead- Dissolved	µg/l	7.5	10	<0.3	<0.3	0.4	-
Nickel- Dissolved	µg/l	15	20	<0.5	<0.5	1.9	-
Zinc- Dissolved	µg/l	75000	100	13	4.0	6.7	-
Mercury- Dissolved	µg/l	0.75	1	<0.02	<0.02	<0.02	-
Total Coliforms	MPN/100ml	-	0	0	0	0	10
Faecal Coliforms	MPN/100ml	-	0	-	-	-	-
BOD	mg/l	-	-	1.2	1.1	<1.0	1.6
COD	mg/l	-	-	13	16	38	10
E.coli	MPN/100ml	-	-	0	0	0	10
Suspended Solids	mg/l	-	-	<5	<5	<5	6
Alkalinity Total (R2 pH 4.5) (CaCO3)	mg/l	-	NAC*	213	221	275	43
Total Dissolved Solids (TDS)	mg/l	-	1000	239	342	469	59

Notes:

1. *Screened against standard for Ammonium as N*
2. *Screened against lower range of overall threshold value range for Ammonium*
3. *Screened against standard for Nitrate as NO3*
4. *Screened against standard for Nitrite as NO2*

APPENDIX 6.3

Laboratory Reports

Element Materials Technology
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Golder Associates Ltd
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

Attention :	Ruth Treacy
Date :	26th June, 2020
Your reference :	20137776
Our reference :	Test Report 20/7972 Batch 1
Location :	Behans
Date samples received :	22nd June, 2020
Status :	Final report
Issue :	1

Six samples were received for analysis on 22nd June, 2020 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Simon Gomery BSc
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Golder Associates Ltd
Reference: 20137776
Location: Behans
Contact: Ruth Treacy
EMT Job No: 20/7972

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					LOD/LOR	Units	Method No.
Sample ID	GW1	GW2	GW3	GW4	SW1	GW5							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	22/06/2020	22/06/2020	22/06/2020	22/06/2020	22/06/2020	22/06/2020							
Dissolved Arsenic #	4.7	33.9	13.7	471.3	32.6	33.1					<2.5	ug/l	TM30/PM14
Dissolved Boron	18	15	32	16	51	15					<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium #	53.3	55.3	49.9	39.6	141.1	56.1					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	12.9	<1.5	1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium #	12.9	27.9	9.5	39.3	20.1	28.1					<0.1	mg/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel #	4	2	4	42	4	<2					<2	ug/l	TM30/PM14
Dissolved Potassium #	0.7	0.9	4.0	3.7	14.3	0.8					<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3	16	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Zinc #	5	5	<3	5	10	5					<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	187	255	165	264	437	258					<1	mg/l	TM30/PM14
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	106	105	105	104	101	103					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	106	103	106	105	102	105					<0	%	TM15/PM10
EPH (C8-C40) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM30
Sulphate as SO4 #	16.0	62.8	58.5	20.2	326.0	64.6					<0.5	mg/l	TM38/PM0
Chloride #	10.9	14.1	17.6	11.6	32.9	14.3					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	33.6	17.3	23.7	8.9	30.9	17.8					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02	0.30	0.12	0.18	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	<0.06	<0.06	<0.06	0.07	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	7.6	3.9	5.4	2.0	7.0	4.0					<0.2	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.10	0.05	0.09	<0.03	0.16	<0.03					<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	158	176	130	260	108	180					<1	mg/l	TM75/PM0
Dissolved Oxygen	9	9	7	7	9	9					<1	mg/l	TM58/PM0
Electrical Conductivity @25C #	415	527	447	512	1029	536					<2	uS/cm	TM76/PM0
pH #	8.17	8.25	8.21	8.31	8.12	8.23					<0.01	pH units	TM73/PM0
Total Organic Carbon #	<2	<2	4	<2	8	<2					<2	mg/l	TM60/PM0
Total Dissolved Solids #	271	357	335	333	741	390					<35	mg/l	TM20/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Golder Associates Ltd
Reference: 20137776
Location: Behans
Contact: Ruth Treacy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/7972						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/7972

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/7972

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.	Yes			
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.				
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 20/7972

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

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Golder Associates Ltd
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

Attention :	Ruth Treacy
Date :	9th February, 2021
Your reference :	20137776
Our reference :	Test Report 21/1215 Batch 1
Location :	L. Behons Rathcoole
Date samples received :	29th January, 2021
Status :	Final report
Issue :	1

Thirteen samples were received for analysis on 29th January, 2021 of which twelve were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Golder Associates Ltd
Reference: 20137776
Location: L. Behons Rathcoole
Contact: Ruth Treacy
EMT Job No: 21/1215

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-7	8-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH03	BH02	BH04	BH01	L.BEHAN HOUSE	SW01	SILT POND 2	L012100	T040400	T040300			
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G			
Sample Date	26/01/2021	26/01/2021	26/01/2021	26/01/2021	26/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021			
Dissolved Arsenic #	24.8	17.4	7.2	12.7	13.3	69.9	6.1	10.3	3.3	6.2	<2.5	ug/l	TM30/PM14
Dissolved Boron	23	21	<12	17	14	51	25	22	15	14	<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Dissolved Calcium #	54.8	88.1	60.7	54.8	68.0	143.0	112.2	111.4	72.8	71.7	<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	13	<7	<7	<7	<7	<7	<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM30/PM14
Dissolved Magnesium #	11.3	24.8	18.3	13.1	11.6	19.8	4.1	13.8	5.3	5.2	<0.1	mg/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	2	<2	<2	5	<2	<2	<2	<2	<2	ug/l	TM30/PM14
Dissolved Potassium #	3.4	0.7	0.5	0.5	0.5	13.4	6.2	5.5	1.2	1.3	<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM30/PM14
Dissolved Sodium #	11.5	14.8	6.6	6.9	8.3	29.6	9.2	15.7	10.2	10.2	<0.1	mg/l	TM30/PM14
Dissolved Zinc #	<3	4	13	<3	24	4	<3	3	<3	<3	<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	184	324	229	192	219	441	298	336	204	201	<1	mg/l	TM30/PM14
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	60	97	97	101	99	106	104	108	111	111	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	56	94	94	99	95	103	99	103	106	108	<0	%	TM15/PM10
EPH (C8-C40) #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
Sulphate as SO4 #	37.5	98.0	7.6	7.1	9.4	346.7	283.5	24.3	13.8	13.6	<0.5	mg/l	TM38/PM0
Chloride #	15.0	18.9	8.5	10.6	11.8	28.5	7.4	42.3	17.2	17.4	<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	23.2	35.2	14.0	15.8	19.3	33.6	1.3	16.3	12.8	12.9	<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.02	<0.02	0.04	<0.02	<0.02	0.53	0.42	<0.02	<0.02	<0.02	<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	0.12	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.16	<0.06	<0.06	<0.06	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	5.2	7.9	3.2	3.6	4.4	7.7	0.4	3.7	2.9	2.9	<0.2	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.03	<0.03	0.14	<0.03	<0.03	0.94	0.15	0.04	<0.03	0.04	<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	140	212	218	180	206	114	32	286	182	182	<1	mg/l	TM75/PM0
Total Organic Carbon #	4	<2	<2	<2	<2	5	6	<2	<2	<2	<2	mg/l	TM60/PM0
Total Dissolved Solids #	278	441	247	229	271	725	476	449	263	256	<35	mg/l	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Golder Associates Ltd
Reference: 20137776
Location: L. Behons Rathcoole
Contact: Ruth Treacy
EMT Job No: 21/1215

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	71-77	78-84									LOD/LOR	Units	Method No.
Sample ID	G010100	G010150											
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G											
Sample Date	27/01/2021	27/01/2021											
Sample Type	Surface Water	Surface Water											
Batch Number	1	1											
Date of Receipt	29/01/2021	29/01/2021											
Dissolved Arsenic #	7.8	10.0									<2.5	ug/l	TM30/PM14
Dissolved Boron	26	18									<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Calcium #	98.2	103.4									<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7									<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5									<5	ug/l	TM30/PM14
Dissolved Magnesium #	6.9	9.4									<0.1	mg/l	TM30/PM14
Dissolved Mercury #	<1	<1									<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Potassium #	2.0	1.9									<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3									<3	ug/l	TM30/PM14
Dissolved Sodium #	16.8	15.1									<0.1	mg/l	TM30/PM14
Dissolved Zinc #	3	3									<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	274	298									<1	mg/l	TM30/PM14
Methyl Tertiary Butyl Ether #	<0.1	<0.1									<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5									<0.5	ug/l	TM15/PM10
Toluene #	<5	<5									<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1									<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2									<2	ug/l	TM15/PM10
o-Xylene #	<1	<1									<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	109	110									<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	104	106									<0	%	TM15/PM10
EPH (C8-C40) #	<10	<10									<10	ug/l	TM5/PM30
Sulphate as SO4 #	28.3	24.4									<0.5	mg/l	TM38/PM0
Chloride #	33.2	30.9									<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	14.2	21.4									<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.05	<0.02									<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	0.10	<0.06									<0.06	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	3.2	4.8									<0.2	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.07	0.04									<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	236	242									<1	mg/l	TM75/PM0
Total Organic Carbon #	<2	<2									<2	mg/l	TM60/PM0
Total Dissolved Solids #	369	484									<35	mg/l	TM20/PM0

Client Name: Golder Associates Ltd
Reference: 20137776
Location: L. Behons Rathcoole
Contact: Ruth Treacy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/1215						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/1215

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/1215

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

APPENDIX 6.4

GW Level Summary Table

Table 1: Summary of groundwater level measurements (m OD) 2020-2021

Well ID	BH1	BH2	BH3	BH4
Easting (ITM)	699497.4	700126.9	699691.7	700211.7
Northing (ITM)	725650.7	725954.4	725930.4	725611.6
Top of Cover (mOD)	175.07	175.48	161.17	195.37
Ground Level (mOD)	174.75	174.91	160.64	194.57
Casing Height (m)	0.32	0.57	0.53	0.80
Groundwater Elevation (m OD)				
03/04/2020	153.49	148.47	145.65	181.94
30/04/2020	152.34	145.39	142.48	181.11
18/06/2020	151.25	142.64	140.55	179.12
20/07/2020	151.38	142.91	143.21	182.54
10/09/2020	153.14	145.20	143.66	186.70
07/11/2020	153.52	145.94	144.68	187.55
11/01/2021	154.49	149.41	146.89	188.53
26/01/2021	155.31	151.81	141.20	188.52
10/02/2021	155.44	152.25	148.49	190.66

7.0 AIR QUALITY AND CLIMATE

7.1 Introduction

7.1.1 Background

Golder Associates Ireland Ltd (Golder) have been commissioned by Mr Laurence Behan to prepare this Air Quality and Climate Chapter as part of an Environmental Impact Assessment Report (EIAR) to assesses the impacts of the ongoing and future activities relating to the development and operation at Windmill Hill, Rathcoole, Co. Dublin (the "Site") on the receiving (air) environment. The existing development use is for the quarrying and production of aggregates and registered in accordance with Section 261, Planning & Development Act 2000 (Quarry Ref. No. QS1054). This chapter considers the potential effects of the continued operation of the Site on air quality and climate.

The choice of team members for each study has been informed by the experience of the relevant lead specialist in their area of technical interest. The air quality and climate assessment has been prepared by Rachel Lansley (BSc, MSc). Rachel is a Chartered Scientist (CSci), a Member of the Institution of Environmental Sciences (IES), and a Member of the Institute of Air Quality Management (IAQM) and has more than 14 years' experience in air quality and climate assessment.

A detailed description of the Site and its location can be found in Chapter 2 of this EIAR (Project Description).

7.1.2 Project Overview

This EIAR has been prepared to accompany a planning application to be made under S.37L of the Planning and Development Act, 2000 as amended for the continuation of extraction at an existing quarry at Windmillhill, Rathcoole, Co. Dublin.

The application for further development of the quarry is to be made concurrent with an application for substitute consent for the quarry that is accompanied by a remedial rEIAR.

The lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The EIA project boundary is generally bounded by the N/M7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called 'Four Winds' that is within the ownership of the planning applicant to the east; and the former local Steelstown Road to the west.

At the centre of the EIAR project boundary is an existing quarry that covers an area of approximately 28.8 ha. with an average working depth of approximately 173 mAOD. The existing quarry is roughly rectangular in shape with an east – west axis parallel to the N/M7 and local Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 5 ha.

The further quarrying development proposed involves a lateral northward extension of the current quarry void area of 4.1 ha. (requiring a total additional land take of 5.19 ha. for landscaping berms) west and east of an existing dwelling also in the applicant's ownership and a deepening of the western and eastern side of the laterally extended void to a final working depth of approximately 150 mAOD. The further development proposed is for quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area and the existing quarry access will be utilised.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.

7.1.3 Scope & Significance Methodology

This chapter presents an assessment of the potential air quality and climate effects associated with the continued operation of the Site. The effects have been assessed in the context of relevant national, regional and local air quality policies.

A qualitative assessment of dust impacts from the quarrying activities has been undertaken in line with Institute of Air Quality Management (IAQM); Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016. The detailed assessment is included in Appendix 7.1.

A traffic screening and quantitative operational phase assessment of effects from road traffic emissions has been undertaken in accordance with the Environmental Protection UK/Institute of Air Quality Management guidance document 'Land –Use Planning & Development Control: Planning for Air Quality' (EPUK/IAQM 2017), as part of the rEIAR submitted for the Site's Substitute Consent Application. Detailed dispersion modelling using ADMS-Roads was undertaken to determine the effect of the Proposed Development on traffic derived pollutants, nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), at nearby sensitive receptors. The assessment concluded that the impact of traffic on local receptors was not Significant. As there are no proposed changes to traffic flows associated with this application (and vehicle emissions are predicted to improve with time due to improvements in technology and emissions), impacts from traffic emissions are considered to be Not Significant and are therefore not considered further.

A quantitative assessment of combustion emissions related to the asphalt manufacturing site was undertaken as part of the rEIAR. Detailed dispersion modelling was undertaken using the latest version (Version 5.2.2) of CERC ADMS5 dispersion modelling software, to predict concentrations of NOx, NO_2, SO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors. The assessment concluded that the impacts from the operation of the plant on local receptors was Not Significant. As there are no proposed changes to the operation of the asphalt plant at the Site, impacts from the combustion emissions are considered to be not Significant and are therefore not considered further.

7.1.3.1 Operational Phase Significance Methodology

The Institute of Air Quality Management (IAQM) provides advice on descriptors of the impact of the change in air quality as a consequence of development (IAQM/EPUK 2017). The impact assessment criteria have been adopted in this study and are presented in Table 7.1.

Table 7.1: IAQM Impact Significance Descriptors

Long Term Average Concentration at Receptor	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	<1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110 or more of AQAL	Moderate	Substantial	Substantial	Substantial

The EPUK/IAQM guidance includes seven explanatory notes to accompany the assessment of effects. In particular, it is noted that descriptors are for individual receptors only and that the overall significance should be determined using professional judgement. Additionally, it is noted that it is *"unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration*

without recognising the inherent uncertainly which is why there is a category that has a range around the [AQS], rather than being exactly equal to it".

The guidance sets out that a change in the predicted annual mean concentration of less than 0.5% (equating to 0.2 µg/m^3 for NO_2 and PM_{10}, and 0.12 µg/m^3 for $PM_{2.5}$) is considered negligible, regardless of the long-term average concentration. A negligible change would not be capable of having a direct effect on local air quality that could be considered to be significant.

The AQS values have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, the elderly or the unwell. Therefore, the sensitivity of all identified receptors is considered equal and no further subdivision in terms of sensitivity is necessary.

The classification of all reported effects is then considered in overall terms. The potential for the development site to contribute to, or interfere with, the successful implementation of policies and strategies for the management of local air quality is considered, as relevant, but the principal focus is any change in the likelihood of maintaining future compliance with the AQS.

In terms of the consequences of any adverse effects, an effect is reported as being either 'not significant' or as being 'significant'. If the overall effect of the development site on local air quality and the majority of receptors within the study area is found to be 'moderate' or 'substantial' this will be deemed to be 'significant'. Effects found to be 'slight' at the majority of receptors within the study area are considered to be 'not significant', although they may be a matter of local concern. Effects classed are 'negligible' are considered to be 'not significant'

7.1.4 Sources of Emissions to Air

7.1.4.1 Particulates

The main potential impact on ambient air quality associated with extraction activities and aggregate processing is that associated with deposition of dust generated by the rock extraction and material transfer operations.

Potential dust emissions associated with quarry workings are:

- Mechanical handling operations, including crushing and grading processes where in general the more powerful the machinery and the greater the volumes of material handled the greater the potential for dust emission;
- Haulage, where the weight of vehicles, their speed of passage and number of wheels in contact with the ground, and the nature and condition of road surfaces or haul routes affect the amount of dust emitted:
- Shot hole drilling;
- Blasting;
- Wind blow from paved areas, material stockpiles, unsurfaced internal haul roads, and quarry floors; and
- Import of soils for quarry restoration including transport and void filling.

7.1.4.2 Odour

Inert materials are being excavated from the Site, which are not odorous. There is the potential for minor odour emissions to arise from bitumen storage associated with the asphalt manufacturing plant. To control the emissions of bitumen fume generated from the bitumen tanks, temperature control is monitored in the production plant in accordance with BAT requirements. Regular inspections of the tank vents are undertaken to ensure any odours are not detectable beyond the Site boundary. Therefore, odour emissions from the ongoing operation of the Site are considered Not Significant and have not been assessed further.

7.2 Policy & Legislation Context

7.2.1 European Air Quality Directives

The European Union (EU) Directive on Ambient Air Quality Assessment and Management came into force in September 1996 (96/62/EC) and defines the policy framework for 12 air pollutants known to have harmful effects on human health and the environment. Air quality limit values (ambient pollutant concentrations not to be exceeded after a given date) for the pollutants are set through a series of Daughter Directives. The first Daughter Directive (1999/30/EC) sets limit values for NO_2 and PM_{10} (amongst other pollutants) in ambient air.

Following the Daughter Directives, EU Council Directive 2008/50/EC on ambient air quality and cleaner air for Europe (CAFE) came into force in June 2008, consolidating the existing air quality legislation, making provision for Member States to postpone attainment deadlines and allowing exemption from the obligation to limit values for certain pollutants, subject to strict conditions and assessment by the European Commission. Directive 2008/50/EC was transposed into Irish legislation in 2011 through The Air Quality Standards Regulations 2011. The Directive merged the four daughter directives and EU Council decision into a single directive on air quality. The new Directive also introduced a new limit value for $PM_{2.5}$ but does not change the existing air quality standards.

7.2.2 National Air Quality Legislation

The Air Pollution Act (1987) is the primary legislation relating to air quality in Ireland and provides the means for local authorities to take the measures that they deem necessary to control air pollution.

The Air Quality Standards Regulations (2011) transpose the Directive on ambient air quality (2008/50/EC) into Irish law. These regulations establish limit values and thresholds for various pollutants in ambient air.

The Environmental Protection Agency (EPA) monitor the levels of various pollutants against the standards set out in EU and Irish legislation. The EPA are the competent authority for annual reporting to the Minister for the Environment, Heritage and Local Government and the European Commission.

7.2.3 Other Relevant Legislation

Legislative references considered specifically for the assessment of air quality and climate from quarrying activities, and relevant statutory instruments in a planning context include:

- European Communities (Environmental Impact Assessment Regulations) 1989 (S.I. No. 349 of 1989).
- Section 177F of the Planning & Development Act 2000 as amended.
- Directive 2014/52/EU of the European Parliament and of the Council, (amending Directive 2011/92/EU);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, S.I. 296 of 2018; and
- Planning and Development Regulations 2001 (as amended).

Legislative references considered specifically for the assessment of air quality and climate from combustion emissions include:

- Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011).

7.2.4 Relevant Guidance

This assessment has been undertaken with guidance from the ‘Guidelines on the information to be contained in environmental impact assessment reports’, published in ‘draft’ by the EPA in August 2017; ‘Environmental Impact Assessment of projects, guidance on the preparation of the Environmental Impact Assessment Report’

published by the European Commission in 2017 and, 'Advice Notes for Preparing Environmental Impact Statements', also published in 'draft' by the EPA in September 2015.

Other guidance documents considered in this assessment include:

- IAQM; Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016;
- EPA; Guideline Document entitled Environmental Management in the Extractive Industries, 2006;
- EPUK; Land-Use Planning and Development Control: Planning for Air Quality, 2017; and
- European Commission; Climate Change and Major Projects, 2016.
- South Dublin County Council; Climate Change Action Plan (CCAP) 2019-2024;
- Climate Action Plan, 2019;
- Irish Concrete Federation – Environmental Code 2nd Edition, October 2005
- Environmental Management in the Extractive Industry, EPA 2004
- Quarries and Ancillary Activities – Guidelines for Planning Authorities – DOEHLG, April 2004
- Process Guidance Note 3/16 (04) – Secretary of State's Guidance for Mobile Crushing and Screening, DEFRA (UK), June 2004
- Process Guidance Note 3/8 (04) – Secretary of State's Guidance for Quarry Processes, DEFRA (UK), June 2004
- Safe Quarry – Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2005 – Health and Safety Authority, 2006
- Environmental Protection Agency's Annual Air Quality in Ireland Report 2013

7.2.5 Air Quality Standards

Table 7.2 below shows the limit or target values, specified by the CAFE Directive 2008/50/EC, relevant to this assessment.

7.2.5.1 Gaseous Pollutants

Table 7.2: Air Quality Standards

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m^3	Basis of application Limit
SO_2	Protection of human health	1 hour	350	Not to be exceeded more than 24 times in a calendar year
		24 hours	125	Not to be exceeded more than 3 times in a calendar year
	Protection of vegetation	Calendar year	20	Annual mean
		1 Oct to 31 Mar	20	Winter mean
NO_2	Protection of human health	1 hour	200	Not to be exceeded more than 18 times in a calendar year

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m^3	Basis of application Limit
		Calendar year	40	Annual mean
NO_2 + NO	Protection of ecosystems	Calendar year	30	Annual mean
PM_{10}	Protection of human health	24 hours	50	Not to be exceeded more than 35 times in a calendar year
		Calendar year	25	Annual mean
$PM_{2.5}$ Stage 1	Protection of human health	Calendar year	25	Annual mean
$PM_{2.5}$ Stage 2		Calendar year	20	Annual mean

7.2.5.2 Coarse Particulates

The impact of dust is usually monitored by measuring rates of dust deposition. According to the Environmental Protection Agency (EPA) Guideline Document entitled Environmental Management in the Extractive Industries (April 2006), there are no Irish statutory standards relating specifically to dust deposition thresholds for inert mineral dust. There are a number of methods to measure dust deposition but only the German TA Luft Air Quality Standards (TA Luft, 1986) specify a method of measuring dust deposition – the Bergerhoff Method (German Standard VDI 2119, 1972) – with dust nuisance.

On this basis, the EPA recommend a dust deposition limit value of 350 mg/m^2/day (Table 7.3) (when averaged over a 30-day period) be adopted at site boundaries associated with quarrying related activities. This limit value has been applied in this assessment.

Table 7.3: Dust Emission Limit Values

Procedures	Monitoring Frequency	Standard
Dust Emissions	Monthly	<350 mg/m^2/day; Bergerhoff Method

7.3 Existing Environment

7.3.1 The Site and Surrounds

The existing development use is for the quarrying and production of aggregates located in Co. Dublin.

Currently the site is made up of predominantly quarrying and unimproved grassland currently used for the grazing of sheep. The surrounding lands are largely agricultural with varying degrees of intensity. There are a number of isolated houses and farmhouses along the N7 and to the south. The nearest dwelling is 120 m to the south of the site and the nearest school is located just over 1 km east of the site in Rathcoole.

Rathcoole is a small town situated just off to the south of the N7 National Primary Route. The population of the town in accordance with the 2016 census is 4,351. There are primary schools and a second level community school. There are a number of shops and pubs in the area. There is a church at the north end of the town.

The quarry was first developed in the 18th century and expanded in the 1960's.

The EIA project boundary is detailed in Figure 7.1 below.

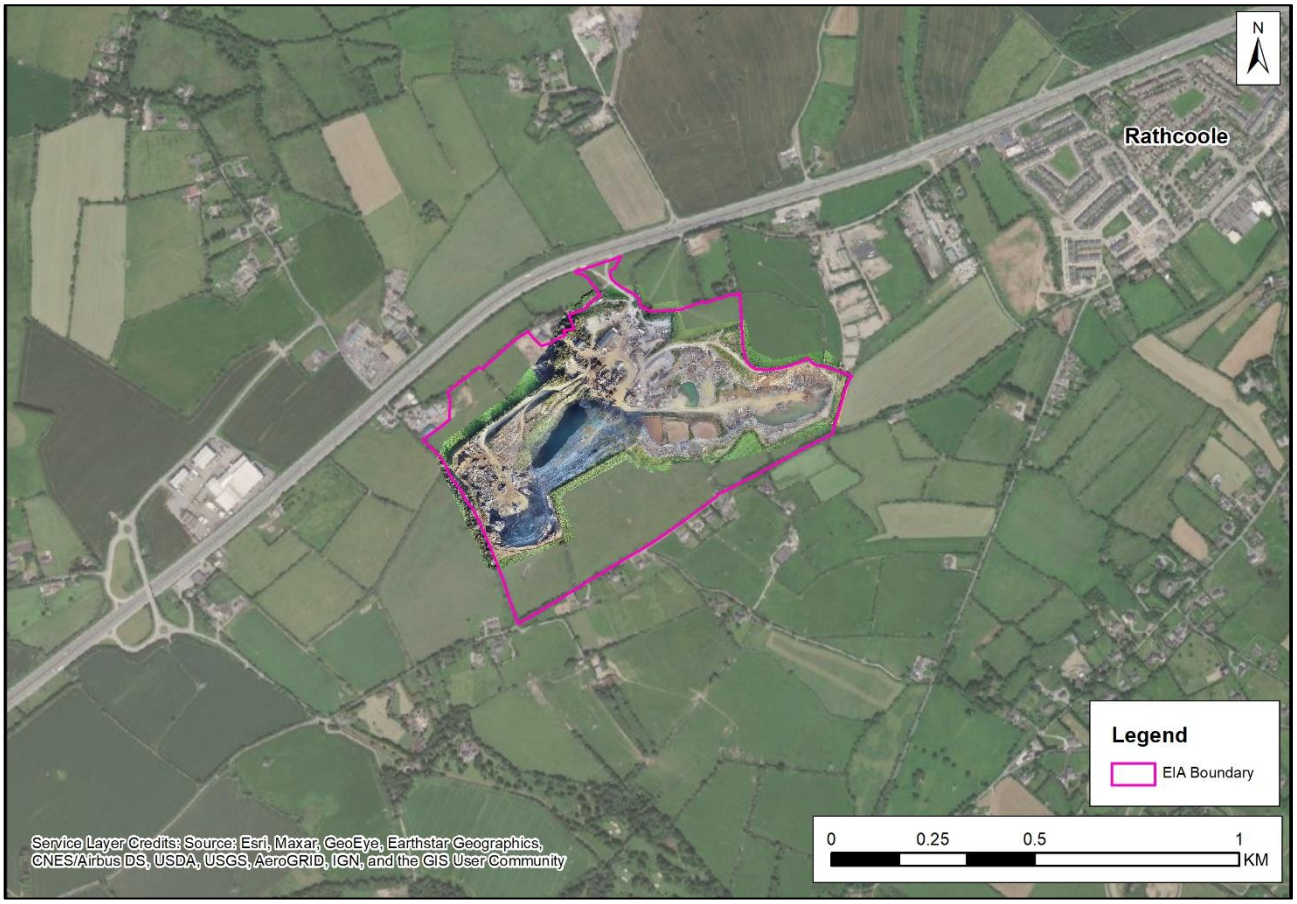


Figure 7.1: EIA Project Boundary.

7.3.2 Study Area

7.3.2.1 Particulates

It has been found that deposited dust does not generally travel beyond 400 m (IAQM, Appendix 2, 2016), therefore all receptors within 500 m of the Site boundary are considered. The guidance states that it is commonly accepted that the greatest impacts from particulates will occur within 100 m of the source, with the potential for travel up to 400 m.

For full consideration of the effects of particulates on the access road, in the absence of any methodology within the IAQM minerals guidance, the IAQM Guidance on the Assessment of Dust from Demolition and Construction (2016) has been considered. This guidance states that human receptors within 50 m of the routes used by vehicles for 350 m from the site exit point should be considered. For this reason, the haul road will be subject to a 50 m buffer, which will then extend 350 m out onto the N7 main road in both directions to account for the possibility of trackout from exiting vehicles. A 350 m length buffer has been applied from the point at which the Site exits onto the N7 public road. The full assessment in contained in Appendix 7.1 of this report.

7.3.3 Receptors

Receptors identified for the purpose of the assessment of particulates/ dust emissions from the operation of the quarry are shown below in Figure 7.2. Three residential receptors located in the vicinity of the Site are owned by the applicant.

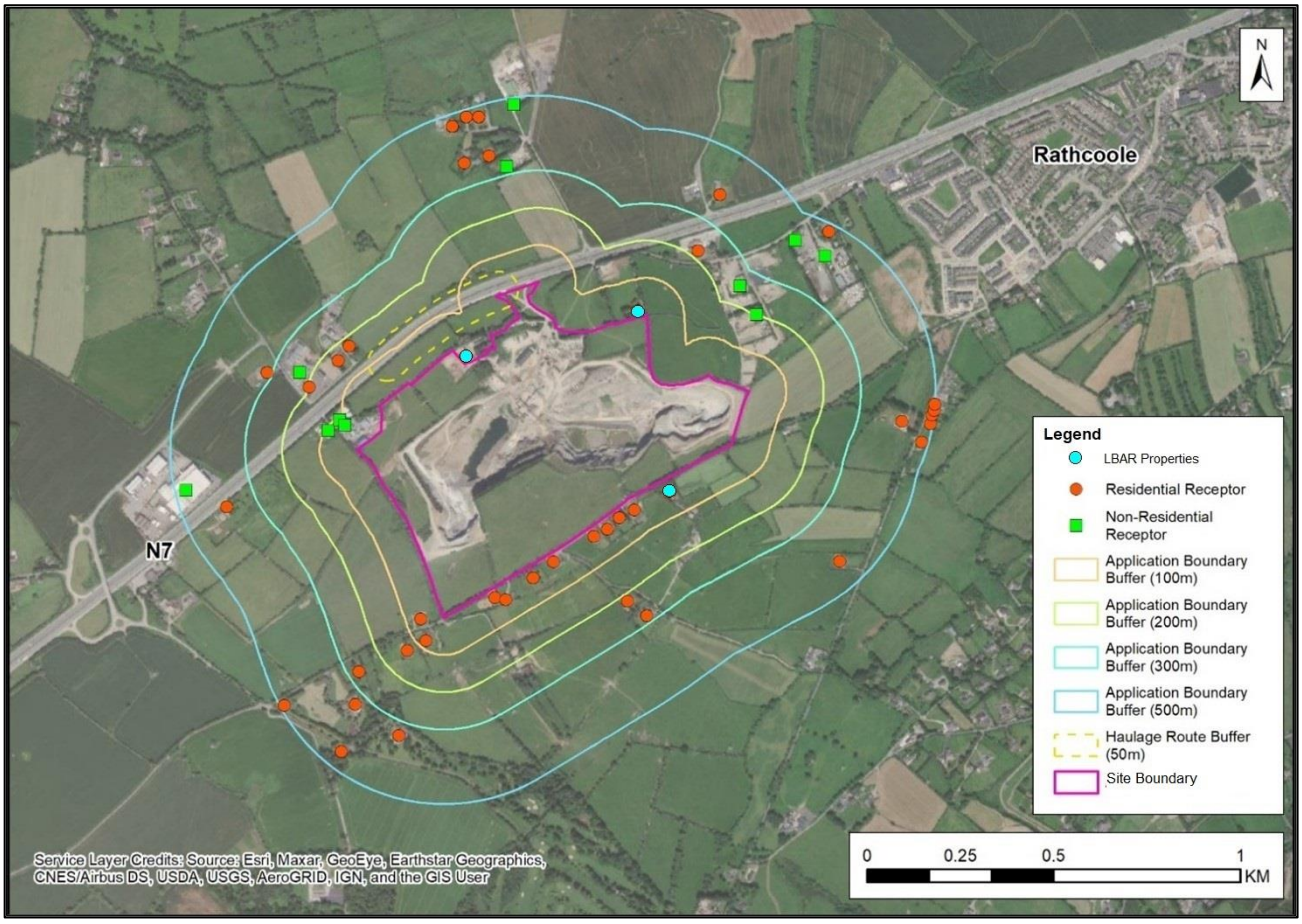


Figure 7.2: Identified Receptors within 500 m of the Site Boundary

7.3.4 Climate at the Site

The Irish climate is subject to strong maritime influences, the effects decreasing with increasing distance from the Atlantic coast. The climate in the area of the Site is typical of the Irish climate, which is temperate maritime.

The closest and most representative Met Éireann station is located at Casement Aerodrome, Baldonnell, Co. Dublin, ca. 5.5 km northeast of the Site. Monthly historical data between 2016 and 2020 have been averaged and are presented in Table 7.4.

Table 7.4: Casement, Co. Dublin recorded 2016 to 2020 Monthly Average Climate Information

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Air Temperature (°C)	5.6	5.4	6.3	7.9	11.7	14.3	16.0	15.4	13.0	10.0	6.5	6.5
Maximum Air Temperature (°C)	12.6	13.8	15.1	18.5	22.2	25.5	25.8	24.1	22.7	18.0	14.7	13.6
Minimum Air Temperature (°C)	-3.1	-4.6	-2.8	-2.6	0.5	4.2	6.5	6.4	3.3	-1.2	-2.7	-3.4
Mean Maximum Temperature (°C)	8.4	8.8	10.1	12.0	16.3	18.6	20.6	19.6	17.2	13.7	9.6	9.3
Mean Minimum Temperature (°C)	2.9	1.9	2.7	3.9	7.0	10.0	11.5	11.1	8.9	6.4	3.3	3.7
Precipitation (mm)	56.6	67.1	58.5	42.8	43.3	78.5	39.1	71.4	72.8	58.2	91.4	63.0

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grass Minimum Temperature (°C)	-8.1	-8.0	-7.0	-6.2	-3.5	0.4	2.2	2.5	-0.3	-5.1	-6.4	-6.9
Mean Wind Speed (knots)	11.4	11.7	10.7	8.7	7.8	8.1	8.1	9.6	9.7	9.5	9.1	11.2
Highest Gust (knots)	53.4	55.0	50.0	47.0	38.3	40.8	34.8	38.0	43.3	48.0	44.3	49.8
Global Solar Rad. Joules/cm2	55.6	84.8	108.3	131.2	207.3	184.4	182.9	160.3	129.4	101.9	66.7	44.5

The information presented in Table 7.4 provides an overview of the climatic conditions at the Site. Over the time period for which data is provided, the wettest month in terms of total rainfall for the period is November. High rainfall provides natural dampening for potential dust emissions. The opposite impact occurs in dry and windy months, when there is increased potential for dust to be mobilised. The months with the highest mean wind speed are January, February and December and the driest month in the Site area is July.

An important meteorological parameter with regard to the dilution and dispersal of air pollutants is wind speed and direction. A full annual wind-rose for the Casement Aerodrome station is presented in Figure 7.3 for the period 01 January 2020 to 31 December 2020. The prevailing winds are from a south-westerly direction.

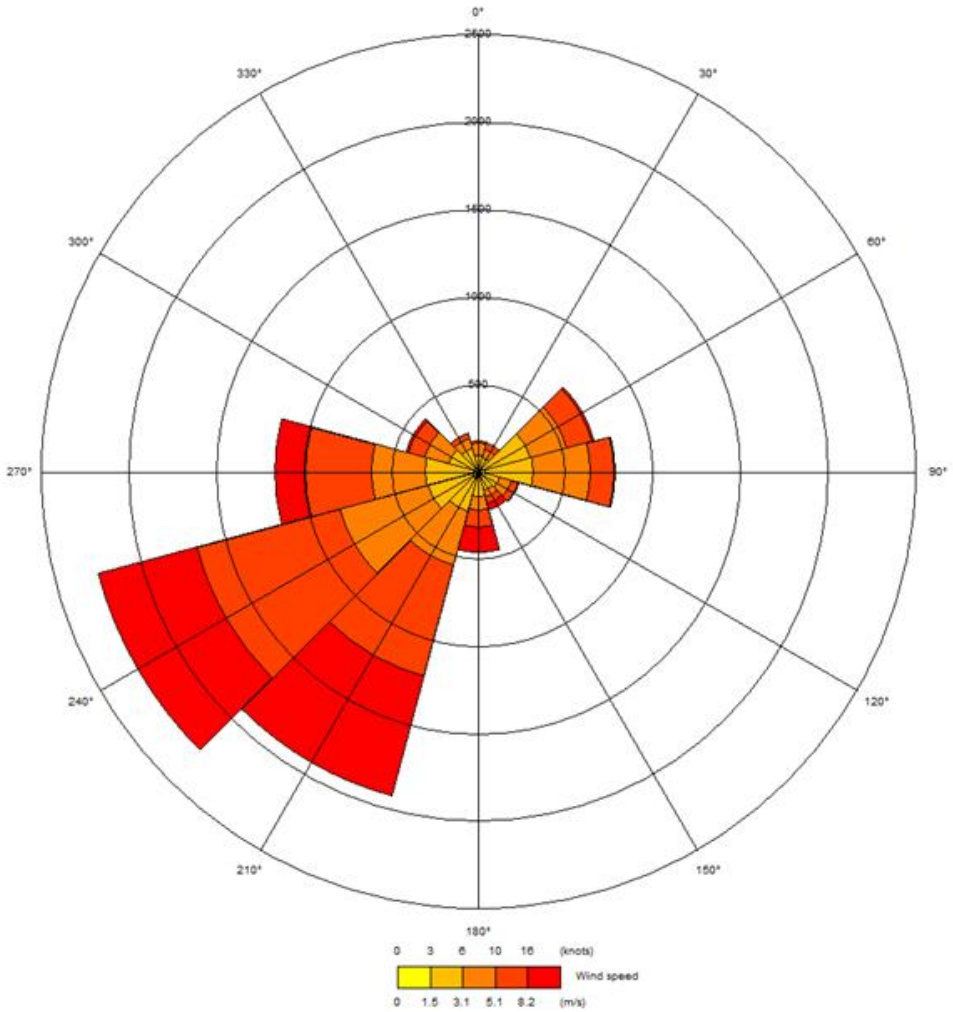


Figure 7.3: Windrose for Casement Aerodrome using Hourly Sequential Wind Data, 01 January 2020 - 31 December 2020

7.3.5 Background Air Quality

7.3.5.1 Primary data - Site Monitoring Data

Dust monitoring has been undertaken historically at the site between 2007 and 2015 and during 2020 and 2021 using the Bergerhoff method at 4 different monitoring locations. Data is presented in this assessment for 2020 and 2021, as this is deemed to be the most applicable data relating to the ongoing operation of the Site. Descriptions of the dust monitoring locations are presented in Table 7.5 and their locations are shown in Figure 7.4.

Table 7.5: Description of Dust Monitoring Locations

Location	Description
D1	Located at the north of the site along the access road.
D2	Located between the N7 and north west corner of the site
D3	Located at the eastern tip of the site.
D4	Located south of the site adjacent to the residential dwellings.

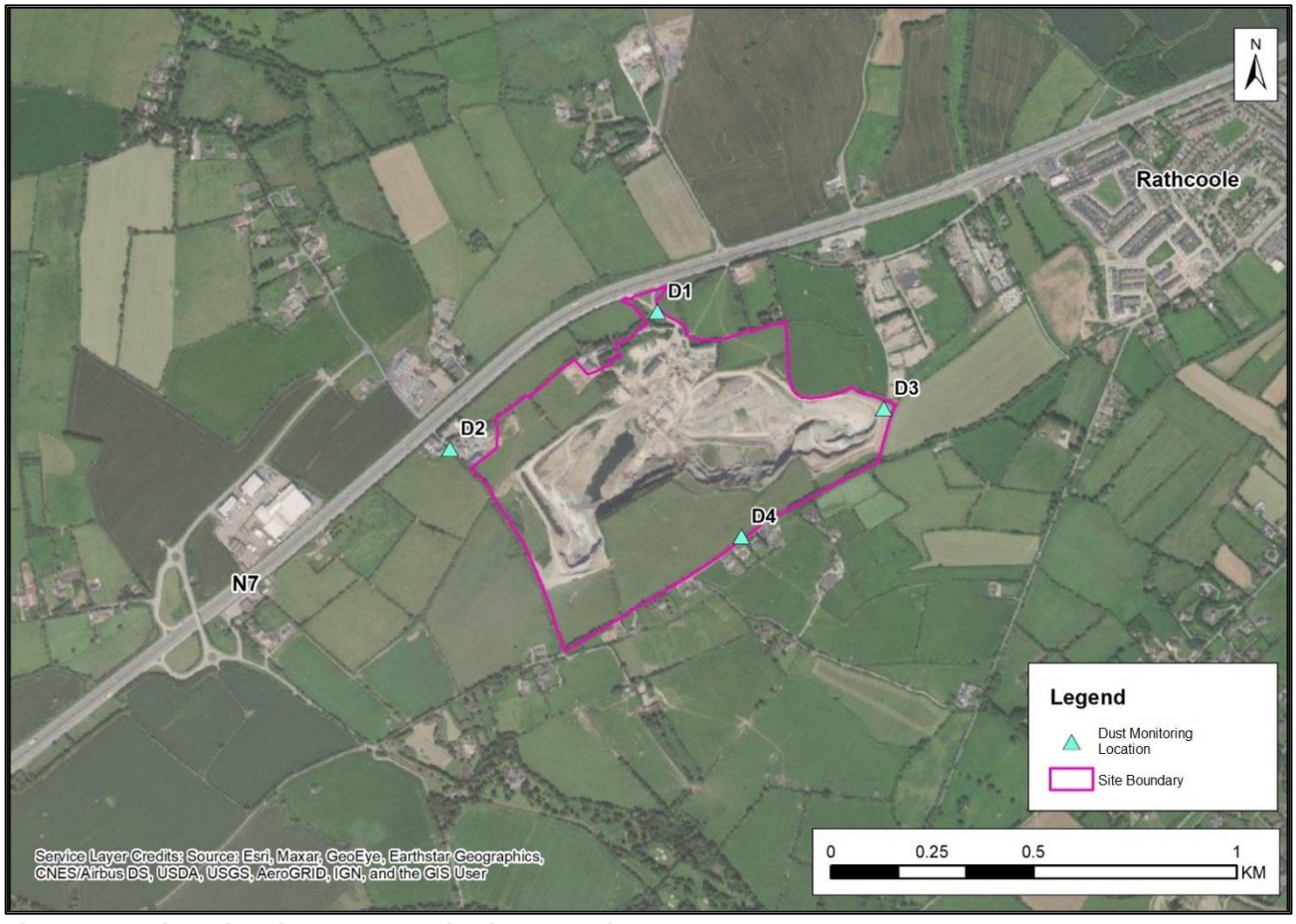


Figure 7.4: Plan Showing Dust Monitoring Locations

The method employed for measuring dust deposition at the Site is the Bergerhoff method. The recommended dust deposition limit value when using the Bergerhoff method is 350 mg/m^2/day, as specified in Table 7.3 of this assessment. This value is also recommended by the EPA in their guidance - Environmental Management in the Extractive Industries (April 2006). Monitoring was undertaken in 2020 and 2021 by independent

laboratories, using standard Bergerhoff gauges. The results of this monitoring are shown in Table 7.6 and are also included in Figure 7.5.

Table 7.6: Recorded Deposited Dust (mg/m2/day) at Monitoring Locations during 2020/2021

Monitoring Period	Monitoring Location			
	D1	D2	D3	D4
04/03/2020 – 03/04/2020	85	341	*	146
03/04/2020 - 30/04/2020	61	88	183	39
19/06/2020 - 20/07/2020	675.7	61.9	*	404.3
10/09/2020 – 09/10/2020	424.9	203.0	520.3	56.4
07/12/2020 – 11/01/2021	141.9	46.0	71.8	224.2
11/01/2021 – 10/02/2021	110.1	97.4	67.8	54.4

* Sample contamination meaning results are not reported.

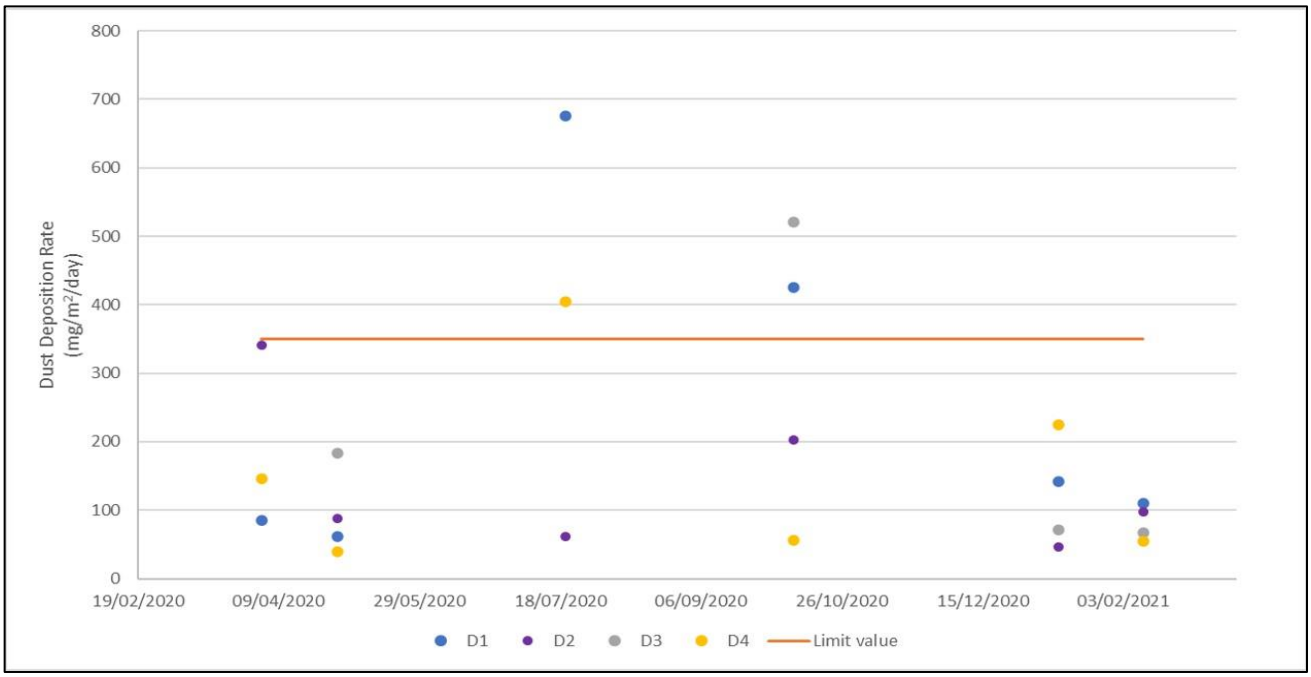


Figure 7.5: 2020/2021 dust deposition monitoring results

7.3.5.1.1 Commentary on Concentrations greater than the Limit Value

During the recent sampling shown in Table 7.6 above, there were four samples that were greater than the limit value of 350 mg/m^2/day occurring during the sampling periods 19/06/2020 - 20/07/2020 and 10/09/2020 – 09/10/2020. The first was at site D1 (675.7 mg/m^2/day), and the second at site D4 (404.3 mg/m^2/day). Then the remaining two occur during the sampling period 10/09/2020 – 09/10/2020 at location D1, with a value of 424.9 mg/m^2/day, and at D3, with a value of 520.3 mg/m^2/day.

The monitoring was undertaken during national lockdown due to COVID-19, when there were reduced personnel on Site. Potentially reduced work practices and dust suppression coupled with the dry weather may have contributed to the high concentrations.

7.3.5.2 Secondary data - EPA Monitoring

There are 4 air quality zones in Ireland, defined for the purposes of air quality management and assessment. Highly populated areas are classified as Zone A, with sparsely populated areas as Zone D. The Site is located in a semi-rural area bordering the Greater Dublin area, and it is therefore deemed reasonable to characterise the area as a Zone C area. A review of publicly available information identifies that the Irish EPA do not operate background air quality monitoring within Rathcoole or the immediate surrounds.

A review of publicly available information identifies that the Irish EPA historically undertook background monitoring at three locations in Zone C areas; Celbridge (8 km north of the Site), Naas (12 km south west of the Site) and Newbridge (22 km south west of the Site) in Kildare. None of these are currently active and none are located in the vicinity of the Development. The most recent monitoring was undertaken at Celbridge, located approximately 8 km north from the Development, although monitoring at this location ceased in 2011. The last reported data from EPA, Ambient Air Monitoring at Celbridge Co. Kildare 12th July 2010- 10th April 2011 (http://www.epa.ie/pubs/reports/air/monitoring/ambientairmonitoringcelbridge.html) is summarised in Table 7.7 below. No $PM_{2.5}$ monitoring was undertaken at this location.

Table 7.7: 2010/ 2011 Background Monitoring Data for PM10 at Celbridge

	Averaging period	Concentration (µg/m^3)
PM_{10}	Annual Average	19.5
	90.4%ile daily average	37.3

In the absence of local background data, the most recent annual mean data (2019) and historical data for NO_2, NO_x, SO_2, PM_{10} and $PM_{2.5}$ from suburban monitoring locations in Zone C areas throughout Ireland are presented in Table 7.8 below. These locations are part of the EPA National Ambient Air Quality Monitoring Network and data is reported to Europe. All monitored concentrations are below the annual AQS. Due to the location of these monitoring sites throughout Ireland and not in the vicinity of the Site, the average of the available historical data is reported and used in the assessment.

Table 7.8: Annual Mean Monitoring Data for Suburban Dublin Zone C Stations

Pollutant	Year	Monitoring Location	Concentration (µg/m^3)
NO_2	2019	Meath Navan	23
		Portlaoise	11
	2010	Celbridge	12
	2007	Navan*	16
	Average		**15.5**
NO_x	2019	Meath Navan	72.5†
		Portlaoise	14.8
	2010	Celbridge	17
	2007	Navan*	32
	Average		**21.3**
SO_2	2019	Portlaoise	1.3
	2010	Celbridge	2

Pollutant	Year	Monitoring Location	Concentration (µg/m^3)
	2007	Navan*	4
	Average		**2.4**
PM_{10}	2019	Portlaoise	15
		Carlow Town	11
	2010	Celbridge‡	18
	2007	Navan*	23
	Average		**16.8**
$PM_{2.5}$	2019	Carlow Town	8
		Meath Navan	11
	Average		**9.5**

**Zone D in 2007. Measurements undertaken by mobile monitoring in 2007.*
†Data omitted due to extreme concentration when compared to NO_2 value and other Zone C NO_X values.
‡Data different to Table 7.11 as only 2010 data considered.
Data from: https://www.epa.ie/pubs/reports/air/quality Accessed 3/3/21.

7.4 Assessment Methodology

7.4.1.1 Particulates

The IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning (2016) has been used for assessing the impacts of deposited dust. It follows a standard source-pathway-receptor methodology.

The residual source emissions are characterised based on the scale of the operations and the Site activities and are classified as either small, medium or large. Guidance on the appropriate scale of the residual source is provided in the IAQM guidance, Appendix 4 (2016). This source characterisation includes consideration of the routine management and mitigation measures which have or will be undertaken at the Site.

The pathway from the source to the receptor is assessed considering the distance and direction of receptors to the source relative to the prevailing wind and local meteorology. The local meteorological data is also used to assess the frequency of the winds in each direction. It has been found that deposited dust does not generally travel beyond 400 m (IAQM, Appendix 2, 2016), therefore all receptors within 500 m of the Site boundary are considered. The guidance states that it is commonly accepted that the greatest impacts will occur within 100 m of the source, with the potential for travel up to 400 m.

For full consideration of the effects of the access road, in the absence of any methodology within the IAQM minerals guidance, the IAQM Guidance on the Assessment of Dust from Demolition and Construction (2016) has been considered. This guidance states that human receptors within 50 m of the routes used by vehicles for 350 m from the Site exit point should be considered. For this reason, the haul road was subject to a 50 m buffer, which extended 350 m out onto the N7 main road to account for the possibility of trackout from exiting vehicles. For conservatism, a 350 m length buffer was applied from the point at which the Site exits onto the N7 public road.

The full assessment is provided in Appendix 7.1 of this report.

7.5 Potential Effects

7.5.1.1 Particulates

7.5.1.1.1 Coarse Particulates

An assessment of the potential effects of deposited dust from the continued operation of the Site is provided in Appendix 7.1 of this report. This assessment has been undertaken in accordance with the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning (2016), as described in Section 7.4.1.1 above.

The assessment defined residual source classifications to activities on Site and used these to assign a magnitude to the dust effects likely to be experienced at identified receptors. Consideration was given to mitigation measures which are currently in place, and will remain in place with the continuation of Site activities. Based on the magnitude of dust effects and the mitigation employed on Site, an overall significance of the effects of dust was assigned to key sources: excavation, transfer on haul roads, transfer on public roads, and dust from on-site processing. For each of these sources, the significance was defined as 'moderate' without mitigation, and 'slight' with mitigation.

Coarse particulate residual impacts of the continuation of existing Site activities on air quality, microclimate and climate change are considered to be slight. During long spells of dry weather, dust emissions can potentially be more elevated, however dust nuisance from the operation is expected to be unlikely if the mitigation measures defined in Appendix 7.1 are implemented during production and restoration. The overall impact from the continued operation of the Site, in terms of dust emissions, is considered 'slight' to the air environment.

In the longer term, on completion of the site restoration, the concentration of airborne dust would be expected to be reduced from operational levels as the result of covering and seeding of exposed, un-vegetated soil surfaces. This will most likely constitute a minor positive impact for the local environment.

With the continued application of the site-specific mitigation measures, it is therefore considered that the residual effects associated with the continued operation of the Site will be Not Significant.

7.5.1.1.2 Fine Particulates

The IAQM recommend that if the PM_{10} background concentration is less than 17 µg/m^3 there is little risk that the process contribution (PC) from the Site would lead to an exceedance of the annual-mean objective. The background data from other equivalent Zone C areas is detailed in Section 7.3.5.2. The annual average of the historic Zone C stations is 16.8 µg/m^3 which is less than 17 µg/m^3. It is unlikely that the PC from the Site would lead to an exceedance of the AQS.

Fine particulate PC can be assessed using the calculation of concentration with distance from source as detailed in LAQM TG03. The guidance document also states that the likely PM_{10} contribution from fugitive dusts, stockpiles, quarries and construction is variable but up to 5 µg/m^3. Therefore, the likely concentration at the receptor locations can be estimated using the calculation considering the distance from source. As $PM_{2.5}$ is a sub-fraction of PM_{10}, the contribution of $PM_{2.5}$ will be lower but if it is conservatively assumed that all of the PM_{10} is $PM_{2.5}$, the increase in concentration due to the changed location of the extraction area is low.

When combining the likely concentration with the average historical background value (16.8 µg/m^3) for Zone C areas, the maximum annual PM_{10} predicted environmental concentration (PEC) would be 18.3 µg/m^3 which is approximately 73% of the AQS and the annual $PM_{2.5}$ PEC would be 73% of the Stage 1 AQS and 91% of the Stage 2 AQS, at the closest receptor (which is owned by the applicant). For the closest privately owned receptor the PEC would be 71% of the PM_{10} AQS. The PEC would be less than this for all other receptors in the vicinity of the Site. The PEC is predicted to be below the annual AQS, with headroom. The impact from fine particle PC from the Site is considered to be Negligible to Slight prior to mitigation which would reduce to negligible due to the mitigation measures employed by the Site.

7.6 Climate Factors

This section considers climate change resilience and adaptation, i.e. how the continued operation of the Site may interact with a changing climate and whether this interaction could result in significant environmental effects.

The contribution of the continued operation of the Site to climate change is also a requirement of the assessment of climate change resilience and adaptation of a development. The assessment will consider the potential climate impacts during the operational phase.

7.6.1 Climate at the Site

The Irish climate is subject to strong maritime influences, the effects decreasing with increasing distance from the Atlantic coast. The climate in the area of the Site is typical of the Irish climate, which is temperate maritime.

7.6.2 Climate Change Impacts for Ireland

The EPA has identified a number of potential impacts for Ireland from climate change. Such changes are expected to include:

- Storm surges and waves. Storm surge events are expected to increase in frequency, with significant increases to be observed on the western coast of the country during the winter months. Average wave heights are expected to increase on the north-west coast of the country by approximately 10%.
- Weather extremes. The prediction of such weather extremes is difficult to predict however, additional energy trapped in the atmosphere by greenhouse gases is likely to continue to stimulate greater atmospheric volatility in Ireland.
- Fluvial flooding. Although it is difficult to predict it is expected that increases in the seasonality extremes will occur with increasing run-off to catchments in winter and decreasing flows in summer. This will result in significant consequences for the management of flood defences, water supplies, waste treatment and biodiversity conservation.
- Sea level rise. The EPA has noted that satellite altimetry has identified a rise of around 3.5 cm per decade in the seas around Ireland, which is in line with the IPCC's global projections. Further increases in sea levels would present as a substantial increase in sea levels globally. This would have significant implications for low lying coastal regions throughout the world and in Ireland.
- Precipitation. Similar to other climate variables precipitation is expected to become heavier during autumn and winter months by the end of the century, while summers are likely to become substantially drier over the same period. The EPA has noted that the accuracy of model projection can be difficult to verify however rainfall in winter/autumn is projected to increase by up to 25% and decline by up to 18% in the summer period.
- Sea temperatures. Sea temperatures around Ireland have been shown to increase by 0.3 to 0.4ºC per decade. Changes of this magnitude will have a significant effect on maritime ecosystems and economies through effects on commercial fish species.

The most applicable climate variable and hazards for the Site, as identified by the EPA, include weather extremes, fluvial flooding and precipitation. Climate change factors such as ocean acidification, sea-level rise and storm surges and waves have been scoped out of this climate assessment, due to the location of the Site.

Factors in relation to the EIAR study areas have also been incorporated into the evaluation below, these include, air quality, noise, landscape and visual, water and flood risk, geology and ecology and biodiversity.

The assessment considers aspects of the Site that are potentially vulnerable to the effects of climate change. Where relevant aspects have been identified, these can be mitigated through embedded mitigation, monitoring or other measures. The impact of the Site on environmental receptors sensitive to climate change has also been considered.

7.6.3 Effect of Climate Change on the Continued Operation of the Site

7.6.3.1 Air Quality

An increase in summer and winter rainfall volume and periods of higher intensity rainfall (storms) could lead to increased dust dampening and suppression. This would result in less dispersion of dust as the increased rainfall would result in particles being less available to be entrained by the air.

In the summer, higher air temperatures could result in changes to chemical reactions which occur in the atmosphere. If temperatures increase, there could be an increase in photochemical reactions in the atmosphere. This could lead to an increase in ozone concentrations in the atmosphere.

Increases in wind speed could change the dispersion patterns of pollutants.

7.6.3.2 Noise

The projected windier, wetter and warmer environment is not anticipated to result in any significant change to future noise or vibration levels arising from the continued operation of the Site.

7.6.3.3 Landscape and Visual

The predicted seasonal variations in rainfall i.e. wetter winters and drier summers could create unfavourable conditions for the establishment of trees and shrubs, particularly during prolonged periods of drought, or where waterlogging of the ground persists. This could increase plant mortality and reduce the effectiveness of screening around the periphery of the Site, along with potential increased on-going maintenance costs.

7.6.3.4 Water and Flood Risk

In the future, increases in winter rainfall volume and periods of higher intensity rainfall (storms) could lead to increased runoff, greater surface water flows and more incidents of flooding. In summary, current predictions suggest that flashier floods in summer and bigger floods in winter could be expected.

In the summer, higher air temperatures could lead to higher surface water temperatures leading to greater evaporation and reduced flows. Rainfall could be less and more intense leading to potential increases in erosion and suspended solid concentrations during sudden high intensity rainfall events on dry ground. Less overall summer rainfall could also lead to lower flows in watercourses and possibly poorer quality (i.e. caused by changes in land use and the quality of runoff). Changes in surface water flow regime through the year caused by changes in rainfall distribution could alter the mobility and dilution of nutrients and contaminants (i.e. lower dilution in summer due to lower flow rates would result in higher concentrations, and lower flow rates could lead to algal blooms and lower oxygen). Lower summer flows and water levels also have the potential to result in reduced surface water resource availability.

The susceptibility of the Site to fluvial flooding has been considered in Chapter 8 Water. Although the Site is currently not mapped as at risk of flooding and is categorised as in low risk Flood Zone C, climate change could alter the risk of flooding and flood damage, due to changes in surface water flows and flood plain storage and also due to flood risk from groundwater flooding. The potential for future change in flood risk is already incorporated into the embedded design mitigation, so no further consideration is required in this climate change assessment.

7.6.3.5 Geology, Ground Conditions and Groundwater

There are no geological heritage sites within the geology study area, and no other mineral sites identified since the Site has been operational. Changes in rainfall, temperature and wind are not anticipated to result in any change to geological conditions that could affect the Site.

In terms of ground conditions and groundwater, higher air temperatures and windier conditions could result in higher evaporation and reduced soil saturation. Reduced soil saturation in drier and warmer summers could lead to reduced groundwater recharge in the summer, and the winter groundwater recharge period could be shortened due to autumn and winter rainfall balancing the soil moisture deficit before recharging groundwater. This may be compensated to some extent by increased winter rainfall. However, aquifers are recharged more effectively by prolonged steady rain, so changes in rainfall regimes could lead to more runoff to surface water rather than recharge to ground during higher intensity summer and winter rainfall events.

If recharge and groundwater levels were to decrease, there could be increased frequency and severity of groundwater droughts. Conversely, if groundwater recharge increases at certain times of the year there could be an increase in the frequency and severity of groundwater-related floods. If groundwater levels in contaminated ground rise due to climate change, this could lead to the mobilisation of historical contamination that was previously above groundwater level highs, which could impact baseline groundwater quality and ground quality.

Higher future temperatures and the potential reduction in the availability of surface water resources could also lead to a greater demand on groundwater resources for urban/industrial supplies and agricultural irrigation. However, improvements in water use efficiency may also take place in parallel with climate change.

7.6.3.6 Ecology and Biodiversity

Climate change presents a risk to native wildlife and to the ecosystem services provided by natural capital, for example clean water.

At a local level (i.e. the spatial extent of the assessment defined for the Site), the projected windier, wetter and warmer environment is not expected to result in any measurable positive or negative change to the baseline biodiversity features of the Site.

7.6.4 Climate Mitigation and Monitoring

7.6.4.1 Air Quality

No additional air quality mitigation or monitoring is required as a result of potential climate change effects.

7.6.4.2 Noise

No additional noise mitigation or monitoring is required as a result of potential climate change effects.

7.6.4.3 Landscape and Visual

Consideration should be given to the inclusion of drought and water tolerant species in the perimeter planting mixes. This would minimise plant losses and maintain landscape and visual amenity.

Any dead or defective plants should be replaced annually as part of the ongoing site maintenance. No additional mitigation or monitoring is required as a result of climate change effects.

7.6.4.4 Water and Flood Risk

No additional water resources or flood risk mitigation or monitoring is required as a result of potential climate change effects.

7.6.4.5 Geology, Ground Conditions and Groundwater

No additional ground conditions or groundwater mitigation or monitoring is required as a result of potential climate change effects.

7.6.4.6 Ecology and Biodiversity

No additional ecology or biodiversity mitigation or monitoring is required as a result of potential climate change effects.

8.1.1 Residual Climate Effects

7.6.4.7 Air Quality

There will be no change to the identified residual air quality effects as a result of potential climate change effects.

7.6.4.8 Noise

There will be no change to the identified residual noise effects as a result of potential climate change effects.

7.6.4.9 Landscape and Visual

The potential changes to the landscape or to views experienced by nearby receptors, as a result of climate change, would be fully mitigated by the mitigation measures proposed. There would be no change to the residual landscape or visual effects identified.

7.6.4.10 Water and Flood Risk

There will be no change to the identified residual water resources and flood risk effects as a result of potential climate change effects.

7.6.4.11 Geology, Ground Conditions and Groundwater

There will be no change to the identified geology, ground conditions or groundwater effects as a result of potential climate change effects.

7.6.4.12 Ecology and Biodiversity

There will be no change to the identified residual ecology and biodiversity effects as a result of potential climate change effects.

7.6.5 Greenhouse Gas

There is the potential for greenhouse gases to be generated from the ongoing operation of the Site.

Primary sources of direct GHGs will likely include vehicle movements, asphalt manufacturing plant operation, waste disposal, and water and energy use. There may also be indirect sources of GHG emissions related to energy purchase.

Estimated ongoing vehicle movements associated with the Site are estimated to generate approximately 11.39 Kilo tonnes carbon dioxide equivalent (Kt CO_{2e}) per annum based on an assumption of 880 AADT with 70% HDV. This assumes diesel HDVs with an average one-way trip length of 50 km one way 100% laden and one way unladen. For LDVs the average trip length is assumed to be 30 km for an average car. The figures are expressed as annual amounts.

The assessment of GHG emissions has required assumptions to be made as some values are currently projected as they cannot be known with complete certainty at this stage. The emission factors used have been sourced from the DEFRA (2019) Greenhouse Gas Reporting Conversion Factors which are designed for emissions reporting. The most appropriate conversion factor has been selected for each activity to represent the resulting emissions as best as possible. However, there will be some discrepancies in the results – such

as for car traffic data, as 'average' car conversion factors have been used. Where available, data has been sourced directly such as the projected AADT data for the operational phase. Where data was not available assumptions have been made regarding traffic travel distances.

Ireland's Greenhouse Gas Emissions Projections (EPA, 2020) estimate that annual emissions for 2021 for the road transport sector will be 12,246.5 Kt $CO_{2e.}$. The estimated emissions relating to the Proposed Development traffic are less than 0.09% of the EPA projections for road transport. It should be noted that this data relates to Irish emissions pre COVID-19 and does not include the findings of the 2021 EPA report on the Impact on 2020 greenhouse gas emissions of COVID-19 restrictions, which has seen a decrease in transport emissions and an increase in residential emissions during restrictions. These findings have not been incorporated due to the likely extended length of the ongoing operational period. Based on the quantum of Greenhouse Gas emissions estimated to be generated by the Proposed Development, the impacts are deemed to be negligible and therefore Not Significant.

7.7 Residual Impacts

Residual impacts of the continuation of existing Site activities on air quality, microclimate and climate change are considered to be no more than slight and the effects Not Significant.

In terms of coarse particulates (dust), during long spells of dry weather, dust emissions can potentially be more elevated, however dust nuisance from the operation is expected to be unlikely if mitigation measures defined in Appendix 7.1 are implemented during production and restoration. The overall impact from the continued operation of the Site, in terms of dust emissions, is considered 'slight' to the air environment. In the longer term, on completion of the site restoration, the concentration of airborne dust would expect to be reduced from operational levels as the result of covering and seeding of exposed, un-vegetated soil surfaces. This will most likely constitute a minor positive impact for the local environment. Following the continued application of the site-specific mitigation measures set out in Appendix 7.1, it is therefore considered that the residual effects associated with the continued operation of the Site relating to dust will be Not Significant.

7.8 Cumulative Impacts

Research has shown that the greatest proportion of dust predominantly deposits within the first 100 m away from the source (The Environmental Effects of Dust from Surface Mineral Workings, Volume 1 DETR, HMSO 1995) as dust has a higher deposition velocity than finer particles (i.e. PM_{10} and $PM_{2.5}$). The finer particles of less than 10 microns aerodynamic diameter may remain airborne for longer and therefore travel larger distances, although a large proportion may still deposit within 200 m of the source.

The assessment undertaken has considered publicly available background monitoring data and incorporated this into the assessment, therefore the assessment includes a consideration for other Sites operating in the area.

There are no planned operations in close proximity to the Site which may generate significant emissions to air. Therefore, there is no opportunity for significant cumulative impacts to arise as a result of the continuation of activities at the Site.

7.9 Summary & Conclusion

This EIAR chapter has assessed the potential impacts of the ongoing operation of the Site on Air Quality and Climate. The possible sources of emissions to air were identified as particulates resulting from the operation of the Site.

The impact of coarse particulates (dust) on the surrounding area as a result of the ongoing activities at the Site is considered to be 'slight' and therefore Not Significant. The assessment considered the ongoing mitigation measures which will continue to be in place. With regards to fine particulates, it is considered that there may be

the potential for an increase in PM_{10} and $PM_{2.5}$ concentrations at the residential receptors downwind in the vicinity of the Site, but the PEC is still predicted to be below the annual AQS, with headroom. The impact of fine particle PC from the Site is therefore considered to be imperceptible and therefore Not Significant.

When considering all of the emissions to air associated with the ongoing operation of the Site, the impacts to air and climate are considered to be Not Significant.

APPENDIX 7.1

Dust Assessment

DUST ASSESSMENT

1.0 INTRODUCTION

1.1 Background

This appendix supports the Air Quality chapter of the EIAR and considers the potential effects of the activities relating to the continued operation at Windmillhill, Rathcoole, Co. Dublin (the "Site") on the receiving (air) environment.

The existing development use, owned by L. Behan Aggregates & Recycling Ltd (LBAR), is for the quarrying and production of aggregates and registered in accordance with Section 261, Planning & Development Act 2000 (Quarry Ref. No. QS1054).

1.2 Report Context

This report forms an Appendix to the Air Quality Assessment (EIAR Chapter 7.0) dated May 2021 and should be read in conjunction with that report.

The report sets out a qualitative assessment of dust impacts (coarse particles for deposited dust and fine particles for human health) from the continued operation of the Site, which has been undertaken in line with IAQM 'Guidance on the assessment of Mineral Dust Impacts for Planning (IAQM 2016).

2.0 ASSESSMENT METHODOLOGY

The following section details the IAQM methodology used for assessing the impacts of deposited dust and fine particulates from the extraction activities. It follows a standard source-pathway-receptor methodology.

The residual source emissions are characterised based on the scale of the operations and the Site activities and are classified as either small, medium or large. Guidance on the appropriate scale of the residual source is provided in the IAQM guidance, Appendix 4 (2016). This source characterisation includes consideration of the routine management and mitigation measures which will be undertaken at the Site.

The pathway from the source to the receptor is assessed considering the distance and direction of receptors to the source relative to the prevailing wind and local meteorology. The local meteorological data is also used to assess the frequency of the winds in each direction. It has been found that deposited dust does not generally travel beyond 400 m (IAQM, Appendix 2, 2016), therefore all receptors within 500 m of the Site boundary are considered. The guidance states that it is commonly accepted that the greatest impacts will occur within 100 m of the source, with the potential for travel up to 400 m.

For full consideration of the effects of the access road, in the absence of any methodology within the IAQM minerals guidance, the IAQM Guidance on the Assessment of Dust from Demolition and Construction (2016) has been considered. This guidance states that human receptors within 50 m of the routes used by vehicles for 350 m from the site exit point should be considered. For this reason, the haul road will be subject to a 50 m buffer, which will then extend 350 m out onto the N7 main road to account for the possibility of trackout from exiting vehicles. For conservatism, a 350 m length buffer has been applied from the point at which the Site exits onto the N7 public road.

The criteria for the categorisation of the frequency of potentially dusty winds (Table 1) and the receptor distance from source (Table 2) is used to define the pathway effectiveness (Table 3).

The residual source emissions and the pathway effectiveness are combined to predict the Dust Impact Risk as shown in Table 4.

Table 1: Categorisation of Potentially Dusty Winds

Pathway Effectiveness	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Table 2: Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200 m and 400 m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

Table 3: Pathway Effectiveness

		Frequency of Potentially Dusty Winds			
		Infrequent	Moderately Frequent	Frequent	Very Frequent
Receptor Distance Category	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

Table 4: Estimation of Dust Impact Risk

		Residual Source Emissions		
		Small	Medium	Large
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

The final step is to assess the likely magnitude of the dust effects (Table 5). This is determined using both the dust impact risk and the receptor sensitivity. Receptor sensitivity is classified as either low, medium or high based on the receptor type.

Table 5: Descriptors for Magnitude of Dust Effects

		Receptor Sensitivity		
		Low	**Medium**	**High**
Dust Impact Risk	**High Risk**	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

3.0 SOURCES

The activities associated with the proposed development that are the most likely dust generating sources are listed below:

- Mechanical handling operations, including crushing and grading processes where in general the more powerful the machinery and the greater the volumes of material handled the greater the potential for dust emission;
- Haulage, where the weight of vehicles, their speed of passage and number of wheels in contact with the ground, and the nature and condition of road surfaces or haul routes all affect the amount of dust emitted:
- Shot hole drilling;
- Blasting;
- Wind blow from paved areas, material stockpiles, unsurfaced internal haul roads, quarry floor
- Import of soils for quarry restoration including transport and void filling.

The following residual source classifications can be attributed based on the identified sources and management and assessment methodology outlined above and in Appendix 4 of the IAQM guidance (2016).

Site preparation/restoration is classified as a large magnitude source due to the size of the working area. The land subject to this EIAR extends approximately 26.87 ha. The actual size of the working area may be smaller, but this conservative value has been used in the assessment.

Mineral extraction is classified as a medium to large magnitude source due to the annual extraction rate being up to 1,000,000 t/yr of aggregate within the working area (based on the total combined extraction area being ca. 40 ha), and a medium dust potential as the extraction material is primarily calcareous greywacke siltstones and shales which have a low porosity and do not store much water.

Materials handling is classified as a large magnitude source as it is conservatively assumed that there will continue to be <20 heavy plant, operating within different areas of the quarry void and on a high volume of material with medium dust potential.

On-site transportation is classified as a large magnitude source as will continue to be >250 (616) on-site HDV trips per day. A 7 m wide haulage road with a bitumen tarmac finish is constructed from the Site entrance to the yard area and Conveyer belt systems are also used to transport material on site, however, there are also unsealed roadways and surfaces on the Site.

Mineral processing is classified as a large magnitude source due to up to ca. 1,000,000 t/yr of material being processed with low moisture content and there being mobile processing plant on the pit floor processing rock.

Stockpiles (of aggregate) and exposed surfaces are classified as a medium magnitude source due to the annual quarry production of up to 1,000,000 t per annum, combined with the fact that stockpiles will be temporary and located within on the pit floor and surface aggregate processing area.

Off-site transportation is classified as a large magnitude source as the proposed movements in this Application are consistent with the current AADT, (this will be approximately 308 outward HDV movements per day), and the fact that the existing wheel wash will be used by all exiting HDVs.

4.0 ASSESSMENT

4.1 Site Parameters

The risks of potential dust emissions associated with the Site being transported off-site are largely determined by the local atmospheric conditions surrounding the Site and distance from the source to the receptor.

The conditions considered in the assessment include:

- Wind speed, to determine the likely occurrence of particles travelling beyond the site boundary; and
- Wind direction, to identify the areas over which particles are likely to travel.

As detailed in the main Air Quality & Climate Chapter 07, the closest Met Éireann station to the Site is located at Casement, Co. Dublin, ca. 5.5 km northeast of the Site. Wind speed and wind direction are measured hourly by the station and a wind-rose has been presented in Figure 1 covering the period 01 January 2020 to 31 December 2020.

The prevailing wind direction is from the southwest, with a large portion of mid wind speeds between 5 - 8 m/s and some higher wind speeds of >8 m/s.

The receptors identified in Table 6 and presented in Figure 1, with their associated distance and direction, are located within 500 m of the Site boundary. This is a conservative approach to the assessment as Site activities were not undertaken directly at the boundary in all directions. Residential receptors have been categorised as high sensitivity receptors.

The remaining non-residential (industrial/ commercial) receptors have been categorised as medium sensitivity receptors. The category of receptor distance is defined based on the criteria in Table 2 of the methodology and the frequency of dusty winds is determined based on the criteria in Table 1 of the methodology.

The receptor distance category and the frequency of dusty winds are then combined using Table 3 of the methodology to define the pathway effectiveness.

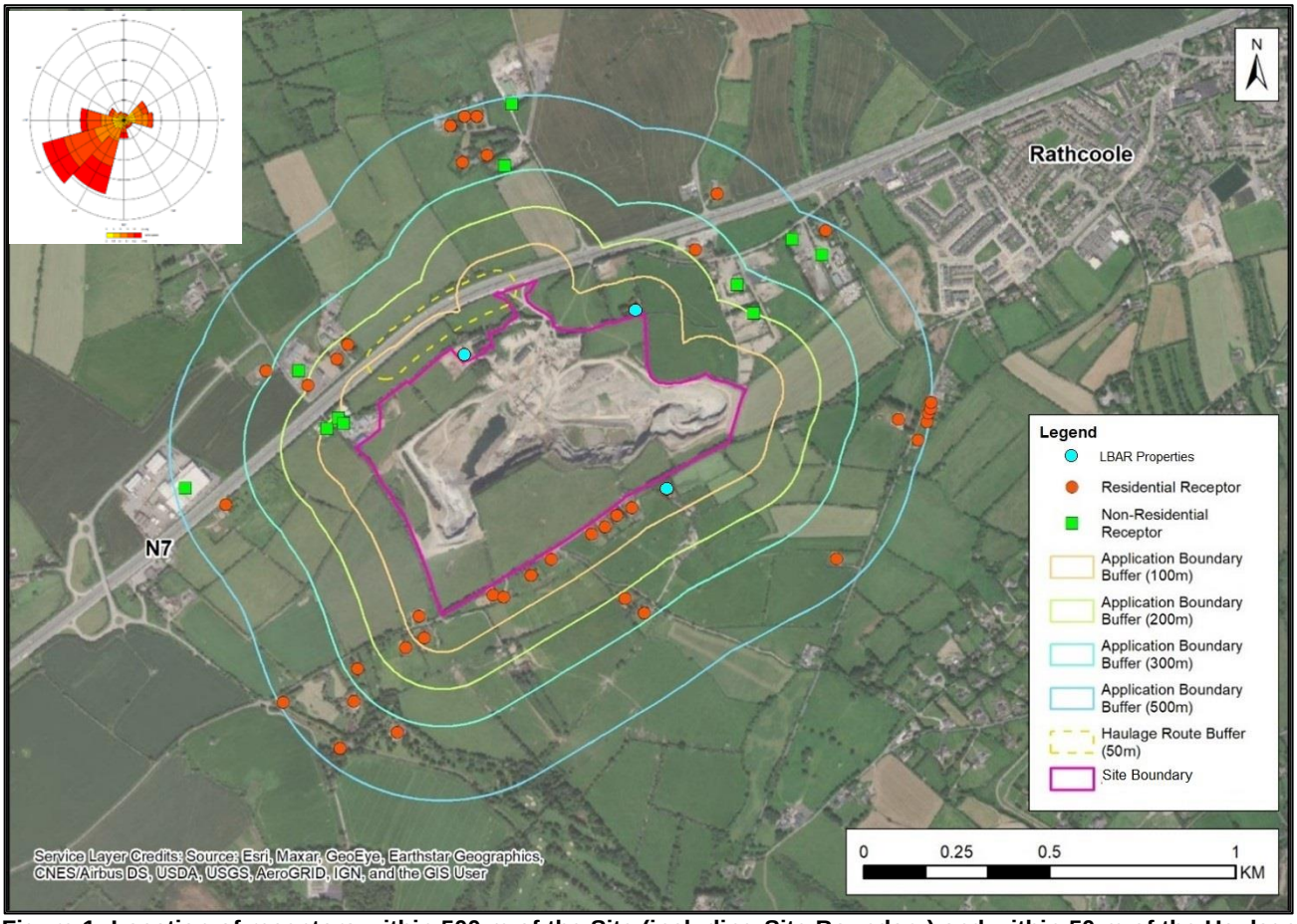


Figure 1: Location of receptors within 500 m of the Site (including Site Boundary) and within 50 m of the Haulage Route (extending 350 m from the point of exit of the Site Boundary).

Table 6: Receptors within 500 m of the Site Boundary

Receptor Type and Distance Band from Site Boundary	Number of Receptors in Group	Category of Receptor distance	Number of Receptors in Prevailing Wind Direction (NE of Boundary or haul route)	Frequency of dusty winds	Pathway Effectiveness
Residential within 50 m (of haul route)	0	Close	0	Moderate	Moderate
Residential within 100 m	13	Close	1	Moderate	Moderate
Residential within 100 m - 200 m	4	Intermediate	0	Moderate	Moderate
Residential within 200 m - 300 m	4	Distant	1	Moderate	Ineffective
Residential within 300 m - 500 m	19	Distant	2	Moderate	Ineffective
Non-Residential within 50 m (of haul route)	0	Close	0	Moderate	Moderate
Non-Residential within 100 m	3	Close	0	Moderate	Moderate
Non-Residential within 100 m – 200 m	0	Intermediate	0	Moderate	Moderate
Non-Residential within 200 m – 300 m	3	Distant	2	Moderate	Ineffective
Non-Residential within 300 m – 500 m	5	Distant	2	Moderate	Ineffective

4.2 Assessment of Coarse Particles

Assessment of the dis-amenity dust associated with the proposed development is summarised for each receptor in Table 7. Following the IAQM guidance, the nature of the activities at the Site and the existing mitigation measures (outlined in Section 5.0) suggest that the magnitude of any deposited dust effects will range from 'moderately adverse' to 'negligible', with the majority of receptors receiving 'slight adverse' effects.

Table 7: Assessment of Dust Dis-amenity Effects at Receptors

Receptor Type and Distance Band from Site Boundary	Maximum Residual Source Emissions	Pathway Effectiveness	Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effects
Residential within 100 m	Large	Moderate	Medium risk	High	Moderate Adverse effect
Residential within 100 m - 200 m	Large	Moderate	Medium risk	High	Moderate Adverse effect
Residential within 200 m - 300 m	Large	Ineffective	Low risk	High	Slight Adverse effect
Residential within 300 m - 500 m	Large	Ineffective	Low risk	High	Slight Adverse effect
Non-Residential within 100 m	Large	Moderate	Medium risk	Medium	Slight Adverse effect
Non-Residential within 200 m – 300 m	Large	Ineffective	Low risk	Medium	Negligible effect
Non-Residential within 300 m – 500 m	Large	Ineffective	Low risk	Medium	Negligible effect

4.3 Assessment of Fine Particles

The IAQM recommend that if the PM_{10} background concentration is less than 17 µg/m^3 there is little risk that the process contribution (PC) from the Site would lead to an exceedance of the annual-mean objective. The background data from other equivalent Zone C areas is detailed in Section 7.3.5.2 of the EIAR Chapter. The annual average of the historic Zone C stations is 16.8 µg/m^3 which is less than 17 µg/m^3. It is unlikely that the PC from the Site would lead to an exceedance of the AQS.

Fine particulate PC can also be assessed using the calculation of concentration with distance from source (for conservatism the site boundary is used) as detailed in LAQM TG03. The guidance document also states that the likely PM_{10} contribution from fugitive dusts, stockpiles, quarries and construction is variable but up to 5 µg/m^3. Therefore, the likely concentration at the receptor locations can be estimated using the calculation considering the distance from source. As $PM_{2.5}$ is a sub-fraction of PM_{10}, the contribution of $PM_{2.5}$ will be lower but if it is conservatively assumed that all of the PM_{10} is $PM_{2.5}$, the increase in concentration due to the changed location of the extraction area is low. The assessment assumes that no mitigation is applied, where in reality the Site has historically employed a number of mitigation measures.

When combining the likely concentration with the average historical background value (16.8 µg/m^3) for Zone C areas, the maximum annual PM_{10} predicted environmental concentration (PEC) would be 18.3 µg/m^3 which is approximately 73% of the AQS and the annual $PM_{2.5}$ PEC would be 73% of the Stage 1 AQS and 91% of the Stage 2 AQS, at the closest receptor (which is owned by the applicant). For the closest privately owned receptor the PEC would be 70.8% of the PM_{10} AQS. The PEC would be less than this for all other receptors in the vicinity of the Site. The PEC is predicted to be below the annual AQS, with headroom. The impact from fine particle

PC from the Site is considered to be Negligible to Slight prior to mitigation which would reduce to negligible due to the mitigation measures employed historically by the Site.

Table 8: Assessment of Fine Particulates at Closest Downwind Receptors

Receptor Type and Distance Band	Number of Receptors in Distance Band	Number of Receptors in Prevailing Wind Direction	Distance from source	Relative concentration (with fallout from source)	Estimated concentration (µg/m^3) at receptor band, assuming source emission of 5 µg/m^3
Residential within 0 m - 100 m of source	13	1[1]	50	30%	1.5
Residential within 100 m - 200 m	4	0	100	18%	0.9
Residential within 200 m - 300 m	4	1	200	8%	0.4

1.Property is owned by the applicant.

5.0 MITIGATION

Currently, the Site has a number of mitigation measures in place which aim to reduce the impact of dust emissions on the surrounding area and identified sensitive receptors. These mitigation measures will continue to be in place and are as follows:

- Dust monitoring will continue to be carried out monthly at the designated monitoring locations;
- The timing of operations will be optimised in relation to meteorological conditions;
- Safety/screening berms are in place along Site boundaries – 2m high and 2 m wide at the crest;
- A water bowser is available on Site for dust suppression/dampening to minimise dust blow during working hours;
- Crushing and screening equipment are fitted with dust suppression systems;
- Conveyors are partially enclosed where possible;
- Stockpiles are located within the quarry floor to take advantage of shelter from the wind.
- Plant will be regularly maintained;
- On site speed restrictions (<15 kph) will be maintained in order to limit the generation of fugitive dust emissions; and
- A wheel wash system is in place along the Site haul road for all vehicles to use prior to exit onto the N7.

Table 9 assesses the potential impacts from the proposed development on the local air quality both with and without the establishment of appropriate mitigation measures detailed above based on the IAQM, 2016 guidance and the application of expert judgement. The duration of these effects will occur in the medium term during the quarry's phased operations (i.e. during stripping, extraction and restoration). Definitions of effect significance are as defined in the EPA's 2017 'Guidelines on the information to be contained in environmental impact assessment reports'.

Without mitigation measures it is considered that dust impacts from extraction activities may not affect the character of an environment but would have noticeable changes. Through the implementation of the

environmental management programme it is likely that the dust from various activities will have an effect capable of measurement but without noticeable consequences to the environment.

Table 9: Assessment of Impacts to Local Air Quality and Mitigation Measures Employed (based on IAQM 2016 guidance and expert judgement)

Impact	With / Without the establishment of Mitigation Measures	Type of Effect	Quality of Effects	Significance of Effects	Duration of Effects
Dust from excavation	Without	Direct	Negative	Moderate	Medium Term (7-15 years)
Dust from excavation	With	Direct	Negative	Slight	Medium Term (7-15 years)
Dust from transfer on haul roads	Without	Direct	Negative	Moderate	Medium Term (7-15 years)
Dust from transfer on haul roads	With	Direct	Negative	Slight	Medium Term (7-15 years)
Dust from transfer on public roads	Without	Direct	N/A	Moderate	Medium Term (7-15 years)
Dust from transfer on public roads	With	Direct	N/A	Slight	Medium Term (7-15 years)
Dust from on-site processing (crushing and screening)	Without	Direct	Negative	Moderate	Medium Term (7-15 years)
Dust from on-site processing (crushing and screening)	With	Direct	Negative	Slight	Medium Term (7-15 years)

6.0 RESIDUAL IMPACTS

Residual impacts of deposited dust and particulates generated during the continuation of existing Site activities on air quality are considered to be slight. During long spells of dry weather, dust emissions can potentially be elevated, however dust nuisance from the operation is expected to be unlikely if the above mitigation measures are implemented during production and restoration. The overall impact from the continued operation of the Site, in terms of dust emissions and particulates, is considered 'slight' to the air environment and Not Significant

In the longer term, on completion of the site restoration, the concentration of airborne dust would expect to be reduced from operational levels as the result of covering and seeding of exposed, un-vegetated soil surfaces. This will most likely constitute a minor positive impact for the local environment.

7.0 CUMULATIVE IMPACTS

Research has shown that the greatest proportion of dust predominantly deposits within the first 100 m away from the source (The Environmental Effects of Dust from Surface Mineral Workings, Volume 1 DETR, HMSO 1995) as dust has a higher deposition velocity than finer particles (i.e. PM_{10} and $PM_{2.5}$). The finer particles of less than 10 microns aerodynamic diameter may remain airborne for longer and therefore travel larger distances, although a large proportion may still deposit within 200 m of the source.

The assessment undertaken has considered publicly available background monitoring data and incorporated this into the assessment, therefore the assessment includes a consideration for other Sites operating in the area.

There are no other identified operations in close proximity to the Site which may generate significant emissions to air. Therefore, there is no opportunity for significant cumulative impacts to arise as a result of the continuation of activities at the Site.

8.0 REFERENCES

Environmental Protection UK / Institute of Air Quality Management (EPUK/IAQM, 2017) Land-Use Planning and Development Control: Planning for Air Quality,v1.2, 2017.

Institute of Air Quality Management (IAQM, 2016) Guidance on the assessment of mineral dust for Planning.

The Environmental Effects of Dust from Surface Mineral Workings, Volume 1 DETR, HMSO 1995.

8.0 NOISE & VIBRATION

8.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany a planning application to be made under S.37L of the Planning and Development Act, 2000 as amended for the continuation of extraction at an existing quarry at Windmillhill, Rathcoole, Co. Dublin.

This chapter of the EIAR assesses the likely impacts of noise and vibration from Behan's Quarry ('the quarry') on the environment during the extraction (and restoration) activities at the Application Site.

The primary source of noise from the development will include traffic, blasting, screening, and crushing of extracted materials, vehicle movements, intermittent noises, reversing alarms, and general plant and machinery.

The primary source of vibration associated with the proposed activity is blasting from the excavation of rock. Blasting results in ground borne vibrations and air-overpressure impacts. It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern.

8.1.1 Project Background and Overview

The application for further development of the quarry is to be made concurrent with an application for substitute consent for the quarry that is accompanied by an rEIAR.

The lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The EIA project boundary is generally bounded by the N7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called 'Four Winds' that is within the ownership of the planning applicant to the east; and the former local Steelstown Road to the west.

At the centre of the EIAR project boundary is an existing quarry that covers an area of approximately 28.8 ha. with an average working depth of 173 mAOD. The existing quarry is roughly rectangular in shape with an east – west axis parallel to the N7/M7 and local Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 3.06 ha.

The further quarrying development proposed involves a lateral northward extension of the current quarry void over approximately 4.1 ha (over a total of 5.16 ha. to accommodate screening berms) west and east of an existing dwelling also in the applicant's ownership and a deepening of the western and eastern side of the laterally extended void to a final working depth of 150 mAOD. The further development proposed is for quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area and the existing quarry access will be utilised.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.

8.1.2 Scope of Assessment

The scope of this assessment has included the following:

- Identification of the study area and sensitive receptors;
- Analysis of noise and vibration survey data;
- Derivation of applicable noise criteria;
- Prediction of operational phase noise and vibration impacts;

- Evaluation of noise and vibration impacts against criteria; and
- Specification of appropriate mitigation, if required.

8.1.2.1 Effects scoped out – HGV Contribution to Road Traffic Noise

DMRB provides scoping criteria for the evaluation of operational noise from a road. With reference to the DMRB scoping criteria provided in Section 8.2.2.5, the contribution of HGVs to traffic noise does not meet 'reasonable stakeholder expectation' for an operational noise assessment. Operational phase changes in traffic noise levels have therefore been scoped out of this assessment.

8.1.3 Site Location and Setting

The quarry is situated approximately 1 km south-west of Rathcoole and 10 km east of Naas. The N7 national road which connects Dublin with Naas passes in an east-west direction just off the quarry.

Vehicular access to the quarry is from the N7 via a 170 m access track that provides access to the quarry and surrounding lands. The quarry is surrounded by agricultural fields and there are other industrial sites 200 m to the east. The area immediately around the quarry is sparsely populated, with a small number of houses to the south of the quarry, to the north west and to the north on the other side of the N7 roadway. A series of third-class roads run around the lands, serving a number of dwellings and farms.

8.1.4 Study Area, and NVSRs

The study area considered in this assessment comprises a buffer approximately 600 m beyond the quarry redline boundary. This area includes the receptors anticipated to be impacted by quarry operations. The closest receptors are located approximately 200 m south of the quarry boundary.

Representative Noise and Vibration Sensitive Receptors (NVSRs) considered within this assessment are shown in Figure 8.1 and are listed in Table 8.1.

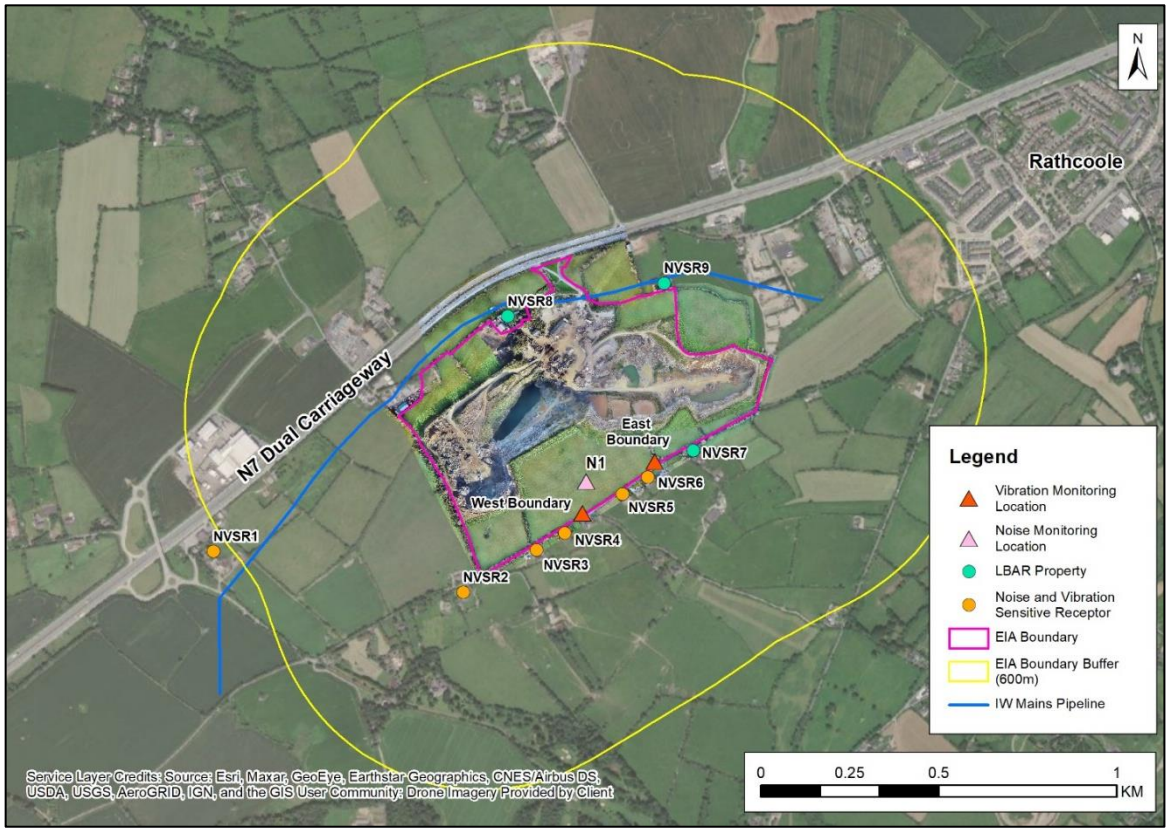


Figure 8.1: Noise and vibration monitoring locations and noise and vibration sensitive receptors.

Table 8.1: Identified representative NVSRs

Item	Representative of	X	Y
NVSR1	Property to the west of the quarry.	698868	725304
NVSR2	Property to the south of the quarry.	699570	725189
NVSR3	Property to the south of the quarry.	699776	725309
NVSR4	Property to the south of the quarry.	699855	725355
NVSR5	Property to the south of the quarry.	700018	725465
NVSR6	Property to the south of the quarry.	700088	725513
NVSR7	Applicant owned property to the south of the quarry.	700217	725588
NVSR8	Applicant owned property to the north of the quarry	700134	726057
NVSR9	Applicant owned property to the east of the quarry	699696	725965

Residential properties were also identified to the north of the quarry, on the far side of the N7 roadway. Observations of the noise environment at these potential NVSRs confirmed that road traffic noise from the N7 was of such prominence that noise from quarry operations would not be audible. These potential NVSRs were therefore scoped out of this assessment. Similarly, residential properties were identified approximately 600 m east of the quarry, however noise from quarry operations was inaudible here against the residual road traffic noise.

An Irish Water (IW) pipeline lies 40 m to the north of the quarry and is potentially vulnerable to proposed blasting activities. This is considered a representative Vibration Sensitive Receptor (VSR) within this assessment. The extent of the IW pipeline is shown in Figure 8.1.

This assessment therefore focuses on potential noise and vibration impacts at the closest NVSRs in the quietest environments, where such impacts would be greatest. Noise and vibration impacts associated with quarry activities at more distant NVSRs in noisier environments have been assumed to be lesser.

8.1.5 About the Author

This noise assessment has been prepared by Gregor Massie MSc BEng AMIOA. Gregor is a corporate member of the UK Institute of Acoustics (IoA) and has more than 3 years' experience in environmental noise assessment. He has completed the IoA postgraduate diploma in Acoustics and Noise Control, and also the Certificate of Competence in Environmental Noise Measurement.

This section of the EIAR has been reviewed by Simon Waddell BSc. (Hons) MIOA. Simon is Principal Consultant at ITPEnergised and has over 10 years of experience in environmental acoustics. Simon has completed the Institute of Acoustics' (IOA) Diploma in Acoustics and Noise Control, and also holds the Certificate of Competence in Environmental Noise Measurement.

ITPEnergised have considerable experience in the assessment of noise impacts and have compiled EIA studies ranging from quarries, mines, retail development, housing developments and wind farms.

8.2 Legislation, Policy and Guidance

8.2.1 Relevant Legislation

Legislative references considered specifically for the assessment of noise and vibration from quarrying activities and relevant statutory instruments in a planning context include:

- Directive 2014/52/EU of the European Parliament and of the Council (amending Directive 2011/92/EU);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, S.I. 296 of 2018; and
- Planning and Development Regulations 2001 (as amended).

8.2.1.1 EU Directive 2002/49/EC

The Directive provides a basis for developing and completing the Community measures concerning noise emitted by the major sources, in particular; road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery. The Directive applies to environmental noise in which humans are exposed, in particular built-up areas, in public parks or quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas.

"Environmental noise" is defined within the Directive as "*unwanted or harmful outdoor sound created by human activities, including noise emitted by means of road traffic, and from site of industrial activity…*"

Member states (of the EU) are required to implement the Directive, by making and approving noise maps and action plans for agglomerations, major roads, major railways, and major airports.

Noise indices specified by the Directive include L_{den} and L_{night}, however, supplementary noise indicators are permitted where these are used to express relevant limit values in Member State legislation.

8.2.2 Relevant Guidance

This assessment has been made with guidance from the 'Guidelines on the information to be contained in environmental impact assessment reports', published in 'draft' by the Environmental Protection Agency (EPA) in August 2017. Guidance related specifically to noise and vibration has been identified below.

8.2.2.1 NG4: Guidance Note for Noise: Licence Applications, Surveys and Assessment in Relation to Scheduled Activities

With regards to noise, the most recent Irish guidance document in relation to noise was published in 2016 by the EPA, Office of Environmental Enforcement (OEE), entitled 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)'.

NG4 sets methods for addressing noise from operations that fall under IPPC and Waste Licensing functions of the Environmental Protection Agency Office of Environmental Enforcement (OEE). NG4 provides detailed consideration of a range of noise related issues including basic background to noise issues, various noise assessment criteria and procedures, noise reduction measures, Best Available Techniques (BAT) and the detailed requirements for noise surveys. NG4 identifies typical limit values for noise from licensed sites as: Daytime (07:00 to 19:00) – 55dB $L_{Ar,\,T}$; Evening (19:00 to 23:00) – 50dB $L_{Ar,T}$; and, Night-time (23:00 to 07:00) – 45dB $L_{Aeq,\,T}$.

NG4 identifies the following guidance as potentially appropriate for assessing noise, subject to the use of the methodology being considered and justified by a competent person:

- BS 4142: 2014: Methods for rating and assessing industrial and commercial sound – evaluation of industrial and commercial noise sources at residential properties;

- BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings – outline guidance on noise matters and deals specifically with noise within buildings; and
- BS 5228-1: 2009 + A1: 2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise – outline guidance on prediction and control of noise from construction and open sites.

8.2.2.2 British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites, Parts 1 and 2.

BS5228 (BSI, 2014) provides a procedure for the estimation of construction noise and vibration levels and for the assessment of the significance of the predicted effects at the nearest sensitive receptors. Annex D of the Standard includes measured typical noise levels for a range of construction plant and activities.

Part 1 of the Standard provides several methods for the evaluation of the significance of construction noise effects. The ABC method considers significance by comparison to the measured baseline $L_{Aeq,T}$ noise level, rounded to the nearest 5 dB. Three categories of threshold values are provided; A, B and C, in increasing 5 dB bands, for the periods “daytime and Saturdays”, “evenings and weekends” and “night time”. Where the measured baseline exceeds the highest category (C), a 3 dB increase over baseline is considered significant. The evaluation periods are defined as follows:

- Daytime: 07:00 – 19:00 on weekdays and 07:00 – 13:00 on Saturdays;
- Evenings and weekends: 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays; and
- Night-time: 23:00 - 07:00 (all days).

Part 2 of the Standard provides threshold levels at which vibration may be perceptible to people, through to becoming intolerable and frequency-weighted thresholds at which vibration may cause cosmetic damage to structures.

The thresholds are dependent on frequency and the type of building, however, in the worst-case, residential, or light commercial structures may see the onset of damage at 15 mm/s PPV at 4 Hz, increasing to 20 mm/s PPV at 15 Hz and above.

8.2.2.3 BS7445-1:2003 Description and Measurement of Environmental Noise. Guide to Quantities and Procedures.

BS7445 provides guidance on appropriate environmental noise monitoring, including specification of equipment and appropriate calibration intervals, suitable weather conditions and observations to note regarding the nature of the noise environment.

Other guidance reviewed as part of the assessment process includes:

- The EPA’s Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non Scheduled Minerals; April 2006);
- As well as the EPA’s NG4 guidance, noise monitoring at the quarry is based on procedures outlined in ISO 1996: Description, Measurement and Assessment of Environmental Noise, and BS4142:2014 Method for Rating and Assessing Industrial and Commercial Sound;
- Guidelines for Environmental Noise Impact Assessment, Institute of Environmental Management and Assessment, 2014;
- The EPA is in the process of updating the existing guidance documents relating to EIAs and the preparation of EIARs. ‘Guidelines on the information to be contained in environmental impact assessment reports’,

published in 'draft' by the EPA in August 2017, and 'Advice notes for preparing Environmental Impact Statements', (Draft, 2015);

- BS 6472:1992 - The Evaluation of Human Exposure to vibration in buildings;
- BS 7385-1:1990 - Evaluation and measurement for vibrations in buildings;
- Department of the Environment, Heritage and Local Government – Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004;
- Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006) Environmental Protection Agency. This guidance outlines primary sources of noise associated with quarrying and offers guidance in relation to the correct approach to be followed in respect of assessment and mitigation. Recommended noise limit values are 55dB $L_{Aeq,1hr}$ and 45dB $L_{Aeq,15min}$ for daytime and night-time respectively; and
- Environmental Code (2005) Irish Concrete Federation. EPA guidelines in relation to blasting activities outlining the methodology and limits to be used for vibration measurement.

8.2.2.4 BS7385:, Evaluation and measurement for vibration in buildings, Part1 1990 Guide for measurement of vibrations and evaluation of their effects on buildings and Part 2 1993 Guide to damage levels arising from ground borne vibration

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above.

BS7385 also provides further context with regards to air overpressure:

"Windows are generally the weakest parts of a structure exposed to air overpressure. Research by the United States Bureau of Mines has shown that a poorly mounted window that is pre-stressed can crack at around 150 dB(lin), with most windows cracking at around 170 dB(lin). Structural damage would not be expected at air overpressure levels below 180 dB(lin).

8.2.2.5 Design Manual for Roads and Bridges (DMRB)

DMRB provides standards and advice regarding the assessment, design, and operation of roads in the UK and sets out screening criteria, by which percentage changes in traffic flow can be related to a predicted change in road traffic noise and vibration. The guidance also provides significance criteria, by which the percentage of people adversely affected by traffic noise can be related to the total noise or vibration level due to road traffic, or the increase over an existing level.

DMRB provides a method for predicting the Basic Noise Level (BNL), a measure of the source noise level of a road. The BNL is a function of the composition, flow and speed of traffic and the quality of the road surface. Changes in the BNL, arising from changes in traffic flow, may be used as a means of determining the significance of operational noise effects.

The following scoping criteria are provided for the evaluation of operational noise from a road:

1) is the project likely to cause a change in the BNL of 1dB $L_{A10,18hr}$ in the do-minimum opening year (DMOY) compared to the do-something opening year (DSOY)?
2) is the project likely to cause a change in the BNL of 3dB $L_{A10,18hr}$ in the do-something future year (DSFY) compared to the DMOY?
3) does the project involve the construction of new road links within 600m of noise sensitive receptors? and

4) would there be a reasonable stakeholder expectation that an assessment would be undertaken?

With regard to a 'reasonable stakeholder expectation' for an operational noise assessment, DMRB notes an example where works involve changes to infrastructure but are not expected to give rise to significant environmental effect, such as smart motorway projects.

Where the response to any of the above scoping questions is 'yes' the scoping assessment shall make a recommendation on the scope of further assessment.

8.2.3 Other Guidance

Other guidance reviewed as part of the assessment process includes:

- Department of the Environment, Heritage and Local Government (DEHLG) – Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004;
- Design Manual for Roads and Bridges (DMRB);
- BS 6472:1992 - The Evaluation of Human Exposure to vibration in buildings;
- Department of the Environment, Heritage and Local Government – Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004; and
- Environmental Code (2005) Irish Concrete Federation (ICF). EPA guidelines in relation to blasting activities outlining the methodology and limits to be used for vibration measurement.

8.2.4 Relevant Planning Objectives and Plans

8.2.4.1 South Dublin County Development Plan 2016-2022

The quarry is located within the administrative area of South Dublin County Council (SDCC) and is subject to the objectives and policies contained within the South Dublin County Development Plan 2016-2022.

In their County Development Plan SDCC identifies that mineral extraction and the aggregate industry is an important economic sector that provides raw materials for the construction industry. SDCC also acknowledges that the processes involved in extraction can give rise to long-term environmental effects and significantly alter landscape character. These effects require important consideration when identifying the suitability of areas for extraction.

Under the SDCC policies for Economic Development and Tourism, 'Policy 10 Mineral Extraction' specifies:

> *'It is the policy of the Council to support the sustainable extraction of aggregate resources at suitable locations within the County subject to appropriate environmental safeguards.'*

Specific objectives in this policy which are relevant to the quarry include:

- **ET10 Objective 1:** To facilitate mineral extraction in suitable locations subject to the protection of amenity and environmental quality; and
- **ET10 Objective 3:** To ensure the satisfactory reinstatement and/or re-use of disused quarries and extraction facilities, where active use has ceased.

SDCC acknowledges that factors such as air pollution, water pollution, nuisance noise and vibrations can negatively affect human health, the environment and residential amenity.

Chapter 7 of the SDCC County Development Plan 2016 - 2022 provides policies and objectives related to 'Infrastructure and Environmental Quality'. In this chapter relevant policies which are related to the development and bio-physical factors (air, noise and water) which could affect human health include:

Policy 2 Surface Water and Groundwater:

'It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive.'

Policy 7 Environmental Quality:

'It is the policy of the Council to have regard to European Union, National and Regional policy relating to air quality, light pollution and noise pollution and to seek to take appropriate steps to reduce the effects of air, noise and light pollution on environmental quality and residential amenity.'

8.3 Assessment Methodology and Significance Criteria

8.3.1 Noise Impact Assessment

8.3.1.1 Receptor Sensitivity

This assessment considers that human receptors, including residential dwellings, have a high sensitivity to noise. Commercial and industrial receptors, comprising buildings and businesses, are considered to have a low sensitivity to noise and have been scoped out of further assessment. The assumed sensitivity of identified representative existing and proposed NVSRs are provided in Table 8.2

Table 8.2: Assumed sensitivity of representative NVSRs

Receptor	Type of receptor	Sensitivity
NVSR1– NVSR9 existing dwellings (eNVSRs)	Human / residential	High

8.3.1.2 Impact Magnitude Criteria

Appropriate criteria have been adopted for the derivation of impact magnitude and are provided in Table 8.3. The criteria have been adapted from DMRB. DMRB provides useful criteria for evaluation of noise during the construction phase of developments, including the typical subjective reaction of affected populations, which is relevant to this assessment.

Table 8.3: Impact Magnitude Criteria

Exceedance of threshold value OR change in noise level, $dBL_{Aeq,T}$	Subjective reaction	Impact Magnitude
≥5	Clearly perceptible	High adverse
≥3, <5	Perceptible	Medium adverse
>0, <3	Barely perceptible	Low adverse
≤0	Inaudible	No change / none

The Proposed Development will introduce additional anthropogenic noise sources to the study area during both the construction and occupation phases, therefore all impacts are assumed to be adverse. The criteria in Table 8.2 and Table 8.3 have been used to determine the significance of noise effects for receptors of different sensitivities, as shown in Table 8.4.

Table 8.4: Assumed Sensitivity of Representative NVSRs

Magnitude	Level of significance, relative to sensitivity of receptor		
	Low	Medium	High
High	Moderate	Moderate/Large	Large
Medium	Slight	Moderate	Moderate
Low	Neutral	Slight	Slight
No change / none	Neutral	Neutral	Neutral

All residential NVSRs are considered to be of 'high' sensitivity to noise and vibration.

This assessment considers that effects of moderate and large significance are significant, and that effects of neutral and slight significance are not significant.

8.3.1.3 Target Noise Levels

Noise criteria have been adopted from appropriate guidance, as provided in Section 8.2. The adopted criteria are provided below.

The quarry's existing permitted noise limits (SDCC Reg. Ref.: SDQU05A/4, Condition 4) are:

a) *'Free-field noise levels attributable to the operation of the entire quarry complex, when measured at the nearest noise sensitive receptor, shall not exceed 55 dB (A) (60 minute L_{Aeq}) during permitted operating hours, and shall not exceed 45 dB(A) (15 minute L_{Aeq}) at any other time.*

b) *Monthly monitoring shall be carried out.*

c) *No audible or impulsive noise shall be permitted outside permitted operating hours.*

d) *Notwithstanding (a) above, where any temporary quarry activity is expected to exceed the noise limits above, this shall be notified in advance to the planning authority, and to residents on the vicinity, indicating the for such activity, and its likely duration. No such exceedance of noise limits shall occur without the prior agreement of the planning authority.*

e) *A noise survey and assessment programme shall be undertaken every six months to assess the impact of noise emissions arising from the operation of the entire quarry complex. The scope and methodology of this survey and assessment programme shall be submitted to the planning authority for its written agreement within three months of the date of this decision. The results obtained from the assessment programme shall be submitted within two weeks of completion for the written agreement of the planning authority. The operator shall carry out any amendments to the programme required by the planning authority following this six-monthly review.'*

The quarry's existing permitted hours of operation (SDCC Reg. Ref.: SDQU05A/4, Condition 3) are:

> *'Quarrying operations, other than blasting, shall be carried out only between 05:00 and 21:00 hours on Monday to Friday inclusive and between 05:00 and 14:00 hour on Saturday. No such activity shall take place outside these hours or on Sundays or public holidays.'*

Excavation and mobile processing of material is carried out between 08:00 - 20:00, Monday to Friday and between 08:00 - 14:00 on Saturdays.

Outside the hours of 08:00 – 20:00 the activities are limited to loading and moving trucks.

It is proposed that these hours and limits are maintained for the proposed continuation of extraction and processing at the quarry and this assessment has been undertaken on this basis.

8.3.1.4 Noise Limits Provided in Guidance

The applicable guidance which dictates noise thresholds is the EPA's '*Environmental Management in the Extractive Industry (Non-Scheduled Minerals)'* (2006). As noted previously, the recommended noise limit values for the Proposed Development are 55 dB $L_{Aeq,1hr}$ and 45 dB $L_{Aeq,15min}$ for daytime and night-time, respectively. The guidance then specifies the daytime and night-time periods as between 08:00 and 20:00, and 20:00 and 08:00, respectively.

Another more recent Irish guidance document in relation to noise was published in 2016 by the EPA and OEE, although applicable to EPA licenced facilities, the NG4 guidance identifies typical limit values for noise from such sites as: Daytime (07:00 to 19:00) – 55 dB $L_{Ar,T}$; Evening (19:00 to 23:00) – 50 dB $L_{Ar,T}$; and Night-time (23:00 to 07:00) – 45 dB $L_{Aeq,T}$.

8.3.1.5 Method of Baseline Characterisation

Baseline noise measurements were undertaken over two days, in November 2020 and February 2021. Monitoring was undertaken at monitoring position N1, which is representative of the closest NVSRs to the quarry, for a duration of 1 hour. Multiple 1/3 octave measurements were also undertaken at 10 m from various plant and equipment operating in the quarry. The monitoring location is shown in Figure 8.1.

Monitoring was undertaken in accordance with BS7445 guidance, using a Norsonic Nor-140 Class I sound level meter (SLM). The SLM was mounted on a tripod at a height of 1.2 – 1.5m above ground level. The SLM was field calibration tested at the start and end of each measurement, with no significant drift noted. The SLM and calibrator were within their laboratory calibration period. SLM calibration certificates are presented in Appendix 8.1.

Weather conditions during the survey were in accordance with the requirements of BS7445, with no rain and wind speeds below 5 m/s throughout. The temperature was generally within the range 5 – 11^{o}C.

The following noise indices were recorded:

- $L_{Aeq,T}$ – the equivalent continuous level is the constant noise level that would result in the same sound energy over a given period and is used to represent varying noise levels over a time, T, as a single number. Typically referred to as the 'ambient' noise level.
- $L_{A90,T}$ – the 'background' or 90th percentile noise level, i.e. the noise level that is exceeded for 90 percent of a time, T. Representative of the quieter moments experienced at a location, this index is unaffected by short-duration noisy events.
- $L_{A10,T}$ – the 10th percentile noise level, i.e. the noise level that is exceeded for 10 percent of a time, T. Typically used to characterise road traffic noise.
- $L_{Amax,T}$ – the maximum noise level recorded over a time, T.

A 1-minute averaging period (T) was selected for measurements to provide sufficient data resolution to characterise the noise environment. Details of observations made during monitoring are provided in Appendix 8.2.

8.3.1.6 Method of Prediction

A 3D model of the quarry was constructed within noise prediction software CadnaA and noise levels were predicted at the representative NVSRs. The software enables prediction of noise levels under atmospheric conditions using the method provided in BS5228.

Measurements were undertaken of various items of plant during the recent baseline survey to characterise their noise emissions. All measurements of plant were undertaken at a distance of 10 m from the source. Appropriate source noise terms from BS5288 were applied to plant which could not be measured during the survey. Table 8.5 presents the noise sources and applied sound power data included in the noise model.

Table 8.5: Source Noise Terms

Item	Resultant sound power level, dBA	Data source	Modelling method
Excavator	110.4	BS_5228_2009_C1_12	Point Source
Excavator - Rock Breaking	121.0	BS_5228_2009_C9_11	Point Source
Screens	110.3	Measured data	Point Source
Loader	103.5	BS_5228_2009_C6_34	Point Source
Drill Rig	119.0	BS_5228_2009_C9_3	Point Source
Crushers	115.5	Measured data	Point Source
Generator	88.1	BS_5228_2009_C4_77	Point Source
Asphalt Plant	98.6	Measured data	Point Source
Dump Truck	105.1	BS_5228_2009_C6_25	Moving point source
Road HGV	101.4	BS_5228_2009_C11_4	Moving point source

The quarry operates during the following hours:

- The quarrying occurs 05:00 - 21:00 Monday to Friday, and 05:00 - 14:00 on Saturdays, with no working on Sundays or Bank Holidays;
- Excavation and mobile processing of material is carried out between 08:00 - 20:00, Monday to Friday and between 08:00 - 14:00 on Saturdays; and
- Outside the hours of 08:00 – 20:00 the activities are limited to loading and HGV movements.

Based on the above timing of activities, two scenarios have been modelled to noise impacts and impacts from proposed operations:

- Scenario 1 – excavation and mobile processing of material; and
- Scenario 2 – loading and moving trucks.

In line with the operational hours of different activities, Scenario 1 has been evaluated against the daytime target level, and Scenario 2 has been evaluated against the night-time target level.

8.3.1.6.1 Scenario 1 – excavation and mobile processing of material

The predicted inputs for this scenario include the activities of the below fixed and mobile equipment. Items of equipment have been located within the designated areas shown in Figure 8.2 so that they are at the closest working location to the NVSRs.

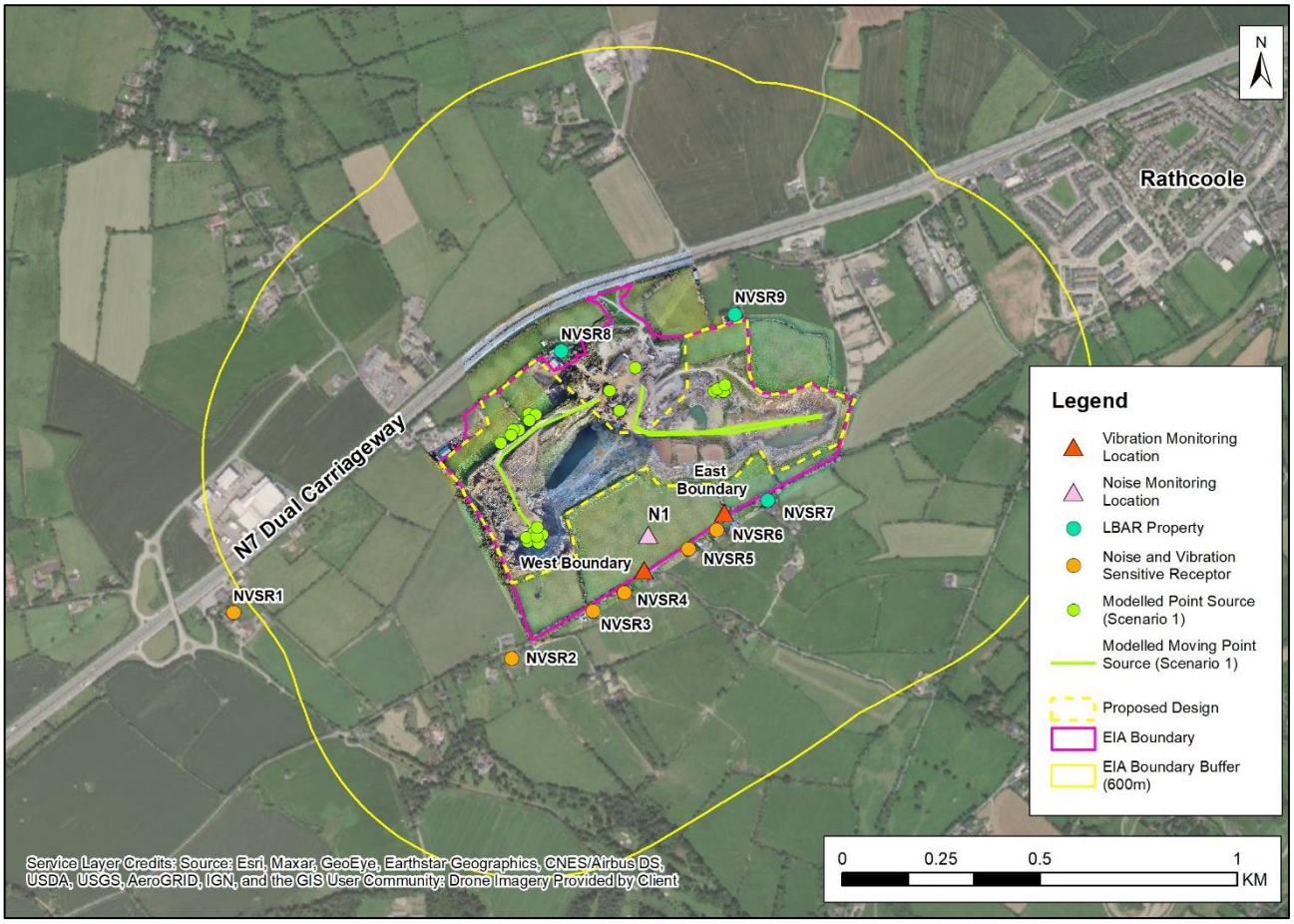


Figure 8.2: Scenario 1 inputs and layout.

Details of operations modelled in Scenario 1 are presented below:

South-west area of pit

- Jaw crusher;
- Cone Crusher;
- Screen;
- Excavator (ca. 50t) feeding first jaw crusher;
- Excavator (ca. 50t) rock breaking;
- Screen; and
- Loader loading road trucks.

Proposed north-west extension area

- Jaw crusher;
- Cone Crusher;
- Screen;
- Excavator (ca. 50t) feeding first jaw crusher;

- Excavator (ca. 50t) rock breaking;
- Screen; and
- Loader loading road trucks.

Proposed north-east extension area

- Jaw crusher;
- Cone Crusher;
- Screen;
- Excavator (ca. 50t) feeding first jaw crusher;
- Excavator (ca. 50t) rock breaking;
- Screen;
- Loader loading road trucks; and
- Road HGV Trucks 4 per hour, 33 % going to and from south-west pit area, 33 % going to and from north-west extension area and 33 % going to and from north-east extension area.

Plant Area

- Screening Plant;
- Asphalt Plant;
- Screening and Washing Plant;
- Water Recycling Unit;
- Loader working with stockpiles and loading; and
- JCB telehandler operating (reduced time)

8.3.1.6.2 Scenario 2 - loading and HGV movements

Scenario 2 includes for the loading and movement of HGVs in the quarry during the night-time period. The locations of the equipment are shown in Figure 8.3.

Details of operations modelled in Scenario 2 are presented below:

- Dump Trucks – Three dumpers moving from north and south work areas to plant area (4 loads per hour);
- Road HGV Trucks 4 per hour, 33 % going to and from south-west pit area, 33 % going to and from north-west extension area and 33 % going to and from north-east extension area; and
- 3 x excavator loading haul trucks and HGVs.

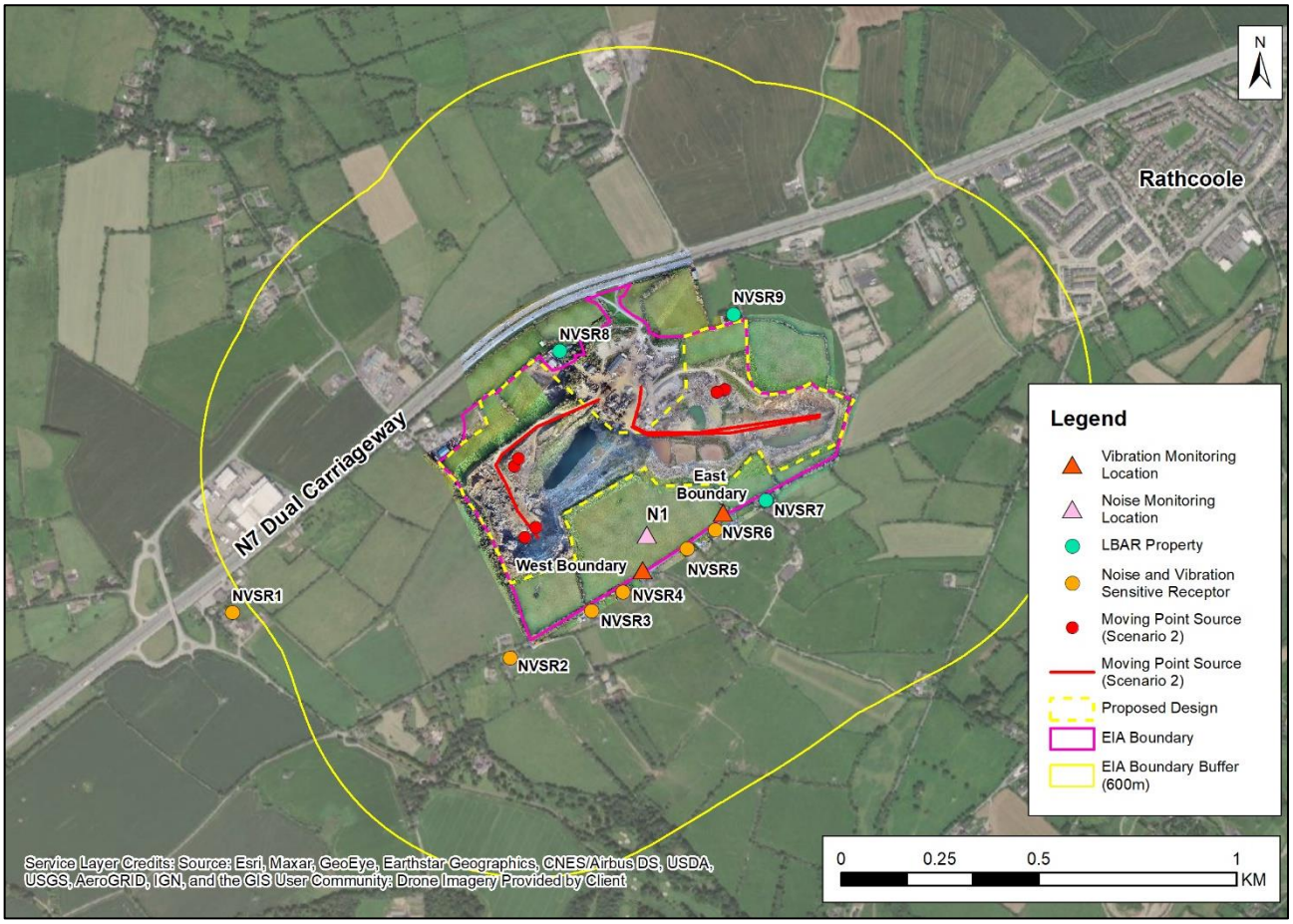


Figure 8.3: Scenarios 2 inputs and layout.

A robust approach has been applied in both model scenarios; modelling has assumed all mobile plant items operated at the area of the quarry closest to the identified NVSRs. We note that these work practices are very unlikely to occur in close proximity at such a location and this therefore represents a possible 'worst case', actual noise impacts are likely to be lower.

The predicted noise levels assume a receptor height of 4 m above local ground level (representative of a first-floor bedroom window). This is a robust approach, which minimises the attenuation due to ground absorption. Predicted levels at the height of a person standing at ground level (e.g. effective receptor height of 1.5 – 1.8 m) will be lower.

A conservative 100% equipment 'on-time' has been applied in all predictions for all fixed and mobile plant throughout the working day. All equipment and plant has been modelled to run simultaneously. The resultant prediction conservatively overestimates the noise output as all plant is not usually in operation simultaneously for 100% of the day. This assessment therefore considers a 'worst-case' 1 hour period during a working day for each scenario when all on-site plant is in use simultaneously. Actual noise impacts are likely to be lower.

8.3.1.7 Model Settings

A typical air temperature of 10^{o}C and relative humidity of 70% have been assumed within the model. Ground absorption within the quarry has been assumed to be G = 0, representative of hard ground conditions. The ground absorption for the area surrounding the quarry has been modelled as G = 0.5 representative of mixed ground conditions.

Local topography has been included within the model for all scenarios, using detailed contour line data provided by Golder.

8.3.2 Vibration Impact Assessment

The most significant potential source of ground borne vibrations that could be generated by the proposed operations at the quarry is the extraction of rock from the active face. Rock extraction requires the use of a pneumatic rock breaker and blasting techniques.

In order to characterise potential vibration impacts at the closest receptors, monitoring has been undertaken by a blasting contractor during blasting activities at the eastern and western boundaries of the quarry.

Measured vibration levels have been assessed according to *British Standard BS 7385: Evaluation and measurement for vibration in buildings, Part1 1990 Guide for measurement of vibrations and evaluation of their effects on buildings and Part 2 1993 Guide to damage levels arising from ground borne vibration.*

8.3.2.1 Vibration Measurement Parameters

- Ground vibration at sensitive receptors is measured as Peak Particle Velocity (PPV) in mm/s. The PPV is the maximum instantaneous velocity of a particle at a point during a given time interval; and
- Air blast (air overpressure) noise is measured in linear decibels dB(Lin). Air overpressure is energy transmitted from the blast site within the atmosphere in the form of pressure waves and is generally perceived as a loud bang.

8.3.2.2 Evaluation Criteria

Table 1 in BS6472 (reproduced here as Table 8.6) provides magnitudes of vibration that are acceptable with respect to human response for up to three blast vibrations events per day.

Table 8.6 - Maximum satisfactory magnitude of vibration with respect to human response for up to three blast vibration events per day

Place	Time	Satisfactory Magnitude, PPV (mm/s)
Residential	Day – 08:00 to 18:00 Mon-Fri, 08:00 to 13:00 Saturdays Night – 23:00 to 07:00 Other times	6.0 to 12.0 2.0 4.5
Offices	Any time	14.0
Workshops	Any time	14.0

The table recommends magnitudes of vibration below which the probability of adverse comments is low.

8.3.2.3 Vibration and air overpressure limits

Vibration limits from blasting are recommended in DEHLG (now DCCAE), EPA and ICF Environmental Guidelines. The vibration limit from blasting should not exceed a peak particle velocity of 12 mm/s when measured in any three mutually orthogonal planes at a receiver location when blasting occurs at a frequency of once per week or less. Research has found that damage to windows occurs at air overpressure levels of 150 dB(lin) and above. Structural damage would likely only occur at air overpressure levels greater than 180 dB(lin).

The acceptable vibration and air overpressure limits at sensitive receptors in Ireland are 12 mm/s (PPV) and 125 dB(lin) Air Overpressure (AOP) as defined in the EPA management guidelines.

8.3.3 Construction Phase

The construction noise levels associated with the proposed activities of the quarry will be of relatively short term duration which served to minimise the noise impacts at existing NVSRs. Future construction phase works will

consist of stripping the top and subsoils to expose the rock reserve. The construction of the screening banks around the quarry has provided more effective attenuation to noise generated by site activities. Noise levels associated with any future construction phase activities will be controlled in accordance with methods provided in BS5228.

Appropriate construction phase noise limits, which are presented in Table 8.7 (NRA Guidelines, 2004) represent a reasonable compromise between the practical limitations in a construction project, and the need to ensure an acceptable noise level for the nearby residents. In addition to the standard workday criterion of 70 dB(A), the guidelines specify a reduced limit of 65 dB(A) for work on Saturdays, and 60 dB(A) for evening periods, and Sundays and Bank holidays.

Table 8.7 – Construction Phase Noise Limit Values

Days	Times	Ambient level, dBL_{Aeq1hr}	Maximum level, dBL_{Amax}
Monday to Friday	07:00 to 19:00	70	80
Monday to Friday	19:00 to 22:00	60	65
Saturday	08:00 to 16:30	65	75
Sundays and Bank Holidays	08:00 to 16:30	60	65

8.4 Baseline Conditions

8.4.1 Characterisation of Baseline Noise Environment

The noise environment at N1 was dominated by road traffic on the N7 roadway, with a lesser contribution from the current operations at the quarry which were sporadic and only faintly audible. Other lesser contributors to measured noise levels included;

- Very sporadic vehicle movements on the country road running adjacent to the closest NVSRs;
- Wind-induced rustling from vegetation; and
- Bird calls.

The measured noise levels at N1 for the November and February surveys are summarised in Table 8.8.

Table 8.8 – Summary of Measured Baseline Noise Levels

Noise monitoring position ID	Duration of measurement, T	Measured Noise Level			
		Ambient, $dBL_{Aeq,T}$	Maximum, dBL_{Amax}	10^{th} Percentile, $dBL_{A10,T}$	Background, $dBL_{A90,T}$
N1 – November 2020	1 hr	53.5	63.3	56.6	47.9
N1 – February 2021	1 hr	54.4	76.1	55.6	49.1

Measured noise levels are presented in Figure 8.4 (November 2020). Figure 8.4 shows the variation in measured noise levels during a 1-hour measurement at N1 during the day-time period of the November 2020 survey. Noise levels are shown to be increasing gradually at the end of the measurement, in the run up to the rush hour period. All of the noise indices show a maximum variation of approximately 10 dB, indicative of a steady noise environment, consistent with road traffic noise from a busy road (N7). The measured ambient noise level was typically below the 55 dB target noise level throughout the measurement. Operational noise from the quarry was sporadic and only faintly audible at N1.

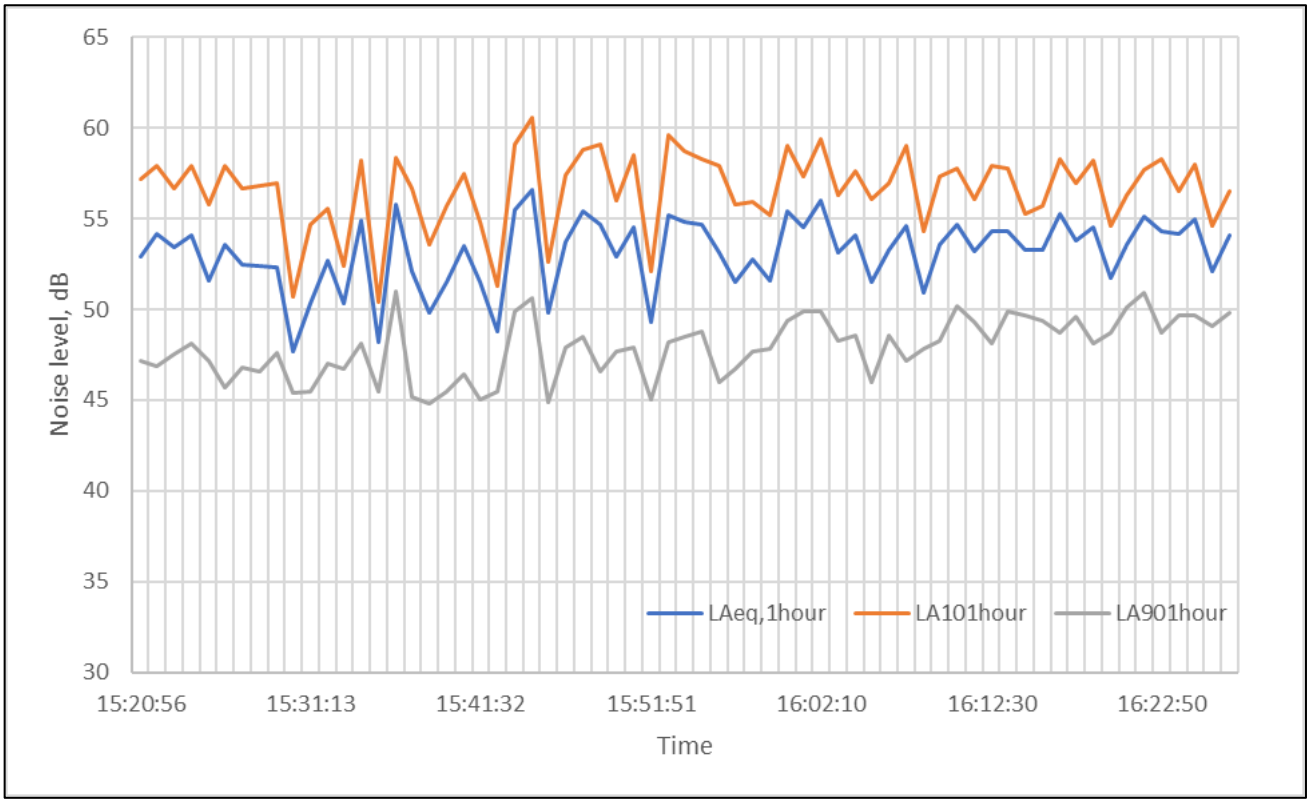


Figure 8.4: Measured Noise Levels – N1 – November 2020

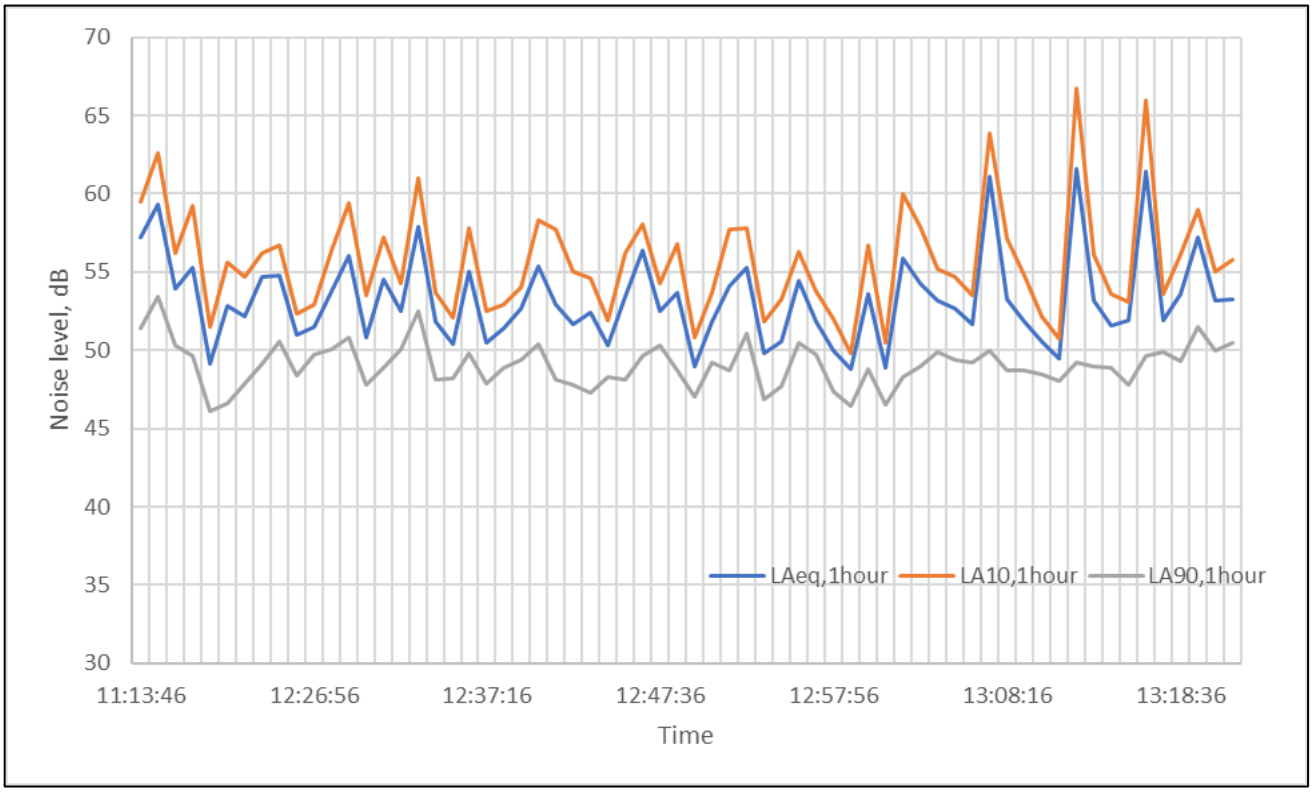


Figure 8.5 shows the variation in measured noise levels during a 1-hour measurement at N1 during the day-time period of the February 2021 survey. The fluctuations in noise levels at the end of the measurement correspond with pulses in the level of road traffic on the N7 roadway. All of the noise indices show a maximum variation of approximately 10 dB, indicative of a steady noise environment, consistent with road traffic noise

from a busy road (N7). The measured ambient noise level was typically below the 55 dB $L_{Aeq1hour}$ target noise level throughout the measurement. Operational noise from the quarry was sporadic and only faintly audible at N1.

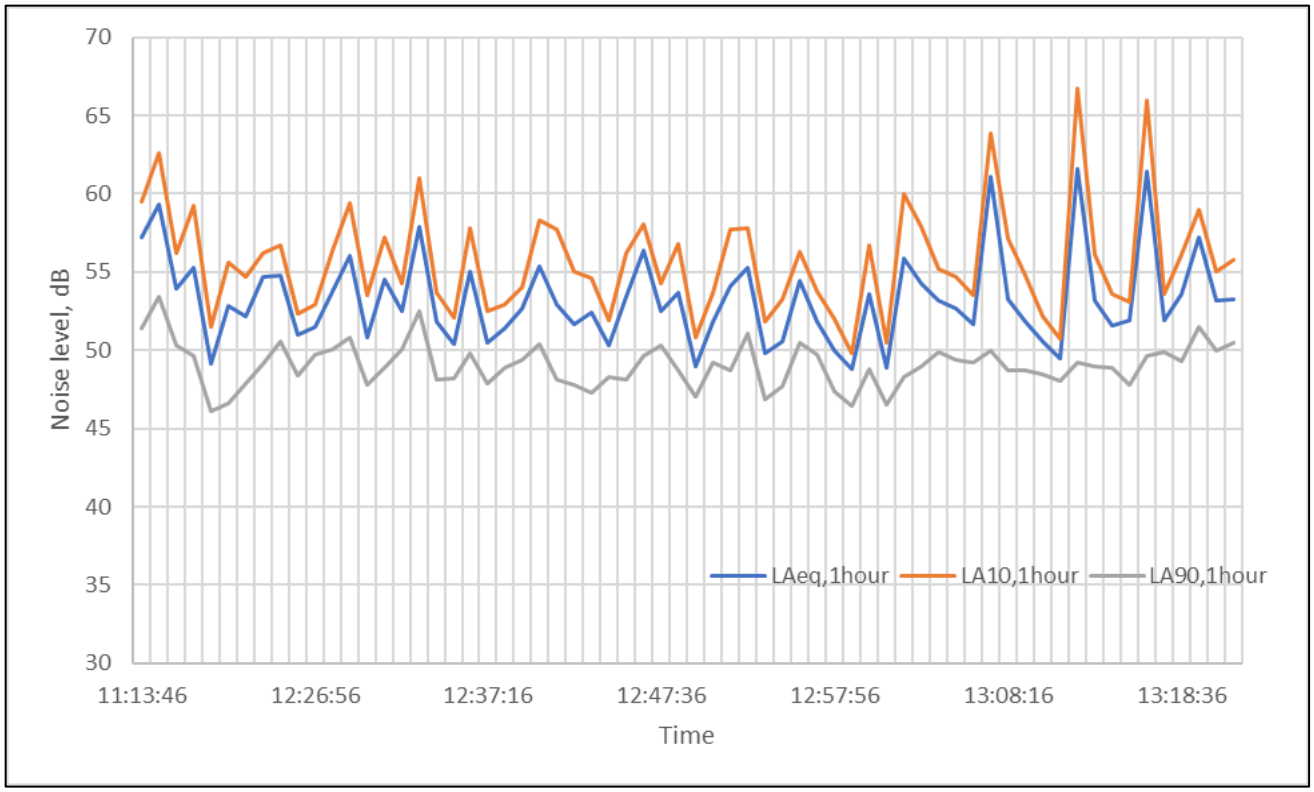


Figure 8.5: Measured Noise Levels – N1 – February 2021

Although there were occasional exceedances in the 55 dB $L_{Aeq1hour}$ target level during both surveys, these were caused by road traffic noise, with quarry operations a lesser contribution to the overall noise environment.

8.4.2 Vibration Monitoring

Human beings are extremely sensitive to vibration, the threshold of perception is typically in the PPV range of 0.14 mm/s to 0.3 mm/s. BS6472-2 sets out vibration levels from blasting activities at which minimal adverse comment is likely to be provoked (Table 8.6). If vibration levels from blasting exceed these values, then the chance of adverse comment increases significantly.

Measurements were undertaken at the eastern and western boundary of the quarry throughout 2019 and 2020. The full results of the vibration monitoring undertaken in 2019 and 2020 are presented in **Appendix 8.3**.

The maximum PPV recorded was 10.6 mm/s, which complies with the vibration limit. The maximum air-overpressure recorded was 124.8 dB(lin) and therefore complies with the air overpressure limit. Measured air-overpressure levels were below the values provided in BS6472 at which damage may be expected to windows.

8.5 Potential Effects

8.5.1 Operational Phase – Noise Impacts

Noise modelling has predicted noise from proposed quarry activities to determine the likely worst-case contribution of proposed quarry operations to the noise environment. The predicted noise levels for Scenario 1 are presented in Table 8.9. The magnitude of impact and significance of effect have been determined with reference to criteria provided in Table 8.3 and Table 8.4 respectively.

Table 8.9 - Evaluation of Predicted worst-case levels for Scenario 1 against daytime target level

Noise Sensitive Receptor	Predicted Noise Level dB(A)	Predicted level minus target level, 55 dB(A) $L_{Aeq,1hour}$	Magnitude of Impact	Significance of effect
NVSR1	48.6	-6.4	No change	Neutral
NVSR2	34.5	-20.5	No change	Neutral
NVSR3	38.7	-16.3	No change	Neutral
NVSR4	38.1	-16.9	No change	Neutral
NVSR5	37.9	-17.1	No change	Neutral
NVSR6	38.7	-16.3	No change	Neutral
NVSR7 – applicant owned property	40.6	-14.4	No change	Neutral
NVSR8 – applicant owned property	54.6	-0.4	No change	Neutral
NVSR9 – applicant owned property	46.2	-8.8	No change	Neutral

Predicted noise levels at all NVSRs are below the daytime target level (55 dB L_{Aeq}) during this conservatively predicted scenario for proposed operations at the quarry. Predicted noise levels are higher at the applicant properties north and east of the quarry (NVSR8 & NVSR9) due to their close proximity to proposed quarry operations. However, for this conservative operational scenario, predicted noise levels at NVSR8 are still 0.4 dB(A) below the target level during the daytime operations.

The predicted noise levels for Scenario 2 are presented in Table 8.10. The magnitude of impact and significance of effect have been determined with reference to criteria provided in Table 8.3 and Table 8.4 respectively.

Table 8.10 - Evaluation of Predicted worst-case levels for Scenario 2 against night-time target level

Noise Sensitive Receptor	Predicted Noise Level dB(A)	Predicted level minus target level, 45 dB(A) $L_{Aeq,15min}$	Magnitude of Impact	Significance of effect
NVSR1	35.3	-9.7	No change	Neutral
NVSR2	25.5	-19.5	No change	Neutral
NVSR3	32.6	-12.4	No change	Neutral
NVSR4	31.0	-14.0	No change	Neutral
NVSR5	30.6	-14.4	No change	Neutral
NVSR6	30.8	-14.2	No change	Neutral
NVSR7 – applicant owned property	32.8	-12.2	No change	Neutral
NVSR8 – applicant owned property	41.6	-3.4	No change	Neutral
NVSR9 - applicant owned property	37.7	-7.3	No change	Neutral

Predicted noise levels at all NVSRs are below the night-time target level (45 dB L_{Aeq}) during this conservatively predicted scenario for proposed operations at the quarry. Predicted noise levels are higher at the applicant properties north and east of the quarry (NVSR8 & NVSR9) due to their close proximity to proposed quarry

operations. However, for this conservative operational scenario, predicted noise levels at NVSR8 are still 3.4 dB(A) below the target level during the night-time operations.

Noise effects for Scenario 1 and Scenario 2 associated with proposed quarry operations during the daytime period and night-time period have been evaluated as being of 'neutral' significance and are therefore 'not significant'.

8.5.2 Comparison of Predicted Noise Levels with Measured Noise Levels at Receptors

A comparison has been made below of the predicted noise levels against the noise levels measured at representative locations during the 2020 and 2021 noise surveys. **Table 8.11** below shows the comparison for the three quarrying scenarios, cells in red signify an exceedance of the daytime baseline noise level.

Table 8.11 - Comparison of Predicted noise levels, Scenario 1 & 2, with measured baseline noise levels

Receptor	Monitoring position	Daytime $L_{Aeq,T}$*	Predicted noise level, dB, $L_{Aeq,1hr}$		Predicted vs Measured noise level, dB	
			Sc.1	Sc.2	Sc.1	Sc.2
NVSR1	N1 – November 2020	53.5	48.6	35.3	-4.9	-18.2
NVSR2	N1 – November 2020	53.5	34.5	25.5	-19.0	-28.0
NVSR3	N1 – November 2020	53.5	38.7	32.6	-14.8	-20.9
NVSR4	N1 – November 2020	53.5	38.1	31.0	-15.4	-22.5
NVSR5	N1 – November 2020	53.5	37.9	30.6	-15.6	-22.9
NVSR6	N1 – November 2020	53.5	38.7	30.8	-14.8	-22.7
NVSR7	N1 – November 2020	53.5	40.6	32.8	-12.9	-20.7
NVSR8	N1 – November 2020	53.5	54.6	41.6	1.1	-11.9
NVSR9	N1 – November 2020	53.5	46.2	37.7	-7.3	-15.8
NVSR1	N1 – February 2021	54.4	48.6	35.3	-5.8	-19.1
NVSR2	N1 – February 2021	54.4	34.5	25.5	-19.9	-28.9
NVSR3	N1 – February 2021	54.4	38.7	32.6	-15.7	-21.8
NVSR4	N1 – February 2021	54.4	38.1	31.0	-16.3	-23.4
NVSR5	N1 – February 2021	54.4	37.9	30.6	-16.5	-23.8
NVSR6	N1 – February 2021	54.4	38.7	30.8	-15.7	-23.6
NVSR7	N1 – February 2021	54.4	40.6	32.8	-13.8	-21.6
NVSR8	N1 – February 2021	54.4	54.6	41.6	0.2	-12.8
NVSR9	N1 – February 2021	54.4	46.2	37.7	-8.2	-16.7

Under Scenario 1 the predicted noise level due to quarrying activities is below the measured noise level at all NVSRs except NVSR8. At NVSR8 the predicted noise level is above the measured baseline ambient level by between 0.2 and 1.1 dB.

Under Scenario 2 the predicted noise level due to quarrying activities under each scenario is below the measured noise level at all NVSRs.

In context, these increases above baseline levels reference can be made to the fact that a 3 dB(A) difference in noise level is the minimum perceptible by the human ear. Both modelled scenarios also made conservative assumptions (see Section 8.3.1.6) and as such the predicted exceedances are unlikely to occur in practice.

It should be noted that predicted noise levels are within the acceptable limits of the existing planning permission and those prescribed in Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA 2006).

8.5.3 Operational Phase – Vibration Impacts (blasting activities)

A sample of the most recent vibration monitoring data is provided in **Table 8.12**.

Table 8.12 – Sample of Vibration Monitoring Data

Date	Location of Seismograph	Air Overpressure dB(L) 125 dB(L) limit	Peak Particle Velocity (mm/s)		
			X 12 mm/s limit	Y 12 mm/s limit	Z 12 mm/s limit
14/10/2020	East Boundary	105.5	2.3	2.3	3.6
16/10/2020	East Boundary	109.5	1.2	1.0	1.7
16/10/2020	West Boundary	114.8	4.2	3.8	4.6
20/10/2020	East Boundary	105.5	1.9	1.2	2.4
20/10/2020	West Boundary	115.9	5.1	5.3	7.4
27/10/2020	East Boundary	107.5	1.8	1.3	2.3
27/10/2020	West Boundary	110.9	2.8	5.1	3.9
03/11/2020	East Boundary	108.8	2.9	1.8	3.0

In this data sample, there are no exceedances in the vibration limits. With reference to **Table 8.6** the probability of adverse comment due to blasting activities at representative NVSRs for this data sample is low. The full record of vibration monitoring data is provided in **Appendix C**

The maximum PPV recorded during historical vibration monitoring was 10.6 mm/s; 1.4mm/s below the 12 mm/s PPV limit. On average PPV values were 2.9 mm/s (see **Appendix C**). With reference to **Table 8.6** the probability of adverse comment due to blasting activities at representative NVSRs is low.

The maximum air-overpressure value recorded was 124.8 dB(lin); marginally below the 125 dB(lin) limit. The average air-overpressure recorded was 111 dB(lin). Measured air overpressure levels were substantially below the level which would see structural damage to windows occur (150 dB(lin)).

It should be noted that vibration monitoring was undertaken at the eastern and western boundary of the quarry, close to blasting activities. Actual vibration levels at NVSRs will be lower.

8.5.3.1 Irish Water (IW) Pipeline

Controlled blasting is conducted at the quarry as a method of rock extraction. The process of drilling and blasting involves drilling a number of holes into a specific rock face, which are then filled with explosives. The explosives

are detonated in a controlled explosion causing the rock face to shatter and collapse. The resultant rock is then removed and crushed for transport from site.

If this process is not managed properly there is potential for accidents to occur. As well as impacting local residents and their properties an improperly managed blast could damage the IW pipeline located to the north of the quarry.

The previously blasted rock face of the quarry is ca. 160 m from the IW pipeline to the north of the quarry. As the proposed quarry extension progresses northwards the blasting activities will occur nearer to the pipeline, however the closest blasted face will be located ca. 40 m away from the line at its closest point. As noted, the IW 2020 'Code of Practice for Water Infrastructure' dictates that: *'detailed proposals, including work method statements, insurance confirmations and details of work completed of a similar nature must be submitted to IW for its consideration before approval will be issued prior to undertaking work in close proximity to IQ assets. All such works in the vicinity of Water Mains or sewers of 400mm diameter and greater shall be subject to written agreement with Irish Water before construction commences on site.'* The extraction methods and mitigation measures will be agreed in consultation with Irish Water prior to the commencement of extraction activities in the northern sections of the Site. Should further surveys be required then these will also be commissioned in conjunction with the requirements of Irish Water.

To reduce the potential of damage to the IW pipeline numerous mitigation measures are currently employed during blasts; these are identified in Section 8.6.2. These measures include a number of operational controls and also the requirement for blasting contractors to be trained and competent.

The quarry will deploy a vibration monitor at the IW pipeline during all blasting events on the northern face of the quarry. From these monitoring records the blasting contractor can determine the margin of compliance with the vibration limit and if blast parameters require refinement for future blasting events.

With the implementation of these mitigation measures and controls it is considered that vibration effects on the IW pipeline from blasting are 'not significant'.

8.5.3.2 Gas Networks Ireland (GNI) Pipeline

A GNI distribution line lies to the north of the quarry adjacent to the N7 roadway. No blasting works are proposed in the vicinity of the distribution line. GNI were consulted regarding the quarry design and noted their potential concerns if works were occurring in the vicinity of a GNI transmission line (as opposed to the distribution line along the N7). GNI advised that upon their review of the plans for the quarry that the nearest extremity to a GNI transmission pipeline was ca. 1,800 m away. GNI also identified that the quarry 'should not, without prejudice, have an undue impact on the GNI Gas Transmission Pipeline or Wayleave'. Should GNI have any concern at a later stage the Applicant will facilitate the monitoring of blasting at the transmission line and will undertake appropriate mitigation measures in line with GNI recommendations.

8.6 Mitigation

8.6.1 Existing Noise Mitigation

Noise mitigation measures for the proposed operations will be incorporated into the design and operation from the existing quarry operation's management and work practices. Measures to reduce potential noise impacts will include:

- A noise monitoring programme will be maintained at N1 bi-annually. This will determine compliance with threshold noise levels specified in the EPA Guideline Document for Extractive Industries (2006), and the Irish Concrete Federation Environmental Code (2nd Edition, 2005);

- Site activities will only take place during the permitted hours of operation and will be monitored to determine compliance with the conditioned noise limits. There will be no activities on site on Sundays or Public Holidays;
- Perimeter screening berms will be constructed along the boundaries of the proposed extended operational area to reduce noise propagation beyond the quarry boundary;
- All haul roads will be kept clear and maintained in a good state of repair to minimise noise from rattling and bouncing of mobile plant;
- Heavy goods vehicles entering and leaving the quarry will have tailgates securely fastened;
- Plant will be operated in a proper manner with respect to minimising noise emissions, e.g. minimisation of drop heights, no unnecessary revving of engines, plant used intermittently not left idling;
- Plant will be subject to regular maintenance, i.e. all moving parts kept well lubricated, the integrity of silencers and acoustic hoods maintained;
- Internal haul roads will be designed so as to have as low a gradient as possible so as to minimise excessive revving of vehicle engines on-site;
- The use of vehicle horns will be discouraged during the daytime period and is banned during the early morning periods before 10:00;
- Out of hours activity (where permitted by the local authority) will only include the loading of trucks from stockpiles and the operation of the asphalt plant, which are relatively low noise activities. Quarry operations such as blasting, excavation or crushing will not occur outside normal operating hours;
- 10 kmph speed limit on access road;
- All site plant, machinery and vehicles will shut down when not in use;
- All pneumatic rock breakers will be fitted with dampeners;
- Pumps and mechanical static plant will be housed in acoustic enclosures;
- Drop heights for materials will be minimised; and
- Low noise level reverse warning alarms consistent with site safety to be utilised.

8.6.2 Existing Vibration Mitigation

The following blast mitigation procedures will continue to be employed during each blast event at the quarry:

- Blast events will be conducted by an approved blasting contractor in accordance with best practice in this field, and potential impacts associated with the activity will therefore be minimised.
- The use of delayed blasting techniques whereby each blast event takes place in a series of timed small blasts rather than a single large blast will be employed to minimise vibrations in the rock body.
- All shot holes will be drilled to exact specifications by specialist contractors. Any features encountered during drilling such as cavities or soft material will be recorded by the drilling contractor and this information will be subsequently passed on to the shot-firer so that the correct charge will be used. This will ensure safe and efficient blasting of the rock face.

- In addition to implementing the necessary blast specifications, the quarry operator will provide appropriate advance warning of blasts to neighbouring residents, undertake required environmental monitoring and record any complaints arising, as detailed below.

The following blast warnings will continue to be provided by the quarry:

- A warning sign will be posted at the quarry entrance on the day of each blast and will be removed following each blast;
- Residents will be notified of blasting times by means of a phone call or text message prior to the blast taking place;
- The blast operator signals 30 seconds prior to each blast;
- The blast operator signals after each blast under Garda supervision;
- Blasting will occur between 09:00 to 18:00 Monday to Friday. Blasting does not take place on Saturdays;
- Vibration monitoring records will continue to be maintained by the Quarry Manager and will be available for display to local residents that may have been affected by site operations; and
- The quarry manager will maintain a written complaints log in which all complaints made by local residents are detailed. This will ensure that the concerns of local residents who may be affected by site activities are considered during the management of activities at the quarry site.

8.6.3 Proposed additional mitigation measures for future operation

The following additional measures are proposed:

- The noise monitoring programme will be undertaken consistently every six months at the monitoring location N1 for a period of 60 minutes while the quarry is operating normally;
- Vibration blast monitoring will be undertaken during blast activities at the closest NVSRs to blasting locations, and not at the eastern and western boundary of the quarry;
- IW will be notified of blasting times by means of a phone call prior to the blast taking place;
- The quarry operator will engage with IW to agree appropriate vibration limits for its infrastructure and a method and programme of monitoring such that compliance with limits will be established as required;
- Vibration blasting monitoring will record PPV, air overpressure, distance to each blast and maximum instantaneous charge levels (MIC); and
- Monitoring of vibration levels at local residences will be conducted in agreement and with the consent of local residents. The quarry manager will give at least 24-hours' notice to the residents at whose homes vibration monitoring will occur. IW will also be contacted in advance of any blasting activities in close proximity to their pipeline to the north of the quarry.

8.7 Cumulative Effects

During recent monitoring, noise from the quarry was determined to be a lesser contributor to the noise environment, with the ambient noise level typically dominated by the road traffic noise from the N7 roadway. Noise from quarrying and other industrial activities will therefore only be audible and have the potential for cumulative effects within fairly close proximity of the quarry site.

A review of quarrying and other industrial activities nearby has determined that there are no other quarry facilities operating in close proximity to the quarry, and cumulative effects are therefore not anticipated. Industrial

premises are noted to the north-west and east of the quarry, however, these were not noted to be audible at NVSRs during the recent survey.

Potentially cumulative noise effects have therefore been assessed as 'not significant'.

The nearest potentially cumulative site at which blasting is known to occur is approximately 7 km from the quarry. At this range the likelihood of blasting related ground-borne vibration or air-overpressure occurring at NVSRs affected by vibration from the quarry is negligible. Potentially cumulative vibration effects have therefore been assessed as 'not significant'.

8.8 Residual/Likely Significant Noise & Vibration Impacts

8.8.1.1 Noise

No additional mitigation is required for operational noise from the quarry, therefore residual effects remain unchanged, and are therefore not significant.

8.8.1.2 Vibration

Following implementation of the supplementary remedial measures outlined in Section 8.6.3, it is anticipated that vibration caused by blasting will meet the vibration limits at all NVSRs. With reference to **Table 8.6** and Section 8.3.2.2 the probability of adverse comments due to blasting activities at representative NVSRs will be low and vibration effects will therefore be not significant.

8.9 Difficulties Encountered

This assessment has been undertaken during the Covid-19 global pandemic, and as such it is possible that road traffic and commercial activities were at lower levels than before Covid-19 restrictions came into force. As a result, measured baseline noise levels due to road traffic may be lower than would have been expected in the pre-Covid situation. Any reduction in road traffic noise would result in a greater prominence of quarrying noise, thereby resulting in a more conservative assessment.

Observations of road traffic flows on the N7, which is a major transport route in and out of Dublin, indicate that traffic conditions are not noticeably different to pre-pandemic conditions, however, and therefore baseline conditions may be considered appropriately representative.

8.10 Summary and Conclusions

This assessment has considered potential noise and vibration impacts associated with the proposed future operations of the quarry on the amenity of residents at existing nearby properties.

The assessment has comprised a desk study to determine an appropriate study area and identify potentially sensitive receptors, characterisation of the baseline noise environment, prediction of worst-case operational phase noise levels and evaluation against appropriate criteria.

The baseline noise environment was dominated by road traffic noise from the N7, with noise from quarry operations noted to be sporadic and only faintly audible at the closest NVSRs.

Operational noise from the quarry has been predicted for two operational scenarios; proposed daytime and proposed night-time operations. Night-time operations are limited to loading and HGV movements. All modelled scenarios followed a highly conservative approach to determine the likely 'worst-case' noise levels at NVSRs. Predicted noise levels are well within the daytime and night-time levels recommended by the EPA Environmental Management Guidelines – Environmental Management in Extractive Industry. Predicted noise levels from quarry operations for all modelled scenarios have been found to be 'not significant'.

Vibration monitoring undertaken throughout 2019 and 2020 at the eastern and western boundary of the quarry determined there were no exceedances in the specified vibration limits. The probability of adverse comments due to blasting activities is low, and measured air overpressure levels were substantially lower than the levels which would see structural damage to windows.

Potential noise and vibration impacts will be controlled by continued implementation of mitigation measures at the quarry. Supplementary measures have been proposed to ensure that blasting is monitored appropriately, and potential impacts associated with the IW pipeline are considered. Noise and Vibration impacts due to proposed quarry operations have been determined to be ‘not significant’.

8.11 References

Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Jan 2016).

BS5288: 2009+A1:2014 Code of practice for noise and vibration control on open sites: Part 1 Noise and Part 2 Vibration.

BS 7385:, Evaluation and measurement for vibration in buildings, Part1 1990 Guide for measurement of vibrations and evaluation of their effects on buildings and Part 2 1993 Guide to damage levels arising from ground borne vibration.

BS7445-1:2003 Description and Measurement of Environmental Noise. Guide to Quantities and Procedures.

ISO 9613-2, First Edition 1996-12-15. Acoustics-Attenuation of sound during propagation outdoors-Part 2: General method of calculations.

EPA, 2006, Environmental Management Guidelines-Environmental Management in Extractive Industry (Non Scheduled Minerals).

Department of the Environment, Heritage and Local Government (DEHLG) – Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004.

Design Manual for Roads and Bridges (DMRB).

BS 6472:1992 - The Evaluation of Human Exposure to vibration in buildings.

Department of the Environment, Heritage and Local Government – Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004.

Environmental Code (2005) Irish Concrete Federation. EPA guidelines in relation to blasting activities outlining the methodology and limits to be used for vibration measurement.

APPENDIX 8.1

SLM Calibration Certificates

CAMPBELL ASSOCIATES
SOUND & VIBRATION SOLUTIONS

Sonitus House, 5b Chelmsford Road Industrial Estate
Great Dunmow, Essex, CM6 1HD

Sales Tel: 01371 871033 Hire Tel: 01371 871037
Admin Tel: 01371 871030 Fax Tel: 01371 879106
E-Mail: info@campbell-associates.co.uk
Website: www.campbell-associates.co.uk

Technical Report

Customer: Golder Associates (Scotland)

Contact: Kevin McGillycuddy

Order No: To be advised

Comments: Calibrator Requires UKAS Calibration

Technical log No: 20900

Report Date: 28 April 2020

Internal ref: 24705/GOL300A

Service Req'd: Calibration

Equipment ID:- NOR-1251.33002

Service Request:- Requires UKAS Calibration

Report: UKAS calibration complete.

Certificate number: U34661

Accessories supplied: C/W Black Leather case & type 1443 adapter

Important

Please note, our calibration and/or repair process may involve changing several parameters in your equipment. We endeavour to restore the original setting wherever possible, however, we cannot guarantee the equipment has been returned with your original settings. On receipt, please ensure that the settings meet your requirements prior to use.

Technician:

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, CM6 1HD, England
www.campbell-associates.co.uk
info@campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate number: U34661

Certificate of Calibration and Conformance

Test object:	**Sound Calibrator**
Manufacturer:	**Norsonic**
Type:	**1251**
Serial no:	**33002**
Customer:	Golder Associates (UK) Ltd
Address:	Attenborough House, Browns Lane Business Park, Stanton on the Wolds, Nottinghamshire. NG12 5BL.
Contact Person:	Kevin McGillycuddy.

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	114.08 dB	0.06 dB	1000.63 Hz	0.00 %	0.35 %
2:	114.07 dB	0.05 dB	1000.63 Hz	0.00 %	0.35 %
3:	114.08 dB	0.06 dB	1000.63 Hz	0.00 %	0.35 %
Result (Average):	**114.08 dB**	**0.06 dB**	**1000.63 Hz**	**0.00 %**	**0.35 %**
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.
The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/%RH Load volume : 0.0003 dB/mm3
The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.
Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2020\NOR1251_33002_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	99.841 ± 0.042 kPa	24.2 ± 0.1 °C	33.8 ± 1.0 %RH

Date received for calibration:	24/04/2020
Date of calibration:	28/04/2020
Date of issue:	28/04/2020
Engineer	Michael Tickner
Supervisor	Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceablity of measurement to recognised national standards, and to the units of measurement realised at an accredited national physical laboratory or other recognised standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.

Certificate number: U34661

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Measurements
The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Instruments and program
A complete list of equipment, hardware and software that has been used in this calibration is available from the calibration laboratory on request.

Traceability
The measured values are traceable to an accredited national physical laboratory within the EU or EFTA.

Comment
Calibrated as received, no adjustments made.

Statement of conformance
As public evidence was available[1], from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

[1] This evidence is held on file at the calibration laboratory.

Notes:
The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Sonitus House, 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM6 1HD
Tel (+44) 01371 871030 Fax (+44) 01371 879106
email calibration@campbell-associates.co.uk

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION 0789

Certificate of Calibration and Conformance

Certificate No.: U31392

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Manufacturer:	**Norsonic**
Type:	**140**
Serial no:	**1402742**
Customer:	**Golder Associates**
Address:	**Sirius Building, The Clocktower, Flassches Yard, South Gyle Crescent, Edinburgh. EH12 9LB.**
Contact Person:	**Karen Campbell.**

Method :
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	72926	31391
Calibrator*	Norsonic	1251	33002	U31390
Preamplifier	Norsonic	1209	12131	Included

Additional items that also have been submitted for verification

Wind shield	Norsonic	Nor1451
Attenuator	None	
Extension cable	None	

These items have been taken into account wherever appropriate.

	Pressure:	Temperature:	Relative humidity:
Environmental conditions:			
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	102.88 ±0.01kPa	22.9 ±0.2°C	35.2 ±2%RH

Date received : 20/03/2019
Date of calibration: 28/03/2019
Date of issue: 28/03/2019

Engineer

Michael Tickner

Supervisor

Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration and Conformance

UKAS Laboratory Number 0789

Certificate No.: U31392

Conformance

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN IEC 61672-1:2002 and similarly that the associated sound calibrator conforms to BS EN IEC 60942.

Statement of conformance

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of BS EN IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available[1], from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with BS EN IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in BS EN IEC 61672-1:2002, and that the sound level meter submitted for testing conforms to the class 1 requirements of BS EN IEC 61672-1:2003.

[1] This evidence is held on file at the calibration laboratory

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed

Comment

Correct level with associated calibrator is 113.9dB(A).

Observations

The details of the uncertainty for each measurement is available from the Calibration Laboratory on request and is based on the standard uncertainty multiplied by a coverage factor K=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details on the sources of corrections and their associated uncertainties that relate to this verification are contained the detailed test report accompanying this certificate.

APPENDIX 8.2

Noise Monitoring Data and Notes

Project Title: L Behan Aggregates		**Project Number: 20137776**	
Monitoring Location No.	N1	**Time & Date** (start of measurement):	06/11/2020 15:20
GPS Coordinates:		**Time & Date** (end of measurement):	06/11/2020 16:26
Calibration check (pre-measurement):	114.1 LAeq	**Calibration check** (post-measurement):	
Weather conditions (at commissioning & decommissioning & any evidence of throughout measurement)			
Wind (light/med/strong/km/h):	Light	Temperature (°C):	11°C
Rain:	None	Cloud (% cover):	20%
Ambient Noise Environment			
Dominant noise source(s):	N7 dual Carriageway to the North		
Other audible noise sources: Tonality, frequency of occurrence, description of noise (e.g. drone/whistle/hum/banging)	Local traffic passing on nearby Kilteel Rd.		
	Birdsong, activity in ajdacent dwellings (builders working on a house)		
	Dogs barking to South, aircraft overhead		
	Presumed quarry activity (pop) heard at 15:24.		
	Cow mooing to South.		
SLM file number (s):	#2		
Photographs:			

Project Title: L Behan Aggregates		**Project Number: 20137776**	
Monitoring Location No.	N1	**Time & Date** (start of measurement):	18/02/2021 12:21
GPS Coordinates:		**Time & Date** (end of measurement):	18/02/2021 13:26
Calibration check (pre-measurement):	114.3 LAeq	**Calibration check** (post-measurement):	
Weather conditions (at commissioning & decommissioning & any evidence of throughout measurement)			
Wind (light/med/strong/km/h):	Medium – remained below 5m/s.	Temperature (°C):	5°C
Rain:	Light drizzle after reading	Cloud (% cover):	100%
Ambient Noise Environment			
Dominant noise source(s):	N7 dual Carriageway to the North		
Other audible noise sources: Tonality, frequency of occurrence, description of noise (e.g. drone/whistle/hum/banging)	Excavator breaking rock on site heard at low levels due to North Westerly wind		
	Local traffic passing on nearby Kilteel Rd.		
	Birdsong, rustling hedges from light gusts of wind		
	Dogs barking to South, horse neigh to south		
	Activity in nearby dwellings to the south.		
SLM file number (s):	#2		
Photographs:			

APPENDIX 8.3

Vibration Monitoring Data

Date	Time	Location of Seismograph	Company	Air Overpressure dB(L)	Peak Particle Velocity (mm/sec)		
					Tran	Vert	Long
01/11/2019	09:56	East Boundary	Instantel	112.8	0.571	0.44	0.635
30/01/2019	11:23	East Boundary	Instantel	119.8	1.429	1.095	1.524
30/01/2019	11:23	West Boundary	Instantel	107	0.524	0.508	0.714
07/02/2019	11:51	East Boundary	Instantel	112.8	2.984	1.921	3.365
07/02/2019	11:51	West Boundary	Instantel	115.7	4.921	4.953	7.445
04/03/2019	10:45	East Boundary	Instantel	111.2	1.524	1.111	2.048
04/03/2019	10:44	West Boundary	Instantel	113.8	3.286	3.445	3.969
27/03/2019	11:19	East Boundary	Instantel	114	6.525	2.619	3.429
27/03/2019	11:19	West Boundary	Instantel	101	1.111	1.429	1.111
02/04/2019	11:43	East Boundary	Instantel	116.1	2.762	1.873	2.556
02/04/2019	11:43	West Boundary	Instantel	118.1	4.191	6.223	9.049
10/04/2019	09:21	East Boundary	Instantel	113.8	1.302	0.587	1.302
10/04/2019	11:11	East Boundary	Instantel	117.4	3.397	1.318	1.683
10/04/2019	09:21	West Boundary	Instantel	123.6	3.508	1.619	3.683
18/04/2019	10:38	East Boundary	Instantel	109.2	2.048	2.873	2.127
18/04/2019	10:38	West Boundary	Instantel	114.2	5.842	7.144	7.826
26/04/2019	10:31	East Boundary	Instantel	94	3.286	1.492	3
26/04/2019	10:31	West Boundary	Instantel	104.2	0.524	0.492	0.635
30/04/2019	10:45	East Boundary	Instantel	109.2	2.191	2.302	2.254
30/04/2019	10:45	West Boundary	Instantel	114.8	7.842	5.461	10.62
03/05/2019	09:15	East Boundary	Instantel	114.2	5.667	1.699	4.588
03/05/2019	09:15	West Boundary	Instantel	101	0.857	0.413	0.73
14/05/2019	10:36	East Boundary	Instantel	111.2	2.048	1.254	2
14/05/2019	10:36	West Boundary	Instantel	115	6.223	5.826	7.064
22/05/2019	09:38	East Boundary	Instantel	109.9	1.873	0.825	1.302
22/05/2019	09:38	West Boundary	Instantel	114	3.953	2.619	5.636
28/05/2019	10:58	East Boundary	Instantel	116.3	5.397	2.508	4.635
28/05/2019	10:58	West Boundary	Instantel	104.2	0.841	0.841	1.333
31/05/2019	12:46	East Boundary	Instantel	109.5	1.667	0.952	2
31/05/2019	12:46	West Boundary	Instantel	113.1	5.239	4.381	8.89
07/06/2019	10:07	East Boundary	Instantel	106.5	1.794	1.429	1.413
07/06/2019	10:06	West Boundary	Instantel	109.9	3.588	4.826	6.461
13/06/2019	10:12	East Boundary	Instantel	114.2	4.794	1.937	3.604
13/06/2019	10:12	West Boundary	Instantel	102.8	0.571	0.476	0.635

Date	Time	Location of Seismograph	Company	Air Overpressure dB(L)	Peak Particle Velocity (mm/sec)		
					Tran	Vert	Long
18/06/2019	12:54	East Boundary	Instantel	104.9	2.302	1.857	2.429
18/06/2019	12:54	West Boundary	Instantel	116.4	6.271	6.413	7.668
26/06/2019	10:16	East Boundary	Instantel	107.5	2.318	1.46	2.826
26/06/2019	12:04	East Boundary	Instantel	115.4	4.794	1.968	3.937
26/06/2019	10:16	West Boundary	Instantel	118.5	4.905	7.239	6.683
26/06/2019	12:04	West Boundary	Instantel	108.4	0.921	0.762	1.476
02/07/2019	10:44	East Boundary	Instantel	109.2	2.222	1.397	2.445
02/07/2019	10:43	West Boundary	Instantel	97.5	0.683	0.381	0.619
09/07/2019	12:17	East Boundary	Instantel	116.7	5.318	2.159	4.953
09/07/2019	12:16	West Boundary	Instantel	107.5	1.413	0.984	2.222
16/07/2019	10:48	East Boundary	Instantel	114.4	2.175	0.937	2.048
16/07/2019	10:48	West Boundary	Instantel	115.6	6.652	2.826	4.381
07/08/2019	13:27	East Boundary	Instantel	114.2	8.398	2.921	6.62
07/08/2019	13:27	West Boundary	Instantel	120	4.223	3.302	4.635
20/08/2019	12:00	East Boundary	Instantel	110.6	4.016	1.857	3.731
20/08/2019	11:59	West Boundary	Instantel	102.8	0.825	0.73	0.968
11/09/2019	12:03	East Boundary	Instantel	114.6	5.048	3.159	4.318
11/09/2019	12:04	East Boundary	Instantel	116.4	2.603	0.667	1.635
11/09/2019	12:03	West Boundary	Instantel	105.5	0.984	0.794	1.492
11/09/2019	12:03	West Boundary	Instantel	118.5	5.699	2.222	4.794
13/09/2019	10:12	East Boundary	Instantel	114.2	4.27	1.508	3.159
20/09/2019	12:27	West Boundary	Instantel	106.5	1.048	1	1.572
26/09/2019	11:50	East Boundary	Instantel	108.4	6.334	2.175	2.905
26/09/2019	11:50	West Boundary	Instantel	98.8	0.698	0.651	1.365
02/10/2019	11:20	East Boundary	Instantel	111.8	0.873	0.46	1.254
02/10/2019	11:20	West Boundary	Instantel	119	2.699	1.095	2.191
07/10/2019	14:40	East Boundary	Instantel	114	6.382	2.397	4.572
07/10/2019	14:40	West Boundary	Instantel	102.8	0.857	1.159	1.365
15/10/2019	13:18	East Boundary	Instantel	110.9	6.858	2.746	2.397
15/10/2019	13:17	West Boundary	Instantel	115.2	5.731	4.318	5.62
22/10/2019	12:28	East Boundary	Instantel	113.8	1.302	0.746	1.222
22/10/2019	10:28	West Boundary	Instantel	116.9	3.921	1.73	3.064
25/10/2019	11:55	East Boundary	Instantel	113.8	6.81	3.873	4.35
25/10/2019	11:52	West Boundary	Instantel	104.2	0.794	0.905	0.952

Date	Time	Location of Seismograph	Company	Air Overpressure dB(L)	Peak Particle Velocity (mm/sec)		
					Tran	Vert	Long
01/11/2019	09:56	West Boundary	Instantel	116.6	1.254	0.952	1.095
04/11/2019	11:03	West Boundary	Instantel	103.5	0.413	0.524	0.698
05/11/2019	12:03	East Boundary	Instantel	113.5	5.35	1.81	3.286
05/11/2019	12:03	West Boundary	Instantel	104.9	0.571	0.778	0.667
13/11/2019	10:11	West Boundary	Instantel	100	0.365	0.365	0.667
14/11/2019	11:04	East Boundary	Instantel	112.8	6.382	1.953	4.715
19/11/2019	10:21	East Boundary	Instantel	109.9	0.873	0.492	1.175
19/11/2019	10:21	West Boundary	Instantel	114.6	1.683	1.191	1.968
22/11/2019	12:36	East Boundary	Instantel	114.6	5.731	2.857	3.016
22/11/2019	12:36	West Boundary	Instantel	106	0.794	0.762	0.873
03/12/2019	13:21	East Boundary	Instantel	118.6	3.985	2.318	3.445
03/12/2019	13:20	West Boundary	Instantel	102.8	0.825	0.937	0.714
11/12/2019	12:12	East Boundary	Instantel	115	2.207	1.413	2.556
11/12/2019	12:12	West Boundary	Instantel	114.4	7.604	5.636	6.461
19/12/2019	11:37	East Boundary	Instantel	111.5	5.255	3.175	5.001
07/01/2020	13:34	East Boundary	Instantel	120.9	8.033	2.873	4.81
07/01/2020	13:33	West Boundary	Instantel	118.7	2.492	2.635	5.429
14/01/2020	13:06	East Boundary	Instantel	114.2	1.794	1.445	2.397
14/01/2020	13:06	West Boundary	Instantel	119.2	7.445	3.81	3.477
17/01/2020	12:14	East Boundary	Instantel	113.8	6.636	2.937	6.017
17/01/2020	12:14	West Boundary	Instantel	101.9	1.016	0.841	1
22/01/2020	10:40	East Boundary	Instantel	113.3	0.873	0.587	1.095
22/01/2020	10:40	West Boundary	Instantel	119.8	1.191	1.016	1.079
31/01/2020	11:45	East Boundary	Instantel	108	3.286	1.079	2.889
31/01/2020	07:59	West Boundary	Instantel	No events recorded			
07/02/2020	10:48	East Boundary	Instantel	108.4	2.016	1.095	1.635
07/02/2020	10:47	West Boundary	Instantel	112.8	2.794	2.413	3.048
12/02/2020	12:07	East Boundary	Instantel	114.8	4.588	1.651	3.254
12/02/2020	08:45	West Boundary	Instantel	No events recorded			
12/02/2020	08:45	West Boundary	Instantel	No events recorded			
18/02/2020	09:16	West Boundary	Instantel	No events recorded			
18/02/2020	09:16	West Boundary	Instantel	No events recorded			
20/02/2020	11:48	East Boundary	Instantel	119.3	5.747	1.699	4.286
20/02/2020	11:47	West Boundary	Instantel	111.5	0.889	0.635	1.016

Date	Time	Location of Seismograph	Company	Air Overpressure dB(L)	Peak Particle Velocity (mm/sec)		
					Tran	Vert	Long
25/02/2020	11:46	East Boundary	Instantel	114.2	1.206	1.238	1.953
25/02/2020	11:46	West Boundary	Instantel	117.6	2.667	2.54	3.429
28/02/2020	12:31	East Boundary	Instantel	118.1	4.334	1.476	2.683
05/03/2020	10:08	East Boundary	Instantel	109.9	0.698	0.492	1.032
05/03/2020	10:08	West Boundary	Instantel	111.5	2.159	0.889	1.651
11/03/2020	11:35	East Boundary	Instantel	108.4	3.794	1.699	3.048
11/03/2020	11:34	West Boundary	Instantel	98.8	0.635	0.635	1.143
19/03/2020	10:01	East Boundary	Instantel	112	1.667	1.048	1.746
19/03/2020	10:01	West Boundary	Instantel	124.8	3.683	1.651	4.953
23/03/2020	09:40	East Boundary	Instantel	116.7	2.064	1.397	2.937
23/03/2020	09:40	West Boundary	Instantel	101.9	0.889	0.635	0.889
10/04/2020	11:11	West Boundary	Instantel	108.8	0.619	0.571	0.667
03/06/2020	09:50	West Boundary	Instantel	121.1	2.41	1.78	6.6
11/06/2020	10:29	West Boundary	Instantel	116.6	1.65	0.889	1.9
17/06/2020	10:36	West Boundary	Instantel	88	2.54	2.03	3.05
23/06/2020	10:06	West Boundary	Instantel	114.6	2.03	1.78	2.67
26/06/2020	12:06	East Boundary	Instantel	97.5	1.476	0.952	1.524
26/06/2020	12:06	West Boundary	Instantel	119	3.937	1.778	3.937
03/07/2020	10:32	East Boundary	Instantel	98.8	1.937	0.746	1.159
03/07/2020	10:32	West Boundary	Instantel	121.6	6.477	3.429	5.842
08/07/2020	09:28	East Boundary	Instantel	91.5	0.762	0.683	1.333
08/07/2020	09:28	West Boundary	Instantel	111.8	1.651	1.016	1.905
13/07/2020	09:43	East Boundary	Instantel	103.5	1.524	0.714	1.254
13/07/2020	09:43	West Boundary	Instantel	116.9	1.778	1.397	2.286
16/07/2020	10:16	East Boundary	Instantel	94	1.778	1.079	1.889
16/07/2020	10:15	West Boundary	Instantel	114.2	1.905	1.524	2.667
22/07/2020	10:50	East Boundary	Instantel	113.5	1.508	0.635	0.873
22/07/2020	10:50	West Boundary	Instantel	117.1	1.143	1.27	2.54
28/07/2020	09:25	East Boundary	Instantel	115	1.175	0.714	1.143
28/07/2020	09:24	West Boundary	Instantel	120.1	1.397	1.778	2.286
04/08/2020	12:49	East Boundary	Instantel	111.8	0.556	0.381	0.429
04/08/2020	12:49	West Boundary	Instantel	111.8	0.762	0.508	0.635
10/08/2020	10:30	East Boundary	Instantel	106	1.302	0.46	1.143
10/08/2020	10:30	West Boundary	Instantel	113.3	2.159	1.27	2.413

Date	Time	Location of Seismograph	Company	Air Overpressure dB(L)	Peak Particle Velocity (mm/sec)		
					Tran	Vert	Long
18/08/2020	10:40	East Boundary	Instantel	118.3	2	1.556	2.969
18/08/2020	10:40	West Boundary	Instantel	107	0.635	0.508	0.762
25/08/2020	09:37	East Boundary	Instantel	115.9	1	0.381	0.81
25/08/2020	09:36	West Boundary	Instantel	113.8	1.397	1.143	1.778
02/09/2020	10:57	East Boundary	Instantel	112.8	0.651	0.476	0.698
02/09/2020	10:56	West Boundary	Instantel	112.8	1.143	1.016	1.143
08/09/2020	09:58	East Boundary	Instantel	104.9	2.222	1.603	2.826
08/09/2020	09:58	West Boundary	Instantel	104.2	2.667	2.667	2.286
16/09/2020	09:44	West Boundary	Instantel	103.5	0.762	1.016	0.889
19/09/2020	09:45	East Boundary	Instantel	114.6	2.302	1.46	2.349
20/09/2020	12:27	East Boundary	Instantel	115.4	4.985	2.349	4.985
22/09/2020	09:45	East Boundary	Instantel	109.2	0.81	0.317	0.571
22/09/2020	09:45	West Boundary	Instantel	117.2	1.397	0.762	1.778
29/09/2020	11:30	East Boundary	Instantel	107	3.477	1.603	3.572
29/09/2020	11:30	West Boundary	Instantel	115.2	3.302	3.81	5.334
04/10/2020	11:52	West Boundary	Instantel	108.8	3.683	4.318	5.08
05/10/2020	11:29	East Boundary	Instantel	109.5	1.46	0.794	1.349
05/10/2020	11:20	West Boundary	Instantel	113.3	3.175	3.302	6.477
14/10/2020	11:52	East Boundary	Instantel	105.5	2.3	2.3	3.6
16/10/2020	10:58	East Boundary	Instantel	109.5	1.2	1.0	1.7
16/10/2020	10:58	West Boundary	Instantel	114.8	4.2	3.8	4.6
20/10/2020	10:04	East Boundary	Instantel	105.5	1.9	1.2	2.4
20/10/2020	10:04	West Boundary	Instantel	115.9	5.1	5.3	7.4
27/10/2020	13:10	East Boundary	Instantel	107.5	1.8	1.3	2.3
27/10/2020	13:10	West Boundary	Instantel	110.9	2.8	5.1	3.9
03/11/2020	11:23	East Boundary	Instantel	108.8	2.9	1.8	3.0
03/11/2020	11:23	West Boundary	Instantel	116.6	6.5	6.7	8.3
Maximum Recorded				**124.8**	**8.4**	**7.2**	**10.6**
Average Recorded				**111.3**	**2.8**	**1.9**	**2.9**

9.0 CULTURAL HERITAGE

9.1 Introduction

Golder Associates Ireland Ltd (Golder) has been commissioned to prepare this Environmental Impact Assessment Report (EIAR) on behalf of Laurence Behan, as Applicant for the proposed continuation and extension of quarrying activity ('the Proposed Development') at their existing quarry site at Windmill Hill, Rathcoole, Co. Dublin ('the Site'). This chapter of the EIAR considers the potential effects of the Proposed Development on cultural heritage.

The choice of team members for each study has been informed by the experience of the relevant lead specialist in their area of technical interest. The cultural heritage assessment has been prepared by Conor Ryan (BA Jt. Hons.). Conor is an Associate of the Chartered Institute for Archaeologists (ACIfA) and has more than 6 years' experience in cultural heritage assessment.

This EIAR has been prepared to accompany a planning application to be made under S.37L of the Planning and Development Act, 2000 as amended for the continuation of extraction at an existing quarry at Windmillhill, Rathcoole, Co. Dublin.

The application for further development of the quarry is to be made concurrent with an application for substitute consent for the quarry that is accompanied by an remedial Environmental Impact Assessment Report (rEIAR).

The lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The EIA project boundary is generally bounded by the N/M7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called 'Four Winds' that is within the ownership of the planning applicant to the east; and the former local Steelstown Road to the west.

At the centre of the EIAR project boundary is an existing quarry that covers an area of approximately 28.8 ha. with an average working depth of 173 mAOD. The existing quarry is roughly rectangular in shape with an east – west axis parallel to the N/M7 and local Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 5 ha.

The further quarrying development proposed involves a lateral northward extension of the current quarry void over approximately 4.1 ha (over a total of 5.16 ha. to accommodate screening berms) west and east of an existing dwelling also in the applicant's ownership and a deepening of the western and eastern side of the laterally extended void to a final working depth of 150 mAOD. The further development proposed is for quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area and the existing quarry access will be utilised.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.

A detailed description of the Site and the Proposed Development can be found in Chapter 2 of this EIAR (Project Description).

9.1.1 Scope

The scope of this cultural heritage assessment comprises a baseline study, effects analysis and impact assessment for the Proposed Development. The baseline is informed by the results of desk-based and archival research.

The impact assessment considers both direct and indirect impacts from the operation and decommissioning (restoration) of the Proposed Development upon cultural heritage assets, and also considers cumulative and combined effects. There is no distinct 'construction' phase to be assessed for the Proposed Development; extraction activity is considered to be 'operation' for the purposes of this assessment. Informed by the results of the impact assessment, an appropriate and proportionate mitigation strategy for the Proposed Development has been developed, with residual effects subsequently assessed.

In lieu of specific guidance from the Institute of Archaeologists of Ireland (IAI), this impact assessment conforms to the guidelines set out by the Chartered Institute for Archaeologists (CIfA, 2020a[1]; 2020b[2]).

For the purposes of this EIAR, the term 'cultural heritage' is used as a collective term to refer to all assets of archaeological, architectural and historical or cultural value. Archaeological heritage typically refers to objects, monuments, buildings, environmental remains or cultural landscapes older than AD 1700, although it can also be used to describe objects, monuments and other tangible remains that date from post-AD 1700[3]. Architectural heritage (or built heritage) refers to structures or buildings (including their contents) of cultural value that are younger than AD 1700. Designed landscapes and gardens dating to post-AD 1700 are also considered to be architectural in this assessment. In both cases, the setting of an asset is considered an integral part of its value.

9.1.2 Site Location and Description

The Site measures approximately 46.14 ha and is located approximately 2.5 km southwest of Rathcoole, Co. Dublin, in the townland of Windmillhill (ITM E 699869, N 725715). It is adjacent to the N7 motorway, approximately 1.5 km from the county boundary with Co. Kildare. The surrounding land is generally rural, agricultural land, particularly to the north, west and south, with greater densities of urban and industrial/commercial development to the east.

9.1.3 Study Area

In order to capture sufficient baseline data to robustly assess direct impacts to cultural heritage assets, the spatial scope of the assessment comprises all the land within the Site (i.e. land situated within the 'EIA Boundary'), together with a buffer of 1 km around the Site to allow the assessment of indirect impacts. This buffer area is considered to be appropriate, given the current use of the Site and the nature of the Proposed Development. The Study Area is shown in Drawing 9.1, (contained in Appendix 9.1).

9.1.4 Chapter Structure

This chapter is divided into the following sections:

- 9.1 – Introduction, which includes details of the assessment scope, study area and structure;
- 9.2 – Policy and Legislation Context, which includes a description of legislation, policy, standards and guidance relevant to cultural heritage;
- 9.3 – Assessment Methodology and Significance Criteria, which presents a description of how the assessment has been undertaken, the consultations that have taken place and includes any assumptions that have been made or limitations that have been encountered;

[1] CIfA (2020a). Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment.

[2] CIfA (2020b). Standard and guidance for historic environment desk-based assessment.

[3] AD 1700 is a point in time used by the National Monuments Service and the National Inventory of Architectural Heritage to distinguish between 'archaeology' and 'architecture'. Although archaeological remains exist that are younger than AD 1700, any buildings, structures or designed landscapes/gardens built during this period are considered in this assessment to be 'architectural'.

- 9.4 – Baseline Conditions, which presents the sources of information used, a detailed breakdown of the assets recorded, a summarised historic map regression and a summarised appraisal of previous archaeological investigations in the study area;
- 9.5 – Characteristics of the Proposed Development, which briefly describes the Proposed Development and those characteristics pertinent to cultural heritage;
- 9.6 – Potential Effects, which summarises the cultural heritage assets considered in the assessment and identifies the sensitivity of those assets. It also presents the potential effects upon these assets as a result of the Proposed Development during operation and decommissioning;
- 9.7 – Mitigation and Monitoring, which presents details of mitigation and monitoring that needs to be adopted to manage the potential effects identified in Section 9.6. It also presents any recommendations for further archaeological investigation that may be required;
- 9.8 – Residual Effects, which presents the residual effects of the Proposed Development, taking account of proposed mitigation;
- 9.9 – Difficulties Encountered, which presents any limitations to the assessment; and
- 9.10 – Summary and Conclusions, which presents a summary of the assessment and final conclusions.

9.2 Legislative and Policy Context

The Minister for Housing, Local Government and Heritage (representing the Department of Housing, Local Government and Heritage) is responsible for the conservation, preservation, protection and presentation of Ireland's cultural heritage. The protection of archaeological heritage is the responsibility of the National Monuments Service (NMS), whilst architectural heritage is the responsibility of the Built Heritage Policy Section (including the Architectural Heritage Advisory Service (AHAS) and National Inventory of Architectural Heritage (NIAH)).

At the national and international level, the key legislation pertinent to this assessment includes:

- The National Monuments Acts, 1930 to 2004;
- The Heritage Act, 1995;
- The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- The Planning and Development Acts, 2000 to 2020;
- The Convention concerning the Protection of the World Cultural and Natural Heritage (1972), ratified by the Irish Government in 1991; and
- The European Convention on the Protection of the Archaeological Heritage (Revised) (1992), ratified by the Irish Government in 1997.

Guidelines on the assessment of impacts on, and the protection of, cultural heritage assets in Ireland have been consulted and adhered to for this impact assessment, including:

- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (2017) – EPA;
- The Framework and Principles for the Protection of the Archaeological Heritage (1999) - Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI); and

- Architectural Heritage Protection: Guidelines for Planning Authorities (2011) - Department of Arts, Heritage and the Gaeltacht (DAHG).

9.2.1 Legislative Mechanisms of Protection

There are a number of mechanisms for heritage protection in Ireland. Heritage assets can be protected under the National Monuments Acts 1930 to 2004 in four ways:

- The asset is recorded in the Record of Monuments and Places (RMP);
- The asset is registered in the Register of Historic Monuments (RHM);
- The asset is a national monument subject to a Preservation Order (or Temporary Preservation Order); or
- The asset is a National Monument in State Care.

Heritage assets can also be protected under the Planning and Development Act 2000, which requires all Local Authorities to curate and maintain a Record of Protected Structures (RPS). An asset is protected if it is inscribed on a county's RPS. Protected Structures may be archaeological in nature, and so an asset may appear on both the RMP and county RPS.

The 'Convention concerning the Protection of the World Cultural and Natural Heritage' (1972) provides The United Nations Educational, Scientific and Cultural Organization (UNESCO) with the power to inscribe assets of international importance on the World Heritage List as a World Heritage Site. Local authorities and stakeholders are encouraged to protect these sites through the production of Management Plans, which aim to manage the site in a suitable fashion.

Local authorities also have mechanisms by which to protect heritage assets, including the creation of Architectural Conservation Areas (ACAs) and Areas of Archaeological Potential (AAPs) (or equivalents).

The mechanisms of heritage protection described here also afford protection to the setting of cultural heritage assets, as well as the physical assets.

9.2.2 Planning Policy

At the local level, the South Dublin County Development Plan (SDCDP) (2016-2022) guides planning policy in relation to cultural heritage. Chapter 9 of the SDCDP specifically outlines the approach taken by the Local Planning Authority to protecting architectural and archaeological heritage within the planning process, with South Dublin County Council (SDCC) stating their overarching policy is to *"protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have a significant negative impact on these assets"*. Policy areas pertinent to this assessment are summarised in Table 9.1.

Table 9.1: South Dublin County Development Plan (2016 - 2022) Relevant Policies and Objectives - Cultural Heritage

Policy Area	Policy	Objective
Archaeological Heritage	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	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.
		To ensure that development is designed to avoid impacting on archaeological heritage that is of

Policy Area	Policy	Objective
	significant historical or archaeological interest	significant interest including previously unknown sites, features and objects.
		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.
		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.
		To protect historical burial grounds within South Dublin County and encourage their maintenance in accordance with conservation principles.
Protected Structures	It is the policy of the Council to conserve and protect buildings, structures and sites contained in the Record of Protected Structures and to carefully consider any proposals for development that would affect the special character or appearance of a Protected Structure including its historic curtilage, both directly and indirectly.	To ensure the protection of all structures (or parts of structures) and the immediate surroundings including the curtilage and attendant grounds of structures contained in the Record of Protected Structures.
		To ensure that all development proposals that affect a Protected Structure and its setting including proposals to extend, alter or refurbish any Protected Structure are sympathetic to its special character and integrity and are appropriate in terms of architectural treatment, character, scale and form. All such proposals shall be consistent with the Architectural Heritage Guidelines for Planning Authorities, DAHG (2011) including the principles of conservation.
		To address dereliction and encourage the rehabilitation, renovation, appropriate use and re-use of Protected Structures.
		To prevent demolition and inappropriate alteration of Protected Structures.
		SLO 3: To secure the preservation of Windmill Hill, Rathcoole (RPS Ref. 358)
Architectural Conservation Areas	It is the policy of the Council to preserve and enhance the historic character and visual setting of	To avoid the removal of structures and distinctive features that positively contribute to the character of Architectural Conservation Areas including buildings,

Policy Area	Policy	Objective
	Architectural Conservation Areas and to carefully consider any proposals for development that would affect the special value of such areas.	building features, shop fronts, boundary treatments, street furniture, landscaping and paving.
		To ensure that new development, including infill development, extensions and renovation works within or adjacent to an Architectural Conservation Area (ACA) preserves or enhances the special character and visual setting of the ACA including vistas, streetscapes and roofscapes.
		To address dereliction and promote appropriate and sensitive reuse and rehabilitation of buildings, building features and sites within Architectural Conservation Areas.
		To reduce and prevent visual and urban clutter within Architectural Conservation Areas including, where appropriate, traffic management structures, utility structures and all signage.
Features of Interest	It is the policy of the Council to secure the identification, protection and conservation of historic items and features of interest throughout the County including street furniture, surface finishes, roadside installations, items of industrial heritage and other stand alone features of interest.	To ensure that development within the County including Council development seeks to retain, refurbish and incorporate historic items and features of interest.
Views and Prospects	It is the policy of the Council to preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County.	To protect, preserve and improve Views and Prospects of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places. Windmill Hill is identified as a Prospect to be Preserved and Protected.

SDCC has a heritage management plan (South Dublin County Heritage Plan 2010-2015), which has been consulted for reference, where applicable.

9.3 Assessment Methodology and Significance Criteria

This assessment has been produced in accordance with national and local legislation and policy, as well as best practice guidance. The impact assessment methodology aligns with EPA draft guidelines (EPA, 2017) and has been adapted from the advice provided by the National Roads Authority (NRA), in their Guidelines for the

Assessment of Architectural Heritage Impacts of National Roads Schemes and Guidelines for the Assessment of Archaeological Heritage Impacts of National Roads Schemes (no publication date). These guidelines can be equally applied to other development schemes.

The assessment has been completed using a phased qualitative assessment methodology, as outlined here:

- Cultural heritage assets with the potential to be affected by the Proposed Development are identified and ascribed a 'value', ranging from ''unknown' to 'very high';
- The 'magnitude' of any effects resulting from the Proposed Development upon the identified receptors are established, ranging from 'no change' to 'high' (assuming no mitigation is in place);
- A comparison of the magnitude of effect and receptor value is used to calculate the significance of effect;
- Where required, a mitigation strategy is proposed, with the significance of effect re-calculated (assuming any proposed mitigation is in place) to ascertain the residual effects.

Effects to cultural heritage assets can result from both direct and indirect effects. Direct effects are considered here to be those which result in an immediate, physical impact to an asset, such as ground disturbance. Indirect effects are considered here to include those that occur through an environmental pathway (e.g. air, waterways, and groundwater) or that are secondary (e.g. mitigation measures for a different impact affecting cultural heritage). These indirect effects may be physical but may also affect the setting of an asset. Indirect effects can include, but are not limited to:

- Noise effects;
- Air pollution/dust effects; and
- Visual effects.

Consultation with other specialists, in particular air quality, noise, and landscape and visual, have been undertaken to capture combined effects and provide a holistic assessment of impacts upon cultural heritage assets.

9.3.1 Assessment of Value of Cultural Heritage Assets

The value of a cultural heritage asset can be assessed using the criteria presented in Table 9.2.

Table 9.2: Criteria for Assessing the Value of Cultural Heritage Assets

Value of Asset	Criteria
Very High	■ World Heritage Sites (including nominated sites); ■ Assets of acknowledged international importance; and ■ Assets that can contribute significantly to acknowledged international research objectives.
High	■ Protected Assets (e.g. assets inscribed on the RMP, RHP or RPS); ■ Undesignated assets of recognised quality or importance (e.g. proposed for inclusion on the RMP, ACAs); and ■ Assets that can contribute significantly to acknowledged national research objectives.
Medium	■ Undesignated assets of regional importance or that might contribute to regional research objectives.
Low	■ Undesignated assets of local importance;

Value of Asset	Criteria
	■ Assets compromised by poor preservation and/or poor survival of contextual associations; and ■ Assets of limited value, but with potential to contribute to local research objectives.
Negligible	■ Assets with very little or no surviving cultural interest.
Unknown	■ The importance of the asset cannot be ascertained.

9.3.2 Assessment of Magnitude of Effect

The scale and magnitude of effects on cultural heritage assets can be assessed using the tiered grading system presented in Table 9.3.

Table 9.3: Criteria for Assessing Magnitude of Effect on Cultural Heritage Assets

Magnitude of Effect	Criteria
High	■ Changes to most or all key archaeological/architectural elements, such that the asset is totally altered; and ■ Comprehensive changes to setting.
Medium	■ Changes to many key archaeological/architectural elements, such that the asset is clearly modified; and ■ Considerable changes to setting.
Low	■ Changes to key archaeological/architectural elements, such that the asset is slightly altered; and ■ Slight changes to setting.
Negligible	■ Very minor changes to elements or setting; and ■ Archaeological receptors are altered but no information is lost (through archaeological excavation and recording).
No change	■ No change.

9.3.3 Assessment of Significance of Effects

Using the value of an asset as indicated in Table 9.2, and the magnitude of effect as ascertained from Table 9.3, Table 9.4 indicates how the assessment of the significance of an effect has been concluded.

Table 9.4: Significance of Effect Matrix

		MAGNITUDE OF EFFECT				
		No change	**Negligible**	**Low**	**Medium**	**High**
VALUE OF ASSET	**Very High**	Imperceptible	Slight	Moderate/ Significant	Significant/ Profound	Profound
	High	Imperceptible	Slight	Slight/ Moderate	Moderate/ Significant	Significant/ Profound
	Medium	Imperceptible	Not Significant	Slight	Moderate	Moderate/ Significant
	Low	Imperceptible	Not Significant	Not Significant	Slight	Slight/ Moderate
	Negligible	Imperceptible	Imperceptible	Not Significant	Not Significant	Slight

The methodology outlined in this section is reliant on an element of subjectivity, and so inherently requires a level of professional judgement. It is considered, however, that the criteria described in Table 9.2 and Table 9.3 provide robust and transparent decision-making guidance that can be widely applied to a variety of potential cultural heritage assets.

9.4 Baseline Conditions

The results of the baseline study are presented here as a summarised appraisal of the various disparate data sources. They have been separated into archaeological and architectural assets. For ease of reference, each asset has been assigned a unique ID reference comprising a two-letter prefix ('AR' for archaeological assets and 'BU' for architectural assets), followed by a sequentially increasing number. This allows information from different datasets, each with their own reference systems, to be collated into a single receptor list.

9.4.1 Data Sources

The baseline study comprised a comprehensive desk-based review of existing, remotely available heritage datasets within the Study Area, which has allowed a good understanding of the baseline cultural heritage conditions at and around the Site to be established. Sources of information consulted include:

- The Sites and Monuments Record (SMR), compiled and maintained by the Archaeological Survey of Ireland (ASI) unit of the NMS, for details regarding all known monuments and sites[4];
- The NIAH Building[4] and Garden[5] Surveys, for details regarding buildings, structures, demesnes, designed landscapes and historic gardens of architectural importance;
- The RMP, compiled and maintained by the NMS, for details regarding protected sites;
- The NMS for details regarding national monuments in State care (ownership or guardianship of the Housing, Local Government and Heritage) and for monuments subject to Preservation Orders;

[4] The SMR and NIAH Building Survey datasets are available in a downloadable Geographical Information System (GIS) format.

[5] The NIAH Garden survey is a work in progress. The desk-based survey (Phases 1 and 2) has been completed, but the field survey (Phase 3) remains incomplete. A policy framework and method of protection remains to be determined.

- The South Dublin County Development Plan (2016-2022) for details regarding the county's RHM, RPS, national monuments in State care (ownership or guardianship of the Local Authority), monuments subject to Preservation Orders, ACAs and AAPs;
- The Kildare County Development Plan (2017 - 2023) for details regarding the county's protected heritage, including the county RPS (relevant where the Study Area extends beyond Co. Dublin into Co. Kildare, to the west);
- UNESCO for details regarding inscribed and tentative World Heritage Sites;
- The topographical files of the National Museum of Ireland (NMI) for details of any finds held in the national archive relevant to the Site;
- The SMR, Excavations Bulletin, and Transport Infrastructure Ireland Digital Heritage Collection for details of previous excavations;
- Ordnance Survey Ireland for historic cartographic and aerial image sources, in order to conduct a map regression
- Pre-existing environmental reports containing information pertinent to the historic environment of the Site; and
- Modern online aerial image sources (e.g. Google Earth, Bing Maps).

9.4.2 Historical background and Archaeological Context

The well-documented archaeological record in the South Dublin area stretches from prehistory through to the modern era, and comprises a wide variety of material culture, with both archaeological and architectural heritage from throughout antiquity evident within the landscape. Early ecclesiastical sites formed the origins of many of the villages in the area, such as Tallaght, Saggart and Rathfarnham, whilst the manorial agricultural landscape of the area, which developed under the Normans in the 13th century, prevails across large areas. Industrialisation from the 17th century onwards, particularly around established villages, and the advent of aviation in the early to mid-20th century have also shaped the modern landscape.

9.4.3 Archaeological Heritage

Sites and Monuments Record and the Record of Monuments and Places

There are 13 archaeological assets from the SMR recorded within the Study Area, as shown in Drawing 9.1, (contained in Appendix 9.1), of which 5 are located within the Site (AR-01 to AR-05). The details of all 13 assets are summarised in Table 9.5, with full details presented in the Cultural Heritage Gazetteer (Appendix 9.2). The assets located within the Site include the extant remains of a circular windmill (AR-01, shown in Figure 9.1), considered to be circa 18th century in origin. The remains stand at two storeys high and are constructed of irregularly coursed masonry. It is believed the existing windmill was built upon the former location of 15th century windmill, which is the assumed origin of the townland name. The other four assets within the Site are located in close proximity to AR-01 and comprise a group of potentially prehistoric features identified primarily through regional scale LiDAR (Light Detecting and Ranging) studies (Davis, 2014); a burial cairn, ring-ditch, hillfort and ceremonial enclosure.



Figure 9.1: Remains of circular windmill, AR-01

To the northwest of the Site there are seven assets, clustered into three groups. The first, comprising one asset (AR-06), is a cave site recorded in the 19th century and interpreted as a potential souterrain, although the record entry describes that modern interpretations suggest the asst is likely a natural feature. The second group, comprising two assets (AR-07 and AR-08), are the remains of Colmanstown Castle and the associated field system. The castle was demolished in 1960. The third group (AR-09, AR-10 and AR-11) comprise a church and graveyard, with an earlier ecclesiastical enclosure at the same location.

The other two assets (AR-12 and AR-13), located to the south and southeast of the Site respectively, comprise a prehistoric ring-barrow and a holy well, dedicated to St. Catherine.

Table 9.5: Archaeological Assets within Study Area

Golder ID	SMR Ref	Easting (ITM95)	Northing (ITM95)	Asset Description	Included (or Proposed for Inclusion) on RMP	Distance to Site	Value
AR-01	DU021-038----	699846	725586	Windmill	Yes*	0 m	High
AR-02	DU021-113----	699846	725592	Cairn - burial cairn	No	0 m	Medium
AR-03	DU021-114----	699839	725583	Ring-ditch	No	0 m	Medium
AR-04	DU021-115----	699852	725580	Ceremonial enclosure	No	0 m	Medium
AR-05	DU021-116----	699823	725571	Hillfort	No	0 m	Medium
AR-06	DU020-010----	698690	725751	Souterrain	Yes	760 m (northwest)	High

Golder ID	SMR Ref	Easting (ITM95)	Northing (ITM95)	Asset Description	Included (or Proposed for Inclusion) on RMP	Distance to Site	Value
AR-07	DU020-011001-	699259	726195	Castle - tower house	Yes	440 m (northwest)	High
AR-08	DU020-011002-	699260	726191	Field system	Yes	440 m (northwest)	High
AR-09	DU020-009001-	699406	726232	Church	Yes*	380 m (northwest)	High
AR-10	DU020-009002-	699406	726234	Graveyard	Yes*	380 m (northwest)	High
AR-11	DU020-009004-	699406	726234	Ecclesiastical enclosure	Yes*	380 m (northwest)	High
AR-12	DU021-039----	699795	725014	Barrow - ring-barrow	Yes	315 m (south)	High
AR-13	DU021-040----	701178	725429	Ritual site - holy well	Yes	860 m (southeast)	High

*also included on the SDCC RPS.

Record of Protected Structures

Four of the archaeological assets recorded within the Study Area are listed on the SDCC RPS. The extant remains of an 18th century windmill (AR-01), which are located within the Site, are listed on the RPS (RPS ref. 358) and are also the subject of planning policy objective SLO 3, specifically *"to secure the preservation of Windmill Hill, Rathcoole (RPS Ref. 358)"*. The church, graveyard and potential enclosure at Colmanstown (AR-09, AR-10 and AR-11) are also included on the SDCC RPS (RPS ref. 341).

Preservation Orders

None of the assets within the Study Area are subject to a Preservation Order. The nearest asset to the Site that is subject to a Preservation Order is an unclassified cairn (SMR ref: DU024-002001--) located in Crockaunadreenagh, approximately 2 km to the southeast of the Site.

National Monuments in State Care

A national monument is defined by the National Monuments Act, 1930 as an asset 'the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'. A National Monument in State Care is one in the ownership or guardianship of the Minster for Housing, Local Government and Heritage or a Local Authority.

The nearest National Monument in State care is the church at Oughterard, Kildare (SMR ref: KD015-007005-), located 14.3 km northeast of the Site.

Register of Historic Monuments

There is no RHM disclosed for SDCC. The nearest monument to the Site that is inscribed on a county-level RHM is the medieval settlement in Kilteel, Kildare (comprising SMR ref: KD020-005----, KD020-006----, KD020-007002-- to KD020-0070010-, and KD020-008----), located approximately 3.9 km to the south of the Site.

Areas of Archaeological Potential

The Site is not located within an AAP. The nearest AAP is the Rathcoole AAP, located approximately 1.3 km northeast of the Site.

World Heritage Sites and Tentative List

There are no World Heritage Sites recorded within the Study Area. The nearest World Heritage Site to the Site is Brú na Bóinne (Archaeological Ensemble of the Bend of the Boyne), located 45 km to the north. The Royal Sites of Ireland, comprising five individual sites in Ireland (Cashel, Dún Ailinne, the Hill of Uisneach, the Rathcroghan Complex and the Tara Complex) as well as Navan Fort in Northern Ireland (UK), is listed on the Tentative List for Ireland for consideration for inclusion on the World Heritage List. Dún Ailinne, the seat of the kings of Leinster, is located approximately 25 km southwest of the Site.

Topographical Files

A remote search was conducted of the topographical files archive at the NMI for all entries recorded in the 17 townlands that are within 1 km of the Site. The search returned 15 entries, all of which are recorded in Colmanstown in the vicinity of AR-11 to the north of the Site. The entries comprise 13 pottery finds made in 1999 and a copper buckle and clasp, both found in 1982. All 15 entries were chance finds were made by members of the public.

9.4.4 Architectural Heritage

National Inventory of Architectural Heritage

A total of eight architectural assets listed on the NIAH Building Survey are recorded within the Study Area, although none lie within the Site. There are no assets listed on the NIAH Garden Survey that are within the Study Area. Details of architectural assets within the Study Area are summarised in Table 9.6 and their locations are shown in Drawing 9.1, (contained in Appendix 9.1), with full details presented in the Cultural Heritage Gazetteer (Appendix 9.2).

Table 9.6: Architectural Assets within Study Area

Golder ID	NIAH ref	Easting (ITM95)	Northing (ITM95)	Asset Description (Asset Date)	Asset listed on RPS?	Distance to Site	Value
BU-01	11213007	700300	726202	Keatingspark House (1870 – 1900)	Yes (RPS ref. 344)	208 m (northeast)	High
BU-02	11213008	701135	726085	Farm house (1800 – 1840)	Yes (RPS ref. 347)	768 m (east)	High
BU-03	11218001	701462	725816	Woodfield House (1880 – 1900)	Yes (RPS ref. 355)	1,050 m (east)	High
BU-04	11218002	701328	725410	Mount Carmel (1890 – 1910)	No	1,006 m (southeast)	Medium
BU-05	11218003	700786	725072	House (1810 – 1840)	No	760 m (southeast)	Medium
BU-06	11218003	700764	725058	House (1810 – 1840)	No	760 m (southeast)	Medium
BU-07	11217002	699192	724995	Steelstown Lodge gate lodge (1875 – 1880)	Yes (RPS ref. 368)	527 m (southwest)	High
BU-08	11218004	700545	724667	House (1800 – 1840)	No	1,000 m (south)	Medium

Record of Protected Structures

Four of the eight architectural assets recorded within the Study Area are included on the SDCC RPS:

- BU-01, BU-02, BU-03 and BU-07.

Architectural Preservation Areas

The Site is not within an ACA. The nearest ACA to the Site is the Rathcoole ACA, located approximately 1.6 km northeast of the Site.

9.4.5 Previous Studies and Archaeological Investigations

Geophysical survey was undertaken in 2018 within the undisturbed southern area of the Site, outside the existing quarry area (Target, 2018; Appendix 9.3), including the locations of AR-01 to AR-05. A complex of potential archaeological features were identified from this survey, particularly around the location of AR-01 and in the southwestern area of the Site (areas M1 and M2 in Target (2018), Appendix 9.3), with no anomalies of archaeological significance in the southeastern areas (areas M3 and M4 in Target (2018), Appendix 9.3). Anomalies in area M3 were considered likely to be of geological origin. The interpretation of the geophysical results aligns with previous, wider scale LiDAR studies, suggesting the area around AR-01 was a prehistoric hillfort, potentially built upon an earlier funerary monument (Target, 2018; Davis, 2014). The extent of archaeological features identified at the Site by this survey are presented in Figures 5 to 7 in Appendix 9.3.

Four other previous archaeological investigations are recorded within the Study Area, three of which were associated with road widening and improvement activities along the N7 motorway. Geophysical survey and trial trenching along the route of the N7 undertaken in 2003 and 2004 revealed two sites of archaeological potential in Bustyhill and Steelstown to the northwest and southwest of the Site, which were both excavated under licence in 2004 (Duffy, 2010 and Duffy, 2011, respectively).

The Bustyhill excavation (Duffy, 2010) to the northwest revealed a potential enclosure site with two entrances, although due to their depth and layout they are considered to potentially form part of the field system, rather than a ringfort or other earthwork construction. Two pits were also identified and dated to the early medieval period.

The Steelstown excavation (Duffy, 2011) to the southwest revealed a potential late Neolithic period structure, indicated by pits and postholes, as well as large amounts of lithics and Grooved Ware pottery sherds in the fill. A fragment of a polished stone axe was also identified. Burnt remains, first identified during trial trenching, were also confirmed, with an Iron Age/early medieval furnace revealed at the location. The interpretation of the Site as either domestic or ritual remains unclear. Excavation undertaken in 2005 at a neighbouring location, however, identified a curvilinear ditch interpreted as an enclosure for a cemetery, consisting of four cremation pit burials containing worked flint, pottery and metal work (Excavations Bulletin ref: 2005:532). It is suggested the two sites may be linked, although the results of radiocarbon dating samples are not available to confirm.

The other excavation in the Study Area was undertaken in 2004 at AR-06 and the entry concludes that the asset is not a souterrain, as recorded on the SMR and RMP (Excavations Bulletin ref: 2004:0474).

9.4.6 Historic Map Regression and Aerial Imagery

Historic mapping and aerial imagery for the Site is available from Ordnance Survey Ireland, including:

- 6 Inch Colour and Black & White – 1829-1841;
- 25 Inch Black & White – 1897-1913;
- Aerial photography (black and white) – 1991;
- Aerial photography (black and white) – 1994;

- Aerial photography (black and white - orthorectified) – 1995;
- Aerial photography (colour - orthorectified) – 2000; and
- Aerial photography (colour - orthorectified) – 2005.

The 6" map, dating from the early- to mid-19th century, depicts the Site as largely undeveloped agricultural land within a wider rural landscape. The original farmhouse is indicated in its current location and the modern-day field and road system layout is easily discernible. Two small areas along the western boundary of the Site are recorded as quarries, as well to the south. AR-01 is labelled as 'Windmill Stump' and AR-06 to AR-10 are clearly labelled the northwest of the Site.

The 25" map, dating from the turn of the 20th century, is equally recognisable when compared to modern aerial imagery and shows that the Site remained largely undeveloped throughout this period. The areas of quarrying previously depicted along the western boundary are shown to have extended eastwards across the Site, following the alignment of a field boundary. AR-01 is indicated on the map but is not labelled. The locations of AR-07 to AR-10 are indicated with labels.

Aerial photography from 1991 is the next available imagery, which documents large scale quarrying and stockpiling activity over the majority of the central area of the Site, with the western end undisturbed. Expansion westwards is documented in aerial imagery from 1994 and 1995. The southern area, where AR-01 to AR-05 are located, remains undisturbed throughout this period. The extent of the quarry in 1995 is shown to be smaller as it is at present, with limited eastwards expansion. The original farm buildings and field layout are still discernible. In the wider area, the rural landscape is still evident, although westward urban expansion from Rathcoole is also documented, with significant residential development along the route of the N7 motorway. The double hedgerow at the western end of the Site demarcate the former alignment of a small road, oriented north-south, known as Tierney's Lane, which was closed in the 1960s.

The steady expansion eastwards, westwards and downwards of the quarry is documented in aerial photographs from 2000 and 2005. The southern area of the Site remains undisturbed, with the focus on eastwards expansion. The 2005 imagery indicates the quarry had not reached its current extent at that time. Modern aerial imagery indicates that eastwards expansion continued until at least 2009. Throughout this period, a rural landscape persists in the surrounding Study Area.

9.4.7 Field Visit Results and Observations

Due to travel restrictions associated with the COVID-19 pandemic, no cultural heritage specific site visit was undertaken. Efforts have been made to access physical archives remotely, whilst photographs and observations from other practitioners who have visited the site have been consulted in the completion of this impact assessment.

9.4.8 Undiscovered Archaeological Remains

Based upon the presence of sub-surface archaeological remains within the Site that have only been identified in recent years through non-invasive surveying techniques, combined with the range and density of archaeological assets within the Study Area, it is not unreasonable to consider that there is potential for undiscovered archaeological remains to exist at the Site.

9.5 Characteristics of the Proposed Development

The Proposed Development comprises the continued extraction of materials within the existing quarry footprint, as well as the expansion of quarrying activity into two previously undeveloped locations to the northwest and northeast (as shown on Drawing 9.1, Appendix 9.1). The depth will vary across the Site, with the lowest point at approximately 120 m AOD.

Ultimately, the quarry pit will be restored through infilling, revegetation and the establishment of a water body, but the scale of extraction means original topography of the Site will not be restored to pre-quarrying levels.

9.5.1 Characteristics of Significance for Cultural Heritage

The total area of the EIA boundary is 46.14 ha, with 5.19 ha of additional extraction proposed within previously undeveloped areas. Works within the existing quarry footprint are not expected to have any direct impact on cultural heritage assets, but proposed extraction works within the 5.19 ha of additional undeveloped land have the potential to disturb ground; this the most pertinent characteristic of the development in terms of assessing impact to cultural heritage.

Visual changes to the landscape, both from quarrying activity during operation and from the restoration of the Site also have the potential to impact cultural heritage, in particular the setting of assets. Dust and noise generating activities from extraction also have the potential to impact upon cultural heritage assets.

9.6 Potential Effects

Using the assessment methodology described in Section 9.3, the effects of the Proposed Development upon cultural heritage assets have been assessed. Due to the nature of the Proposed Development (i.e. progressive quarrying), all effects have been considered as occurring during the operational phase, with no discrete construction phase considered. Decommissioning, comprising the restoration of the Site, has also been assessed.

9.6.1 Operation Phase

There are no known cultural heritage assets within the existing quarry footprint or in the proposed additional extraction areas, and so no direct effects are predicted to known designated or non-designated assets. Known assets within the Site, comprising AR-01, AR-02, AR-03, AR-04 and AR-05, are located outside the existing quarry footprint to the south. There is no additional extraction proposed in this area, and so no direct effects are predicted to occur at these five assets.

There is potential for undiscovered archaeological remains to exist within the Site, including the previously undeveloped additional extraction areas. If such remains do exist beneath the surface in these additional extraction areas, then there is potential for them to be directly affected by ground disturbance during extraction.

The proximity of AR-01, AR-02, AR-03, AR-04 and AR-05 to the existing quarry means there is likely to be impacts upon the setting of these assets due to noise and dust emissions and visual changes. This, however, is reflective of the baseline situation as the quarry is already operational and so the current setting is already impacted by noise and dust emissions and visual changes. The Proposed Development would therefore not result in a change of setting, but rather a continuation of the existing, impacted setting.

The air quality and noise assessments indicate that there will be no significant effects during operation of the Proposed Development. As such, no indirect effects on the setting of cultural heritage assets outside the Site within the Study Area are predicted as a result of air and nose emissions from the Proposed Development.

The landscape and visual assessment has identified a number of visual effects that have the potential to affect the 16 cultural heritage assets outside the Site within the wider Study Area. Intervisibility between the Site and the ten assets to the south and east is possible, but the Proposed Development is unlikely to result in additional visual changes to setting of these assets, which do not have views into the quarry pit or of the exposed rockface. Rather, the Proposed Development would represent a continuation of the existing, impacted setting. Proposed boundary planting is expected to reduce intervisibility at these assets and so in the medium term, whilst the visual changes cannot be reversed, it is likely that the setting of these assets will be improved.

Six assets located to the northwest of the Site (AR-06 to AR-11) have clear views towards the quarry pit and exposed rockface. It is expected that boundary planting and landscaping will obscure views of the additional extraction areas, and so the Proposed Development would result in no change, with a continuation of the existing, impacted setting.

Table 9.7 presents the potential operation phase effects on cultural heritage assets.

Table 9.7: Potential Effects - Operation Phase

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (before mitigation)
AR-01	Indirect effects to setting	No change	High	Imperceptible
AR-02	Indirect effects to setting	No change	Medium	Imperceptible
AR-03	Indirect effects to setting	No change	Medium	Imperceptible
AR-04	Indirect effects to setting	No change	Medium	Imperceptible
AR-05	Indirect effects to setting	No change	Medium	Imperceptible
Potential Undiscovered Archaeological Remains	Damage or loss of asset through quarrying activity	High	Very High	Profound adverse*
AR-06	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-07	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-08	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-09	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-10	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-11	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-12	Indirect effects to setting (visual)	Low	High	Slight positive
AR-13	Indirect effects to setting (visual)	Low	High	Slight positive
BU-01	Indirect effects to setting (visual)	Low	High	Slight positive
BU-02	Indirect effects to setting (visual)	Low	High	Slight positive
BU-03	Indirect effects to setting (visual)	Low	High	Slight positive
BU-04	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-05	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-06	Indirect effects to setting (visual)	Low	Medium	Slight positive

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (before mitigation)
BU-07	Indirect effects to setting (visual)	Low	High	Slight positive
BU-08	Indirect effects to setting (visual)	Low	Medium	Slight positive

*this is a conservative scenario, assuming very high value archaeological remains do exist within the Proposed Development.

9.6.2 Decommissioning Phase

Ground disturbance will be limited to operational activities, and so no direct effects are predicted as a result of decommissioning.

Once quarrying activity ends and the Site is restored, the effects of air and noise emissions on the setting of the five assets in close proximity to the quarry pit (AR-01, AR-02, AR-03, AR-04 and AR-05) will also end. This will reflect an improvement compared to the existing setting. Restoration works cannot entirely restore the landscape as it was prior to extraction, and so there will still be visual changes to the setting of these assets. The proposed restoration, however, will seek to revegetate and rehabilitate the exposed quarry, which will reduce the visual impact upon setting compared to the existing conditions. The proposed restoration will also reduce visual impacts upon the setting of cultural heritage assets in the wider Study Area compared to existing conditions.

The air quality and noise assessments indicate that there will be no significant effects during decommissioning of the Proposed Development. As such, no indirect effects on the setting of cultural heritage assets outside the Site within the Study Area are predicted as a result of air or noise emissions from the Proposed Development.

Table 9.8 presents the potential decommissioning phase effects on cultural heritage assets.

Table 9.8: Potential Effects - Decommissioning Phase

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (before mitigation)
AR-01	Indirect effects to setting	Low	High	Slight positive
AR-02	Indirect effects to setting	Low	Medium	Slight positive
AR-03	Indirect effects to setting	Low	Medium	Slight positive
AR-04	Indirect effects to setting	Low	Medium	Slight positive
AR-05	Indirect effects to setting	Low	Medium	Slight positive
AR-06	Indirect effects to setting (visual)	Low	High	Slight positive
AR-07	Indirect effects to setting (visual)	Low	High	Slight positive
AR-08	Indirect effects to setting (visual)	Low	High	Slight positive
AR-09	Indirect effects to setting (visual)	Low	High	Slight positive
AR-10	Indirect effects to setting (visual)	Low	High	Slight positive

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (before mitigation)
AR-11	Indirect effects to setting (visual)	Low	High	Slight positive
AR-12	Indirect effects to setting (visual)	Low	High	Slight positive
AR-13	Indirect effects to setting (visual)	Low	High	Slight positive
BU-01	Indirect effects to setting (visual)	Low	High	Slight positive
BU-02	Indirect effects to setting (visual)	Low	High	Slight positive
BU-03	Indirect effects to setting (visual)	Low	High	Slight positive
BU-04	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-05	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-06	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-07	Indirect effects to setting (visual)	Low	High	Slight positive
BU-08	Indirect effects to setting (visual)	Low	Medium	Slight positive

9.6.3 'Do-Nothing' Scenario

If the Proposed Development weren't to be developed, i.e. the 'do-nothing' scenario, there would be no change to the existing baseline as described in Section 9.4. There would be no adverse impacts to cultural heritage assets as a result of the Proposed Development during operation, however the Site would also not be restored, and so the slight positive impacts resulting from the improved setting of assets in close proximity to the quarry pit and in the wider Study Area during decommissioning would not be realised.

9.7 Mitigation and Management

9.7.1 Operation Phase

To mitigate for the potential presence of undiscovered archaeological remains within the additional extraction areas, it is recommended that a phased approach is implemented. Initially, a geophysical survey of the two additional extraction areas will be undertaken. The results of this geophysical survey will then inform the further development of the mitigation strategy, including the need for further intrusive archaeological investigation. If required, this may range from archaeological supervision of soil stripping work by a licensed archaeologist, to trial trenching and targeted evaluation, to broader, more extensive archaeological excavation.

To ensure the protection of assets AR-01, AR-02, AR-03, AR-04 and AR-05 from inadvertent direct impacts, the area will be clearly demarcated and the presence, significance and protections afforded to these assets will be communicated to all staff working on site, as part of their environmental induction.

9.7.2 Decommissioning Phase

No cultural heritage specific mitigation is proposed during decommissioning.

9.7.3 Monitoring

Beyond the phased archaeological mitigation strategy, no long-term or on-going monitoring for cultural heritage is proposed.

9.8 Residual Effects

9.8.1 Operation Phase

The residual effects of the Proposed Development during operation are presented in Table 9.9.

Table 9.9: Residual Effects - Operation Phase

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (after mitigation)
AR-01	Indirect effects to setting	No change	High	Imperceptible
AR-02	Indirect effects to setting	No change	Medium	Imperceptible
AR-03	Indirect effects to setting	No change	Medium	Imperceptible
AR-04	Indirect effects to setting	No change	Medium	Imperceptible
AR-05	Indirect effects to setting	No change	Medium	Imperceptible
Potential Undiscovered Archaeological Remains	Damage or loss of asset through quarrying activity	Negligible	Very High	Slight adverse*
AR-06	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-07	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-08	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-09	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-10	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-11	Indirect effects to setting (visual)	No change	High	Imperceptible
AR-12	Indirect effects to setting (visual)	Low	High	Slight positive

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (after mitigation)
AR-13	Indirect effects to setting (visual)	Low	High	Slight positive
BU-01	Indirect effects to setting (visual)	Low	High	Slight positive
BU-02	Indirect effects to setting (visual)	Low	High	Slight positive
BU-03	Indirect effects to setting (visual)	Low	High	Slight positive
BU-04	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-05	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-06	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-07	Indirect effects to setting (visual)	Low	High	Slight positive
BU-08	Indirect effects to setting (visual)	Low	Medium	Slight positive

*this is a conservative scenario, assuming very high value archaeological remains do exist within the Proposed Development.

9.8.2 Decommissioning Phase

The residual effects of the Proposed Development during decommissioning are presented in Table 9.10.

Table 9.10: Residual Effects - Decommissioning Phase

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (after mitigation)
AR-01	Indirect effects to setting	Low	High	Slight positive
AR-02	Indirect effects to setting	Low	Medium	Slight positive
AR-03	Indirect effects to setting	Low	Medium	Slight positive
AR-04	Indirect effects to setting	Low	Medium	Slight positive
AR-05	Indirect effects to setting	Low	Medium	Slight positive
AR-06	Indirect effects to setting (visual)	Low	High	Slight positive
AR-07	Indirect effects to setting (visual)	Low	High	Slight positive
AR-08	Indirect effects to setting (visual)	Low	High	Slight positive

Golder ID	Description of Effect	Magnitude of Effect	Asset value	Significance of Effect (after mitigation)
AR-09	Indirect effects to setting (visual)	Low	High	Slight positive
AR-10	Indirect effects to setting (visual)	Low	High	Slight positive
AR-11	Indirect effects to setting (visual)	Low	High	Slight positive
AR-12	Indirect effects to setting (visual)	Low	High	Slight positive
AR-13	Indirect effects to setting (visual)	Low	High	Slight positive
BU-01	Indirect effects to setting (visual)	Low	High	Slight positive
BU-02	Indirect effects to setting (visual)	Low	High	Slight positive
BU-03	Indirect effects to setting (visual)	Low	High	Slight positive
BU-04	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-05	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-06	Indirect effects to setting (visual)	Low	Medium	Slight positive
BU-07	Indirect effects to setting (visual)	Low	High	Slight positive
BU-08	Indirect effects to setting (visual)	Low	Medium	Slight positive

9.9 Cumulative Effects

Due to the nature of the Proposed Development and the likely effects described, the potential for cumulative effects to occur is limited to indirect effects to the setting of cultural heritage assets within the Study Area. There are no extractive or sizeable industries in the surrounding Study Area and so no cumulative effects are expected to occur.

9.10 Difficulties Encountered

A key limitation is that the assessment methodology cannot account for cultural heritage assets that are not recorded in the available data sources. Previously unrecorded assets, such as sub-surface archaeological remains, which do not present any diagnostic features, would not necessarily be identified by the desk-study.

Information has been used from a range of sources to determine baseline cultural heritage conditions. This assessment is therefore limited by the availability and reliability of these data sources.

Travel restrictions and public health safety measures associated with the COVID-19 pandemic meant a cultural heritage specific site visit was not undertaken, restricting opportunities for assessing indirect impacts to setting (particularly with regards to visual effects). This has been overcome using photographs and observations collected by other practitioners during site visits, and through close collaboration with other relevant specialists (e.g. air quality, noise and landscape and visual).

9.11 Summary and Conclusions

A continuation and expansion of quarrying activity at the Windmill Hill quarry site is proposed. A detailed study has been undertaken to determine the cultural heritage baseline conditions and a full impact assessment of the Proposed Development has been completed.

Whilst no known designated or non-designated cultural heritage assets, either within the Site and the Study Area, are predicted to be directly affected by the proposed quarrying activity, the potential for undiscovered archaeological remains to exist at the Site is acknowledged. As such, there is potential for a profound adverse effect. A phased mitigation strategy to address this direct impact to undiscovered archaeological remains is proposed, with geophysical survey of the two additional extraction areas the first phase. This will inform the development of the mitigation strategy, in particular the scope and scale of any intrusive archaeological works that may be required.

Clear demarcation and communication of known cultural heritage assets within the Site to all staff members is also proposed to be included in all site environmental inductions.

Indirect effects to setting are expected to be occur to the 5 assets within the Site (AR-01 to AR-05) and the 16 assets within the wider Study Area. During operation, the setting is expected to remain unchanged compared to the existing baseline for the many of these assets, resulting in imperceptible effects. Boundary planting is likely to result in slight positive effects at the assets located to the south and east of the Site. During decommissioning, when the setting is expected to improve compared to the existing baseline, a slight positive effect is predicted for all assets.

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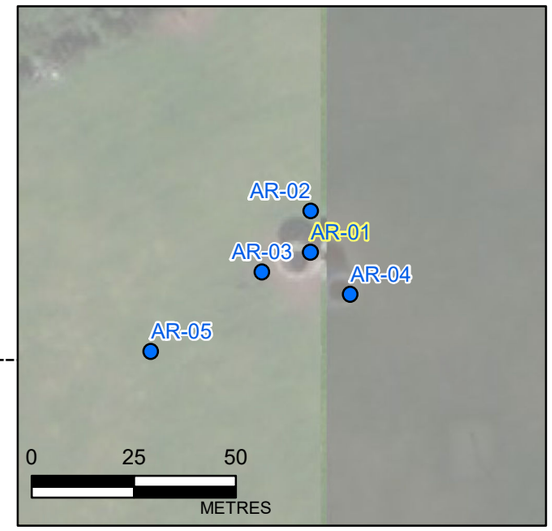
APPENDIX 9.1

Drawing – Cultural Heritage Assets and Study Area

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725000

AR-09
AR-10
AR-11
AR-07
AR-08
AR-06
AR-03
AR-02
AR-01
AR-05
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AR-13
BU-01
BU-02
BU-03
BU-04
BU-05
BU-06
BU-07
BU-08



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LEGEND

- Archaeological Asset
- Architectural Asset
- Proposed Additional Extraction Areas
- EIA Boundary
- Study Area

NOTE(S)
YELLOW HIGHLIGHT INDICATES ASSET IS LISTED ON SDCC RPS

REFERENCE(S)
1. COORDINATE SYSTEM: IRENET95 IRISH TRANSVERSE MERCATOR
2. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
3. SITES AND MONUMENTS RECORD DATA CREATED AND MAINTAINED BY THE NATIONAL MONUMENT SERVICE.
4. NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE BUILDING AND GARDEN SURVEY DATA CREATED AND MAINTAINED BY THE NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE.

CLIENT
L. BEHAN AGGREGATES & RECYCLING LTD

PROJECT
WINDMILL HILL QUARRY EIAR

TITLE
CULTURAL HERITAGE ASSETS AND STUDY AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2021 MAR 04
DESIGNED	CR
PREPARED	CR
REVIEWED	PW
APPROVED	PW

PROJECT NO.	CONTROL	REV.	DRAWING
20137776	R03.9-EIA-001	B.0	9.1

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APPENDIX 9.2

Cultural Heritage Gazetteer

CULTURAL HERITAGE GAZETTEER

1.0 ARCHAEOLOGICAL ASSETS

Golder ID	SMR Reference	Description	Easting (ITM)	Northing (ITM)	Townland	RMP	Sensitivity/Value
AR-01	DU021-038----	Windmill	699846	725586	WINDMILLHILL	Yes	High
AR-02	DU021-113----	Cairn - burial cairn	699846	725592	WINDMILLHILL	No	Medium
AR-03	DU021-114----	Ring-ditch	699839	725583	WINDMILLHILL	No	Medium
AR-04	DU021-115----	Ceremonial enclosure	699852	725580	WINDMILLHILL	No	Medium
AR-05	DU021-116----	Hillfort	699823	725571	WINDMILLHILL	No	Medium
AR-06	DU020-010----	Souterrain	698690	725751	BUSTYHILL	Yes	High
AR-07	DU020-011001-	Castle - tower house	699259	726195	COLMANSTOWN	Yes	High
AR-08	DU020-011002-	Field system	699260	726191	COLMANSTOWN	Yes	High
AR-09	DU020-009001-	Church	699406	726232	COLMANSTOWN	Yes	High
AR-10	DU020-009002-	Graveyard	699406	726234	COLMANSTOWN	Yes	High
AR-11	DU020-009004-	Ecclesiastical enclosure	699406	726234	COLMANSTOWN	Yes	High
AR-12	DU021-039----	Barrow - ring-barrow	699795	725014	NEWTOWN LOWER	Yes	High
AR-13	DU021-040----	Ritual site - holy well	701178	725429	CROCKSHANE	Yes	High

2.0 ARCHITECTURAL ASSETS

Golder ID	NIAH Reference	Building Name	Original Use	Date	Easting (ITM)	Northing (ITM)	Townland	RPS	Sensitivity
BU-01	11213007	Keatingspark House	House	1870 - 1900	700300	726202	KEATINGSPARK	Yes	High
BU-02	11213008		Farm house	1800 - 1840	701135	726085	CROCKSHANE	Yes	High
BU-03	11218001	Woodfield House	House	1880 - 1900	701462	725816	CROCKSHANE	Yes	High
BU-04	11218002	Mount Carmel	House	1890 - 1910	701328	725410	CROCKSHANE	No	Medium
BU-05	11218003		House	1810 - 1840	700786	725072	CARRIGEEN	No	Medium
BU-06	11218003		House	1810 - 1840	700764	725058	CARRIGEEN	No	Medium
BU-07	11217002	Steelstown Lodge	Gate lodge	1875 - 1880	699192	724995	STEELSTOWN	Yes	High
BU-08	11218004		House	1800 - 1840	700545	724667	CARRIGEEN	No	Medium

APPENDIX 9.3

Geophysical Survey

Geophysical Survey Report

Proposed quarry development at Windmillhill, Rathcoole, South County Dublin

Detection License
18R0211

Client
Byrne Mullins & Associates

On behalf of
L. Behan Aggregates & Recycling Ltd.

Date
November 2018

Project
TAG1800IE39



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TARGET REPORT 1800IE39

PROPOSED QUARRY DEVELOPMENT AT WINDMILLHILL, RATHCOOLE, SOUTH COUNTY DUBLIN

PROJECT BACKGROUND

Geophysical survey was undertaken at the site of a proposed quarry development situated in Windmillhill townland, c.2.4km SW of Rathcoole in South County Dublin, at the southern edge of an existing quarry located c.0.9km NE of Junction 5 on the N7. The site lies directly N of a minor road serving Rathcoole and Steeltown/Newtown Lower, and extends over c.13 hectares of land, traversing 4 adjacent fields. An 18th century windmill, recorded monument and place (RMP) DU021-038, lies within the site boundary to the NW.

This geophysical survey forms part of a pre-planning archaeological assessment, and it was commissioned by Byrne Mullins & Associates on behalf of L. Behan Aggregates & Recycling Ltd. The survey objectives were to identify the location, form and extent of buried archaeological remains, where present within the site boundary, and to advise further archaeological works, which may be required prior to the proposed development of the site.

Coordinates 699961 725516 (ITM central coordinate)

Townland Windmillhill

County South County Dublin

Landuse Pasture

Landscape, soils geology Hilltop (215m O.D) occupied by clayey drift with siliceous stones of the Drumkeeran (0700DK) association, with bedrock comprising of calcareous greywacke siltstone and shale of the Carrighill Formation (Irish National Soils Map, 1:250,000k, V1b, 2014; Geological Survey Ireland Spatial Resources, Public Data Viewer Series).

Archaeology DU021-038 represents the only RMP situated within the site boundary. The site does, however, encompass lands deemed to have a high archaeological potential as defined during the course of previous developments, and a recent UCD LIDAR study of the Dublin Mountains (Davis, 2014). The UCD LIDAR study, in particular, reports the discovery of a cairn on which DU021-038 and its 15th century predecessor are located; two sub-circular enclosures; and three suspected barrows within the site boundary. The following extract from the National Monuments Service SMR Database provides details of DU021-038 and further RMPs within the wider landscape:

SMR No.	Class	Townland	ITM Easting	ITM Northing
DU020-009001-	Church	Colmanstown	699406	726232
DU020-009002-	Graveyard	Colmanstown	699406	726234
DU020-009004-	Ecclesiastical enclosure	Colmanstown	699406	726234
DU020-010----	Souterrain	Bustyhill	698690	725751
DU020-011001-	Castle - tower house	Colmanstown	699259	726195
DU020-011002-	Field system	Colmanstown	699260	726191
DU021-038----	Windmill	Windmillhill	699846	725586
DU021-039----	Barrow - ring-barrow	Newtown Lower	699795	725014

Fieldwork	31st October – 1st November 2018	**Detection license**	18R0211
Report issue	18th November 2018	**Client**	Byrne Mullins & Associates on behalf of L. Behan Aggregates & Recycling Ltd.
Author	John Nicholls MSc	**Techniques**	High resolution magnetic gradiometry and electromagnetic induction (EMI)

© TARGET

1 SURVEY METHODOLOGY

1.1 Survey methodology, coverage and data collection

1.1.1 High resolution magnetic gradiometry was undertaken at the site investigating all available lands within the proposed development boundary, completing a c.10.5 hectares of survey in 4 fields (M1-M4). The magnetic gradiometer survey employed an advanced multichannel fluxgate gradiometer system combined with cm precision GPS. Magnetic gradiometer and GPS data were recorded simultaneously at rates of 75Hz and 1Hz respectively, conducting parallel instrument traverses 3.2m in width across the site.

1.1.2 Targeted EMI survey was also undertaken in magnetic gradiometer area M2 focusing on the enclosure and suspected barrow remains noted from previous UCD LIDAR study, completing a total 1.24 hectares of EMI in 2 areas (EMI1-EMI2). The EMI survey employed a sled mounted conductivity meter combined with cm precision GPS, recording quadrature (apparent conductivity -mSm) and in-phase (apparent magnetic susceptibility -ppt) data and GPS measurements simultaneously at rates of 10Hz and 1Hz respectively, conducting parallel instrument traverses 1m in width across EMI1-2.

1.2 Survey instrumentation

1.2.1 Details of the instrumentation employed for this geophysical survey are provided below:

Technique	Sensor spacing	Sample rate	Instrumentation	Instrument sensitivity/precision
Magnetic (fluxgate) gradiometry	0.40m	75Hz	Foerster Ferex CON650 Archaeology fluxgate gradiometers, 10-channel data logger	<75pT/√Hz at 1Hz (650mm baseline)
EMI	1m	10Hz	CMD MiniExplorer conductivity meter	Vertical dipole orientation (0.5m, 1.0m, and 1.8m depth range)
GPS	3.60m -MAG, 1m -EMI	1Hz	Trimble R10 GPS (VRS system)	<0.1m (vertical & horizontal)

1.3 Data processing

1.3.1 Survey data were processed using in-house, open-source and commercial software. Following GPS, magnetic gradiometer and EMI measurements on site survey data were processed as follows:

Process	Technique	Description
1a	Magnetic gradiometry	Zero median drift correction to balance data from entire sensor array
1b	EMI	Smoothed overall drift function (running average) using a window width of 30 readings
2	Gridding of corrected data via nearest neighbour interpolation	
3	Greyscale generation at optimum range & export to tiff-format (.tiff & .wld)	

1.3.2 To assure integrity of the processed data, and maintain close correlation with the original raw on-site measurements, no additional smoothing, low or high pass filters were applied proceeding steps 1a-3.

1.4 Data display

1.4.1 Figure 1 presents a site location diagram at a scale of 1:5000 displaying the boundary of the proposed development, location of 18th century windmill DU021-038, and extent of magnetic gradiometer and EMI surveys.

1.4.2 Figures 2-4 display the results from magnetometer survey in M1-M4 presented as greyscale images at scales of 1:2000 and 1:1500.

1.4.3 Figure 5-7 present an interpretation of the results from magnetic gradiometer survey in M1-M4 at scales of 1:2000 and 1:1500.

1.4.4 Figures 8-10 display the results from EMI survey in EMI1-EMI2 presented as greyscale images of quadrature (apparent conductivity -mSm) and in-phase (apparent magnetic susceptibility -ppt) data (vertical dipole depth ranges 0.5m – 1.8m) at a scale of 1:1250.

1.4.5 Figure 11 provides an interpretation of the results from EMI survey in EMI1-EMI2 at a scale of 1:1250.

2 GENERAL CONSIDERATIONS & COMPLICATING FACTORS

2.1 Access & ground conditions

2.1.1 Ground conditions at the site were generally suitable for geophysical survey, the investigation area comprising mostly accessible level pasture land. Survey was precluded in M1 to the SW by outcropping geology, and in M4 to the NE by a cattle crush and poor terrain.

2.1.2 At the start of fieldwork c.3ha of the site, to the NE in both M2 and M4, was no longer available to geophysical survey, these locations having since been incorporated into the existing quarry.

2.2 Modern interference

2.2.1 Numerous small-scale ferrous responses are evident in the results from survey in M1-M4 and in EMI1. Ferrous responses are a common occurrence in magnetic survey data, and in most cases represent modern metal debris contained within the topsoil.

2.2.2 Large-scale ferrous responses are also evident in the results from survey in M2-M4. these deriving form survey in proximity to existing field boundaries, metal fencing and other modern surfaces bordering the investigation perimeter. A large ferrous response visible in the results from M2 and EMI1, c.30m S of DU021-038, corresponds to interference from a telegraph pole. Where subtle variations associated with buried archaeological remains may be present in proximity to large-scale ferrous responses such as these, they will likely remain beyond detection due to the range of interference encountered.

2.2.3 The route of a buried cable/service, possibly relating to the telegraph pole, is also evident in the results from M2/EMI1, and visible as a linear ferrous response extending in a south-easterly direction from the edge of the existing quarry.

2.2.4 High voltage overhead power cables traverse the south-western portion of the site and have contributed large-scale magnetic interference across c.60% of M1, with further interference noted to the SW in M2. Where subtle variations associated with buried archaeological remains may be present in proximity to this magnetic disturbance, these responses will likely remain beyond detection due to the range of interference encountered.

2.3 Former landuse

2.3.1 Remains of former cultivation are evident in the results from magnetic gradiometer survey in M2-M4, and visible as a series of closely spaced parallel linear anomalies aligned approximately NW-SE.

3 MAGNETIC GRADIOMETRY RESULTS

3.1 M1

3.1.1 The results from survey in M1 are dominated by large-scale magnetic disturbance deriving from high voltage overhead power cables traversing M1 NW-SE. Where subtle variations in response associated with buried archaeological remains may be present in this location, they will likely remain beyond detection due to the range of interference encountered.

3.1.2 One strongly magnetic positive response (1) has been recorded NW of survey centre in M1. Interpretation of this anomaly is tentative given its location within broad a region of magnetic disturbance deriving from high voltage power cables traversing this portion of the site. An archaeological interpretation should not be entirely dismissed. A possible archaeological origin for small-scale positive anomaly 2 at the eastern edge of M1 should also not be ignored, although a natural soil/geological or modern ferrous interpretation is expected for this response.

3.1.3 No further responses of note are indicated by the results from survey in M1.

3.2 M2

3.2.1 The remains of 2 circular enclosures (3-4) recorded immediately NE and SW of DU021-038 are evident to the N in M2. These measure c.25m in diameter, and comprise a series of concentric fragmented positive/negative curving responses containing further small-scale anomalies of likely significance. These enclosures are located in a broad region of increased magnetic response, and partially overlie the location of the suspected cairn referred to by the previous UCD LIDAR study.

3.2.2 Two large, external and overlapping enclosures (5-6) encompassing responses 3-4, extending over a total c.2.5ha across the north-western portion of M1, are also evident in the results. Enclosure 5 comprises a poorly defined series of positive/negative linear responses and trends, which are reniform in character and measure c.215m NE-SW by 114m NW-SE. Enclosure 6, which is roughly circular in form, is defined by a series of narrow and weakly magnetic curving responses and trends, and measures c. 170m in diameter. Two converging ditches (7-8) extend through the eastern interior of enclosure 6, with a further outer enclosure ditch (9) indicated to the E. Responses 5-6 correspond to the enclosure features identified by the previous UCD LIDAR study.

3.2.3 Numerous responses of likely archaeological significance have been recorded in association with enclosure/ditch remains 3-9. These comprise small-scale positive anomalies, irregular patterns of response, and weak trends. The most notable of these include strongly magnetic responses 10 and weak curvilinear trend 11 to the SW of enclosure 3; a cluster of potential pit/posthole features (12) to the NE of enclosure 4; and linear responses 13 to the E of enclosure 3. The potential that curvilinear response 11 represents a weakly magnetic circular enclosure should also be considered.

3.2.4 To the SE of survey centre in M2 a series of weakly magnetic curving trends (14) highlight the location of a possible further enclosure, c.23m in diameter, with a small-scale poorly defined positive (15) of potential significance at the interior. Response 14 corresponds to the location of a suspected bowl barrow identified by the previous UCD LIDAR study.

3.2.5 The results from survey in M2 also display an abundance of weakly magnetic anomalies, small-scale positive responses and linear trends, most notably a series of rectilinear responses (16) to the SW. Given the immediate archaeological context the potential that these represent linear remains, posthole and pit locations possibly associated with enclosures 3-6 should not be ignored. However, a natural soil/geological, recent landuse or modern ferrous origin for some of these responses should also be considered. A NE-SW band of natural soil/geological variation is evident at the southern limit of enclosure 6, and corresponds to a distinct change in topography noted at the time of fieldwork.

3.3 M3

3.3.1 No responses of definite archaeological character are indicated by the results from survey in M3. Small-scale positives of potential note and weak linear trends are evident in the results NW (17) and NE (18) of

survey centre, and to the SW (19). An archaeological interpretation for these anomalies is tentative, and a natural soil/geological or modern ferrous origin should not be dismissed.

3.3.2 No further responses of note have been recorded from magnetic gradiometer survey in M3.

3.4 M4

3.4.1 No responses of archaeological significance have been recorded from magnetic gradiometer survey in M4. The results from this survey location are dominated by modern ferrous and patterns of former cultivation.

4 EMI RESULTS

4.1 EMI1

4.1.1 The results from survey in EMI1 highlight the locations of the two enclosures recorded immediately NE and SW of DU021-038 by the magnetic gradiometer survey (3-4), which partially overlie the location of the suspected cairn referred to by the previous UCD LIDAR study. These are mostly evident in the apparent magnetic susceptibility results from the vertical dipole 0.5m depth range, and visible as two circular/curvilinear features (A & B), which measure c.24m in diameter. Response A is encompassed by a broad region of high conductivity/low magnetic susceptibility, potentially representing remains of the cairn referred to in the previous UCD LIDAR study, although interpretation remains uncertain.

4.1.2 Remnants of two external enclosures beyond A-B, which were also recorded by the magnetic gradiometer survey in M1 (5-6), and noted by the previous UCD LIDAR study, are evident in EMI1 as linear response C, which extends NW of survey centre on NE-SW alignment; and weak curving trends D, located W of survey centre heading to the SE.

4.1.3 Additional responses of potential note in EMI1 include strongly magnetic positive anomaly E, at the northern survey edge overlapping with enclosure response C; and a curving trend (F), representing remains of a possible further barrow referred to in the previous UCD LIDAR study.

4.1.4 Numerous poorly defined anomalies have also been recorded in EMI1. The exact origin of these remains uncertain. Whilst an archaeological interpretation for these anomalies poorly defined anomalies should not be entirely dismissed, they are mostly expected to derive from near surface variations in underlying soils and/or geology.

4.1.5 The route of a suspected buried cable/service, which was recorded by magnetic gradiometer survey in M2, is also apparent NE of survey centre in EMI1.

4.2 EMI2

4.2.1 Curving trends G at survey centre in EMI2 correspond to the weakly magnetic enclosure remains recorded to the SE in magnetic gradiometer area M2 (14), and highlight the location of a suspected barrow also referred to in the UCD LIDAR study.

4.2.2 No further responses of note have been recorded from EMI survey in EMI2.

5 CONCLUSION

5.1 The results from magnetic gradiometer survey and targeted EMI survey within the site boundary have recorded a substantial and highly significant complex of archaeological remains, which extends across the central portion of the proposed quarry development. This complex includes two enclosures, which border the upstanding remains of 18th century windmill DU021-038, and these enclosures are encompassed by two larger outer enclosures, the most substantial of which is c170m in diameter. The remains of at least one further enclosure, which a previous UCD LIDAR study suggests represents a probable bowl barrow, have also been recorded in locations M2/EMI2, in proximity to a minor road which forms the southern site boundary.

5.2 Multiple further responses of archaeological significance have also been recorded, the majority extending through magnetic gradiometer area M2.

5.3 The results from this geophysical survey largely correspond to the findings from the previous UCD LIDAR study, which concluded that the remains identified at Windmillhill represent part of a hillfort, likely centred on an earlier prehistoric funerary monument (Davis, 2014).

5.4 The potential significance of a number of poorly defined responses recorded in M1 and M3 should not be entirely ignored, although these anomalies are largely expected to derive from a combination of natural soil/geological variation, recent landuse and/or modern ferrous debris.

5.5 Elsewhere, the results from survey highlight remains of former cultivation, the route of a buried cable/service and an area of natural soil/geological variation.

*** This conclusion must be read in conjunction with the detailed discussion of the results included in the main section of this report.**

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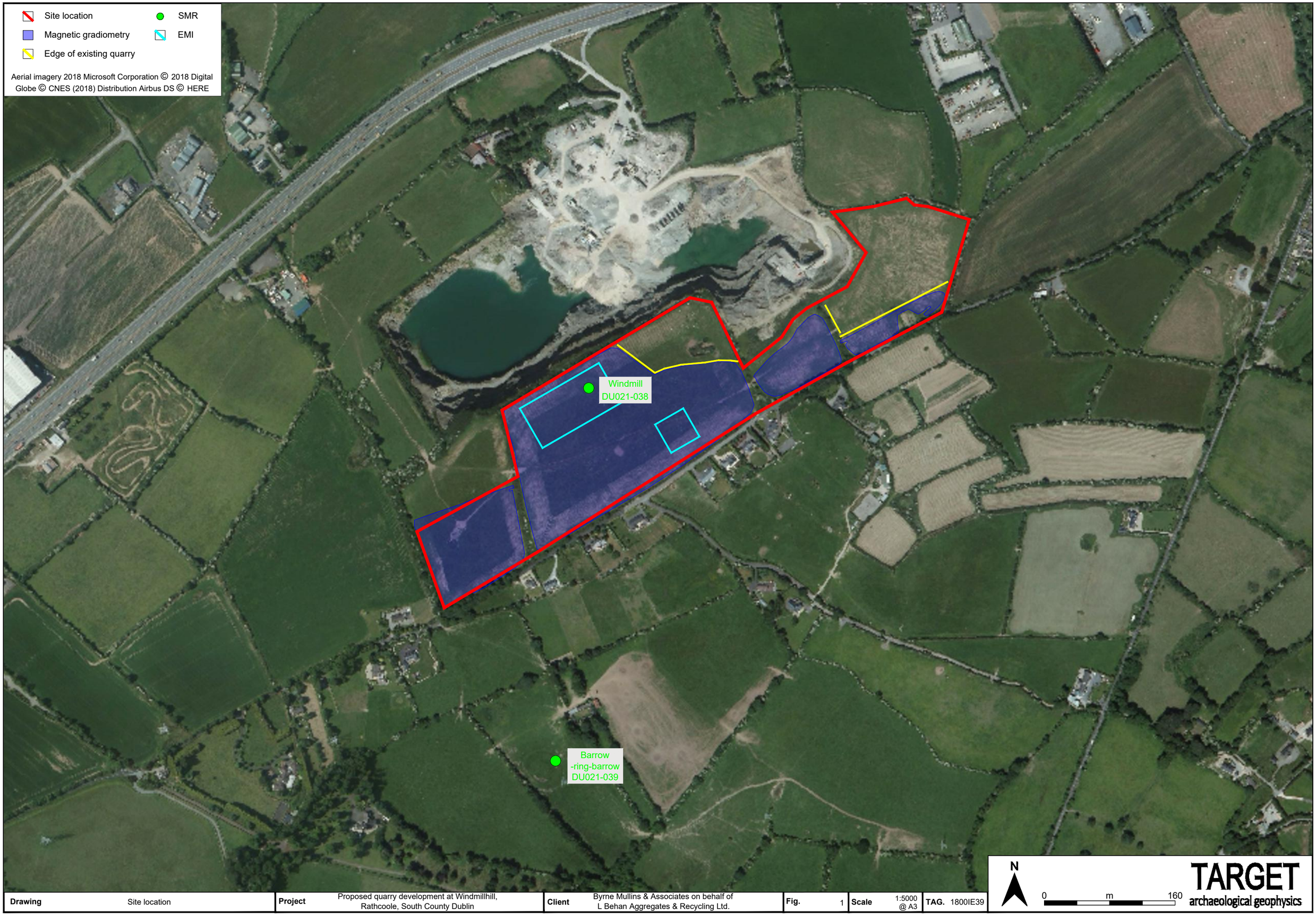
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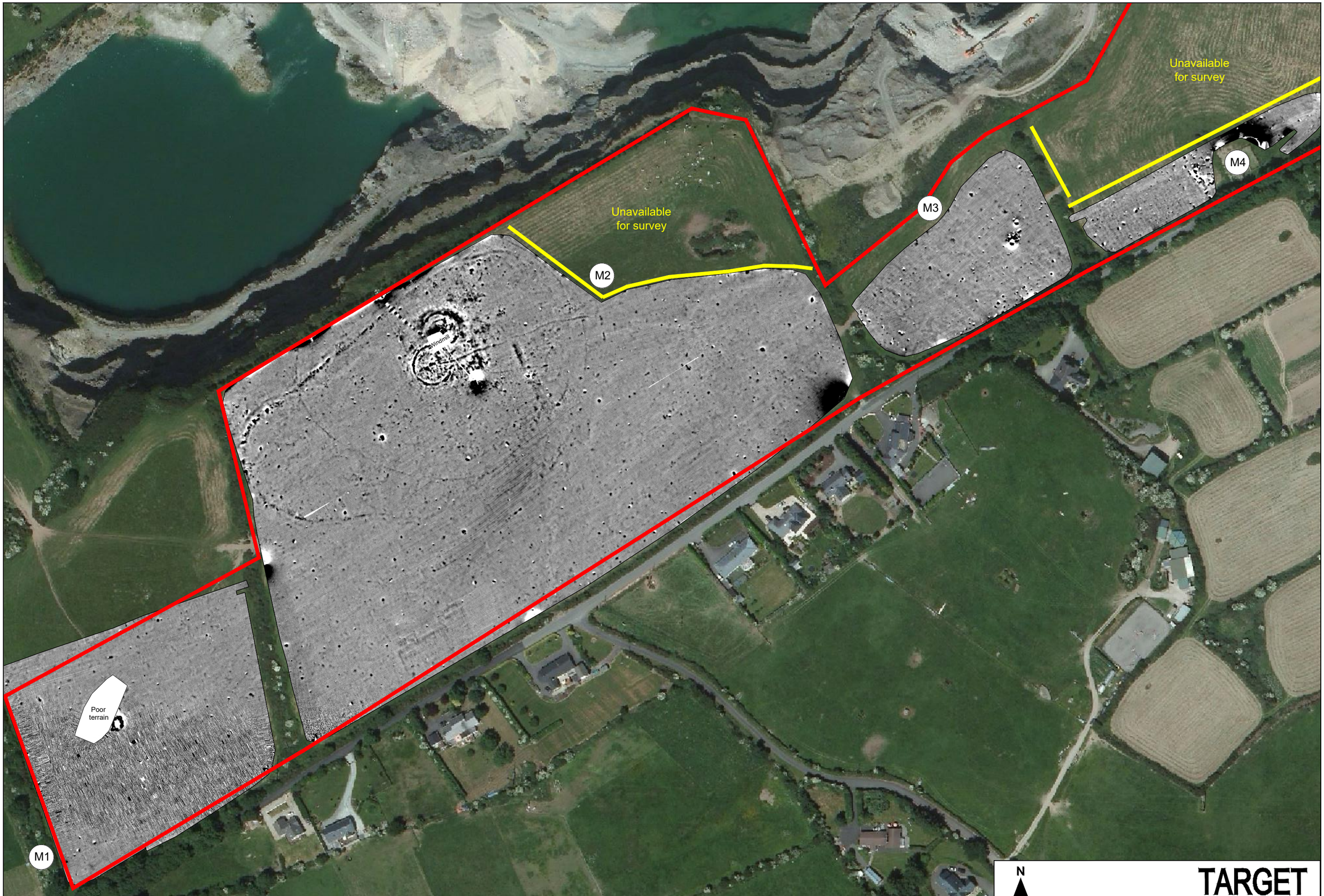
Fig. 1	Site location	1:5000
Fig. 2	Magnetic gradiometry greyscales M1-M4	1:2000
Fig. 3	Magnetic gradiometry greyscales M1-M2	1:1500
Fig. 4	Magnetic gradiometry greyscales M3-M4	1:1500
Fig. 5	Magnetic gradiometry interpretations M1-M4	1:2000
Fig. 6	Magnetic gradiometry interpretations M1-M2	1:1500
Fig. 7	Magnetic gradiometry interpretations M3-M4	1:1500
Fig. 8	EMI greyscales EMI1-EMI2- vertical dipole 0.5m depth range	1:1250
Fig. 9	EMI greyscales EMI1-EMI2- vertical dipole 1.0m depth range	1:1250
Fig. 10	EMI greyscales EMI1-EMI2- vertical dipole 1.8m depth range	1:1250
Fig. 11	EMI interpretations EMI1-EMI2	1:1250

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Drawing	Site location	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	1	**Scale**	1:5000 @ A3	**TAG.**	1800IE39

TARGET archaeological geophysics



Drawing	Magnetic gradiometry greyscales M1-M4	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	2	**Scale**	1:2000 @ A3	**TAG.**	1800IE39

TARGET archaeological geophysics

M2

Windmill

Poor terrain

M1

Drawing	Magnetic gradiometry greyscales M1-M2	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	3	**Scale**	1:1500 @ A3	**TAG.**	1800IE39

N

0 m 60

TARGET archaeological geophysics



Drawing	Magnetic gradiometry greyscales M3-M4	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.** 4	**Scale** 1:1500 @ A3	**TAG.** 1800IE39	N 0 m 60 TARGET archaeological geophysics

Archaeology -ditch
Archaeology - bank/mound
? Archaeology
?? Archaeology
Increased response
Trend
Buried cable/service
Cultivation
Natural
Magnetic disturbance
Ferrous

Unavailable for survey

Unavailable for survey

M1

M2

M3

M4

Windmill

Poor terrain

N

0 m 80

TARGET archaeological geophysics

Drawing	Magnetic gradiometry interpretations M1-M4	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	5	**Scale**	1:2000 @ A3	**TAG.**	1800IE39

Archaeology -ditch
Archaeology - bank/mound
? Archaeology
?? Archaeology
Increased response
Trend
Buried cable/service
Cultivation
Natural
Magnetic disturbance
Ferrous

M2
M1
Windmill
Poor terrain
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
19

N

0 m 60

TARGET archaeological geophysics

Drawing	Magnetic gradiometry interpretations M1-M2	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	6	**Scale**	1:1500 @ A3	**TAG.**	1800IE39

Archaeology -ditch
Archaeology - mound
? Archaeology
?? Archaeology
Increased response
Trend
Buried cable/service
Cultivation
Natural
Magnetic disturbance
Ferrous

Unavailable for survey

Unavailable for survey

M2

M3

M4

18

17

19

7

6

9

14

15

N

0 m 60

TARGET archaeological geophysics

Drawing	Magnetic gradiometry interpretations M3-M4	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	7	**Scale**	1:1500 @ A3	**TAG.**	1800IE39

Apparent conductivity

-9.4 mSm -8.02

EMI1

Windmill

EMI2

Apparent magnetic susceptibility

1.0163 ppt 1.092

EMI1

Windmill

EMI2

N

0 m 50

TARGET archaeological geophysics

Drawing	EMI greyscales EMI1-EMI2 - vertical dipole 0.5m depth range	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	8	**Scale**	1:1250 @ A3	**TAG.**	1800IE39

Apparent conductivity

8.38 mSm 12.7

EMI1

Windmill

EMI2

Apparent magnetic susceptibility

1.15 ppt 1.4

EMI1

Windmill

EMI2

N

0 m 50

TARGET archaeological geophysics

Drawing	EMI greyscales - vertical dipole 1.0m depth range	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	9	**Scale**	1:1250 @ A3	**TAG.**	1800IE39

Apparent conductivity

3.1 mSm 5.04

EMI1

Windmill

EMI2

Apparent magnetic susceptibility

1.15 ppt 1.85

EMI1

Windmill

EMI2

N

0 m 50

TARGET archaeological geophysics

Drawing	EMI greyscales - vertical dipole 1.8m depth range	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.**	10	**Scale**	1:1250 @ A3	**TAG.**	1800IE39

Enclosure
? Cairn
? Archaeology
?? Archaeology
Trend
Natural
Buried cable/service
Ferrous

EMI1
EMI2
Windmill
A
B
C
D
E
F
G

Drawing	EMI interpretations EMI1-EMI2	**Project**	Proposed quarry development at Windmillhill, Rathcoole, South County Dublin	**Client**	Byrne Mullins & Associates on behalf of L Behan Aggregates & Recycling Ltd.	**Fig.** 11	**Scale** 1:1250 @ A3	**TAG.** 1800IE39

N

0 m 50

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10.0 LANDSCAPE AND VISUAL

10.1 Introduction

This Environmental Impact Assessment Report [EIAR] has been prepared to accompany a planning application under S.37L of the Planning and Development Act, 2000 as amended for further quarrying of an existing quarry at Windmillhill, Rathcoole, Co. Dublin. The remedial Landscape and Visual Impact Assessment (LVIA) was prepared by Cunnane Stratton Reynolds.

This LVIA was carried out by Ronan Finnegan BSc PGDipLA CMLI. Ronan has over eight years' experience in LVIA, and has worked on the Landscape and Visual assessment for a range of developments throughout Ireland and the UK, including wind and solar energy, infrastructure, quarry developments, residential and commercial developments. Oversight of the chapter was provided by Declan O' Leary, CMLI, MILI, Managing Director of Cunnane Stratton Reynolds.

The application for further quarrying is to be made concurrent with an application for substitute consent of the existing quarry that is accompanied by an rEIAR.

This section of the EIAR considers and assesses potential significant effects resulting from quarrying related activities that are proposed to be carried out on the site and on its surrounding environment. It also records mitigation measures proposed to be undertaken.

10.2 Methodology

10.2.1 Guidance Documents

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the effects of change and the significance of these effects, resulting from development on both the landscape and on people's views and visual amenity.

The methodology for remedial assessment of the landscape and visual effects is informed by the following key guidance documents for LVIA and EIA, namely:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition 2013, (UK Landscape Institute and Institute of Environmental Management and Assessment) - hereafter referred to as the GLVIA;
- *Guidelines for Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017 Draft).
- South County Dublin Development Plan 2016-2022; and
- Kildare County Development Plan 2017-2023.

References are also made to the '*Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities'* document, published in 2000 by the Department of Environment, Heritage and Local Government.

10.2.1.1 Definitions in LVIA

A key distinction to make in a LVIA is that between landscape effects and the visual effects of development. These are related but assessed separately.

'Landscape' results from the interplay between the physical, natural, and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. The effects on the landscape as a resource, and on the physical fabric and character of the landscape are assessed. Character is not just about the physical elements and features that

make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and 'visual amenity' refer to the interrelationship between people and the landscape. The GLVIA prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

The GLVIA also advises that the terms 'impact' and effect' should be clearly distinguished and consistently used in the preparation of an LVIA. This is consistent with the EPA (2017) draft guidelines.

'*Impact*' is defined as the action being taken. In this case, the impact would be the development on the quarry site from 1990 to the present day.

'Effect' is defined as the change or changes resulting from those actions, e.g., a change in landscape character, or changes to the composition, character and quality of views in the receiving environment. This chapter therefore focusses on these effects.

10.2.1.2 European Landscape Convention and GLVIA

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This definition is important in that it expands beyond the idea that landscape is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right - a shared resource providing a complex range of cultural, environmental and economic benefits to individuals and society.

The Guidelines for Landscape and Visual Impact Assessment (GLVIA) notes that as a cultural resource, the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreation and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions. As an environmental resource, the landscape provides habitat for fauna and flora. It receives, stores, conveys and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource, the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

The GLVIA also notes that landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the environs of the Proposed Development have altered over the last thousand years, from wilderness to agriculture, forestry and settlement.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs.

Climate change is one of the major factors likely to bring about future change in the landscape, and it is accepted to be the most serious long-term threat to the natural environment, as well as economic activity (particularly

primary production) and society. The need for climate change mitigation and adaptation, which includes the management of water and more extreme weather and rainfall patterns, is part of this.

10.2.2 Methodology for Landscape Assessment

In Section 10.6 of this chapter the landscape effects of the Proposed Development are assessed. Landscape assessment considers the likely nature and scale of changes which have taken place to the main landscape elements and characteristics, and the consequential effect on landscape character and on the landscape fabric. Existing trends of change in the landscape are taken into account. The landscape effect is assessed based on measurement of the landscape sensitivity against the magnitude of change which has taken place.

10.2.2.1 Sensitivity of the Landscape Resource

Landscape sensitivity is a function of its land use, landscape patterns and scale, visual enclosure and distribution of visual receptors, scope for mitigation, and the value placed on the landscape. It also relates to the nature and scale of development proposed. It includes consideration of landscape values as well as the susceptibility of the landscape to the proposed change.

Landscape values can be identified during the desk study, by the presence of landscape designations or policies which indicate particular values, either on a national or local level. In addition, a number of criteria are used to assess the value of a landscape. These are described further in below.

Landscape susceptibility is defined in the GLVIA as the ability of the landscape receptor to accommodate the Proposed Development without undue consequences for the maintenance of the baseline scenario and/or the achievement of landscape planning policies and strategies.

Susceptibility also relates to the type of development – a landscape may be highly susceptible to certain types of development but have a low susceptibility to other types of development. Landscape susceptibility in relation to quarry developments can include consideration of:

- Topography and skyline;
- Landscape pattern and landcover; and
- Settlement pattern.

For the purpose of assessment, five categories are used to classify the landscape sensitivity of the receiving environment. These are set out in Table 10-1 below.

Table 10.1: Categories of Landscape Sensitivity

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principal management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principal management objective for the area is conservation of the existing character.

Sensitivity	Description
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principal management objective is to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principal management objective for the area is to facilitate change in the landscape through development, repair or restoration

10.2.2.2 Magnitude of Landscape Change

The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Five categories are used to classify magnitude of landscape change as set out in Table 10-2 below.

Table 10.2: Magnitude of Landscape Change

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape (i.e. landscape receptors), and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in major alteration or compromise of important landscape receptors, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration of landscape receptors, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration of landscape receptors, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to landscape receptors, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

10.2.2.3 Significance of Effect

In order to classify the significance of effects, the magnitude of change is measured against the sensitivity of the landscape/viewpoint, using the following guide, from the EPA Draft Guidance (2017).

There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound. It is considered that Significant Effects would be those described as Significant, Very Significant and Profound.

Table 10.3 below outlines how the sensitivity and magnitude of change are combined in the assessment.

Table 10.3: Significance of Effect Matrix

		Sensitivity of the Resource				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude of Change	**Very High**	Profound	Profound-Very Significant	Very Significant-Significant	Moderate	Slight
	High	Profound-Very Significant	Very Significant	Significant	Moderate-Slight	Slight-Not Significant
	Medium	Very Significant-Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate-Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight-Not Significant	Not significant	Imperceptible	Imperceptible

It should be noted that the matrix is a guideline only, and the assessor's professional opinion may depart from the above matrix.

Landscape effects are also classified as beneficial, neutral or negative/adverse. Development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and if a development achieves the objective of the policy the resulting effect might be positive, even if the landscape character is changed.

10.2.3 Methodology for Visual Assessment

In Section 10.6 of this chapter the visual effects of the development are assessed. Visual assessment considers the value of the views, and the visual susceptibility of the visual receptors (groups of people) and the changes to the composition and character of views. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The significance of the visual effects experienced at these locations is assessed by measuring the visual receptor sensitivity against the magnitude of change to the view resulting from the development.

10.2.3.1 Sensitivity of the Visual Receptor

Visual receptor sensitivity is a function of two main considerations:

Susceptibility of the visual receptor to change -This depends on the occupation or activity of the people experiencing the view, and the extent to which their attention or interest is focussed on the views or visual amenity they experience at that location.

Visual receptors most susceptible to change include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage or other attractions and places of community congregation where the setting contributes to the experience.

Visual receptors less susceptible to change include travellers on road, rail and other transport routes (unless on recognised scenic routes which would be more susceptible), people engaged in outdoor recreation or sports where the surrounding landscape does not influence the experience, and people in their place of work or shopping where the setting does not influence their experience.

Value attached to the view - This depends to a large extent on the subjective opinion of the visual receptor but also on factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. by appearing in arts).

Visual receptor susceptibility and value of the viewpoints which are assessed, are discussed further in Sections 10.3.3.5 and 10.6.2. For the purpose of assessment, five categories are used to classify a viewpoint's sensitivity as set out in Table 10.4 below.

Table 10.4: Visual Receptor Sensitivity

Sensitivity	Description
Very High	Viewers at iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise designated as being of high value or national value. This may also include residential viewers who are focussed to a large extent on the view.
High	Viewers at viewpoints that that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features) and views which are valued by the local community. This would include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes
Medium	Viewers at viewpoints representing people travelling at slow or moderate speed through or past the affected landscape in cars or on public transport, where they are partly but not entirely focused on the landscape, or where the landscape has some valued views. The views are generally not designated, but which include panoramic views or views judged to be of some scenic quality, which demonstrate some sense of naturalness, tranquillity or some rare element in the view.
Low	Viewers at viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, etc. The view may present an attractive backdrop to these activities but there is no evidence of that the view is valued, and not regarded as an important element of these activities. Viewers travelling at high speeds (e.g. Motorways) may also be considered of low susceptibility.
Negligible	Viewers at viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping where the view has no relevance or is of poor quality.

10.2.3.2 Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view as set out in Table 10.5 below.

Table 10.5: Magnitude of Change to the view

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes the dominant the composition and defines the character of the view and the visual amenity
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity

A set of 12 no. viewpoints were produced from a list carefully selected viewpoints, to assist in assessing the magnitude of changes from various locations throughout the study area. These locations include areas near to residences, along local roads, and viewpoints also representing protected views and scenic routes. These were initially identified during the desk study and verified during a site visit. The rationale for the viewpoints selected is at 10.3.3.52 below.

10.2.3.3 Significance of Visual Effects

As for landscape effects, in order to classify the importance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint as set out in Table 10.3 above in Section 10.2.2.3. The seven categories as set out by the EPA (2017) are used to describe the significance of the effect.

10.2.3.4 Quality and Timescale of Effects

The effects are also classified as beneficial, neutral or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn. These qualitative impacts/effects are defined as:

- Adverse – Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished;
- Neutral - Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality; and

- Beneficial – improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Landscape and Visual effects are also categorised according to their longevity or timescale:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to fifteen years;
- Long Term – Lasting fifteen years to sixty years; and
- Permanent – Lasting over sixty years

10.2.4 Study Area

The EIA project area, defined in Figure 10.1 below, is referred to under the heading 'Site and Immediate Vicinity'. This area includes the existing quarry, the Proposed Development and adjoining agricultural land all contained within the project boundary line. However, the LVIA study area also includes part of the wider landscape approximately 5 kilometres radius from the existing quarry site.

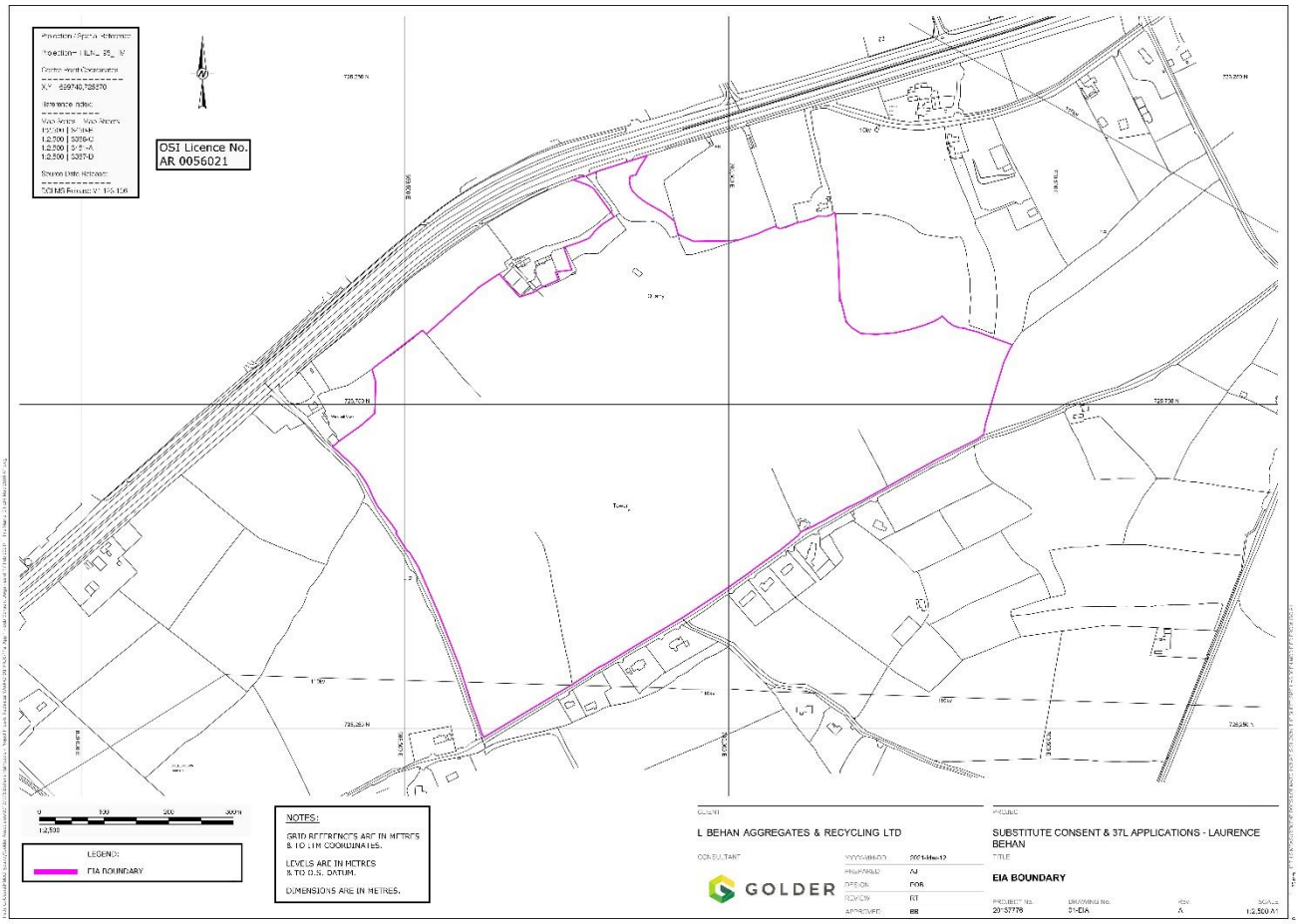


Figure 10.1: EIAR Project Boundary

10.2.5 Limitations

The assessment of the 12 viewpoints is based on the captured view at the time of the field visit. All views are captured from the public road, in a site visit in June 2021, and so assumptions must be made on the potential

views of the Proposed Development from the adjoining representative receptors located on private lands, e.g. grounds of a residence. Views will be affected by changes in the weather and there may also be alteration in the growth of roadside hedgerows, or the addition or removal of an element which could affect the predicted changes to the captured view.

10.3 Receiving Environment

This section sets out the character of the baseline landscape by starting with a description of the relevant planning policies, landscape character, landscape of the site and environs and visual receptors.

10.3.1 Planning Policy

The South Dublin County Development Plan 2016-2022 (hereafter referred to as the SDCC Plan) relates to the site and eastern part of the study area, covering a mix of rural landscape and urban landscape. The western and southern parts of the study area from lies within the rural landscape of Kildare County Council and therefore the Kildare County Development Plan 2017-2023 is also referred to.

10.3.1.1 South Dublin County Development Plan 2016-2022

10.3.1.1.1 Land Use Zoning and Objectives

The site (indicated in Figure 10.2 below with a red dot) is zoned RU (*To protect and improve rural amenity and to provide for the development of agriculture).*

The Zoning Map also includes several marked Prospects (Windmill Hill, Athgoe Hill and Bustyhill) as well as views on the map (one east of the site and one to the northeast. The accompanying policies are set out below.

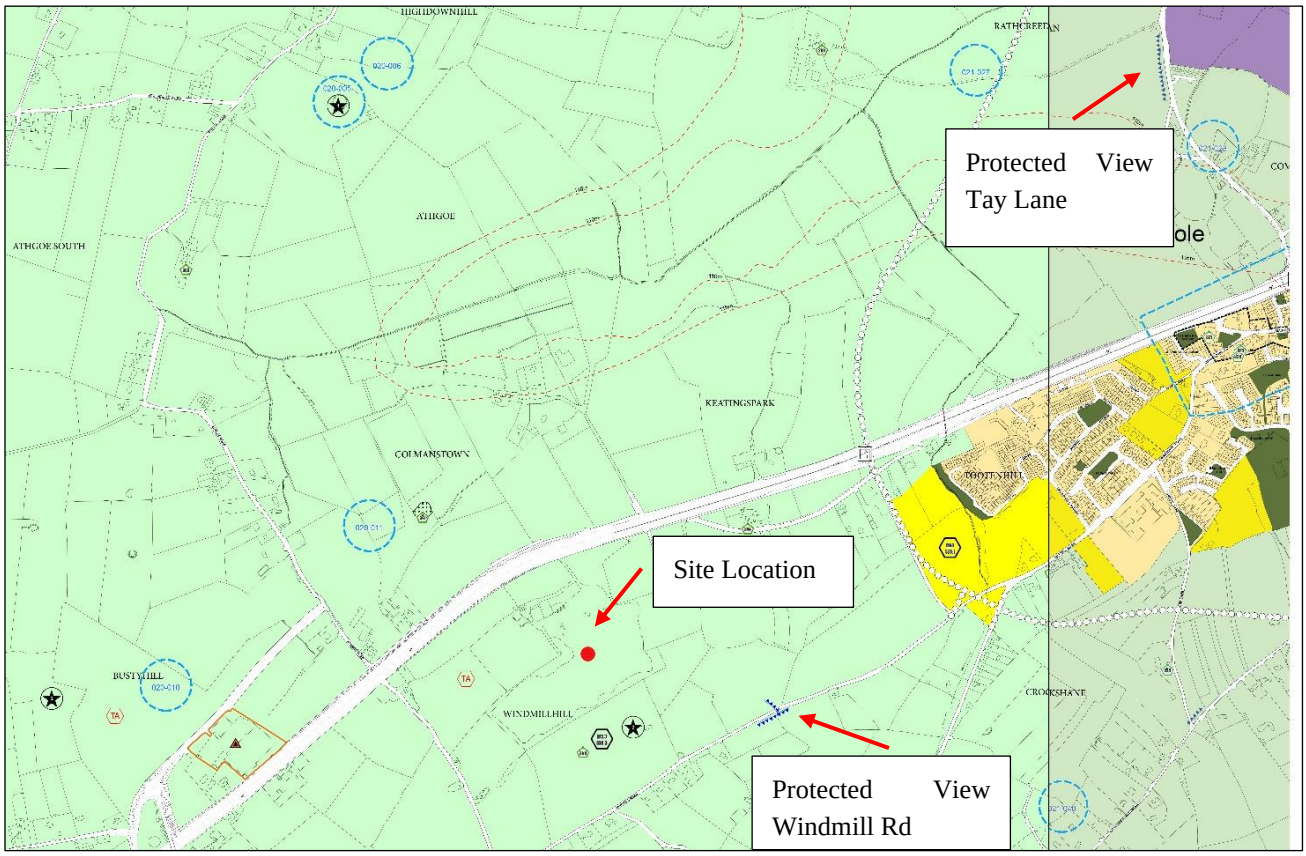


Figure 10.2: Land Use Zoning Map 7 and 8, (Source: the SDCC Plan).

Chapter 4 of the SDCC Plan includes objectives relating to sustainable Mineral Extraction the relevant policy and objectives are as follows:

- *ECONOMIC AND TOURISM (ET) Policy 10 Mineral Extraction: is the policy of the Council to support the sustainable extraction of aggregate resources at suitable locations within the County subject to appropriate environmental safeguards*
- *ET10 Objective 1: To facilitate mineral extraction in suitable locations subject to the protection of amenity and environmental quality*
- *ET10 Objective 2: To limit the operation of the extractive industry and ancillary uses at environmentally sensitive locations and within areas designated with Zoning Objective 'HA – DM', 'HA-LV' and 'HA-DV' where extraction would result in significant adverse effects and/or prejudice the protection of the County's natural and built heritage.*
- *ET10 Objective 3: To ensure the satisfactory reinstatement and/or re-use of disused quarries and extraction facilities, where active use has ceased.*

Chapter 9 of the SDCC Plan includes objectives relating to Heritage, Conservation and Landscapes. The relevant policy and objectives are as follows:

- *HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 2 Archaeological Heritage: 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*
- *HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 3 Protected Structures: is the policy of the Council to conserve and protect buildings, structures and sites contained in the Record of Protected Structures and to carefully consider any proposals for development that would affect the special character or appearance of a Protected Structure including its historic curtilage, both directly and indirectly.*
- *HCL3 Objective 1: To ensure the protection of all structures (or parts of structures) and the immediate surroundings including the curtilage and attendant grounds of structures contained in the Record of Protected Structures.*
- *HCL3 Objective 2: To ensure that all development proposals that affect a Protected Structure and its setting including proposals to extend, alter or refurbish any Protected Structure are sympathetic to its special character and integrity and are appropriate in terms of architectural treatment, character, scale and form. All such proposals shall be consistent with the Architectural Heritage Guidelines for Planning Authorities, DAHG (2011) including the principles of conservation.*
- *Heritage, Conservation and Landscapes (HCL) Policy 7 Landscapes: 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.*
- *HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 8 Views and Prospects: is the policy of the Council to preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County.*
- *HCL8 Objective 1: To protect, preserve and improve Views and Prospects of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places*

10.3.1.1.2 Views and Prospects

The SDCC Plan, as well as the Landscape Character Assessment, includes views and prospects. The SDCC Plan notes that there are many scenic views and prospects. The SDCC Plan distinguishes between these as follows:

Views, which are more localised views, and Prospects, which relate to prominent landscapes or areas of special amenity or special interest that are widely visible from surrounding areas. It notes that views from prominent public places will be protected.

A review of views within the study area indicates two views in proximity to the quarry development. These views are indicated on the SDCC Plan Maps and shown in Figure 10.2 above. A protected view on Tay Lane lies to the northeast of the site, while another protected view lies to the southeast of the site along Windmill Road and are indicated on the map.

The nearest view is located on a short section of the L6065 Windmill Road just along the Site's south eastern end boundary.

The mapped location of the Windmill Road protected view is obstructed is by trees, thus impeding any potential view. However, the intended view can be partially experienced nearby from minor gaps within the roadside vegetation to the west of the mapped scenic view location as illustrated below in Figure 10.2. however this view is not in the direction of the site and is not considered further



Figure 10.3: Views west of mapped Scenic View on Windmill Road

A view is also located to the west of Rathcoole, on Tay Lane. This view is towards the west, with arable land in the foreground, and views of gently rolling hills of Athgoe, and Windmill Hill. The quarry is visible from this view and this is included in the Viewpoint list (Viewpoint 1).

The SDCC Plan includes a list of 18 Prospects, which are prominent hills or mountains which are widely visible from surrounding areas. A total of 18 prospects are listed in the SDCC Plan and 16 are listed in the SDCC Landscape Character Assessment.

A total of five of these hills are prospects located within the study area, with the most prominent being Saggart Hill. The existing quarry site and is located on the northern side of Windmill Hill. These prospects listed within the study area include:

- Athgoe Hill;
- Bustyhill;
- Windmill Hill;
- Lugmore/Tallaght Hill; and
- Saggart Hill.

There may be some limited visibility of the southern ridgeline of Windmill Hill from more distance (over 11km) prospect hills within the Dublin Mountains to the southeast edge of the council area however it is unlikely there is any visibility of the quarry development at this distance.

(The SDCC Plan Landscape Character Assessment also includes some views for consideration; however, it should be noted they do not appear in the SDCC Plan). Only one view is within the study area, that from the Grand Canal (all canal length) which emphasis views along the canal and towpath.

10.3.1.2 Kildare County Development Plan 2017-2023

The western and southern parts of the study area lie within the rural landscape of Kildare County Council (KCC). The various policies in relation to landscape character, protection and enhancement of the landscape through the county are found within the Kildare County Development Plan 2017-2023 (hereafter referred to as the KCC Plan), specifically Chapter 14 Landscape, Recreation and Amenity. Policies relevant to the proposed development are outlined below.

The KCC Plan notes that there are many scenic routes across the county which provide views of the landscape of the county and many built and archaeological features. Additional protected views include those along river and canal corridors and from hills. Views are listed on Table 14.5 and Maps 14.2 and 14.3 of the KCC Plan.

Policy: 14.9 Scenic Routes and Protected Views

- *14.9.1 Scenic Routes It is the policy of the Council to: SR 1 Protect views from designated scenic routes by avoiding any development that could disrupt the vistas or disproportionately impact on the landscape character of the area, thereby affecting the scenic and amenity value of the views. SR 2 Review and update all Scenic Routes and Views in the county during the lifetime of the Plan (Tables 14.5 – 14.10 refer)*
- *14.92.2 Water Course and Canal Corridor Views: WV2 Preserve and enhance the scenic amenity of the river valleys and canal corridors and the quality of the vistas available from designated views.*

A total of three scenic routes (10,11,12), one hill view and two views along the Grand Canal (GC1, GC2) are within the study area, and listed below. These are illustrated identified in Figure 10.3 below with the approximate Site location also indicated.

Scenic Routes:

- No.10 - Views of the West Plains on the Oughterard Road (L2009)
- No.11 - Views of the Upland Areas on the Oughterard Road (L6018)
- No.22 - Views to the North-West of the Open Countryside; from Kilteel Village to Rathmore Village

Hill Views;

- Cupidstownhill

Canal Views;

- GC1 - Old Grange Bridge Old Grange
- GC2- Henry Bridge Clonaghris

The visual assessment considers the potential effects of the Development upon the nearest scenic route No. 11. Scenic Routes 10 and 22 are focussed to the west, and north-west, away from the site. The canal views are not likely to have visibility and are not considered further.

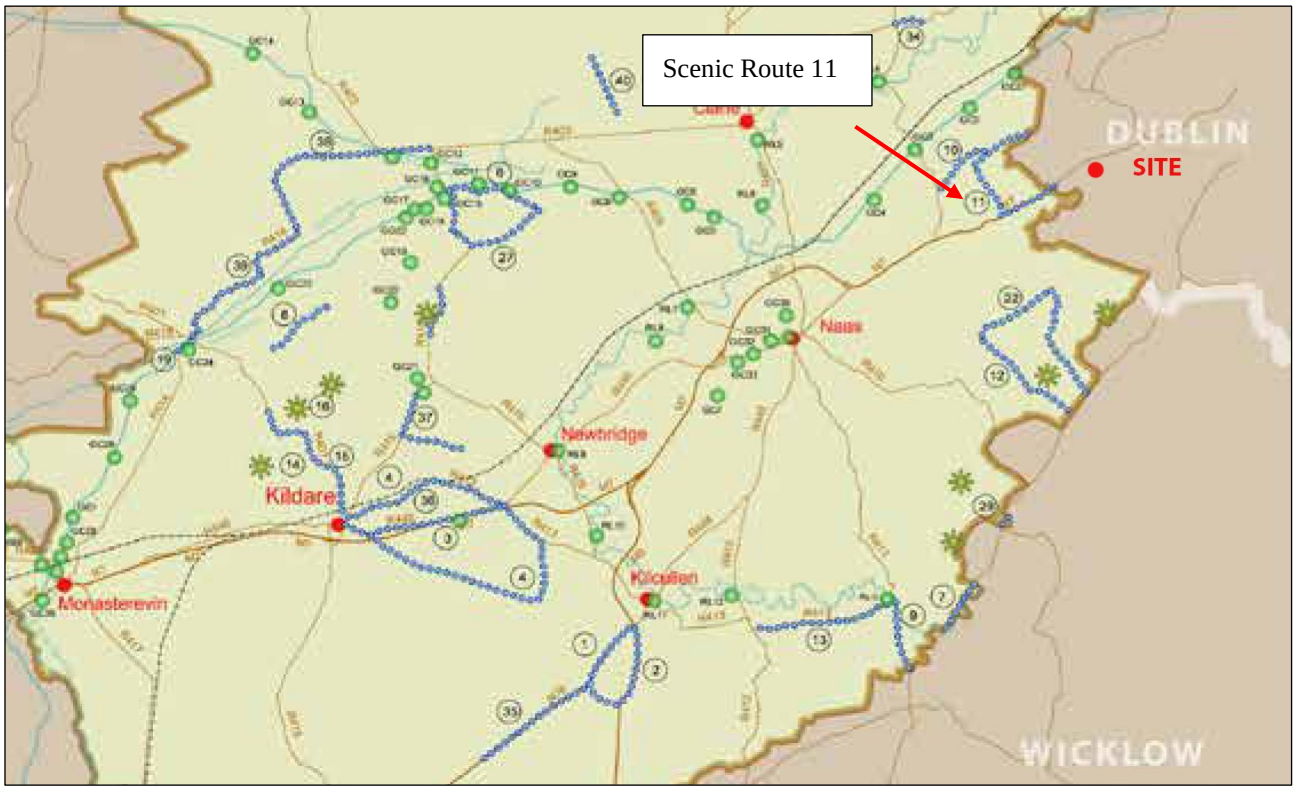


Figure 10.4: Scenic Routes and Viewpoints. Source: Kildare County Council

10.3.2 Landscape Character Assessment

In 2015, South Dublin City Council carried out a Landscape Character Assessment of South Dublin County (hereafter known as the SDCC Assessment). The study area (within 5 km radius of the site) includes three of these Landscape Character Areas (LCAs). They include the Athgoe and Saggart Hills LCA, Urban South Dublin LCA and Newcastle Lowlands LCA. However, the site and its immediate vicinity are included in the Athgoe and Saggart Hills LCA. The Site is shown in the LCA map in Figure 10.4 indicated by a red dot.

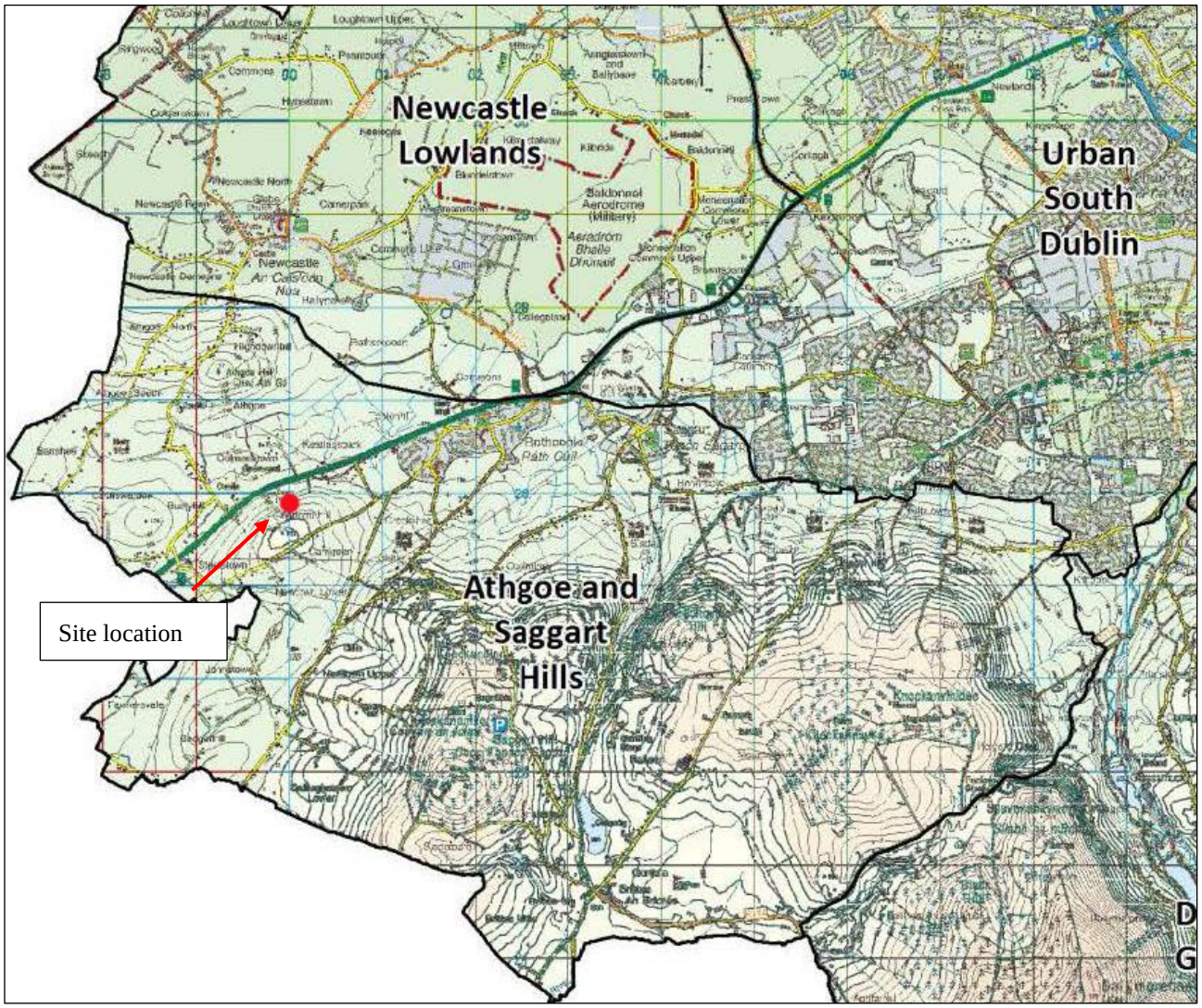


Figure 10-5: LCA Map with site. (Source: SDCC)

Further detail on each LCA is provided in the SDCC Assessment document itself. The Proposed Development falls within the Athgoe and Saggart Hills LCA which the Assessment describes the key characteristics as:

- Enclosure varies between open and expansive on hills such as Athgoe, Saggart Hills to more enclosed, intimate areas defined by narrow rural lands on slopes with high earth banks and hedgerows;
- Long views across surrounding lowlands to the north and east;
- Round pillars associated with vernacular style;
- Sheep grazing; and
- Field boundaries medium to large rectangular pattern and evidence of removal and rationalisation of boundaries relatively recently.

The landscape values noted in the SDCC Assessment are as follows:

- pNHA designations;
- prehistoric megalithic ritual landscape;
- scenic routes and extensive views; and

- recreational uses -golf course, equestrian and walking activities.

Landscape Value and Sensitivity, as well as visual sensitivity, and the landscape capacity, are also set out in the Assessment. It should however be noted that the GLVIA (2013) regard Landscape Sensitivity as related to the type of development and therefore can vary depending on the type of development being considered. . The SDCC Assessment states the following:

- Landscape Character Sensitivity – Medium-High.
- Visual Sensitivity: High
- Overall landscape Sensitivity: High
- Landscape Value: High

The sensitivity of the site, which is on the side of Windmill Hill, a prospect, to quarrying, an activity which typically extracts material from the ground and can change local topography is potentially of High sensitivity but this is considered more fully in Section 10.5.

Co. Kildare

A Landscape Character Assessment for County Kildare was carried out and this identifies the nearest Landscape Character Area as the Eastern Transition LCA, west of the site. The key characteristics are as follows:

- Located between the between the County Kildare uplands and lowlands;
- Undulating topography with a series of small hilltops;
- Long distance views of Kildare lowlands, eastern uplands and the skyline to east is defined by the Wicklow hills; and
- Predominantly pastureland use with some blocks of coniferous forestry and
- Dense rural population across small settlements and clusters of rural dwellings.

The parts of the LCA closest to the site would have some visibility of the site as shown in Section 10.5.2.

10.3.3 Landscape Character

Landscape character is described in terms of landform (topography and drainage) and landcover (vegetation, built form, natural and cultural heritage. The Site (which is the EIAR project boundary) and immediate surrounds are described separately from the wider landscape.

10.3.3.1 Topography and Drainage

10.3.3.1.1 Wider Landscape

The topography of the wider landscape is influenced by a number of relatively low but nonetheless noticeable hills (ranging from approx.170-395mAOD) which lie on a larger, relatively elevated plain, as seen in the OSI Discovery Map. The N7 runs northeast/southwest through this elevated plain.

Windmill Hill lies immediately southeast of the Site, and the hills of Badgerhill, Knockananiller and Saggart Hills lie further to the southeast. Hills are also found to the northwest, with Bustyhill and Castlewarden the closest hills, and Athgoe Hill lies further north. Several rivers or streams run off the hills, with the Griffin River rising near Athgoe Hill and running to the east, wand a number of unnamed streams are shown to the southeast of the site, at Newtown Upper, Newtown Lower and Redgap.

10.3.3.1.2 Site and immediate vicinity

The Site and the immediate surroundings (as seen on the EIA project boundary) is defined by its location on the north-eastern slope of Windmill Hill. The quarry face is currently approximately 50m north of the peak of Windmill Hill.

Across the existing quarry the current elevation levels greatly vary between approximately 215m along the top of the southern quarry face down to 150m on the lowest point of the quarry floor.

Within the EIA project boundary, Windmill Hill slopes south from the hilltop (219 m) near the remaining windmill structure to approximately 205m OD along Windmill Road, and to the west to a level of 200mOD while the lands to the east slope to a height of approximately 180m OD at the lowest point. Lands to the north of the quarry slope from 160m, to approximately 144-147 m contour, just south of the N7 road.

10.3.3.2 Land Cover – Vegetation, Built Form and Cultural Heritage

10.3.3.2.1 Wider landscape

The landcover of the wider landscape compose of agricultural lands, interspersed with a number of areas of built form, but mainly rural in nature. The N7 lies just north of the Site, and runs northeast/southwest through a predominantly rural landscape. Fields range from large to relatively large, to smaller fields in the areas of Redgap and to the east of Athgoe Hill with some also evident at Keatingspark. A considerable area of woodland to the south of the site, denotes the boundary of the golf course, formerly the lands associated with Johnstown House.

In terms of built form, several areas in the wider landscape show small clusters of detached dwellings – south of the site along Windmill Road, some at Redgap, and further clusters to the north at Athgoe, and east of the site along the Kilteel Road. There is an expanding urban landscape further to the northeast of the site. The nearest settlement is the small town of Rathcoole which lies approximately 590m to the east of the site. This settlement consists predominantly housing estates which merge into the neighbouring Saggart on the periphery of Dublin City. Some 2km to the north is the small town of Newcastle with the large Greenogue Business Park and Baldoyle aerodrome located east of this settlement. The small village of Kilteel, within County Kildare, is approximately 3.44km to the southwest of the Site.

There are a number of industrial estate/storage units located within the wider rural landscape outside of the surrounding settlements and not far from the N7 road corridor. These include Blackchurch business park north of the N7, and a number of sheds on the location of the present day Barlon Industrial Park. These are on the northern side of the N7, west of the site. Several buildings which are today of an industrial nature at the end of the cul-de-sac road at Colemanstown, north of the site across the N7 road. To the east of the site, several large sheds are visible on the L-6065, which is currently a plant rental location.

There are several golf courses in the area, the Beech Park Golf Club southwest of the Site would have been the main recreational land use in the vicinity. Another golf club is at Castlewarden to the southwest of the Site, between the N7 and Castlewarden Road. Other recreational activity land uses include Coillte looped walks on the hills of Saggart/Slievethoul and Lugg lie southeast of the Site.

10.3.3.2.2 The Site (EIAR project boundary) and immediate vicinity

The quarry in the centre of the EIAR project boundary is only accessible from directly off the N7 road. The main components of the Site (all lands contained within the EIAR boundary) in landscape terms are as follows:

- Site entrance: A stone wall with pillars and gated separate entry and exit points;
- Buildings: A small office beside a weigh bridge, a large agricultural-type shed, and several smaller structures;

- Storage and loading area: Hard standing areas on the northern end around the existing buildings, used for processing, storage and loading of quarried materials, parking for vehicles etc;
- The excavation: An excavation of irregular shape in plan approximately 28.8ha in area at its upper perimeter, with steeply sloping rock faces of varying height (up to 56m) around the sides. The southern quarry face which follows the ridgeline of Windhill is particularly prominent when viewed from the north. Other sections of excavations within the existing quarry are much less visible from the surroundings due to the higher topography of the immediate land;
- Disturbed lands around the excavation: Areas of varying width around the excavation (between the excavation and the earth mounds inside the site boundary), variously stripped of topsoil, excavated to shallow depths, used for storage of material;
- Earth mounds. Mounds of earth have been formed inside the south east and south west boundaries of the (existing) site. and these are effective in screening the excavation and operations from the surroundings. The south east mound is high and angular in form. It is visible from the surroundings. The mound to the southwest is narrow and less prominent in the landscape;
- Agricultural lands: Outside of the existing quarry limits but within the EIAR site boundary are seven fields of varying sizes under pasture. The largest field located to the south of the site contains the base of the windmill tower on the summit of Windmill Hill. Only the three northern fields, covering approximately 5.19 hectares, are required for the proposed site extension to the existing quarry.
- Boundary vegetation: There are various lines of trees, hedgerows and gorse scrub along the various boundaries of the quarry with the adjoining agricultural lands. Some lines of coniferous trees along the quarries northern boundary near the quarry entrance along with small pockets of deciduous woodland.



Figure 10.6: Elevated view from the quarry's eastern end looking across the quarry and wider landscape



Figure 10.7: View of workings within western quadrant of quarry, facing north west face of quarry.



Figure 10.8: View of quarry face and floor along the south western boundary of the western quadrant of the quarry.



Figure 10.9: View of quarry floor and adjacent haul route, facing south, along south eastern boundary of quarry.



Figure 10.10: View of quarry face along the southwestern boundary.



Figure 10.11: Elevated view from the quarry's western end looking east across the quarry and beyond.



Figure 10.12: Roadside view of the Site's agricultural land which contains the remaining windmill structure.

10.3.3.3 Land Use

10.3.3.3.1 Wider landscape

Land uses in the wider vicinity include agriculture, several industrial parks/areas, scattered residential clusters, and recreation/leisure (golf courses). Transport is also a land use with the N7 a prominent feature of the baseline landscape.

10.3.3.3.2 Site (EIAR project boundary) and immediate vicinity

Land uses on site and immediate surrounds included quarrying on the Site, agriculture, and residential land uses. Some nearby land uses include small industry/commercial yards to the east and west of the Site.

10.3.3.4 Landscape Value/Sensitivity

10.3.3.4.1 Landscape Characteristics

The landscape value can be described in terms of value with reference to 'designated features' which are referred to in the current SDCC Plan, as well as values derived from its qualities which include quality, naturalness, cultural heritage, rarity, tranquillity, recreation value and accessibility.

The SDCC Plan notes that in this LCA 4 – Athgoe and Saggart Hills – is considered of High Value, and of Medium-High to High sensitivity. (As noted previously, the sensitivity of a particular landscape relates to the type of development proposed).

The values associated with the site and wider landscape are evident in the importance of the surrounding hills (Windmill Hill, Athgoe, Bustyhill and Saggart) as Prospects, which are important elements of the landscape when viewed from the surroundings – particularly from 'prominent public places' as notes in the SDCC Plan. Other evidence of value are the protected views in the vicinity which have views either towards the hills (Protected View from Tay Lane, northeast of the site, as annotated on Figure 10.2) or long-distance views over the rolling countryside. The remnants of historic landscapes are also considered to be valued features of the landscape.

More localised elements of landscape value evident in the immediate vicinity of the site include Windmill Hill itself (designated as a Prospect), the windmill tower which is a landmark, and the number of cultural heritage monuments located adjacent to this. The Site was not publicly accessible, and the quarry surrounded by agricultural fields and hedgerows which are not considered rare.

10.3.3.5 Visual Receptors

Potential visibility of the proposed extension is largely limited to those receptors located upon the lower lands to the north of site, as the ridgeline of Windmill Hill, vegetation along L6065 Windmill Hill road and some existing mounds help screen receptors views from the south of the study area.

Despite the close proximity to the site a number of receptors will have no or very limited views of the Proposed Development, including those on L6065 Windmill Hill Road which bounds the site (Viewpoints 5 and 7), L8040 Keatings Park and some directly north of the N7 where views are screened by topography and/or vegetation. Potential views from the N7, near to the Site entrance, are similarly limited by the same factors.

Receptors with the clearest visibility of the Proposed Development will be those where the existing quarry face and ridgeline of Windmill Hill is already clearly visible within these receptors' existing views. Such views are typically experienced by road users or residences located along the local road network north of the Site, such as those including along Tay Lane (Viewpoint 1); Colemanstown Lane (Viewpoint 4); L6002 Athgoe Road (Viewpoint 10); Old Chapel View Road (Viewpoint 11) and L6018 Puckstown Road (Viewpoint 12).

Potential visual receptors which would have the highest sensitivity to the Proposed Development will include views from residences along the local road network and edges of settlements. Less sensitive receptors would be those road users through the surroundings roads, in particular those travelling at speed along the N7 will have low sensitivity, workers or recreational activity within the small settlements will have low to medium sensitivity.

Twelve viewpoints were selected for the visual assessment which are representative of a range of receptors. These viewpoints are listed in Table 10.6 and Section 10.4.2.

10.4 Proposed Development

The main elements of the proposed development will consist of:

- Continued use of the existing quarry (26.87 ha) and further expansion of the quarry by 4.1ha (extracted area) along the northern boundary;
- Removal of three agricultural fields over 5.1ha area (extraction and buffer boundary area) for the proposed site extended area;
- Removal of trees and scrub on internal field boundaries;
- Creation of mounds around the boundary edges using the site's cleared earth;
- Implementation of the landscape planting along the boundary edges and internally as part of the proposed mitigation and restoration measures; and
- Lifetime of quarry to occur over next 10 to 15 years, depending on market conditions with a further 2-5 years for restoration.

10.5 Proposed Landscape Mitigation and Remediation Measures

The proposed approach to landscape mitigation and remediation has been informed by (a) the existing effects of the quarry and the historic remediation measures implemented on site, (b) the potential effects of further

quarrying at the site (i.e. the Proposed Development), and (c) consideration of the relevant policy in the SDCC Plan.

The landscape mitigation and remediation measures will seek to provide visual screening of the existing quarry and proposed development from nearby visual receptors. The landscape proposals will also enhance the biodiversity and ecosystem services delivery of the site in comparison with the surrounding agricultural lands.

Details of these mitigation measures are illustrated in Appendix 10.1 Figure 10.26 (Drawing 214201-1-101/B).

Measures to be implemented prior to the excavation of the proposed site and during its operational phase are:

- Management/Improvement of the retained site boundary hedgerows and trees: Generic improvements and spot fixes to be made where required to optimise the health of the hedgerows, their biodiversity value and visual screening function;
- Reprofiling of the existing mounds on the south eastern and southwestern boundaries of the Site, where required, in order to help reduce the prevalence of these structures on views within the locality;
- Woodland planting added to existing and new earth mounds (within the Proposed Development). These will be planted with a woodland species mix (including tree and shrub species), to form a substantial belt of woodland along the hillside. This will soften the form of the constructed mound, add to the height of the mound as a visual screen, and contribute to vegetation/habitat in the landscape generally; and
- Annual review/management of the new boundary planting to ensure that it becomes established and provides adequate visual screening, with generic improvements and spot fixes (including supplementary planting or thinning) to be implemented where required.

Measures to be implemented after the cessation of quarrying include:

- Management/Improvement of site boundary hedgerows: A final survey and appraisal of the site boundary hedgerows in terms of (a) species mix - for biodiversity and maximum screening (height, density of foliage), and (b) intactness/continuity. Generic improvements and spot fixes to be made where required to optimise the health of the hedgerows, their biodiversity value and visual screening function;
- Management/Improvement of woodlands on the mounds: A final survey of the woodland planted earth mounds, with generic improvements and spot fixes (including supplementary planting, or thinning) to be implemented where required;
- Re-vegetation/colonisation of site outside of excavation: In accordance with current best practice recommendations the areas between the excavation and the woodland-planted earth mounds around the perimeter of the site will be allowed to re-vegetate/colonise naturally. This results in greater biodiversity and habitats most appropriate to the site conditions;
- Removal of built infrastructure: All buildings and redundant infrastructure to be removed from site and the lands prepared for natural re-vegetation/colonisation;
- Lake formation in quarry void to a level of 155mAOD: Engineered shallow areas on the floor of the quarry will initially provide islands and will ultimately be covered by water as the quarry fills to its natural level (determined by the water table), forming a permanent lake. The shallow areas will provide suitable substrate for aquatic invertebrates, with gentle grading of shoreline and marginal planting added (to be determined at the time, with the advice of an ecologist);
- Quarry benches: At a number of locations (to be determined at the time, with the advice of an ecologist) a mixture of trees and shrub species will be planted in an engineered substrate to form patches of habitat.

This will create a platform for a more diverse flora to develop naturally and provide habitat and food resources for birds, mammals, insects and other invertebrates.

- Quarry faces: Whilst recognising the geological heritage value of the exposed quarry faces, it is proposed that some native tree and shrub species be planted in/on fissures and ledges, to help break up the bare profile of the quarry face. Other plant species will be allowed to find and colonise the area by natural means and these will include various mosses, lichens, algae, ferns, flowering plants, etc. The gradually increasing plant diversity over time will in turn ensure that a corresponding diverse list of animal species (birds, mammals, butterflies and other insects, other invertebrates, etc.), can become established.
- Safety measures: An agricultural fence to be installed around the edge of the excavation, to act as a visual indicator of the edge and a physical barrier for people and animals. Signage as required around edges to notify of danger.

10.6 Assessment of Effects

10.6.1 Landscape Effects

The assessment of potential landscape effect considers the sensitivity of the landscape resource and the magnitude of landscape change which would result from the Proposed Development.

10.6.1.1 Landscape Sensitivity

The sensitivity of the landscape resource refers to the degree to which a particular landscape type can accommodate change arising from a particular development without detrimental effects on its character, quality/condition or value. The sensitivity of the landscape to development varies depending on the nature and scale of the development.

10.6.1.1.1 Wider landscape

Landscape Sensitivity of the wider Landscape Character Area is considered by the SDCC Landscape Character Assessment to be Medium-High to High. However, the GLVIA notes that Sensitivity is considered to be a combination of an area's landscape value and its susceptibility to change. The SDCC Assessment considers the Landscape Value to be High.

Several elements of high value are indicated in the Development Plan – namely the topography and hills in the area, and several open and expansive views of the hills and landscape, as well as elements such as cultural heritage features in the wider landscape. However, this study also identifies several elements of low landscape value in the area include the N7, and areas of industrial development.

10.6.1.1.2 Site and Immediate Vicinity (rEIAR project boundary)

Elements of high value on the Site and its immediate vicinity include the landmark which is Windmill Hill itself, which is an important part of the wider landscape and views, and also the windmill ruin itself, as well as and other features of cultural heritage interest on the hill identified by reference to the historic environment viewer (maps.archaeology.ie). The field boundaries and hedgerows are considered of Medium value. The quarry void itself is an operating quarry, would be considered of Low sensitivity.

10.6.1.2 Potential Magnitude of Landscape Change

Magnitude of change refers to the potential effects of the Proposed Development on the main elements, characteristics and values of the receiving environment landscape of the site and wider landscape.

10.6.1.2.1 Wider Landscape

The Proposed Development is located within and adjacent to the existing quarry which occupies a small portion of the Athgoe and Saggart Hills LCA. The proposed excavation will consist of the deepening of the existing

quarry floor and extending the quarry's limits further north consuming three former pasture fields. The scale of these changes will be localised and contained from the south by Windmill Hill. The magnitude of change of the development to the Athgoe and Saggart Hills LCA and wider landscape would be considered Low:

Change that is moderate or limited in scale, resulting in minor alteration of landscape receptors, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.

10.6.1.2.2 The Site

- The extraction of minerals by excavation results in alteration of the landform. At a local scale this is high magnitude. The Proposed Development would see the area of the application boundary of approximately 28.8ha being further extracted (including the extraction extent). The shape of the excavation area will remain irregular shape as the new land take follows the three existing field boundaries. The depth of the excavation would be increased to a level of 150m AOD; Several benches would be formed in the quarry faces (creating potential for habitat development in the future). New mounds will be added around the boundary edges of the new excavation areas. Some alternations to the form of the mounds on the southern boundaries is proposed as part of development in order to make them less conspicuous in the landscape. The landform of the agricultural lands within the overall site boundary but outside of the Proposed Development will remain unaltered.
- While the landform of the (enlarged) Site would be significantly altered, at a wider landscape scale this is less notable. The profile of the Windmill Hill ridgeline would not be altered as seen from the south. The loss of lands on the northern boundary will slightly increase the views of the quarry's southern rock face and new northern boundary mounds from the north;
- There would be some loss of woody vegetation in the form of the hedgerows and trees with the removal of field boundaries along the northern boundary of the existing quarry and the expanded site lands and one internal field boundary between two of the fields. The agricultural grassland will be stripped from all three fields within the extent of the proposed expanded site and the underlying soil used to create the boundary earth mounds;
- The landscape mitigation and remediation proposals include the planting of a belt of woodland on the retained and new earth mounds inside the site boundaries, and supplementation/improved management of existing hedgerows and treelines on the site; and
- In time there would be an increase in the volume and connectivity of woody vegetation on the site overall. On completion of quarrying activity, the remainder of the site (the areas between the earth mounds/woodland belts and the excavation, and the benches in the quarry walls) would be allowed to recolonise naturally, and the excavation would be allowed to fill with water to a level dictated by the water table. Ultimately, the site would develop a high diversity of habitats compared to the wider agricultural environs.

Overall, the potential magnitude of change of the development to the Site's characteristics would be considered Medium:

Change that is moderate in extent, resulting in partial loss or alteration of landscape receptors, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context.

10.6.1.2.3 Land Use

10.6.1.2.3.1 Wider Landscape

The primary land uses in the area are agriculture, extractive industry, residential, industrial, transport, and sports/recreation. There would be a loss of agricultural land (grassland/pasture) and a corresponding increase

in the area occupied by extractive industry (and ultimately habitat). At a landscape scale this change would be slight, i.e., the agricultural usage and value of the landscape would not be significantly altered.

10.6.1.2.3.2 The Site

There will be a loss of 5.19ha of pasture to accommodate the extended quarry. The remaining agricultural lands within the site boundary will continued to be farmed and not be directly affected by the Proposed Development. There would be no direct effect on residential land use in that the lands affected have no residential use or development potential (being removed from the road network).

The potential magnitude of change to land use can be considered low:

Change that is moderate or limited in scale, resulting in minor alteration of landscape receptors, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.

10.6.1.3 Significance of Effect

The significance of landscape effects is determined by measuring the proposed magnitude of change against the landscape sensitivity (refer to Table 10.3).

The potential landscape effects of the Proposed Development will be relatively localised, resulting in **Slight to Moderate,** adverse long term on the Landscape Character and landscape fabric of the site being greatest within the immediate environment. There will be a **Slight** adverse long-term effect on the land use with the increased area of mineral extraction. After the cessation of the quarry there will be some **Slight** beneficial long-term effects through the restoration of the lands to provide a diverse range of vegetation cover, habitats and water bodies, which will help improve the character of the site and immediate surroundings.

10.6.2 Visual Effects

10.6.2.1 Visual Receptor Sensitivity

Visual receptors of medium to high sensitivity include those at locations of scenic viewpoints (Viewpoints 1 and 12), viewpoints near residences and viewpoints which have a view towards Windmill Hill and could be considered as a Prospect as per the SDCC Plan.

There were no viewpoints considered along the N7 as the quarry is largely screened from view and vehicles are typically travelling at speed. Some 12 viewpoints from the surrounding area were chosen and reviewed to assist in the assessment of visual effects which have occurred. The locations are shown below in Figure 10.13 (and listed in Table 10.6) listed below:

It is noted that there is not full visibility from all viewpoints, however these viewpoints are consistent with the rEIAR viewpoints, and therefore are included to allow direct comparison between the rEIAR and EIAR.

Table 10.6: Viewpoint Location

Viewpoint	Description
1	View from South Dublin County Council Protected View on Tay Lane
2	View from Rathmill Green, Broadfield Manor housing estate
3	View from next to farmhouse along L8040 Keatings Park northeast of quarry
4	View from along Colemanstown Lane north of quarry
5	View from nearest group of houses south of quarry along Windmill Road

6	View from group of houses along Windmill Hill Road west of junction with Carrigeen Lane
7	View from next to group of houses along Windmill Road to the southwest of quarry
8	View from edge of a group of houses along Rathcoole Hill Road at junction of Carrigeen Lane
9	View from along L6044 Oweneen's Lane
10	View from group of houses along L6002 Athgoe Road
11	View from group of houses along Old Chapel View Road
12	View from Kildare County Council Protected route on L6018 Puckstown Road

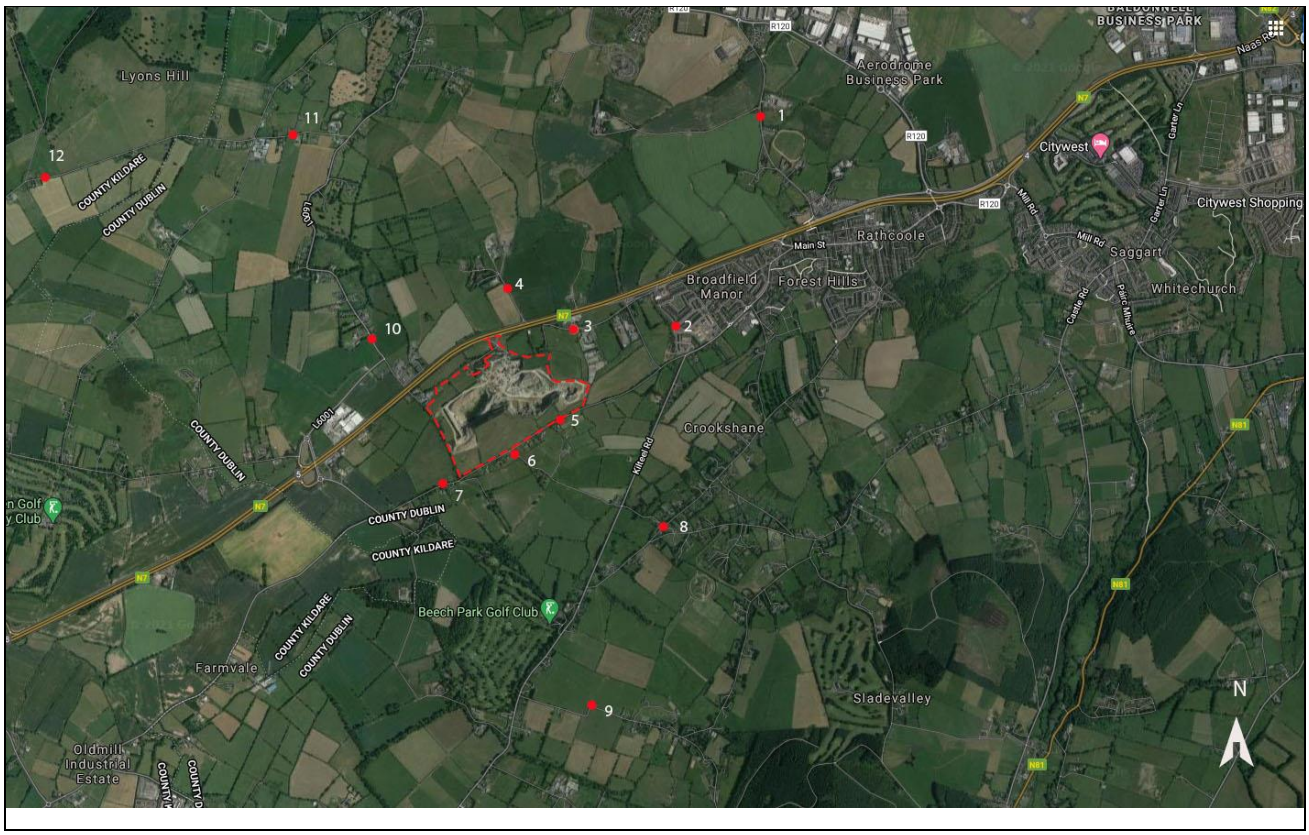


Figure 10-13: Viewpoint Locations. Image Source: Google Maps 2021

10.6.2.2 Viewpoint Assessment

The viewpoint assessment considers the potential visual effects of the Proposed Development upon the existing views of visual receptors identified within Table 10-6 above and in Figure 10-13 and summarised in Table 10-7 at the end of this section.

Viewpoint 1 –South Dublin County Council Protected View on Tay Lane.

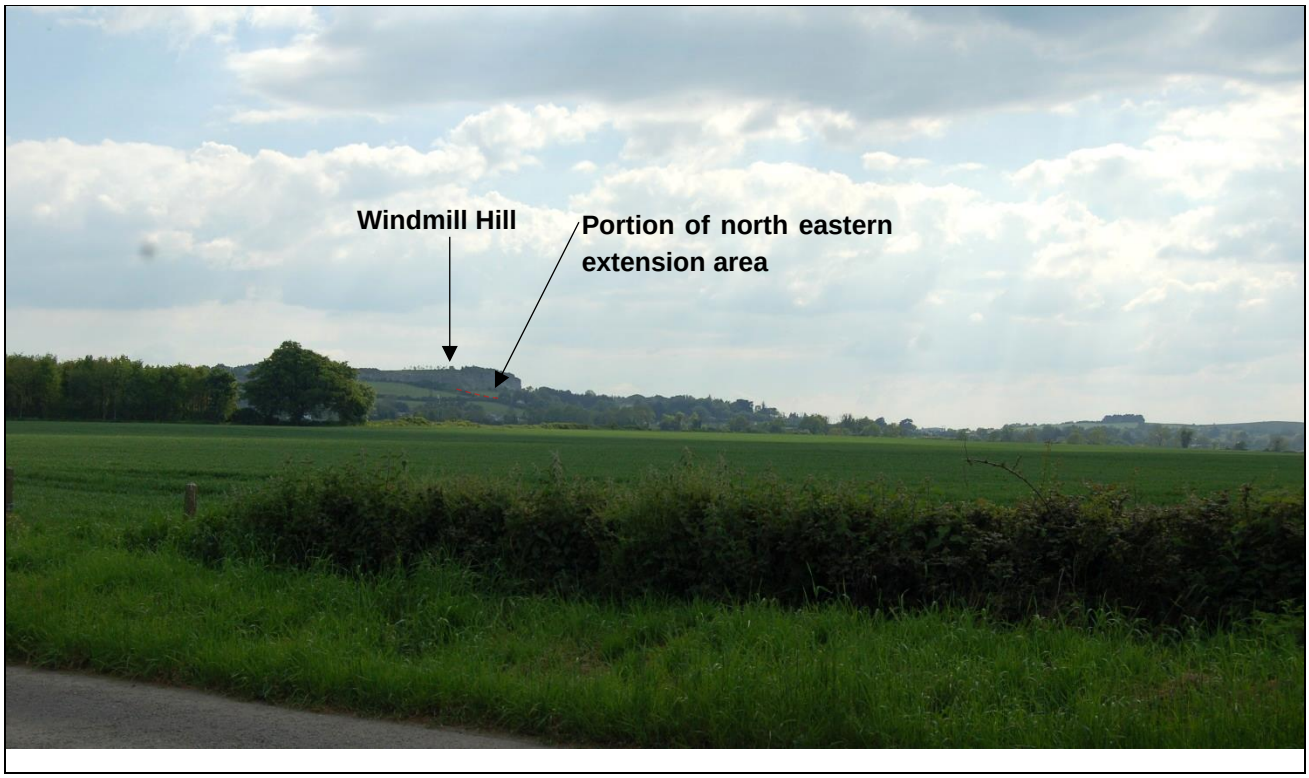


Figure 10.14: Viewpoint 1–Existing View

Existing View

A lack of high field hedgerows allows panoramic roadside views across the large field and towards the outline of hills in the background towards the west and south. Amongst these hills the existing quarry is distinguishable by its pale rock face along the ridge of Windmill Hill. Only the north eastern field of the proposed extension area is partially visible below this rock face, as the other Proposed Development lands are fully screened by the trees within and surrounding the quarry. The remaining windmill structure is visible on the summit of Windmill Hill, directly south of the quarry's edge.

Proposed View

The visibility of the existing quarry's southern rock face will be slightly increased due to the loss of the agricultural field within the north eastern proposed extension area. The new mounds and woodland planting along the edges of the same site boundary will further reduce views as the planting matures.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered High (designated protected view).

Magnitude of Change

The magnitude of change is considered Low. Low is "*Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context*".

The loss of the north eastern field within the proposed extension area will open up views of quarry's southern rock face. Trees will be removed along the northern boundary of the existing quarry but changes within this view are likely to be barely perceptible due to screening by the proposed site's retained trees nearer to the quarry

entrance. Addition of new mounds and woodland planting along the edges of the same site boundary will further reduce views as the planting matures.

Significance of Visual Effect

The significance of the visual effect is **Moderate-Slight**. The quality of the effect is considered adverse, medium term. These effects will reduce to **Slight** and beneficial as the boundary planting matures helping to further screen both the extended and the existing quarry rock face.

Viewpoint 2 – Rathmill Green, Broadfield Manor housing estate`

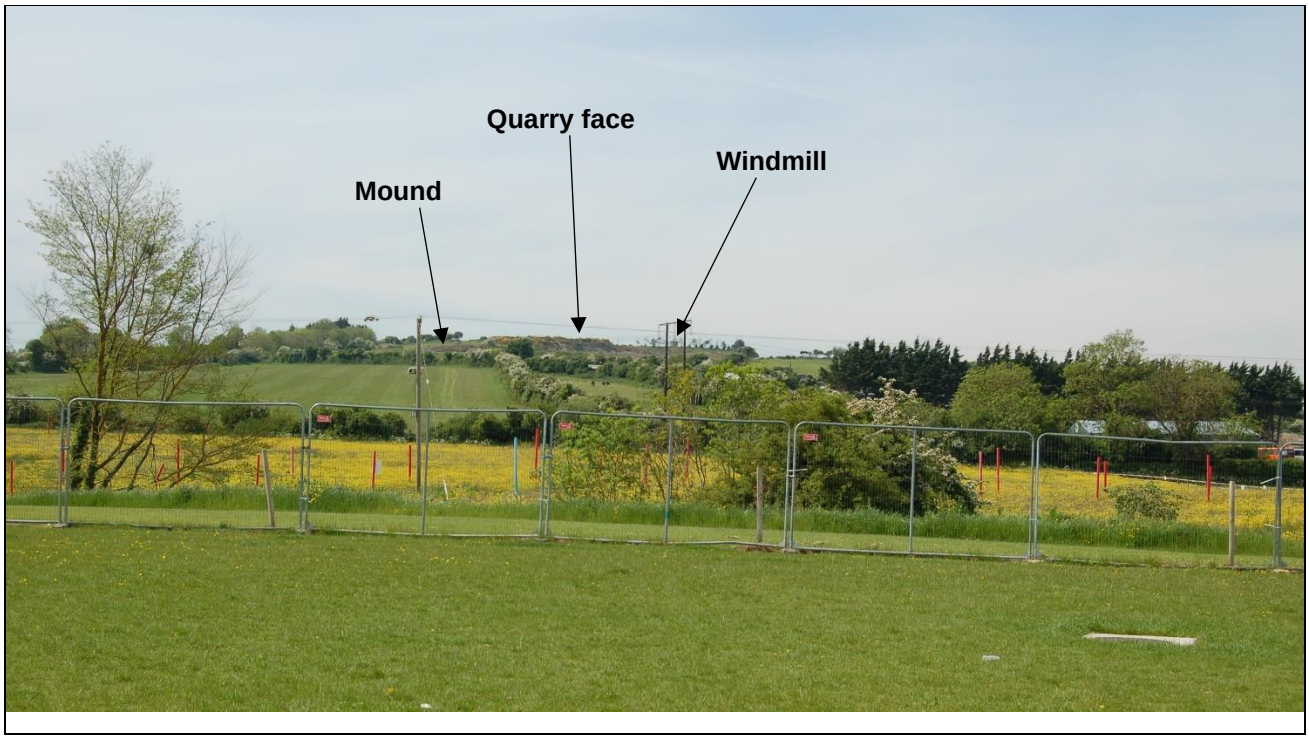


Figure 10.15: Viewpoint 2– Existing View

Existing View

The view is from the small amenity space between the houses of Rathmill Green and Brookfield lawns, which is contained by the temporary security fencing. Beyond the fencing is the surrounding farmland which raises west towards the summit of Windmill Hill in the background. In the middle ground are partial views of sheds and vehicles within the industrial units on L6040 Keatings Park. Partial views of the Site's worked quarry face, south eastern boundary mound and boundary vegetation along with the remaining windmill structure on the ridge (through the electricity post in the centre) are visible in the background. The majority of the quarry is not visible due to topography.

Views from the adjacent groups of houses tend to be partially obscured by the trees along the small stream flowing past the amenity space with more open views experienced from upper floors.

Proposed View

Views will be limited to the existing mound and small portion of rock face. The mound will be the regraded of the mound, where required, to help reduce its jagged appearance and planted with a woodland mix to soften its form and in time mature to form a belt of woodland on the upper flank. The exposed rock face will similarly be softened by natural regeneration.

Visual Receptor Sensitivity

Visual Receptor Sensitivity is considered to be Medium. The view is from a residential area but is not considered of high scenic value.

Magnitude of Change

The magnitude of change is considered Low. "*Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context".*

The new woodland planting mix on the south eastern boundary mound will help reduce the visibility of an existing mound and provide new block of woodland on part of the hill.

Significance of Visual Effect

The visual effect is considered **Slight.** The quality of the effect is considered beneficial effects, long term. As the current views of the mound will be improved by the proposed regrading and as the woodland planting matures along with natural regeneration along the rock face.

Viewpoint 3 – Farmhouse along L8040 Keatings Park

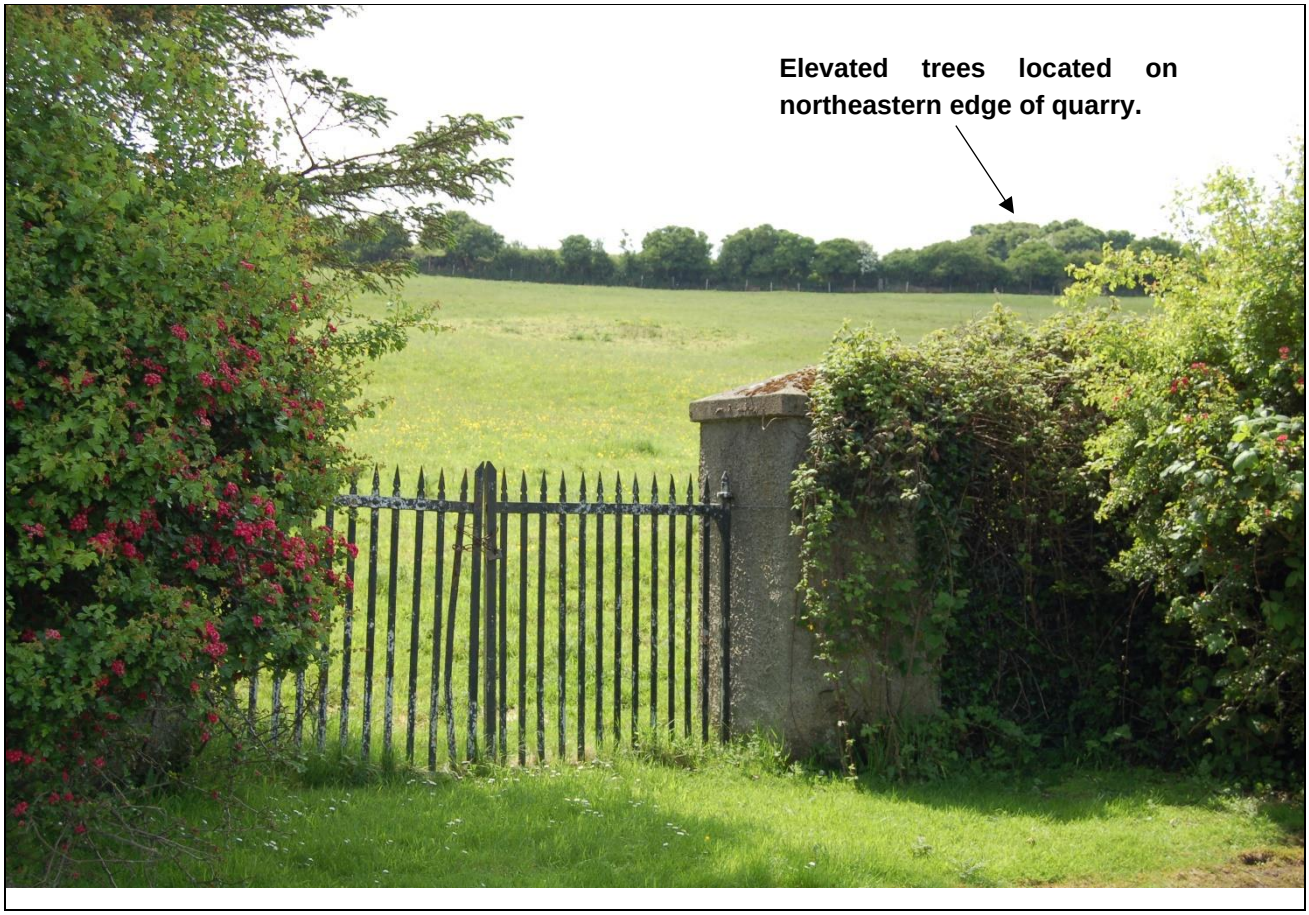


Figure 10.16: Viewpoint 3– Existing View

Existing View

The view is taken opposite Keatings Park House, to the northeast of the quarry. Outward views from the house are heavily restricted by the mix of walls and hedgerows along the garden and opposite side of the laneway. The field gate in the foreground provides views into the neighbouring fields which rises up towards the southwest

in the direction of the existing quarry. However, the intervening field hedgerow in the middle ground greatly screens views of the site boundary. The only visible elements of the Site are the upper portions of a group of trees on the quarry's far north-eastern boundary which peer above the intervening hedgerow.

Proposed View

The extended quarry would remain screened by the topography and dense field hedgerows. Proposed woodland planting mix on the new north-eastern boundary mound would ultimately mature and become partially visible behind the existing high field hedgerows.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium.

Magnitude of Change

The magnitude of change would be negligible.

The additional mound and woodland planting mix to the internal boundary will have limited visibility behind the existing field boundary.

Significance of Visual Effect

The visual effect is considered to be **Not Significant;** the quality of the effect is considered neutral, long term. As there is no significant effect on the composition, character or quality of the view.

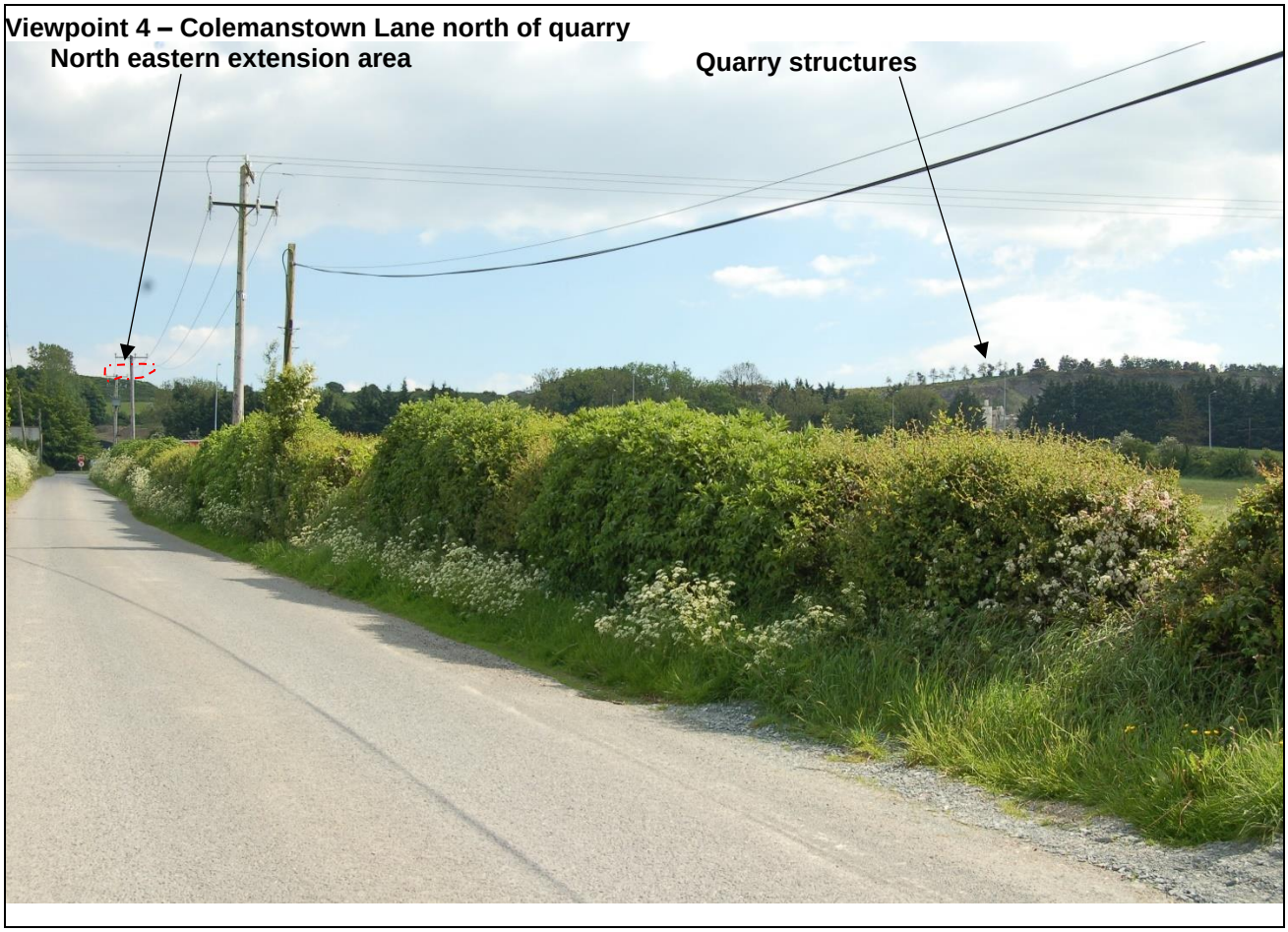


Figure 10.17: Viewpoint 4– Existing View

Existing View

The existing view looks north towards the N7 road and the Site directly beyond the road in the background. Views of the N7 road and its' traffic are partially screened by the hedgerow opposite, the route is clearly defined within the middle ground by the street lighting.

The single agricultural field within the north eastern end of the proposed extension area is partially visible through gaps in the trees lining the roadside and field boundaries. The existing quarry is largely screened by the topography. The ridgeline of Windmill Hill and existing quarry's upper southern rock face are visible in the background peering above the lower hillside, trees and hedgerows. Some of the quarry's processing plant structures are partially visible between a gap in the tree cover.

Proposed View

The view will consist of the expansion of the existing quarry over the one agricultural field located in the north eastern proposed extension area, resulting in greater visibility of the quarry within the landscape than at present. As the Proposed Development progresses, it will result in notable quarrying activity across the proposed extension area resulting in a lowering of the current ridge and topography of this field providing greater views of the existing quarry and towards its southern rock face. The new northern mound and woodland planting mix will help to enclose the works. In time as the planting matures it will form a belt of woodland which will reduce views into the quarry.

Views will be experienced by road users including local residents along the laneway on approach to the N7. Potential views from the group of residences located at the end of the same laneway, approximately 120m northwest of the viewpoint, are fully screened by their garden hedgerows and other houses.

Visual Receptor Sensitivity

Views will be experienced by road users walking or driving towards the N7 road. The visual receptor sensitivity is considered to be Medium, representing road users (primarily residents) travelling at slow speeds at a viewpoint which is pleasant but not highly scenic. (It should be noted that in selecting this viewpoint, consideration was also given to potential views from a group of residences located at the end of the same laneway, approximately 120m northwest of the viewpoint, but these appear to be fully screened by their garden hedgerows and other houses.) Viewers closer to the N7 road would not experience open views.

Magnitude of Change

The magnitude of change in this view is considered Medium:

"Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context".

There will be a notable loss of one field currently under pasture, some trees and scrub removed on the fields southern boundary and alternations to the landform resulting from the quarrying activity within the proposed extension area. Additional mound and woodland planting mix will be added to the proposed extended area's eastern, northern and western boundary edges.

Significance of Visual Effect

The visual effect is considered a **Moderate-Slight,** the quality of the effect is considered adverse, medium term. These effects will reduce to **Slight to Not Significant** as the boundary mound planting matures reducing views. Any potential views will only be experienced temporarily in passing by the road users on the laneway (approaching the junction).

Viewpoint 5 – Nearest group of houses south of quarry along Windmill Road



Figure 10.18: Viewpoint 5– Existing View

Existing View

The existing view, next to the property entrance, looks across the road to the high vegetated bank marking the Site's southern boundary with the road. Some gorse covered mounding is visible in the centre of the view above the field boundary. However, the main orientation of the residence is facing away from the proposed site.

All roadside views looking north from the group of residences are contained by their lower elevation below the road, the planting within their gardens and the gorse lining the site's southern boundary. Some partial views of the outline of Windmill Hill and the remaining windmill structure are possible through gaps in the roadside vegetation. Similarly, road users are hindered by the same roadside vegetation with only occasional glimpse towards the Site through small breaks in this vegetation cover. The existing quarry is not visible as it is set behind the hill's ridgeline.

Proposed View

Potential views of the proposed extended site from this group of residents will be fully screened by Windmill hill's ridgeline. The limited visibility of the existing boundary mounds from the end residence would appear further softened by the woodland planting along them. As the planting matures it will further reduce the visibility of the mound. Similarly,

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium as the road is considered scenic with long distance views glimpsed between gaps in the hedgerow, and the location is close to a scenic view and a cluster of houses. There is potential visibility, similar to this view, from the grounds of the nearest dwelling.

Magnitude of Change

The magnitude of change is considered Low:

"Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context".

The only change would be the slight altering of the shape of the existing mounds within the Site's south eastern boundary and planting them up with a woodland mix which as it matures will soften these structures appearance.

Significance of Visual Effect

The visual effect is considered **Not Significant,** the quality of the effect is considered neutral, long term. As the improvements to the view will be barely perceptible from this single resident and road users. An element of professional judgement was applied to the guideline Matrix outlined in Table 10.3.

Viewpoint 6 – Group of houses along Windmill Road west of junction with Carrigeen Lane

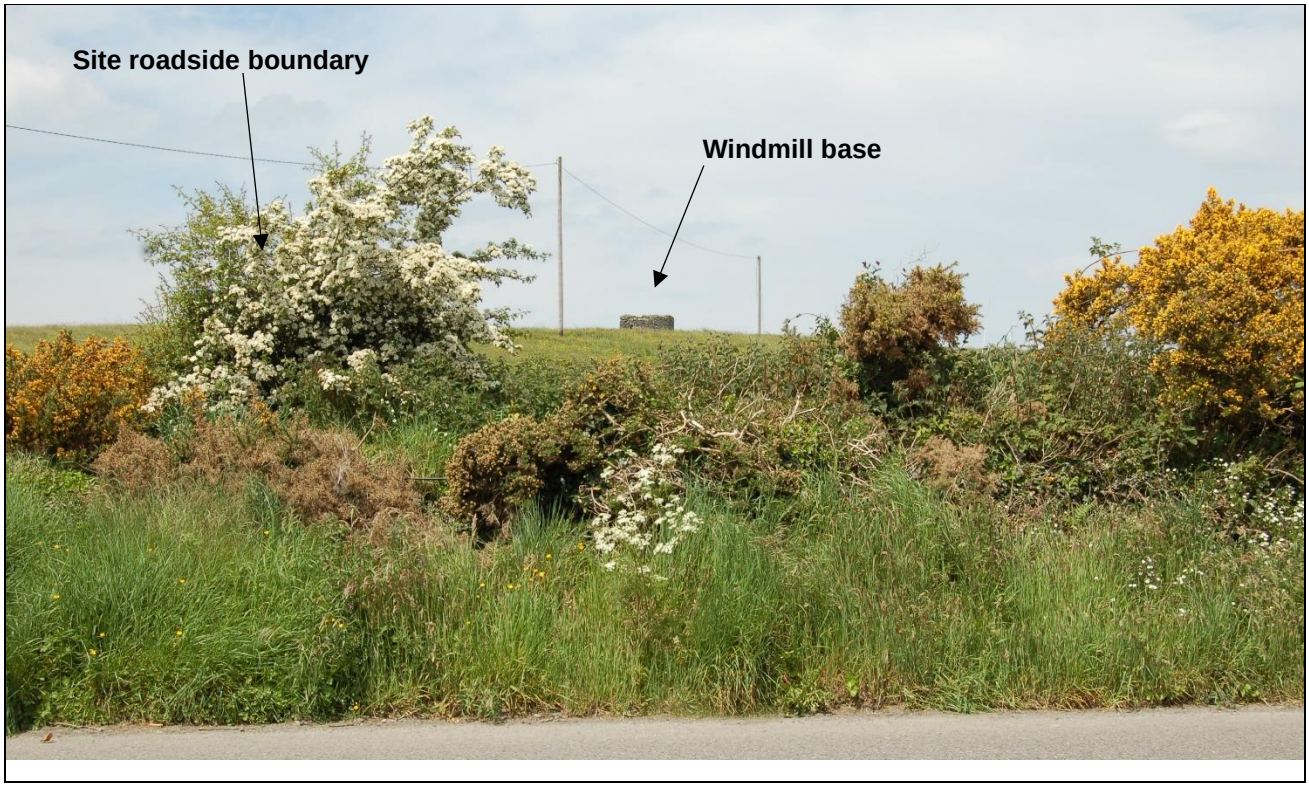


Figure 10.19: Viewpoint 6– Existing View

Existing View

This view is from the junction of Carrigeen Lane looking onto Windmill Road. (Note four houses are located to the left of the junction but not visible in the view). A large sloping agricultural field is seen behind a low hedgerow, and the remains of the windmill structure is visible on the summit of the hill. This land falls within part of the southern part of the Site boundary.

Of the four houses, only the one on the far western end has any views of the existing quarry or Proposed Development, not shown in the above view. Such views will consist of partial first floor views looking through the roadside trees and scrub towards the quarry's disturbed grounds and mound on its southwestern edge along the hill's ridgeline.

Proposed View

The Proposed Development would remain screened by the ridgeline of Windmill Hill. Additional mitigation hedgerow and woodland planting mix will be visible along the south western end of the existing quarry edge.

This planting will mature providing a dense field hedgerow boundary along the flanks of the hill and reduce visibility of the mounding. These changes will only be visible form the first floor views of the end residential receptor. The remaining residents within the group and road users will not be affected as any potential views are fully screening by the roadside vegetation.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be High –views would be experienced by local residents in the adjacent houses and there are clear views of the Windmill ruin on the summit of the hill which is regarded as a Prospect in the development plan and is a landmark in the local landscape.

Magnitude of Change

The magnitude of change is considered Low:

"Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context".

The new hedgerow and woodland planting on the south western boundary will add a new hedgerow to the hillside which will add an enclosure between the field and existing quarry but has limited visibility from this group of residential receptors.

Significance of Visual Effect

The visual effect is considered **Moderate-Slight** upon the single affected residential receptor. The quality of the effect is considered neutral, long term.

Viewpoint 7 –Group of houses along Windmill Road to the southwest of quarry



Figure 10.20: Viewpoint 7– Existing View

Existing View

This view is taken from a relatively narrow road with a rural character ((Windmill Road). A short break in the predominantly high roadside hedgerow allows views towards a dwelling, which partly screen the ridgeline of Windmill Hill. To the left of the house, the ridgeline of the hill is marked by gorse, and a hedgerow marking the existing quarry's western boundary edge, although there are no views of the quarry itself. Trees and vegetation are seen to the rear of the dwelling.

Proposed View

The Proposed Development will not be visible from road users as views are screened by the existing boundary vegetation and adjoining house.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium, as it represents road users along a local road with some scenic qualities and a pleasant rural character. This section with a more open view is a short section in a predominantly vegetated roadside.

Magnitude of Change

The magnitude of change is considered None:

Significance of Visual Effect

The visual effect is considered to result in **No Change.**

Viewpoint 8 – Group of houses along Rathcoole Hill Road at junction of Carrigeen Lane

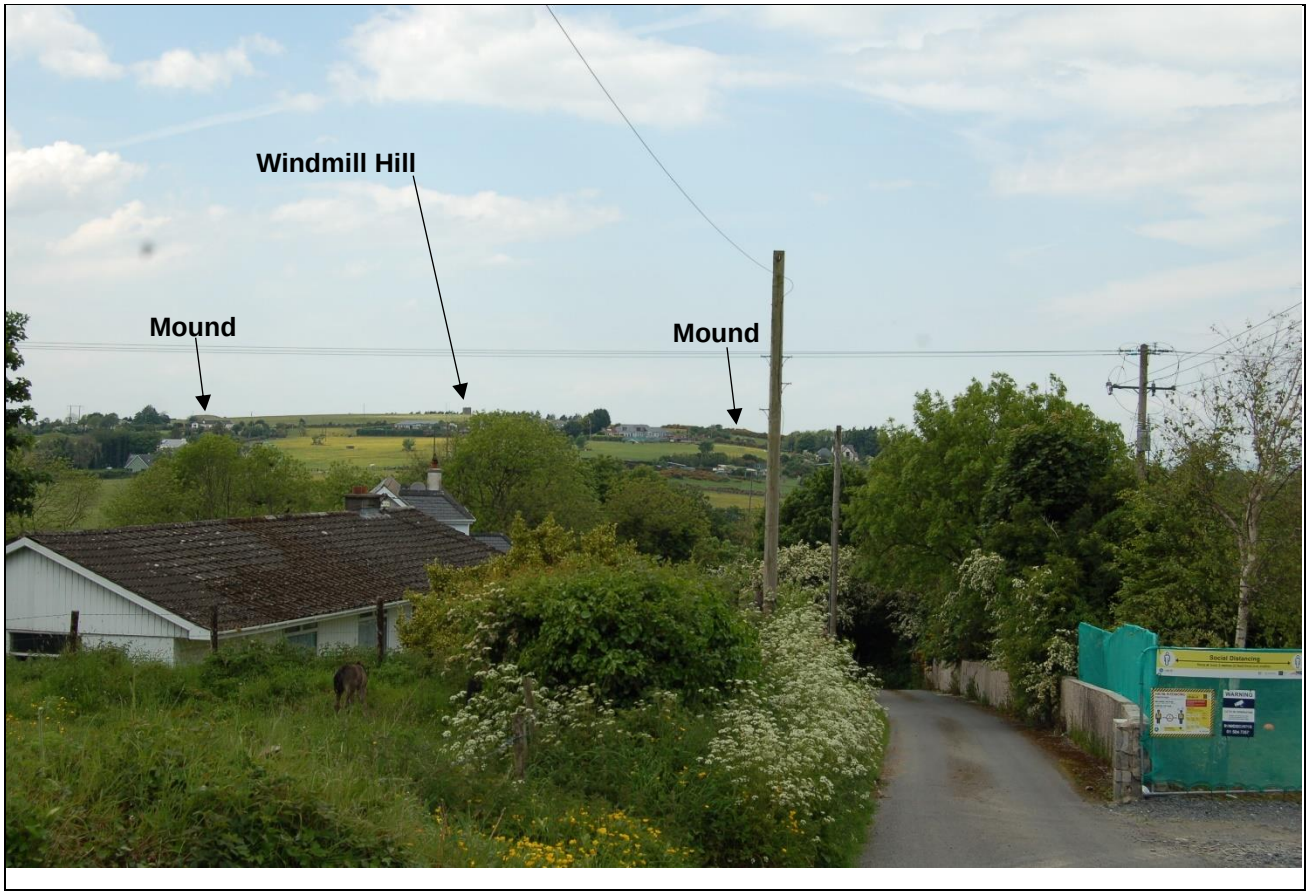


Figure 10.21: Viewpoint 8– Existing View

Existing View

The road junction provides views across the undulating agricultural lands towards the ridgeline of Windmill Hill, with the remaining windmill structure visible in the background. The existing quarry is largely hidden from view by the ridgeline, except for the bare mounds on the south western end and gorse covered mounds on the south-eastern site boundary, but somewhat distant. The visibility of the existing quarry's north-eastern worked face is apparent from the rear of some of the houses along the northern end of the Rathcoole Hill Road and within 450m east of this point.

Proposed View

A woodland planting mix will be added to the existing visible mounds on the south eastern site boundary. As the planting matures it will soften these structures within the view and add a small woodland cluster along the flanks of the hill. Potential views of the Proposed Development from the road and group of residents will be fully screened by Windmill hill's ridgeline.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be High as it represents road users along a narrow rural road, with good views towards Windmill Hill which is a Prospect in the SDCC Plan. It is also taken at the entrance to a dwelling which is slightly elevated with good views towards the site.

Magnitude of Change

The magnitude of change is considered Negligible, with the mounds occupying a very limited proportion of the overall view, and rather difficult to discern at this distance. The mounds do not interfere with the views towards the hilltop and the windmill. Negligible is defined as:

'Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.'

Significance of Visual Effect

The visual effect is considered **Not Significant, neutral effect.** An element of professional judgement was applied to the Matrix in Table 10.3 (which is a guideline only). As the proposed landscape mitigation will help soften the regular form of the existing mounds currently visible from this group of residences and road users at this point.

Viewpoint 9 – L6044 Oweneen's Lane

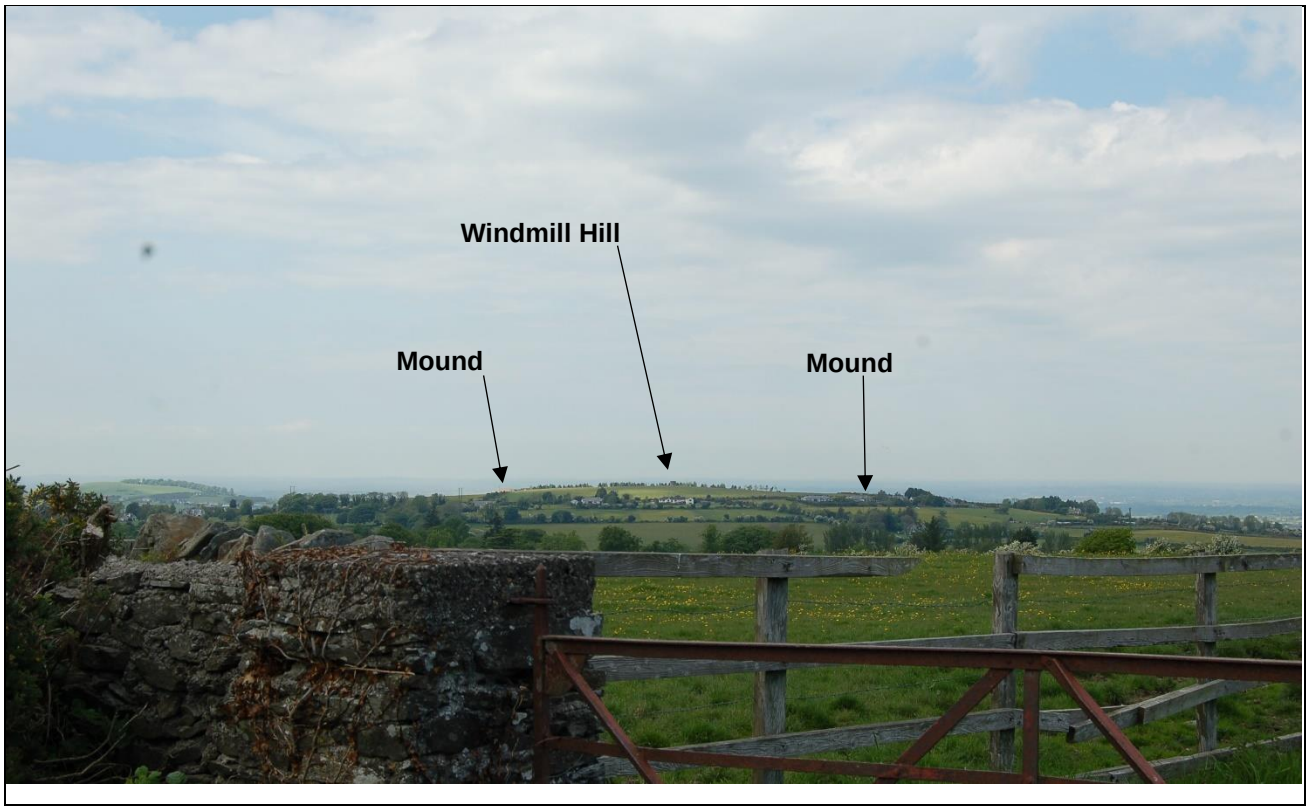


Figure 10.22: Viewpoint 9– Existing View

Existing View

The existing view along a short open section of this local road provides panoramic views across the undulating lands across to Windmill Hill and surrounding hills. The settlements of Rathcoole and Newcastle to the north are visible in the distance. The ridgeline of Windmill Hill blocks views of the proposed extension areas/existing quarry, while in the distance some of the overburden mounds are just visible.

Proposed View

There will be a slight increase of woodland and hedgerow planting visible in front of the existing quarry elements on the southern boundary with the implementing of the mitigation measures. As the planting matures it will provide increased tree and hedgerow cover along the flanks of the hill.

Visual Receptor Sensitivity

The visual receptors are road users in a pleasant area with some scenic views, which will have Medium sensitivity.

Magnitude of Change

The magnitude of change is considered *Negligible*.

"Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity".

The existing views of the quarry's southernmost elements will reduce due to the mitigation planting, becoming fully screened as this planting matures overtime. These bands of trees and hedgerows will be similar to others

found upon the surrounding hills and do not affect main views of the windmill base along the summit of Windmill Hill.

Significant of Visual Effect

The visual effect is considered **Slight beneficial in medium term** as the planting becomes established and helps to screen the existing mounds currently visible on Windmill Hill This will r**educe to Not Significant beneficial as the maturing trees become harder to distinguishable among the hill's existing tree cover.**

Viewpoint 10– Group of houses along L6002 Athgoe Road

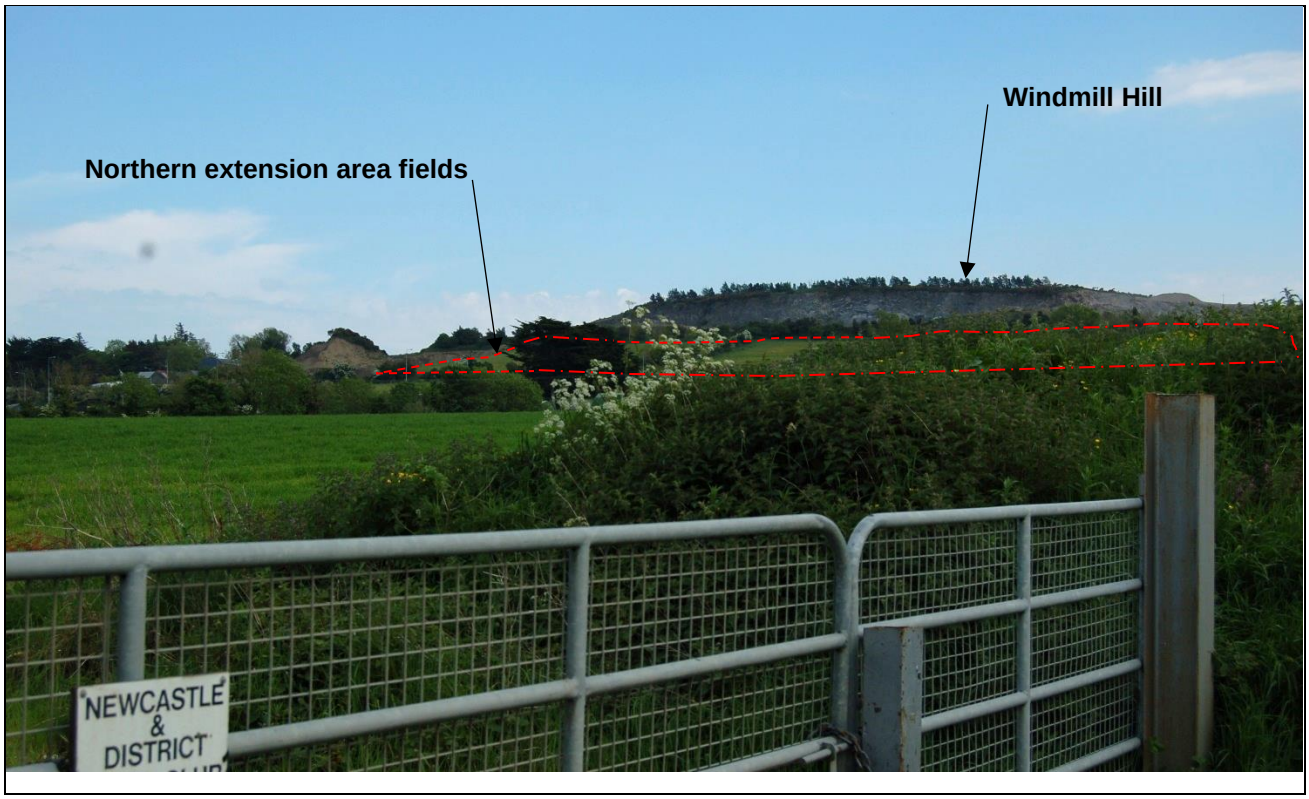


Figure 10.23: Viewpoint 10– Existing View

Existing View

This view is taken from the road, south of a cluster of dwellings where there is an open view towards the Site. (Most houses within the group have no views of the existing quarry as they are surrounded by high garden and roadside hedgerows and trees.) Three houses on the south eastern edge of the group may have varying ground and upper floor views towards Windmill Hill. There is an open view towards Windmill Hill and the quarry, and the hill and quarry face are prominent in the view.

Views of the quarry are partially contained by the topography along the Site's northern boundary, of which the two visible agricultural fields form part of the proposed northern extension area. Portions of these lands are partially obstructed by the surrounding vegetation. The passing traffic along the N7 route is visible through gaps in the roadside hedgerows in the middle ground.

Proposed View

The view will consist of the expansion of the existing quarry over the two adjoining agricultural fields located in the northern proposed extension area. As the Proposed Development progressives, it will result in notable quarrying activity across the proposed extended area resulting in a lowering of the current ridge and topography

of these fields providing greater views of the existing quarry. New mounds formed along the field boundaries and with added woodland planting mix to soften their form. As the new planting matures it will form a belt of woodland on the northern boundary helping to further screen the lower end of the enlarged quarry extent.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered Medium, High, representing road users on a minor road close to a cluster of residences, with some scenic qualities.

Magnitude of Change

There will be a notable loss of two fields currently under pasture and the various mature trees and hedgerow which divide these fields and bound the existing quarry's northern boundary. Together with changes to the landform from the quarrying activity within the proposed extension area. Additional mounds and woodland planting will be added to the proposed extended area's eastern, northern and western boundary edges.

The magnitude of change is considered Medium, defined as:

"…introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity."

Significant of Visual Effect

The significance of the visual effect is considered to be **Significant** for residents. The quality of the effect is considered adverse, medium term. The loss of agricultural lands will result in the quarry becoming more prevalent within the varied views of a few residents. However, as initial views of the lower quarry lands become less apparent with the mature planting the effects will be reduce to **Moderate-Slight** for residents adverse.

Viewpoint 11– Group of houses along Old Chapel View Road

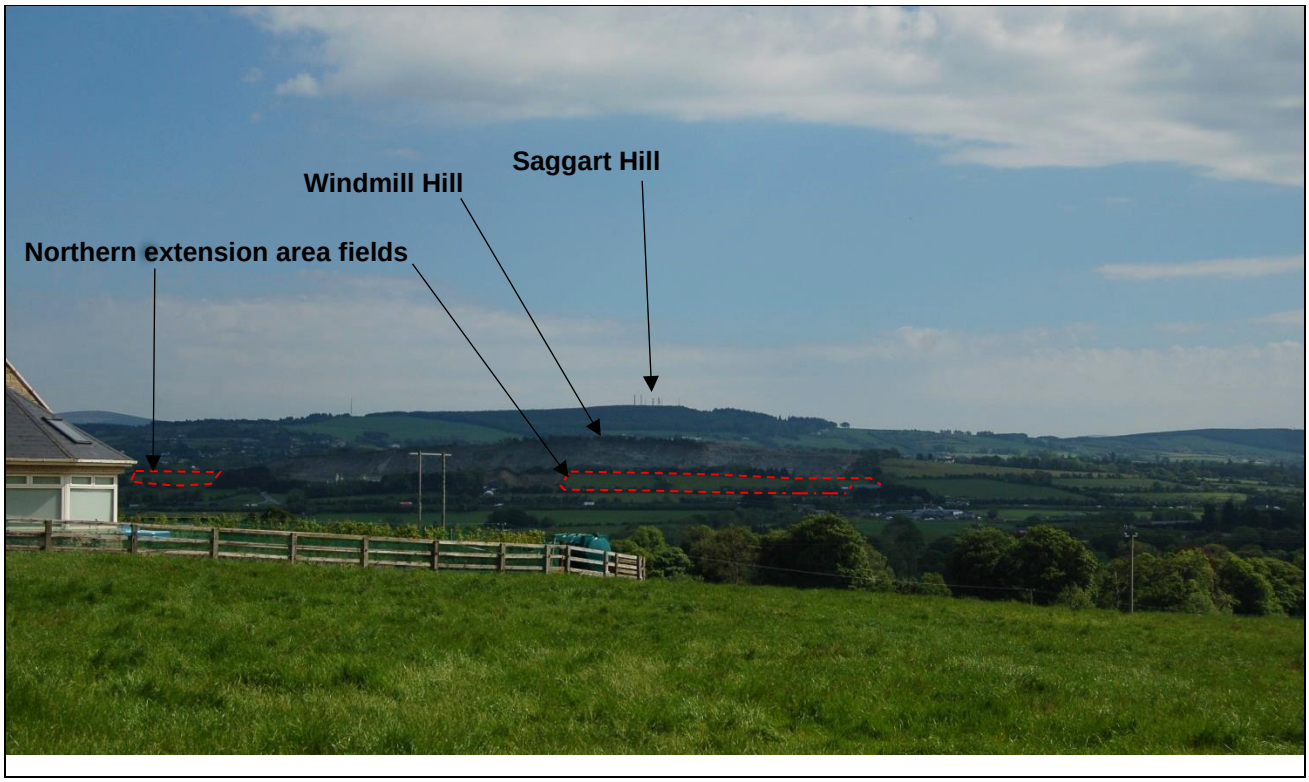


Figure 10.24: Viewpoint 11– Existing View

Existing View

The elevated point in the road near a cluster of houses, provides panoramic views over undulating agricultural fields with tree clumps. The existing quarry is visible in the middle ground, to the right of the residence. The higher Saggart Hill and Dublin mountains form a backdrop to the quarry.

The three agricultural fields which form the proposed northern extension areas are clearly visible along the front of the existing quarry in the middle ground. Views from within this group of residents vary, with most orientated to the southwest away from the proposed Site or enclosed by garden hedges. Some views are possible towards the proposed site from the rear or side of a few residences and over experienced by road users over short gaps in the roadside hedgerows.

Proposed View

The distant view will consist of the expansion of the existing quarry over all three fields within the proposed extension area. As the Proposed Development progressives, it will result in notable quarrying activity across the proposed extended area resulting in a lowering of the current ridge and topography of these fields providing greater views of the existing quarry. New mounds formed along the field boundaries and with added woodland planting mix to soften their form. As the new planting matures it will form a belt of woodland on the northern boundary helping to further screen the lower end of the enlarged quarry extent.

Visual Receptor Sensitivity

The viewpoint is near a cluster of houses and represents an open view which may be shared by some of the houses and gardens without intervening vegetation or walls. Visual receptor sensitivity is considered to be High due to the proximity to houses and the scenic qualities to the view.

Magnitude of Change

There will be a notable loss of three fields currently under pasture and the various mature trees and hedgerow which divide these fields and bound the existing quarry's northern boundary. Together with changes to the landform from the quarrying activity within the proposed extension area. Additional mounds and woodland planting will be added to the proposed extended area's eastern, northern and western boundary edges.

The magnitude of change is considered Medium, defined as *"…introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity."*

Significant of Visual Effect

The significance of the visual effect is considered to be **Significant** for residents. The quality of the effect is considered adverse in quality, long term. The loss of agricultural lands will result in the quarry becoming more prevalent within the varied views of a few residents. However, as initial views of the lower quarry lands become less apparent with the mature planting the effects will be reduce to **Moderate-Slight** adverse for residents.

Viewpoint 12– Kildare County Council Protected route on L6018 Puckstown Road

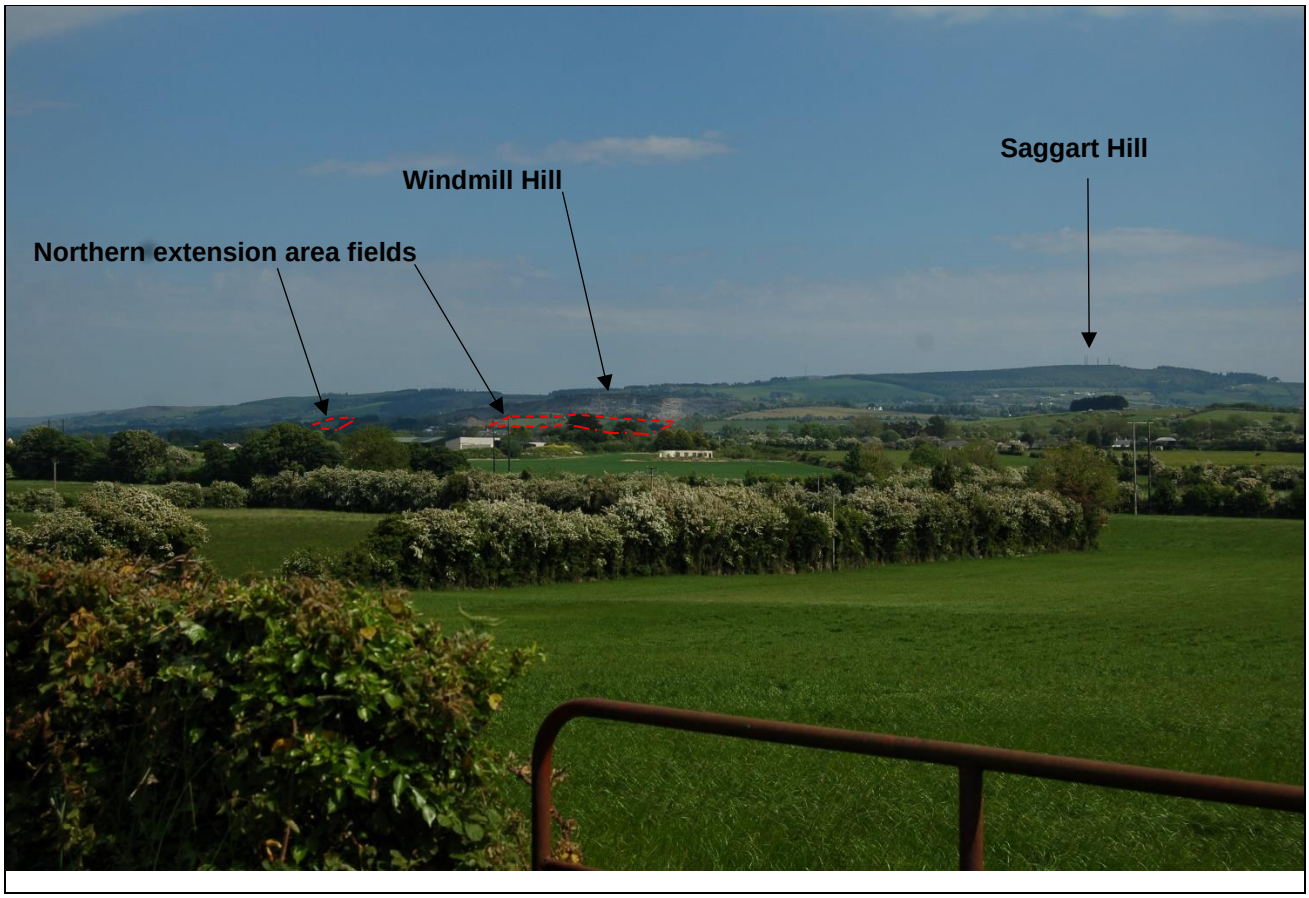


Figure 10.25: Viewpoint 12– Existing View

Existing View

The view looks to the across the undulating agricultural lands which includes Windmill Hill, Saggart Hill and Dublin Mountains in the background. The site/existing quarry is distinguished by the contrast of the rock face and mounds with the surrounding vegetation cover. The two sections of agricultural lands which form the proposed northern extension area are partially visible to the front of the existing quarry in the middle ground.

Proposed View

The distant view will consist of the expansion of the existing quarry over all three fields within the proposed extension area. There is some partially screening of the Proposed Development by the mature trees bounding the intervening agricultural lands and new mounds.

The distance from the proposed site will mean that it will be hard to clearly distinguish the various quarrying activity as it progresses and lowers the current ridge and topography of these fields providing slightly expanded views of the existing quarry. The new mounds formed along the field boundaries and with added woodland planting mix to soften the edges of the extended quarry works. As the new planting matures it will form a belt of woodland on the northern boundary helping to further screen the lower end of the enlarged quarry extent.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be High for road users on this county level designated scenic route.

Magnitude of Change

There will be a notable loss of three fields currently under pasture and the various mature trees and hedgerow which divide these fields and bound the existing quarry's northern boundary. Together with changes to the landform from the quarrying activity within the proposed extension area. Additional mounds and woodland planting will be added to the proposed extended area's eastern, northern and western boundary edges.

The magnitude of change is considered Medium, defined as:

"…introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity."

Significant of Visual Effect

The significance of the visual effect is considered to be **Significant.** The quality of the effect is considered adverse, medium term. The extended quarry will be in contrast with the other hills within this protected view but the distance (approximately 3km) will help reduce the significance of the Proposed Development. However, as initial views of the lower quarry lands become less apparent with the mature planting the effects will be reduce to **Moderate-Slight** adverse, in the long term.

10.6.2.3 Visual Summary

The visibility of the Proposed Development will occur within the same extents as the existing quarry. Any changes to the existing view will be most prevalent upon local receptors, including residents and road users, typically located northwards of the quarry. Visual changes include a loss of three fields, some boundary vegetation and greater views of quarrying activity on site. Mitigation measures to help reduce inwards views of the Proposed Development include providing new mounding with woodland planting and hedgerows along the boundaries with some effected views reducing as the planting matures.

The visual effects, listed below in Table 10-7 range from Not Significant to Significant visual effect in one view and the majority are adverse in quality.

Table 10-7: Summary of visual effects from each viewpoint

Viewpoint	Description	Visual Receptor Sensitivity	Magnitude of Change	Significance and Qualitatively		
				Short	Medium	Long
1	View from South Dublin County Council Protected View on Tay Lane	High	Low	Moderate-Slight Adverse		Slight Beneficial
2	View from Rathmill Green, Broadfield Manor housing estate	Medium	Low	Slight and Beneficial		
3	View from next to farmhouse along L8040 Keatings Park northeast of quarry	Medium	Negligible	Not Significant and Neutral		

4	View from along Colemanstown Lane north of quarry	Medium	Medium	Moderate-Slight, Adverse	Slight-Not Significant Adverse
5	View from nearest group of houses south of quarry along Windmill Road	Medium	Negligible	Not Significant Slight and Neutral	
6	View from group of houses along Windmill Road west of junction with Carrigeen Lane	High	Low	Moderate-Slight and Neutral	
7	View from next to group of houses along Windmill Road to the southwest of quarry	Medium	None	None	None
8	View from edge of a group of houses along Rathcoole Hill Road at junction of Carrigeen Lane	High	Negligible	Not Significant, Neutral	
9	View from along L6044 Oweneen's Lane	Medium	Negligible	Slight and Beneficial	Not Significant Beneficial
10	View from group of houses along L6002 Athgoe Road	Medium	Medium	Significant and Adverse	Moderate-Slight and Adverse
11	View from group of houses along Old Chapel View Road	High	Medium	Significant and Adverse	Moderate-Slight and Adverse
12	View from Kildare County Council Protected route on L6018 Puckstown Road	High	Medium	Significant and Adverse	Moderate-Slight-and Adverse

10.6.3 Cumulative Effects

Cumulative landscape effects can be defined as those which:

'…result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future' (Landscape Institute and IEMA, 200 quoted in GLVIA 2013).

The potential for cumulative landscape and visual effects to have occurred, e.g., other quarries, road schemes or large-scale housing/industry across the study area were considered.

The potential for cumulative landscape and visual effects of the Proposed Development with other potential development types e.g., other quarries, road schemes or large-scale housing/industry across the study area were considered. However, following a review of South Dublin County Council and Kildare County Council Planning Portals there are no developments likely to have any notable potential cumulative interaction with the Proposed Development.

Several active quarries are located across the wider landscape (6-10km) within both SDCC and KCC areas. The nearest quarries are Ballinascorney (6.0km southeast) and Belgard (6.2km east). These various quarries through the wider landscape are generally contained within their local rural or urban landscapes and not likely to have any notable potential cumulative interaction with the Proposed Development, so are not considered any further here.

10.7 Conclusion

The Proposed Development is located within and adjacent to the existing Behan's Quarry, Rathcoole. The existing quarry covers an area of approximately 28.8ha across a variation in quarry floor levels. The quarry's various plant machinery, processing/office structures and stockpiles of the extracted materials are all contained within the EIA project boundary. The proposed further quarry expansion will laterally extend the existing quarry void to the north by approximately 4.1 ha. and deepen the existing quarry void to a final average depth of 150m AOD.

Despite its scale, views of the working quarry are generally hidden by the surrounding topography. The upper profile of the worked southern boundary does however stand proud of the tree cover within the quarry and in contrast to the surrounding local hills.

The Proposed Development will result in further excavation from the existing quarry void and expanding it northwards across three small fields, over an additional 5.19ha of which 4.11ha will be extracted. This will result in lowering of the existing quarry floor, loss of pasture cover and some boundary hedgerows and trees. The alternation to the landform across the agricultural lands set within the proposed extension area will highly noticeable across the local landscape but limited over the wider landscape. Mitigation measures at section 10.5 include the use of mounds and woodland planting along the revised boundary edges to help enclose the development. The implementation of the proposed landscape mitigation and remediation measures will increase the quantity and diversity of vegetation and habitat in the local landscape, as highlighted on the restoration plan (Appendix 10.1, Figure 10.26).

Similarly, the viewpoint assessment found that this alternation of landform would be most apparent from those nearest visual receptors north of the proposed site which already experience clear views of the existing quarry's deep southern rock face. These affected receptors will experience a localised visual change of landcover from pasture to quarrying, with the associated site works gradually lowering the existing landform. This will open the lands up and potentially increase the visual prominence of the quarry within these views compared to the existing quarry's visibility. However, the landscape mitigation measures include new mounds and woodland planting across the boundaries of the affected fields to help screen inwards views, which will further reduce as the planting matures.

The ridgeline of Windmill Hill, which is a SDCC protected prospect, helps to screen views of the existing quarry and proposed extension areas from the majority of receptors views located south of the quarry and this ridgeline. Some limited receptors have partial views of the existing quarry's mounds on the southern boundary. However, the proposed mitigation measures will help to soften their appearance with woodland planting.

APPENDIX 10.1

Proposed Landscape Mitigation (Drawing 214201-1-101/B)



LEGEND

- EIA SITE BOUNDARY
- LANDOWNER BOUNDARY
- WORKING QUARRY LIMITS
- PROPOSED EXCAVATION
- EXPOSED ROCK FACES AND BENCHES IN THE EXTENDED AREAS
- EXISTING BUILDING RETAINED
- EXPOSED ROCK FACES IN THE WORKING QUARRY
- EXISTING WATER BODY
- EXISTING SCREENING MOUND
- PROPOSED SCREENING MOUND
- EXISTING WOODLAND SUPPLEMENTED BY INFILL PLANTING AS REQUIRED
- AGRICULTURAL FIELD
- NEW WOODLAND FRAMEWORK FOR SCREENING AND HABITAT ENHANCEMENT
- BIRD BOX (indicative location)
- EXISTING HEDGEROW SUPPLEMENTED FOR SCREENING HABITAT
- BAT BOX (indicative location)
- PROPOSED HEDGEROW
- INVERTEBRATE HOUSING (indicative location)
- AREAS AROUND QUARRY FOR NATURAL COLONIZATION
- AREA FOR REINSTATEMENT

PLANTING SCHEDULE				
PLANT TYPE	**%/No.**	**Size**	**Form**	**Spacing**
WOODLAND MIX : Planted at 2-3m c/s in groups of 5-15 no.				
Alnus glutinosa	25%	120-150cm	1+1	2-3m c/s
Betula pendula	10%	120-150cm	1+1	2-3m c/s
Ilex aquifolium	5%	60-90cm	3lt cg	5/lin.m
Pinus sylvestris	15%	120-150cm	1+1	2-3m c/s
Prunus avium	10%	120-150cm	1+1	2-3m c/s
Quercus robur	20%	120-150cm	1+2	2-3m c/s
Salix caprea	10%	120-150cm	1+1	2-3m c/s
Sorbus aucuparia	5%	120-150cm	1+1	2-3m c/s

Hedgerow Mix supplementing existing and new hedgerows: Planted at 5/lin.m double staggered				
Corylus avelana	25%	40-60cm	B/R	5/lin.m
Crataegus monogyna	35%	60-90cm	B/R	5/lin.m
Ilex aquifolium	10%	45-60cm	2lt cg	5/lin.m
Prunus spinosa	10%	60-90cm	B/R	5/lin.m
Rosa canina	5%	40-60cm	B/R	5/lin.m
Sambucus nigra	5%	60-90cm	B/R	5/lin.m
Viburnum opulus	10%	40-60cm	B/R	5/lin.m

REV	DATE	AMENDMENT
B	03/06/2021	REVISED LAYOUT

CUNNANE STRATTON REYNOLDS

LAND PLANNING & DESIGN

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EMAIL info@csrlandplan.ie

N

PROJECT: **BEHANS QUARRY EIAR WINDMILL HIII, RATHCOOLE, CO. WICKLOW**	DATE: June 2021
	SCALE: 1:2000 @ A1
DRAWING: **PROPOSED LANDSCAPE MITIGATION**	DRAWN: RF CHECKED: DOL
	DRAWING NO: **21420-1-101/B**

11.0 TRAFFIC & TRANSPORTATION

11.1 Introduction

11.1.1 General

PMCE Ltd were commissioned by Golder Associates Ireland to undertake an assessment of the traffic impacts associated with an existing quarry at Windmillhill Road, Rathcoole, on the N/M7, Naas Road, Co. Dublin.

The lands that are the subject of this EIAR extend to 46.14 ha., which reflects the existing extractable area declared under the S.261 quarry registration in 2005. The EIA project boundary is bounded by the N7 to the north, Windmillhill Road to the south, and agricultural lands to the east and west.

The existing quarry is located within the centre of the EIAR lands and covers an area of approximately 28.8 ha, with an average working base of 173 mAOD. The existing quarry is roughly rectangular in shape with an east – west axis parallel to the N7 and Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 5 ha.

Further development at the quarry proposes a lateral northward extension of the current quarry void over approximately 4.1 ha, and a deepening of the western and eastern side of the laterally extended void to a final working base of 150 mAOD. The Proposed Development relates to quarrying only and is over an area of approximately 26.87 ha. The material extracted will be processed at the existing central processing area, with the current access being retained.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions, with a further 5 years for restoration that will remediate the quarry void to agricultural/amenity use.

11.1.2 Information Reviewed

In preparing this Chapter reference has been made to the following documents: -

- “Traffic and Transport Assessment Guidelines” (May 2014) published by Transport Infrastructure Ireland (TII).
- Unit 5.3 (Travel Demand Projections) of the “Project Appraisal Guidelines” (2019) published by Transport Infrastructure Ireland.
- Traffic Count Data, collected by Traffinomics from 13 to 15 October 2020;
- Unit 16.1 (Expansion Factors for Short Period Traffic Counts) of the “Project Appraisal Guidelines” (2016) published by TII; and
- “Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions)” – DN-GEO-03060 (TII Publications), published by TII in June 2017.

11.1.3 Objective

The objective of this Chapter is to assess the traffic impacts associated with the Proposed Development in terms of its integration with existing traffic on the surrounding road network. This assessment determines the impact on operational performance of trips generated by the Proposed Development on the local road network.

11.1.4 Methodology

The methodology adopted for this assessment involved, in brief: -

- A site visit on 12 November 2020; the weather was dry, and the ground surface was wet.

- Trip Generation and Trip Assignment – This is used to derive trip rates for a 12-hour period and to provide information as to which direction vehicles will travel to/from the Proposed Development.
- Link Capacity Assessment - To obtain an AADT value for the main road linking the Proposed Development to the surrounding network.
- Existing Traffic Assessment – The traffic count data was used to assess the suitability of the existing junction layout for the quarry access.
- Future Year Assessments – The estimated future year volumes on the study area network, as a result of the increase in background traffic and any site related traffic, was used to assess the future suitability of the junction for 2021 (assumed year of opening) and at three future assessment years, +5 (2026), +15 (2036) and +30 (2051).

11.1.5 Location plan

Figure 11.1 shows the location of the access to the quarry which is the subject of the application on the N7 National Road, Co. Dublin, while **Figure 11.2** shows an aerial image of the Application Site.

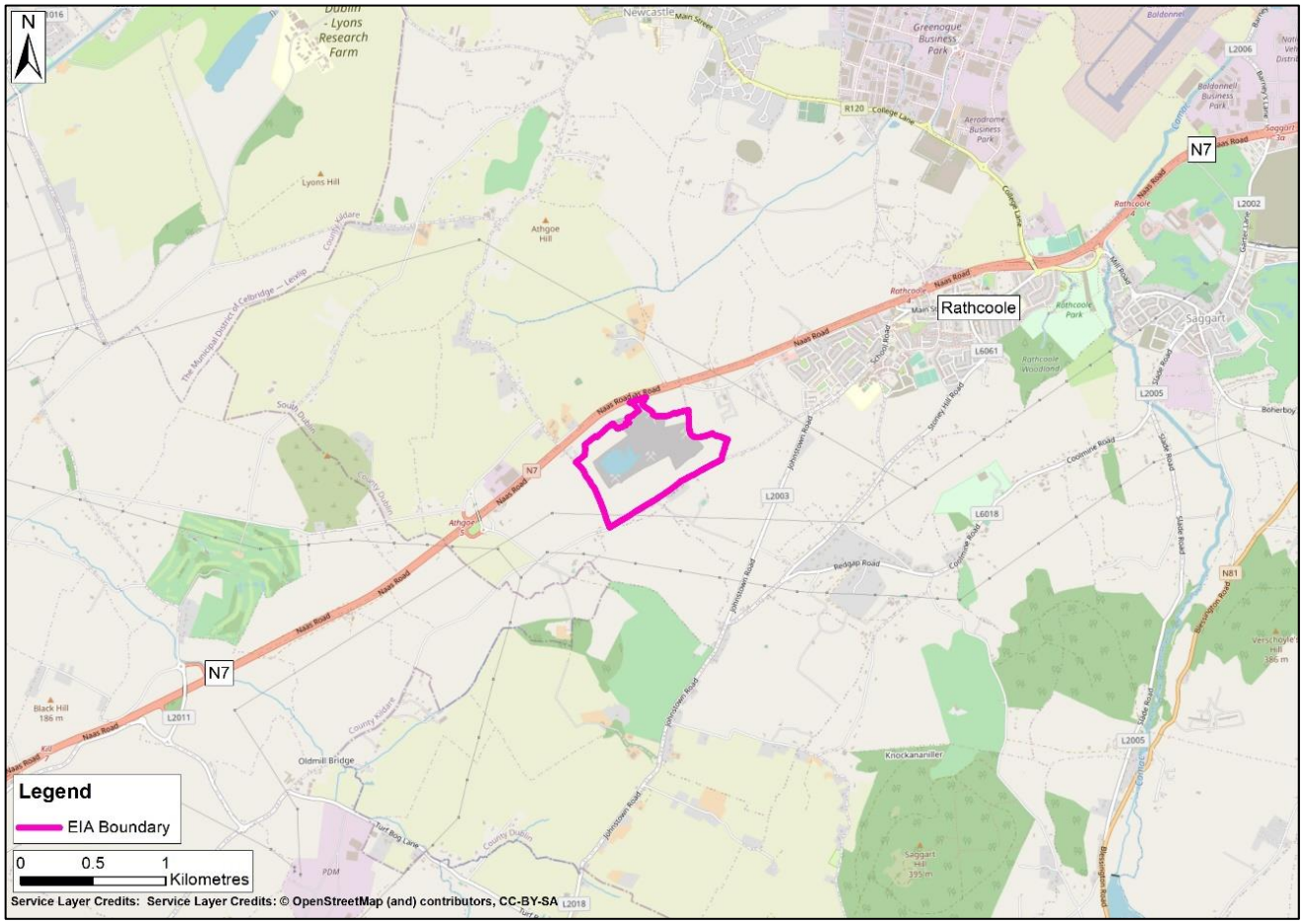


Figure 11.1: Location Plan.

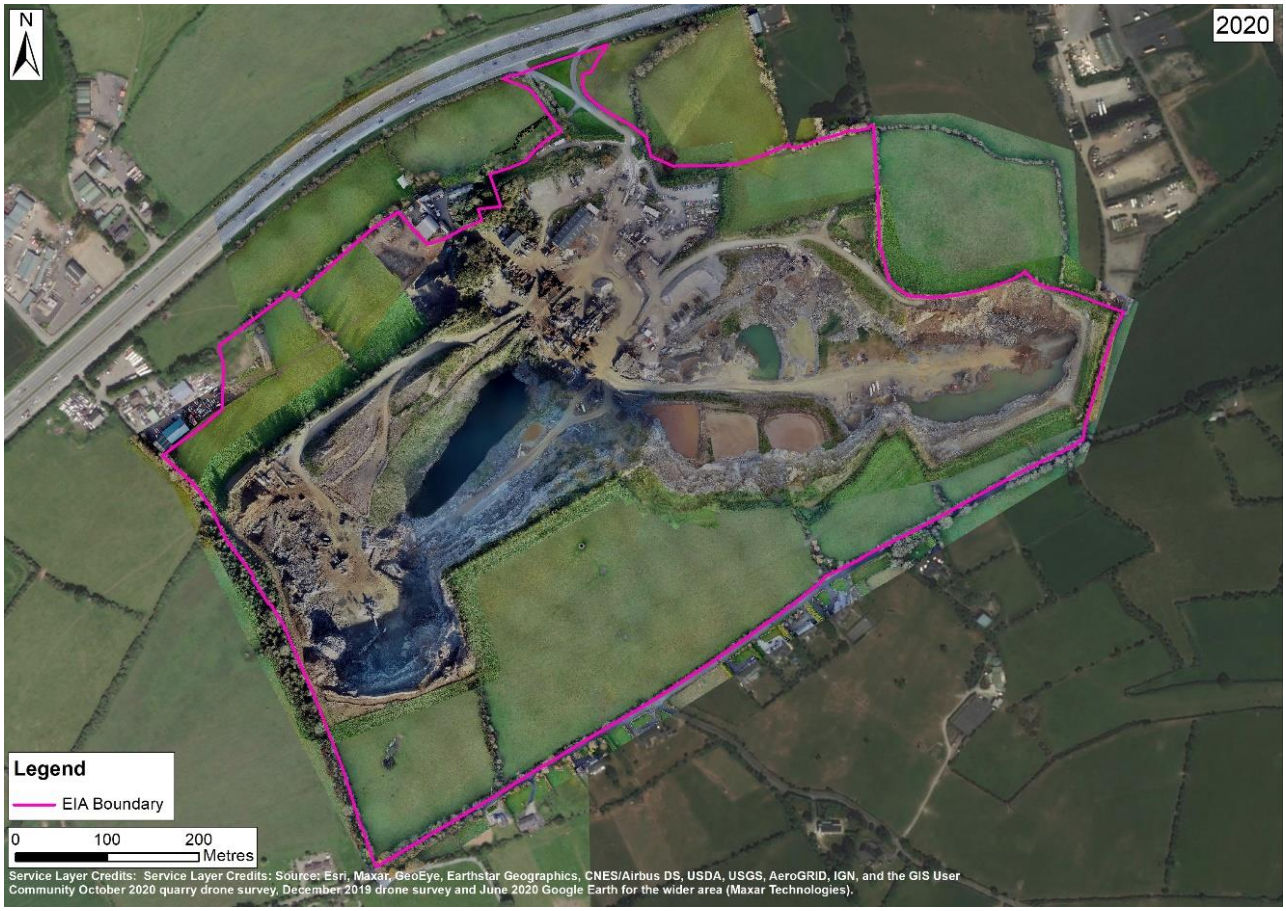


Figure 11.2: Aerial Photograph of Project Boundary.

11.2 Existing Conditions

11.2.1 The Site

The quarry is located on the westbound carriageway of the N7 National Road, Co. Dublin, upstream of Junction 5 (Castlewarden) and is accessed directly from the N7 westbound carriageway via a left-in/left-out junction which, in the vicinity of the Site, runs from east to west. Operations at the quarry include the extraction of gravel, processing of extracted material, delivery of materials and servicing of plant/machinery.



Figure 11.3: Existing Site Access.

The main quarrying activities take place approximately 200 m from the access junction with the N7 National Road and are accessed via an internal road (Figure 11.3).

11.2.2 Existing Road Network

11.2.2.1 N7

The N7 National Road extends in an east to west direction, from the interchange with the M50 motorway, at M50 Junction 9, in the east to the M7/N18/M20 interchange in the west. The N7 National Road transitions to the M7 motorway to the west of Junction 9. In the vicinity of the Site access, the N7 is a dual carriageway with three traffic lanes in each direction (Figure 11.4). Each lane is approximately 3.75 m in width with 2.5 m wide hard shoulders and no footways.



Figure 11.4: Looking West Along N7 from its junction with the Quarry Access.

11.2.2.2 Quarry Access

The quarry is accessed via a left-in/left out junction directly from the N7 westbound carriageway. The Site access, and exit, is gated outside operational hours. A deceleration lane, measuring approximately 16 m, from the N7 carriageway is provided on approach to the access and the exit includes a merge taper, measuring approximately 30 m long, for vehicles entering the N7.

11.2.3 Traffic Volumes

11.2.3.1 Quarry Access

12-Hour classified Junction Turning Counts (JTCs) were carried out on three consecutive days from Tuesday 13 to Thursday 15 October 2020 at the quarry access. The count was carried out between 5:00 am and 5:00 pm, with this time period encompassing the main operating hours of the quarry. The period also includes the peak hours on the adjacent National Road. Surveyed vehicles were broken down into five categories as follows:

1) Cars.

2) LGV's (Light Goods Vehicles).

3) OGV1 (Two and three axle goods vehicles).

4) OGV2 (Four and five axle goods vehicles); and

5) Buses.

The detailed results of the traffic survey are summarised in Appendix 11.1.

The morning and evening peak hours for each day have been established as follows;

- **Tuesday:** 05:45 – 06:45 (AM Peak) and 16:15 – 17:15 (PM Peak), (Table 11.1);
- **Wednesday:** 06:30 – 07:30 (AM Peak) and 16:30 – 17:30 (PM Peak), (Table 11.2); and
- **Thursday:** 05:45 – 06:45 (AM Peak) and 16:15 – 17:15 (PM Peak), (Table 11.3).

This indicates that the AM Peak falls between 05:45 and 7:30 and the PM Peak falls between 16:15 and 17:30.

Table 11.1: Quarry Traffic (Tuesday).

Hour Commencing	LVs In	HGVs In	LVs out	HGVs Out
05:00	22	9	0	6
06:00	31	20	3	44
07:00	16	14	5	27
08:00	8	26	1	30
09:00	6	28	6	23
10:00	7	25	8	33
11:00	5	20	2	22
12:00	6	19	8	15
13:00	4	30	6	27
14:00	5	27	4	24
15:00	7	27	9	26
16:00	6	27	23	13
17:00	1	18	33	2
18:00	1	2	15	0
Period Total	**125**	**292**	**123**	**292**
	417		**415**	

Table 11.2: Quarry Traffic (Wednesday).

Hour Commencing	LVs In	HGVs In	LVs Out	HGVs Out
05:00	25	11	0	1
06:00	27	17	2	29
07:00	19	13	7	35
08:00	5	26	3	34
09:00	7	31	3	27
10:00	7	20	6	26
11:00	3	30	4	22
12:00	5	20	4	20
13:00	1	19	5	25
14:00	4	27	2	22
15:00	5	29	3	30
16:00	4	24	27	14

Hour Commencing	LVs In	HGVs In	LVs Out	HGVs Out
17:00	2	15	35	1
18:00	2	5	14	2
Period Total	**116**	**287**	**115**	**288**
	403		**403**	

Table 11.3: Quarry Traffic (Thursday)

Hour Commencing	LVs In	HGVs In	LVs Out	HGVs Out
05:00	28	11	0	4
06:00	27	13	2	40
07:00	12	24	3	27
08:00	6	19	3	32
09:00	11	29	5	25
10:00	5	24	2	19
11:00	3	25	7	27
12:00	6	26	5	24
13:00	5	21	10	26
14:00	4	25	6	29
15:00	9	26	8	23
16:00	8	30	24	8
17:00	0	14	37	3
18:00	2	5	10	1
Period Total	**126**	**292**	**122**	**288**
	418		**410**	

11.2.3.2 N7 National Road

At the time of preparing this report Government enforced travel restrictions were in place nationally due to the COVID-19 pandemic. As a direct result of these travel restrictions, travel patterns on the N7 are likely to have significantly reduced, and therefore may not be representative of typical travel patterns on the N7. For this reason, it was not considered practical to undertake traffic counts on the N7, as the results would not be representative of the average volume of traffic travelling on the N7.

In lieu of traffic count data on the N7 westbound carriageway, historical (pre-pandemic) AADT and peak hour figures, recorded and reported by the TII traffic counter TMU N07 015.0 W, were used to estimate the average daily traffic patterns (Table 11.4).

Traffic counters provide information on the volume of traffic by hour of day and vehicle class, i.e., motorcycle, car, goods vehicles distinguished by number of axles etc. with up to twelve vehicle classes being identified. Vehicles are detected by passing over loops embedded in the road surface. It is possible from the data collected to establish the vehicle profiles and the various vehicle classes. Given the close proximity of the TII traffic

counter to the Proposed Development Site, and the absence of any major junctions or alternative routes between the traffic counter and the Site, the traffic data is considered suitable for the purpose of this traffic assessment.

Table 11.4: N7 Traffic Flow Data

N7 National Road	
AADT	43,937
Peak hour (Vehicles per hour)	5,019

11.2.4 Trip Generation

The proposed continuation, and expansion, of operations at the quarry will be carried out during the existing opening hours with no alterations to working hours or extraction rates. The development traffic is therefore expected to remain in line with current traffic volumes at the access on the N7, as recorded over a three-day period in October 2020. Based on the results of these traffic counts, which recorded traffic entering and exiting the quarry, the highest daily trips recorded were 417 inbound, and 415 outbound, (occurring on Tuesday 13 October), and these have therefore been used in this traffic assessment.

11.2.5 Trip Assignment

As the quarry access is via a left-in/left-out junction, when accessing the quarry, 100% of the development traffic will approach from the east on the N7 and 100% will depart to the west.

11.2.6 Cumulative Effects

The N7 bounds the quarry lands to the north and is the main arterial road in the area. A search of planned adjacent developments which may have an impact on future traffic flows in the vicinity of the Proposed Development was undertaken and it is noted that there are no extractive or sizable industries in the surrounds of the Site which may contribute to cumulative traffic from adjacent developments having an impact on the operation of the N7 carriageway. The large volume of traffic on the N7, as recorded by the TII traffic counters, relative to traffic generated by adjacent developments results in this dominating the baseline traffic data.

11.3 Road Impacts

11.3.1 Assessment Years

The “Traffic and Transport Assessment Guidelines” published by Transport Infrastructure Ireland recommend the assessment of traffic in the Opening Year, for the Opening Year +5 years, the Opening Year +15 years and the Opening Year +30 years.

The assessment years for this traffic impact assessment are therefore 2021, the Opening Year, 2026, 2036 and 2051 for the Future Assessment Years.

11.3.2 Traffic Growth

The "Project Appraisal Guidelines - Unit 5" published by TII has been used to determine future year traffic flows on the network from the data recorded by the nearby TII traffic counter. Table 11.5 contains a summary of the traffic growth factors published in the "Project Appraisal Guidelines". For this assessment, a central growth scenario has been adopted (a ‘central’ growth scenario was assumed given the Site’s location and scale).

Table 11.5: Future Year Traffic Growth Figures for the Dublin Metropolitan Area (as per Table 6.1 in the Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections).

Year	Low Growth		Central Growth		High Growth	
	LV	HV	LV	HV	LV	HV
2016-2030	1.0146	1.0280	1.0162	1.0295	1.0191	1.0328
2030-2040	1.0034	1.0116	1.0051	1.0136	1.0087	1.0172
2040-2050	1.0028	1.0144	1.0044	1.0162	1.0093	1.0256

11.3.3 N7 National Road Impact Assessment

In the vicinity of the quarry, the N7 has three 3.75 m lanes and a 2.5 m hardshoulder in each direction, with no pedestrian or cycle facilities. The forecast two-way AADTs for each of the assessment years is indicated in Table 11.6 with the AADT for the final future forecast year calculated as 66,715. This is less than the maximum AADT for a road of this type at Level of Service D.

Table 11.6: Current, and Future, AADT on the N7 in the vicinity of the Project Site.

Year	2020 (Base Year)	2021 (Opening Year)	2026 (Opening Year +5)	2036 (Opening Year +15)	2051 (Opening Year +30)
AADT	43,937	50,556	55,288	61,016	66,715

Table 11.7: Combined AADT for each Assessment Year (N7).

AADT Forecast for future years	Assessment Years				
	2020	2021	2026	2036	2051
Background Traffic	43,937	50,556	55,288	61,016	66,715
Quarry Traffic	-	832	832	832	832
Combined Traffic (Background + Quarry)	43,937	51,388	56,120	61,848	67,547
Quarry Traffic as % of Combined Traffic	-	1.62%	1.48%	1.35%	1.23%

The traffic generated by the quarry represents between 1.23% and 1.62% of total traffic on the N7 National Road (Table 11.7). It is consequently concluded that the N7 will have sufficient link capacity for each of the future assessment years with, and without, the Proposed Development.

11.3.4 Assessment of Junction Layout

For the purposes of the traffic flow capacity assessment at the quarry access the existing road layout at the left-in/left-out junction was assessed in accordance with the permitted traffic volumes for this type of junction layout, as detailed in Chapter 7 of TII Publications document DN-GEO-03060, “Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions).” Vehicles entering the Site are required to diverge from the N7 mainline upstream of the junction and then merge with free-flowing high speed traffic when exiting the Site.

At merges, two traffic streams travelling in approximately the same direction join together and combine into a single traffic stream. The capacity of the merge is determined by the capacity of the two upstream carriageways, the capacity of the downstream carriageway, the traffic intensity and the relative speed of each traffic stream.

At diverges, a single traffic stream separates into two traffic streams. Similarly, the capacity of the diverge is governed by the capacity of the upstream and downstream carriageways or lanes.

Peak hour traffic flows for the merge, diverge and the mainline are shown in Table 11.8 and Table 11.9 below. The maximum peak hour for each of these elements during the 3-day traffic count was used in this assessment. These values were used to identify the most appropriate junction design layout required for the quarry access with reference to Figure 11.5 (Figure 7.3 of TII Publication document DN-GEO-030-060).

Figure 7.3 of TII Publication document DN-GEO-030-060 provides a number of junction layouts to cater for different volumes of traffic with the following merge layouts provided:

- Layout A (Figure 7.4.1 in DN-GEO-030-060) provides a basic parallel merge;
- Layout B (Figure 7.4.2 in DN-GEO-030-060);
- Layout C (Figure 7.4.3 in DN-GEO-030-060) and Layout D (Figure 7.4.4 in DN-GEO-030-060) are required where flows justify a lane gain arrangement; and
- Layout E (Figure 7.4.5 in DN-GEO-030-060) may be considered as a Departure from Standard where it is not possible to use Layout C.

Table 11.8: Mainline Eastbound (N7) Peak Hour Traffic.

N7 National Road (Mainline)	Peak Hour Traffic (VPH)				
	2020	2021	2026	2036	2051
LVs	4,341	4,411	4,780	5,198	5,539
HGVs	678	698	807	968	1203
Totals	5,019	5,109	5,588	6,167	6,743

Table 11.9: Connector road (Quarry Access Road) Peak Hour Traffic.

Quarry Access Road	Peak Hour Traffic (VPH)
Merge Stream	51
Diverge Stream	55

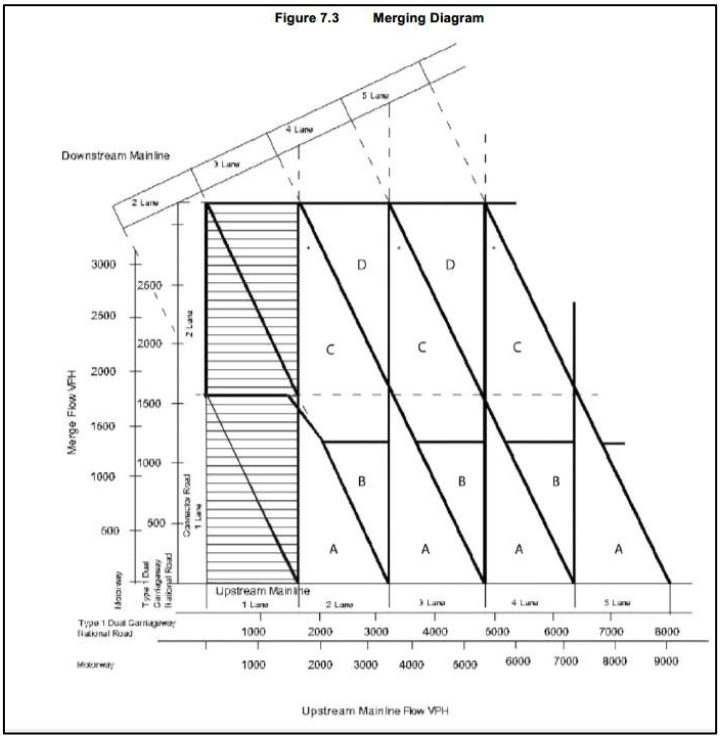


Figure 11.5: Diagram in DN-GEO-030-060 used to determine the required Merge Layout.

Similarly, peak hour flows for the diverge and the mainline downstream of the back of the diverge nosing were used to select a suitable diverge layout, as shown in Figure 11.6 (Figure 7.5 of DN-GEO-03060).

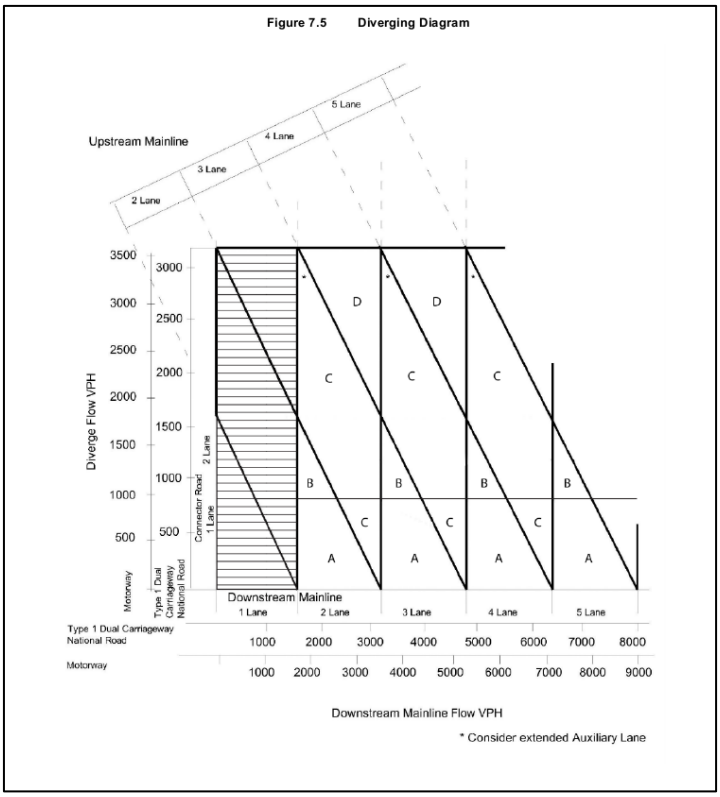


Figure 11.6: Diagram in DN-GEO-030-060 used to determine the required Diverge Layout

The assessment concludes that for both the merge, and diverge, a junction layout of Type A, as indicated in Figure 11.7 and Figure 11.8, for a merge and diverge respectively is the most appropriate, and will operate sufficiently for all assessment years, 2020, 2021, 2026, 2036 and 2051.

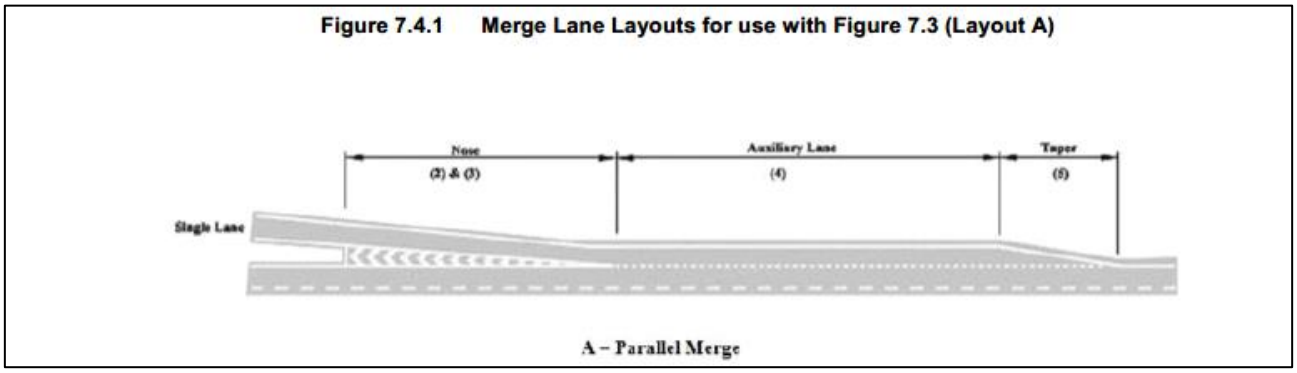


Figure 11.7: Merge Lane Layout Type A.

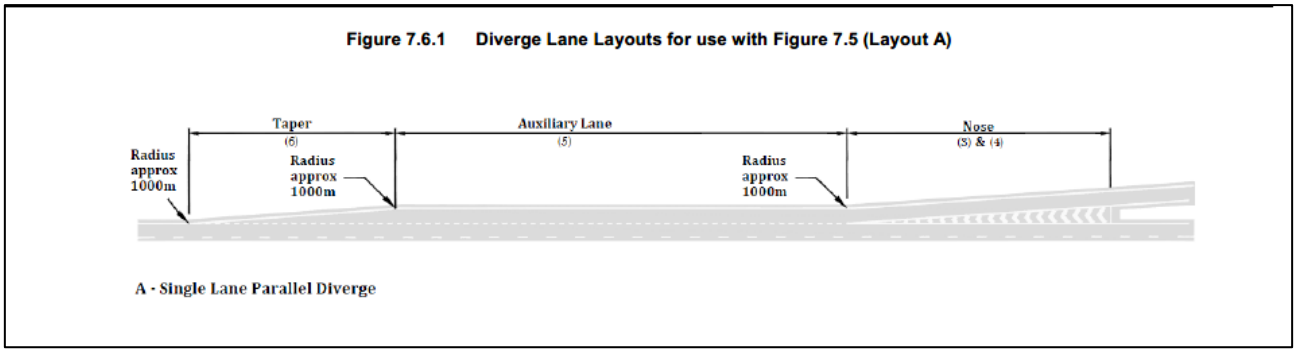


Figure 11.8: Diverge Lane Layout Type A.

11.3.5 Junction Layout Requirements

Following the determination of the required junction layout, the existing junction layout was assessed to determine if it meets the geometric requirements of a Type A junction, in accordance with TII Publications document DN-GEO-03060, “Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions)”.

Table 11.10 below lists the geometric requirements for a Type A junction layout, in relation to the merge and diverge lanes, and compares the existing junction parameters to those required.

Table 11.10: Comparison of the Requirements for a Type A Layout to the Existing Merge and Diverge Layout at the Site Access.

Merge Layout				
Parameters	Nose ratio	Nose length (m)	Auxiliary Lane length (m)	Length of Auxiliary lane taper (m)
Required Layout	1:25	75	160	55
Existing Layout	-	-	110	30
Diverge Layout				
Parameters	Nose ratio	Nose length (m)	Auxiliary Lane length (m)	Length of Auxiliary lane Taper (m)
Required Layout	1:15	70	150	55
Existing Layout	1:3	10	42	16

This assessment concludes that the current junction layout should be amended to bring the access junction in line with current TII standards. This can be achieved by amending the current road markings at the quarry access junction. Specifically, the following amendments are required to ensure the junction layout complies with the current TII Publication documents.

1) Nose length of 75 m with a ratio of 1:25 to be provided for the merge, and nose length of 70 m with a ratio of 1:15 to be provided for the diverge;

2) Auxiliary lane to be extended to 160 m for merge, and 150 m for diverge; and

3) Auxiliary Lane Taper to be extended to 75 m for merge, and 70 m for diverge.

However, due to the presence of an existing access to the east of the existing diverge lane, the full auxiliary lane and auxiliary lane taper is not feasible without conflicting with this access. It is therefore considered sufficient to retain the existing arrangement of the diverge at the quarry access. The merge should, however, be amended in line with the requirements listed above. Further design would be required prior to implementing the necessary roadmarkings at this location.

11.4 Road Safety

11.4.1 Sightlines

Sight distances, in accordance with Section 7.13 of the TII Publications document DN-GEO-03060, “Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions),” have been assessed at the Site access junction. The available sight distances when merging with, and diverging from, the N7 mainline are described below.

11.4.1.1 Merge

The Stopping Sight Distance (SSD) on the merge taper must be in accordance with the speed of that road rather than the mainline speed limit. This SSD will apply until the driver reaches the back of the merge nosing at which point the SSD must be in accordance with that required for the mainline speed limit. There must be no obstruction to sight lines between the merge taper and the mainline, and vice versa, for the length of the merge nosing.

There is a minimum approach angle at which drivers can merge on direct sight. Below this minimum approach angle drivers will be moving nearly parallel to the mainline carriageway and will have to merge using their wing mirrors.

The design speed of the merge taper is 85 kph which requires SSD of 160m while the speed of the N7 mainline is 100 kph and requires SSD of 215 m. During the site visit the sightlines at the merge were assessed and are considered sufficient for drivers merging with the N7 mainline when exiting the Site.

11.4.1.2 Diverge

The SSD required for the mainline design speed shall be maintained until the driver reaches the tip of the diverge nosing. The SSD can then be reduced to the Desirable Minimum for one design speed step below the mainline design speed. When the driver reaches the back of the diverge nosing, the SSD can then be reduced to the Desirable Minimum for the design speed of the diverge lane.

The design speed of the diverge lane is 85 kph which requires SSD of 160 m while the design speed of the N7 mainline is 100 kph and requires SSD of 215 m. During the site visit, the sightlines at the diverge were assessed and are considered sufficient for drivers diverging from the N7 mainline when entering the Site.

11.4.2 Public Transport

There are no public transport provisions in the vicinity of the Site. The lack of public transport facilities is not connected with the operation of the Site.

11.4.3 Parking

Existing parking provision is sufficient for the number of staff working on site and any miscellaneous trips that may occur.

11.4.4 Pedestrians & Cyclists

There are no footpaths or cyclist provisions in the vicinity of the Site. The absence of these facilities at this location however is not connected with the operation of the Site.

11.5 Conclusions

The following conclusions have been identified:

1) Following Link and Junction Capacity analysis, it was determined that the Quarry Access onto the N7 shall not generate capacity issues in 2021, the Opening Year, or future assessment years 2026, 2036 and 2051.

2) Following geometric assessment of the current left-in/left-out junction arrangement on the N7, the following amendments shall be necessary on the westbound on-slip:

   - Nose length of 75 m with a ratio of 1:25 to be provided;
   - Auxiliary lane to be extended to 160 m; and
   - Auxiliary Lane Taper to be extended to 75 m.

Due to the presence of an existing access to the east of the existing diverge lane, it will not be feasible to amend the current westbound off-slip.

3) Sightlines were assessed on the westbound on- and off-slip arrangements and were found to be compliant with TII sightline requirements.

The assessment therefore indicates that the Proposed Development will have a negligible impact on traffic flows on the existing road network due to the low volumes of traffic to be generated from it and, with the above amendments being implemented at the merge at the quarry access junction, the junction will accommodate existing and future traffic volumes for all future forecast years.

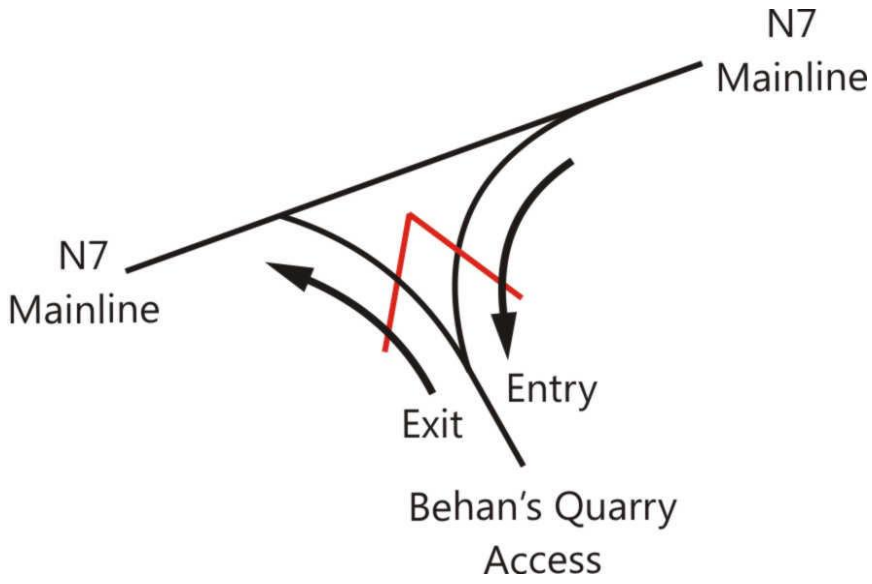
APPENDIX 11.1

Traffic Survey Data

Site Location



Movement Numbering



	Job number: TRA/20/112	Job Date: 13th to 15th October 2020	Drawing No: TRA/20/112-01	traffinomics.ie
	Client: PMCE	Job Day: Tuesday to Thursday	Author: SPW	

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**
MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 13th October 2020

LOCATION: Behan's Quarry Access DAY: Tuesday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
05:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0
05:15	1	0	0	1	0	2	3	0	0	0	0	0	0	0
05:30	5	0	0	4	0	9	14	0	0	0	1	0	1	2
05:45	15	0	0	4	0	19	24	0	0	0	5	0	5	12
H/TOT	22	0	0	9	0	31	43	0	0	0	6	0	6	14
06:00	5	2	0	6	0	13	21	0	0	0	7	0	7	16
06:15	7	1	0	4	0	12	17	1	1	0	18	0	20	43
06:30	5	2	0	4	0	11	16	1	0	0	11	0	12	26
06:45	9	0	0	6	0	15	23	0	0	0	8	0	8	18
H/TOT	26	5	0	20	0	51	77	2	1	0	44	0	47	104
07:00	4	1	0	1	0	6	7	2	1	0	8	0	11	21
07:15	1	2	0	3	0	6	10	0	0	0	7	0	7	16
07:30	2	1	1	8	0	12	23	0	1	0	5	0	6	13
07:45	5	0	0	1	0	6	7	1	0	0	7	0	8	17
H/TOT	12	4	1	13	0	30	47	3	2	0	27	0	32	67
08:00	1	1	0	4	0	6	11	0	0	3	8	0	11	23
08:15	1	0	1	6	0	8	16	1	0	0	6	0	7	15
08:30	2	0	1	8	0	11	22	0	0	1	5	0	6	13
08:45	1	2	0	6	0	9	17	0	0	1	6	0	7	15
H/TOT	5	3	2	24	0	34	66	1	0	5	25	0	31	66
09:00	1	1	1	5	0	8	15	1	2	0	8	0	11	21
09:15	1	2	0	6	0	9	17	0	1	0	4	0	5	10
09:30	0	0	1	6	0	7	15	1	0	1	6	0	8	16
09:45	1	0	0	9	0	10	22	1	0	2	2	0	5	9
H/TOT	3	3	2	26	0	34	69	3	3	3	20	0	29	57
10:00	1	1	0	4	0	6	11	1	0	0	9	0	10	22
10:15	3	0	1	9	0	13	25	1	0	0	6	0	7	15
10:30	2	0	0	5	0	7	14	2	1	1	8	0	12	23
10:45	0	0	0	6	0	6	14	1	2	1	8	0	12	23
H/TOT	6	1	1	24	0	32	64	5	3	2	31	0	41	82
11:00	1	1	0	7	0	9	18	1	0	0	7	0	8	17
11:15	1	0	0	5	0	6	13	0	0	0	5	0	5	12
11:30	1	0	1	4	0	6	12	0	0	0	5	0	5	12
11:45	1	0	0	3	0	4	8	0	1	1	4	0	6	12
H/TOT	4	1	1	19	0	25	50	1	1	1	21	0	24	52

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**

MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 13th October 2020

LOCATION: Behan's Quarry Access DAY: Tuesday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
12:00	1	2	0	6	0	9	17	3	0	0	4	0	7	12
12:15	0	1	0	4	0	5	10	1	1	0	4	0	6	11
12:30	0	2	0	2	0	4	7	0	1	0	4	0	5	10
12:45	0	0	0	7	0	7	16	0	2	0	3	0	5	9
H/TOT	1	5	0	19	0	25	50	4	4	0	15	0	23	43
13:00	1	0	0	12	0	13	29	0	0	0	4	0	4	9
13:15	2	0	0	5	0	7	14	3	0	0	7	0	10	19
13:30	1	0	1	7	0	9	19	1	0	0	7	0	8	17
13:45	0	0	1	4	0	5	11	2	0	2	7	0	11	21
H/TOT	4	0	2	28	0	34	71	6	0	2	25	0	33	67
14:00	3	0	1	4	0	8	14	1	0	1	6	0	8	16
14:15	0	1	0	5	0	6	13	1	0	0	3	0	4	8
14:30	0	0	1	11	0	12	27	1	0	0	5	0	6	13
14:45	1	0	1	4	0	6	12	0	1	0	9	0	10	22
H/TOT	4	1	3	24	0	32	65	3	1	1	23	0	28	58
15:00	2	0	0	5	0	7	14	2	0	1	8	0	11	22
15:15	0	2	0	7	0	9	18	2	0	0	6	0	8	16
15:30	0	0	0	6	0	6	14	2	0	0	7	0	9	18
15:45	1	2	1	8	0	12	23	1	2	0	4	0	7	12
H/TOT	3	4	1	26	0	34	68	7	2	1	25	0	35	68
16:00	2	0	0	5	0	7	14	5	1	1	6	0	13	21
16:15	1	0	0	6	0	7	15	2	0	0	4	0	6	11
16:30	1	0	0	9	0	10	22	2	1	0	1	0	4	5
16:45	2	0	1	6	0	9	17	11	1	0	1	0	13	14
H/TOT	6	0	1	26	0	33	67	20	3	1	12	0	36	52
17:00	0	1	0	6	0	7	15	16	1	1	1	0	19	21
17:15	0	0	1	4	0	5	11	5	1	0	0	0	6	6
17:30	0	0	1	5	0	6	13	4	1	0	0	0	5	5
17:45	0	0	0	1	0	1	2	4	1	0	0	0	5	5
H/TOT	0	1	2	16	0	19	41	29	4	1	1	0	35	37
18:00	0	0	0	0	0	0	0	5	1	0	0	0	6	6
18:15	0	0	0	1	0	1	2	4	0	0	0	0	4	4
18:30	0	1	1	0	0	2	3	1	3	0	0	0	4	4
18:45	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	0	1	1	1	0	3	5	11	4	0	0	0	15	15
P/TOT	96	29	17	275	0	417	783	95	28	17	275	0	415	781

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**
MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 14th October 2020

LOCATION: Behan's Quarry Access DAY: Wednesday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0
05:30	1	1	0	3	0	5	9	0	0	0	1	0	1	2
05:45	20	0	0	8	0	28	38	0	0	0	0	0	0	0
H/TOT	24	1	0	11	0	36	50	0	0	0	1	0	1	2
06:00	4	1	0	3	0	8	12	0	0	0	3	0	3	7
06:15	3	0	0	2	0	5	8	0	0	0	12	0	12	28
06:30	7	0	1	3	0	11	15	0	0	1	9	0	10	22
06:45	11	1	0	8	0	20	30	1	1	0	4	0	6	11
H/TOT	25	2	1	16	0	44	65	1	1	1	28	0	31	68
07:00	3	0	0	2	0	5	8	1	0	0	9	0	10	22
07:15	6	1	0	6	0	13	21	2	2	0	7	0	11	20
07:30	3	0	1	2	0	6	9	1	0	2	8	0	11	22
07:45	5	1	0	2	0	8	11	1	0	1	8	0	10	21
H/TOT	17	2	1	12	0	32	48	5	2	3	32	0	42	85
08:00	1	1	0	6	0	8	16	2	0	0	9	0	11	23
08:15	0	1	0	7	0	8	17	0	0	0	8	0	8	18
08:30	1	0	1	7	0	9	19	1	0	1	4	0	6	12
08:45	1	0	0	5	0	6	13	0	0	1	11	0	12	27
H/TOT	3	2	1	25	0	31	64	3	0	2	32	0	37	80
09:00	2	0	0	6	0	8	16	1	0	0	7	0	8	17
09:15	0	1	1	8	0	10	21	1	1	2	5	0	9	17
09:30	2	1	0	9	0	12	24	0	0	1	4	0	5	11
09:45	0	1	1	6	0	8	16	0	0	1	7	0	8	18
H/TOT	4	3	2	29	0	38	77	2	1	4	23	0	30	62
10:00	0	0	0	6	0	6	14	2	1	0	11	0	14	28
10:15	0	0	1	3	0	4	8	1	0	0	6	0	7	15
10:30	5	0	0	3	0	8	12	1	0	1	5	0	7	14
10:45	2	0	0	7	0	9	18	1	0	0	3	0	4	8
H/TOT	7	0	1	19	0	27	52	5	1	1	25	0	32	65
11:00	0	0	0	6	0	6	14	0	0	0	6	0	6	14
11:15	0	0	1	5	0	6	13	1	1	1	6	0	9	17
11:30	0	0	1	8	0	9	20	0	0	1	3	0	4	8
11:45	3	0	2	7	0	12	22	2	0	0	5	0	7	14
H/TOT	3	0	4	26	0	33	69	3	1	2	20	0	26	53

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**

MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 14th October 2020

LOCATION: Behan's Quarry Access DAY: Wednesday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
12:00	0	0	1	2	0	3	6	1	0	1	7	0	9	19
12:15	0	0	1	3	0	4	8	2	0	0	7	0	9	18
12:30	1	0	0	2	0	3	6	0	0	1	0	0	1	2
12:45	1	3	0	11	0	15	29	0	1	0	4	0	5	10
H/TOT	2	3	2	18	0	25	49	3	1	2	18	0	24	48
13:00	0	0	0	4	0	4	9	2	0	0	4	0	6	11
13:15	0	0	1	3	0	4	8	1	0	0	6	0	7	15
13:30	0	0	1	4	0	5	11	1	0	0	8	0	9	19
13:45	1	0	0	6	0	7	15	1	0	1	6	0	8	16
H/TOT	1	0	2	17	0	20	43	5	0	1	24	0	30	62
14:00	1	0	0	4	0	5	10	0	1	1	4	0	6	12
14:15	2	0	1	3	0	6	10	1	0	1	6	0	8	16
14:30	0	1	2	10	0	13	27	0	0	1	5	0	6	13
14:45	0	0	0	7	0	7	16	0	0	1	3	0	4	8
H/TOT	3	1	3	24	0	31	64	1	1	4	18	0	24	49
15:00	2	0	0	9	0	11	23	1	0	0	9	0	10	22
15:15	1	0	0	4	0	5	10	1	0	1	4	0	6	12
15:30	0	1	1	7	0	9	19	0	0	0	9	0	9	21
15:45	0	1	0	8	0	9	19	1	0	1	6	0	8	16
H/TOT	3	2	1	28	0	34	71	3	0	2	28	0	33	70
16:00	0	1	1	4	0	6	12	3	1	1	7	0	12	22
16:15	0	0	1	3	0	4	8	2	0	0	2	0	4	7
16:30	0	1	0	6	0	7	15	4	1	0	2	0	7	10
16:45	1	1	0	9	0	11	23	12	4	0	2	0	18	21
H/TOT	1	3	2	22	0	28	58	21	6	1	13	0	41	58
17:00	0	1	0	6	0	7	15	8	1	0	1	0	10	11
17:15	0	1	1	3	0	5	9	7	2	0	0	0	9	9
17:30	0	0	1	2	0	3	6	8	0	0	0	0	8	8
17:45	0	0	0	2	0	2	5	8	1	0	0	0	9	9
H/TOT	0	2	2	13	0	17	35	31	4	0	1	0	36	37
18:00	1	0	0	3	0	4	8	4	1	0	1	0	6	7
18:15	1	0	0	1	0	2	3	3	0	1	0	0	4	5
18:30	0	0	0	0	0	0	0	3	1	0	0	0	4	4
18:45	0	0	0	1	0	1	2	1	1	0	0	0	2	2
H/TOT	2	0	0	5	0	7	14	11	3	1	1	0	16	18
P/TOT	95	21	22	265	0	403	759	94	21	24	264	0	403	758

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**
MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 15th October 2020

LOCATION: Behan's Quarry Access DAY: Thursday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
05:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0
05:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0
05:30	5	1	1	3	0	10	14	0	0	0	2	0	2	5
05:45	16	2	1	6	0	25	33	0	0	0	2	0	2	5
H/TOT	25	3	2	9	0	39	52	0	0	0	4	0	4	9
06:00	7	1	0	4	0	12	17	0	0	0	8	0	8	18
06:15	2	1	0	2	0	5	8	0	0	0	14	0	14	32
06:30	4	1	0	1	0	6	7	1	1	3	10	0	15	30
06:45	5	6	1	5	0	17	24	0	0	0	5	0	5	12
H/TOT	18	9	1	12	0	40	56	1	1	3	37	0	42	92
07:00	3	2	0	6	0	11	19	1	0	0	13	0	14	31
07:15	1	2	0	6	0	9	17	0	1	0	4	0	5	10
07:30	1	1	0	6	0	8	16	0	1	0	4	0	5	10
07:45	2	0	1	5	0	8	15	0	0	1	5	0	6	13
H/TOT	7	5	1	23	0	36	66	1	2	1	26	0	30	64
08:00	1	2	1	9	0	13	25	0	1	1	11	0	13	28
08:15	0	0	0	2	0	2	5	1	0	1	6	0	8	16
08:30	1	1	0	6	0	8	16	0	1	0	6	0	7	15
08:45	1	0	0	1	0	2	3	0	0	0	7	0	7	16
H/TOT	3	3	1	18	0	25	49	1	2	2	30	0	35	75
09:00	2	0	0	13	0	15	32	0	1	0	7	0	8	17
09:15	1	3	1	4	0	9	15	0	0	0	7	0	7	16
09:30	1	2	0	5	0	8	15	2	0	0	4	0	6	11
09:45	2	0	1	5	0	8	15	0	2	1	6	0	9	17
H/TOT	6	5	2	27	0	40	76	2	3	1	24	0	30	62
10:00	0	2	0	5	0	7	14	0	0	1	5	0	6	13
10:15	1	2	0	5	0	8	15	1	0	0	9	0	10	22
10:30	0	0	0	5	0	5	12	0	0	0	0	0	0	0
10:45	0	0	1	8	0	9	20	0	1	0	4	0	5	10
H/TOT	1	4	1	23	0	29	59	1	1	1	18	0	21	45
11:00	0	0	0	3	0	3	7	0	2	1	8	0	11	22
11:15	1	0	0	9	0	10	22	1	1	0	7	0	9	18
11:30	0	1	1	7	0	9	19	1	2	0	7	0	10	19
11:45	1	0	0	5	0	6	13	0	0	1	3	0	4	8
H/TOT	2	1	1	24	0	28	60	2	5	2	25	0	34	68

TRAFFINOMICS LIMITED

BEHAN'S QUARRY TRAFFIC COUNTS **OCTOBER 2020**
MANUAL CLASSIFIED ENTRY/EXIT COUNTS **TRA/20/112**

SITE: 01 DATE: 15th October 2020

LOCATION: Behan's Quarry Access DAY: Thursday

	ENTRY							EXIT						
TIME	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	BUS	TOT	PCU
12:00	0	0	0	4	0	4	9	0	1	0	8	0	9	19
12:15	1	1	1	10	0	13	27	1	0	0	5	0	6	13
12:30	1	1	0	5	0	7	14	2	1	1	5	0	9	16
12:45	1	1	1	5	0	8	15	0	0	0	5	0	5	12
H/TOT	3	3	2	24	0	32	64	3	2	1	23	0	29	59
13:00	1	0	0	4	0	5	10	3	1	1	5	0	10	17
13:15	2	0	1	6	0	9	17	1	1	0	10	0	12	25
13:30	0	1	0	3	0	4	8	4	0	1	4	0	9	15
13:45	1	0	1	6	0	8	16	0	0	1	4	0	5	11
H/TOT	4	1	2	19	0	26	52	8	2	3	23	0	36	67
14:00	1	0	0	7	0	8	17	2	0	1	3	0	6	10
14:15	2	0	1	9	0	12	24	1	0	0	5	0	6	13
14:30	0	1	0	5	0	6	13	2	0	1	11	0	14	29
14:45	0	0	0	3	0	3	7	1	0	1	7	0	9	19
H/TOT	3	1	1	24	0	29	61	6	0	3	26	0	35	70
15:00	1	0	0	4	0	5	10	1	1	0	5	0	7	14
15:15	4	0	0	8	0	12	22	0	0	0	4	0	4	9
15:30	2	1	3	8	0	14	26	2	0	0	6	0	8	16
15:45	1	0	0	3	0	4	8	3	1	1	7	0	12	22
H/TOT	8	1	3	23	0	35	66	6	2	1	22	0	31	60
16:00	3	0	0	8	0	11	21	2	0	0	4	0	6	11
16:15	1	1	0	8	0	10	20	5	1	0	1	0	7	8
16:30	1	1	0	8	0	10	20	1	3	1	2	0	7	10
16:45	1	0	1	5	0	7	14	11	1	0	0	0	12	12
H/TOT	6	2	1	29	0	38	76	19	5	1	7	0	32	42
17:00	0	0	0	5	0	5	12	11	3	1	0	0	15	16
17:15	0	0	2	2	0	4	8	3	3	0	2	0	8	11
17:30	0	0	0	5	0	5	12	7	3	0	0	0	10	10
17:45	0	0	0	0	0	0	0	6	1	0	0	0	7	7
H/TOT	0	0	2	12	0	14	31	27	10	1	2	0	40	43
18:00	0	0	0	0	0	0	0	1	1	1	0	0	3	4
18:15	0	0	1	2	0	3	6	1	1	0	0	0	2	2
18:30	0	2	0	0	0	2	2	2	1	0	0	0	3	3
18:45	0	0	0	1	0	1	2	2	1	0	0	0	3	3
H/TOT	0	2	1	3	0	6	10	6	4	1	0	0	11	12
P/TOT	86	40	21	270	0	417	779	83	39	21	267	0	410	768

12.0 MATERIAL ASSETS

12.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Golder Associates Ireland Ltd (Golder) for the L Behan Aggregates and Recycling Ltd Section 37L Application (of the Planning and Development (Amendment) (No. 2) Regulations 2015) to An Bord Pleanála (ABP). The Application has been made for the proposed quarrying activities (the Proposed Development) located at the lands at Windmillhill, south of Rathcoole in South Dublin (the Site).

Material assets comprise the physical resources in the environment, which may be of human or natural origin. The objective of the assessment contained in the following sections is to ensure that these assets have been used in a sustainable manner with respect to operations at the Proposed Development.

Material Assets in the vicinity of the Site comprise of built services and infrastructure, such as surface water drainage, telecommunications, electricity, gas and water supply infrastructure and geological resources.

Other material assets include roads and traffic, which have been assessed in Chapter 11 of this EIAR. Please refer to Chapter 8 (Noise and Vibration) for the assessment of potential effects of blasting and vibration on neighbouring dwellings.

The following assessment was prepared by Kevin McGillycuddy (BA (Mod), MSc). Kevin is a Practitioner Member of the Institute of Environmental Management and Assessment and has more than 8 years' experience in environmental consultancy.

12.2 Legislative Requirements

Annex IV of the amended EIA Directive (2014/52/EU) requires that the developer provides a description of the factors (specified in Article 3(1)) which are likely to be significantly affected by the project, including a study of the potential impacts to material assets.

The 2014/52/EU Directive was transposed into Irish law through European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) which amended the Planning and Development Act, 2000, and the Planning and Development Regulations, 2001. This EIAR has been produced in accordance with these relevant legislative requirements and Statutory Instruments.

12.3 Assessment Methodology and Significance Criteria

12.3.1 Technical Scope

This assessment has been made with guidance from the 'Guidelines on the information to be contained in environmental impact assessment reports', published in 'draft' by the EPA in August 2017 (the 2017 EPA draft guidelines[1]). The guidelines were drafted by the EPA with a view to facilitating compliance with EIA Directive (2014/52/EU).

The 2017 EPA draft guidelines suggest the following subheadings under which to arrange issues concerning 'Built Services'; *"Electricity, Telecommunications, Gas, Water Supply Infrastructure, Sewerage".*

The assessment also considered 'Advice Notes for Preparing Environmental Impact Statements', also published in 'draft' by the EPA in September 2015.

Having regard to the above guidance, particularly the 2017 EPA draft guidelines, and the characteristics and context of the lands that are the subject of this application, this EIAR chapter aims to identify the likely significant

[1] Environmental Protection Agency (2017) Guidelines on the information to be contained in Environmental Impact Assessment Reports, Draft, August 2017

effects that the Proposed Development may have on 'built services' and other relevant material assets which are discussed under the following headings:

- Electricity network utilities;
- Gas infrastructure;
- Telecommunications;
- Local water supplies and foul water network;
- Surface water network;
- Waste management infrastructure; and
- Geological resource.

12.3.2 Prediction of Impacts and Effects Prior to Mitigation

This chapter of the EIAR describes the likely significant direct effects of the Proposed Development on the material assets in the surrounding environment. The potential indirect/secondary, cumulative, do-nothing, worst case, indeterminable, irreversible, residual, and synergistic effects of the Proposed Development are also described, where appropriate. The extent, context and frequency of effects has also been considered in the assessment process.

Prediction methods are required to identify and assess the significant effects of the Proposed Development on the environment. The predictive method used for this assessment is a common framework of assessment criteria and terminology based on the EPA's 2017 draft guidelines, with some adjustments to improve clarity.

This common framework follows a 'matrix approach' to environmental assessment which has been presented in Chapter 1 (Introduction) of this EIAR.

12.3.3 EIA Significance Terminology

As identified in Chapter 1 (Introduction) of this EIAR, a common framework of assessment criteria and terminology has been used based on the EPA's 2017 draft guidelines. This common framework follows a 'matrix approach' to environmental assessment which is based on the characteristics of the impact (magnitude and nature) and the value (sensitivity) of the receptor.

The assessment reported below is based on the common framework described in Chapter 1 of this EIAR. It has been assumed that the value (sensitivity) of the material assets is no greater than **Medium**, which equates to 'Medium or high importance and rarity, regional scale, limited potential for substitution' (see Table 1.4 of Chapter 1). This sensitivity has been assumed given the importance of the assets to users surrounding the Proposed Development, and the sensitivity of the users to potential disruption.

A description of the significance categories used is provided in Table 12.1. Effects that are either **Large or Profound are considered to be Significant**, and **effects that are Moderate, Slight or Imperceptible are considered to be Not Significant**. How the level of effect is determined, based on the environmental value and magnitude of impact, is explained in Table 1.6 of Chapter 1.

Table 12.1: Significance categories and typical descriptions.

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.

Significance Category	Typical Description
	Only adverse effects are usually assigned this level of significance. These factors are key issues in the decision-making and consent process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance which are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also be included in this significance category.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment. These can be beneficial or adverse effects and are considered to be very important issues which are likely to be substantial in the decision-making process.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. These are beneficial or adverse effects which may be important but are not likely to be central to decision-making or consent. The cumulative effects of these factors may influence consent or decision-making if they should lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Imperceptible	An effect capable of measurement but without significant consequences. No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

12.3.4 Information Sources

Information for the assessment of potential impacts on the identified material assets was obtained by means of a desk-based review, and included the following sources:

- ESB network utility plans;
- Gas Networks Ireland utility plans;
- Eir CYBD mapping;
- Irish water utility mapping;
- Field surveys of the Application Site;
- Department of Communication, Climate Action and Environment (DCCAE) Eircode maps; and
- Aerial and ordnance survey maps of the area.

12.3.5 Temporal Scope

Under the programme of the Proposed Development, the extraction phase will last for between 10 and 15 years which will provide for fluctuations in market demands for the aggregate extracted from the Site. The duration of

the extraction phase is therefore classified as ‘medium-term’ by the EPA’s 2017 draft guidelines (seven to fifteen years).

The restoration phase of the Proposed Development will follow the extraction phase and will be 2 to 5 years in duration, which is ‘short-term’ (those lasting from one to seven years).

12.3.6 Geographical Scope

The EIA directly covers the physical extent of the Site as shown in Figure 12.1 As predicted impacts on the human environment can extend beyond the immediate Site boundary, a wider ‘zone of influence’ has been considered.

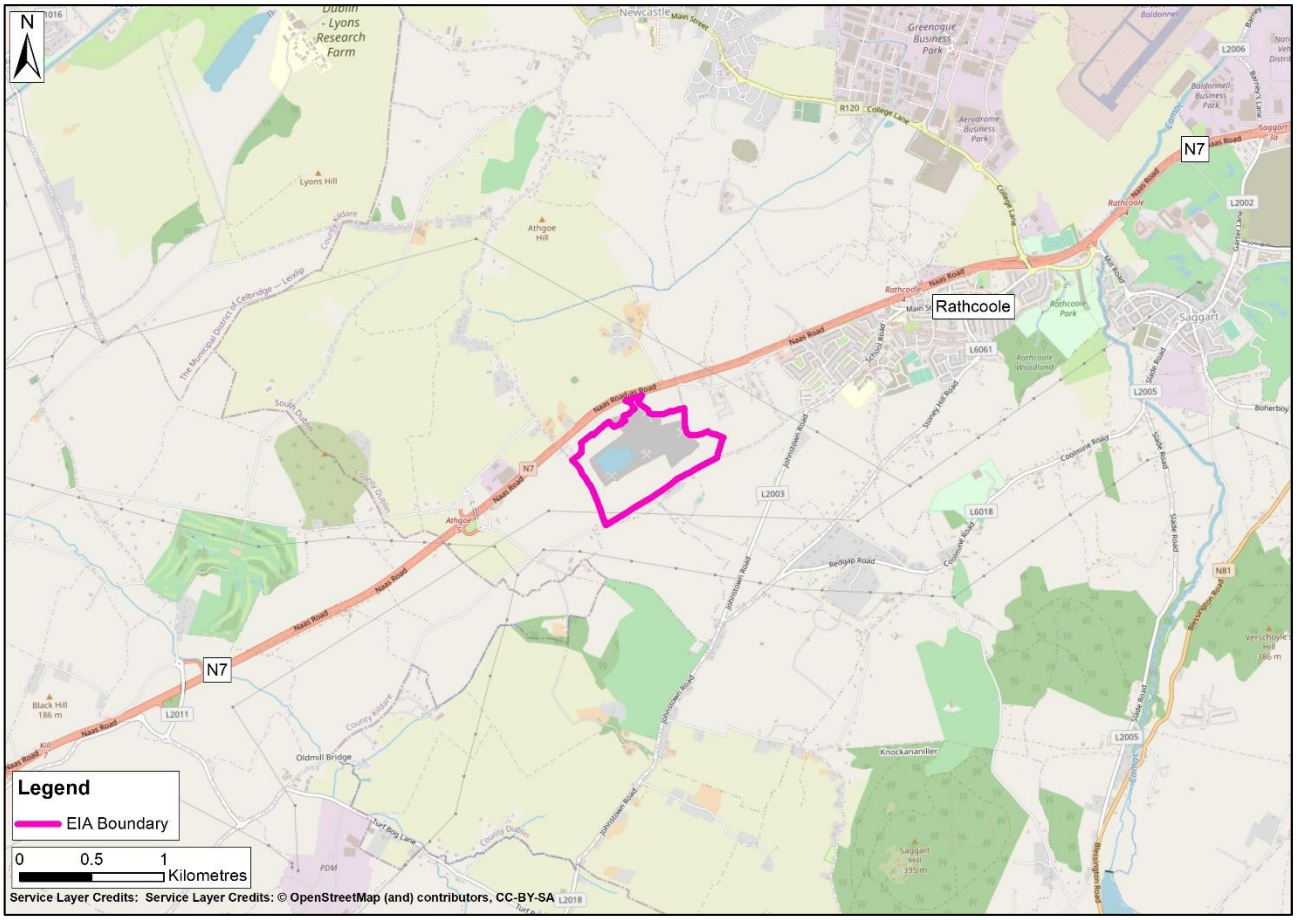


Figure 12.1: EIA Boundary of the Proposed Development.

The geographical study area for the assessment covers the development area and the assessment area has been extended as appropriate to identify the relevant material assets surrounding the Proposed Development.

In the assessment of cumulative impacts the geographical extent of the EIAR has been extended as appropriate to include the relevant related or unrelated development activities.

12.4 Baseline

12.4.1 Surrounding Environment

The Site is an active quarry located in south county Dublin, east of the border with Co. Kildare. The Site is located within the townland of Windmill Hill and located directly south of the N7 Dublin to Limerick road, ca. 2 km to the southwest of Rathcoole. The L6065 local road runs along the southern boundary of the Site.

The lands surrounding the Site to the north, west and south can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Dry cattle, sheep rearing and grazing of horses are the main activities in the area, with further arable activities to the south-west. Suburban development has extended from more built-up areas of Rathcoole along the N7 towards the east of the Site.

12.4.2 ESB Network Utilities

A service map was received from ESB Networks on 04 February 2021 detailing both the layout of underground and overhead ESB lines on-site and in the locality. The received service map has been provided in Appendix 12.1 of this chapter.

The service maps provided by ESB indicate that the Site (office and plant area) is connected to the grid by an underground medium/low voltage cable (10KV/20KV/400V/230V) which is connected to a transformer linked to medium voltage overhead power lines (10KV/20KV) which enters the Site from the north.

Premises around the Site are serviced by medium and low voltage overhead lines which traverse the area to the west, east, south and north.

An overhead 110KV line traverses the south western corner of the quarry area of the landholding.

12.4.3 Gas Supply

A service map was received from Gas Networks Ireland (GNI) on 10 November 2020 detailing the gas network in the area. There is a medium-pressure distribution pipe (180 PE-80 4 bar) located just outside the northern section of the Site, between the boundary of the EIA study area and the N7 Dual Carriageway.

GNI were consulted regarding the application for the Proposed Development and identified the nearest extremity of the quarry is some 1,800 m away from a transmission pipeline.

The service map indicates that no other gas pipelines are found within the area and no premises in the surrounding area are serviced by GNI infrastructure.

These GNI service routes have been included in Appendix 12.2.

12.4.4 Telecommunications Network

Service maps have been sourced (10 November 2020) from the Eir online mapping request portal and have been redrawn to an appropriate scale for reporting purposes (Figure 12.2).

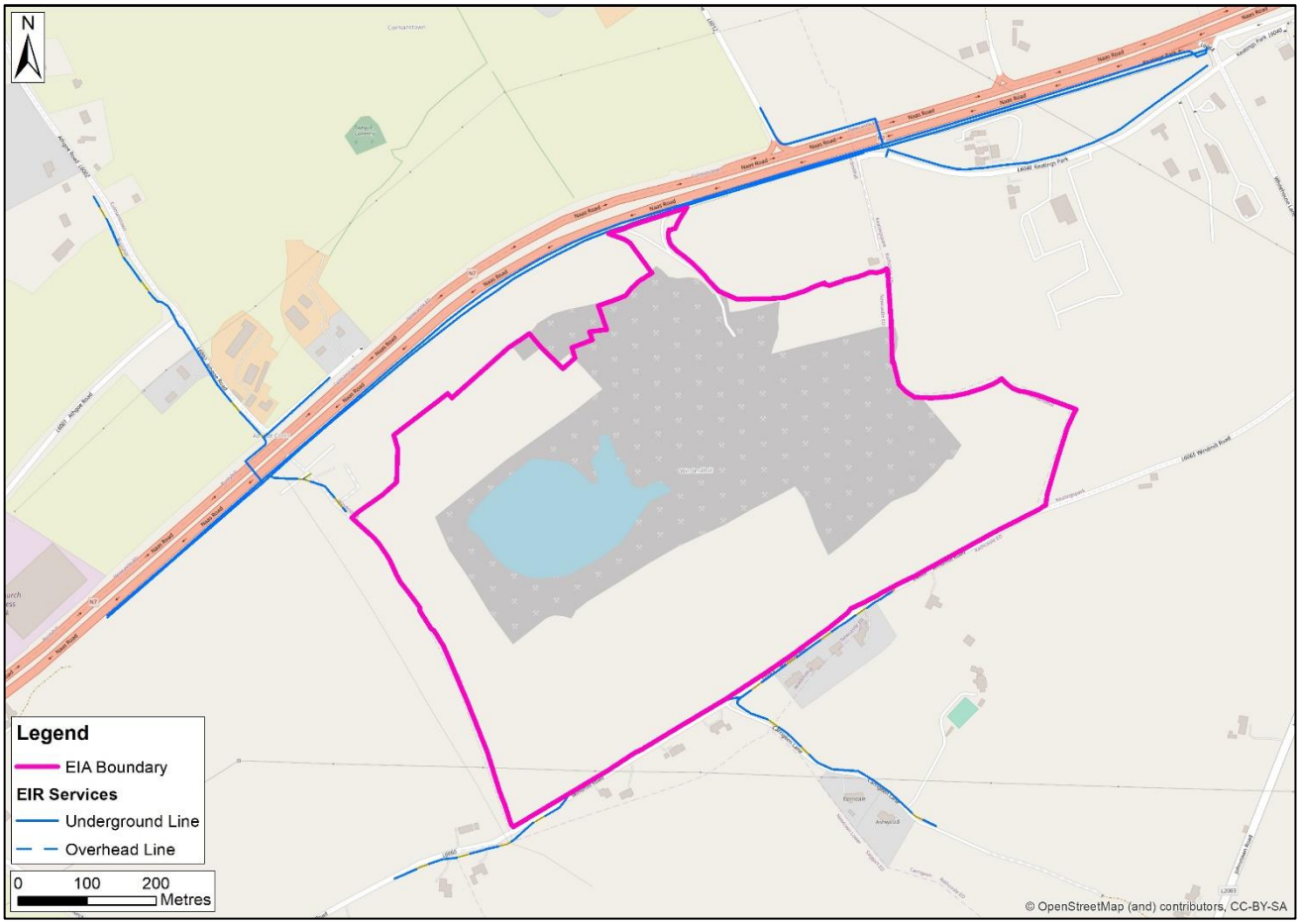


Figure 12.2: Under and Overground EIR services surrounding the Proposed Development.

Trenched underground services are routed along the N7 to the north, while underground and overground services run along the local road to the south of the Site (L6065). These lines service the ribbon residential developments situated adjacent to them.

A mast has been in place to the south of the Site along the southern boundary of the pit and was noted by the applicant to have been installed in ca. 1991. The Applicant notes that this mast serves internet to the Site and some users in the Rathcoole and Saggart area. The mast is serviced by Ripplecom and powered by electrical infrastructure along the L6065 local road.

12.4.5 Local Water Supplies and Sewerage Infrastructure

Public mains connection services are not connected to the office plant area onsite. Water is abstracted from groundwater wells on the Site. The use of groundwater at the Site has been in existence for decades. The wells services the welfare facilities at the Site office, and bottled water is used for drinking.

The Liffey aqueduct water main tracks along the northern section of the Site, the map in Appendix 12.3 displays this route. The Irish Water maps indicate this main has been in place since 1940.

Foul water from staff facilities does not discharge to the South Dublin County Council sewerage infrastructure services. It is instead collected onsite in a holding tank and in portable lavatories. These wastes are subsequently collected and removed from Site by contractors.

A potable water network, operated by Irish Water, serves the residential premises to the east of the Site in Rathcoole. A service layout has been provided in Appendix 12.3. The Irish Water service mapping indicates

that ribbon residential developments on the L6065 to the south of the Site are not connected to mains water services, instead abstracting potable water from wells.

Sewerage services at the same dwellings are covered by independent septic tank systems.

12.4.6 Surface Water Drainage Infrastructure

Lands within the Site are dominated by rock extraction areas, recolonising bare ground and improved grassland fields. Currently the surface water infiltrates through the underlying soils and sub-soils.

There are no existing public surface water drainage networks within the Site.

During periods of higher rainfall any pumped water that is not used as part of the washing plant activities, or temporarily stored in the water tank, is allowed to discharge to a culvert located adjacent to the Site entrance. Overflow from the water tank is returned to the flooded pit area if necessary. A drainage survey of the culvert used for discharge was carried out in 2021 and identified a piped flow path north towards the N/M7 dual carriageway, where it joins the motorway drainage system. The discharge culvert is not in connectivity with the Irish Water public supply mains which runs through the Site boundary near the entrance.

12.4.7 Waste Management and Local Waste Infrastructure

Small amounts of general refuse waste are generated by the site office and staff portacabin facilities. These are collected on Site and transported to local permitted and licenced waste facilities. These waste streams are recycled or disposed, as appropriate, by a licensed waste contractor.

Waste is also generated from the maintenance and servicing of equipment, these include waste oils and lubricants and tyres which are disposed by the service contractor through appropriate waste channels respective to the waste stream. The Site generates limited quantities of light bulbs, batteries and scrap metals. These are disposed of as required by appropriately licenced operators.

12.4.8 Geological Resource and Local Economy

The geology of the Site is described in detail in Chapter 6.0 (Land, Soils and Geology). As outlined previously, rock extraction has been an established activity in the area with the quarry dating back to before the 1960s. The extracted aggregate is used in the construction industry.

12.5 Characteristics of the Proposed Development

The application for further development of the quarry is to be made concurrent with an application for substitute consent for the quarry that is accompanied by an rEIAR.

The lands the subject of this EIAR extend to 46.14 ha. that reflect historic operational site information including the extractable area declared under S.261 quarry registration in 2005. The EIA project boundary is generally bounded by the N/M7 to the north and the local Windmillhill Road to the south. The eastern and western EIA project boundaries are demarcated by the Windmillhill townland boundary that consist of field boundaries and the entrance to a dwelling called ‘Four Winds’ that is within the ownership of the planning applicant to the east; and the former local Steelstown Road to the west.

At the center of the EIAR project boundary is an existing quarry that covers an area of approximately 28.8 ha. with an average working depth of 173 mAOD. The existing quarry is roughly rectangular in shape with an east-west axis parallel to the N/M7 and local Windmillhill Road. The existing quarry has a centrally located administration and processing plant area over approximately 5 ha.

The further quarrying development proposed involves a lateral northward extension of the current quarry void over approximately 4.1 ha (and 5.16 ha to accommodate screening berms) west and east of an existing dwelling also in the applicant’s ownership and a deepening of the western and eastern side of the laterally extended void

to a final working depth of 150 mAOD. The further development proposed is for quarrying only and is over an area of approximately 29.98 ha. The material extracted will be processed at the existing central processing area and the existing quarry access will be utilised.

It is anticipated that extraction of the remaining reserve will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.

12.6 Potential Effects

The main potential impacts and associated effects that will be considered in the assessment relate to the following:

- Activities or events that might impact electrical services and utilities for surrounding users;
- Activities or events that might impact gas services and utilities for surrounding users; including the impacts of blasting on site on gas pipelines;
- Activities or events that might impact telecommunications networks for surrounding users;
- Activities or events that might impact surface water drainage networks surrounding the Site;
- Activities or events that might impact water supplies and services for surrounding users; including the impacts of blasting on site on water supply pipelines;
- Activities or events that might impact wastewater networks for surrounding users;
- Activities or events that might impact waste management infrastructure; and
- Activities that might impact geological resources surrounding the Site.

12.6.1 ESB Network Utilities

The Proposed Development will utilise electricity supplies to the Site via the existing onsite connection to the grid. The Proposed Development seeks to maintain existing connections and no new connections or demands on the electrical infrastructure are proposed.

Further expansion of the existing pit is not proposed to the south-west in the area where the overhead 110KV line traverses the Site.

Potential impacts from the Proposed Development's continuation of quarrying on the local electrical supply network are therefore considered to be **negligible** resulting in long term effects that are **imperceptible**.

12.6.2 Gas Supply

There are no requirements for a GNI connection to service the Proposed Development. Therefore, there will be no additional supply demands on the GNI network from the Site. Potential impacts from the Proposed Development on the local gas consumption in the network are considered to be **negligible** resulting in effects that are long term and **imperceptible**.

Part of the Proposed Development's layout includes extensions of the existing pit to the north of the Site in two separate areas. The winning of rock in these areas will be carried out using existing blasting methods employed at the Site. It is not proposed to conduct any of these works in the vicinity of the distribution line (adjacent to the N7). GNI were consulted regarding the Proposed Development design and noted their potential concerns if works were occurring in the vicinity of a GNI transmission line (as opposed to the distribution line along the N7). GNI advised that upon their review of the plans for the Proposed Development that the nearest extremity of the quarry to a GNI transmission pipeline is ca. 1,800 m away. GNI also identified that the Proposed

Development 'should not, without prejudice, have an undue impact on the GNI Gas Transmission Pipeline or Wayleave'. Should GNI have any concern at a later stage the Applicant will facilitate the monitoring of blasting at the transmission line and will undertake appropriate mitigation measures in line with GNI recommendations.

Blasting is carried out on Site by a suitably qualified contractor and the methods are strictly controlled. These measures have been discussed in Chapter 8 (Noise and Vibration) of this EIAR. Potential impacts from the Proposed Development on the gas supply network are considered to be **negligible** resulting in effects that are **imperceptible**.

12.6.3 Telecommunications Network

The Site's office currently utilises a privately owned mast located to the south of the pit for telecommunications.

The Proposed Development does not seek to access additional telecommunication infrastructure nor does it seek to carry out extraction activities which may result in telecommunication infrastructure being affected.

Potential impacts from the Proposed Development on the local telecommunication networks are therefore considered to be **negligible** resulting in effects that are **imperceptible**.

12.6.4 Local Water Supplies and Sewerage Infrastructure

Water used on Site is abstracted from groundwater wells, and bottled water is used for drinking water. Additional abstraction points or access to the public water supply network are not required as part of the Proposed Development. As it is not proposed to consume water from the local supply network then potential impacts from the Proposed Development on the water supply network are considered to be **negligible** resulting in effects that are **imperceptible**.

As noted, part of the Proposed Development's layout includes extensions of the existing pit to the north of the Site in two separate areas. During the latter stages of the Proposed Development the quarried faces are proposed to be within 40 m of the Liffey aqueduct water main.

Controlled blasting is conducted at the quarry as a method of rock extraction. The process of drilling and blasting involves drilling a number of holes into a specific rock face, which are then filled with explosives. The explosives are detonated in a controlled explosion causing the rock face to shatter and collapse. The resultant rock is then removed and crushed for transport from site.

If this process is not managed properly there is potential for accidents to occur. As well as impacting local residents and their properties an improperly managed blast could damage the IW pipeline located to the north of the quarry.

The previously blasted rock face of the quarry is ca. 160 m from the IW pipeline to the north of the quarry. As the proposed quarry extension progresses northwards the blasting activities will occur nearer to the pipeline, however the closest blasted face will be located ca. 40 m away from the line at its closest point. The IW 2020 'Code of Practice for Water Infrastructure' dictates that: *'detailed proposals, including work method statements, insurance confirmations and details of work completed of a similar nature must be submitted to IW for its consideration before approval will be issued prior to undertaking work in close proximity to IQ assets. All such works in the vicinity of Water Mains or sewers of 400mm diameter and greater shall be subject to written agreement with Irish Water before construction commences on site.'*

Extraction in this area of the pit is proposed to be carried out in a phased manner in a northerly direction. To reduce the potential for damage to the Irish Water pipeline numerous mitigation measures are currently employed during blasts and these have been described in detail in Chapter 8 Noise and Vibration. These measures include a number of operational controls and also the requirement for blasting contractors to be trained and competent. The blasting activity itself will be conducted using these existing blasting methods that

are currently employed on Site. Further extraction methods and mitigation measures will be agreed in consultation with Irish Water prior to the commencement of extraction activities in the northern sections of the Site. Should further surveys be required then these will also be commissioned in conjunction with the requirements of Irish Water.

The quarry will deploy a vibration monitor at the Irish Water pipeline during all blasting events on the northern face of the quarry. From these monitoring records the blasting contractor can determine the margin of compliance with the vibration limit and if blast parameters require refinement for future blasting events. The results of such events will be reported to Irish Water as appropriate. With these embedded design and management measures it is considered that impacts of Site activities on this Liffey aqueduct water main will be **negligible** resulting in effects that are **imperceptible.**

The Site utilises contained systems for collecting wastewater, and there are no additional toilets proposed as part of the Proposed Development. The current Site practices will be maintained and the wastewater will be collected and removed from the Site by contractors. Potential impacts from the Site's wastewater/sewage on the underlying groundwater and local environment are therefore considered to be **negligible** resulting in effects that are **imperceptible.**

12.6.5 Surface Water Drainage Infrastructure

As noted, surface water on the Site infiltrates through the underlying soils and sub-soils and percolates to the groundwater. In addition, as part of the water management system on the Site, water abstracted from the western quarry pit is periodically discharged during periods of prolonged rainfall to a culvert located on the northern portion of the Site adjacent to the N7 roadway. Water from this culvert is discharged into the roadway drainage system. It is unknown where the water in the motorway drainage system flows to from this point and it may discharge untreated to a tributary of the River Griffeen near Rathcoole. Pumped water is only discharged at the discharge culvert when not used by on-Site activities. Discharged water does not come into contact with 'dirty' water from the washing plant.

Assessments made in Chapter 6 (Water) have identified a **negligible** magnitude of impact from increased flooding risk due to off-Site discharge of pumped water via the Site discharge culvert, which has been determined to have **imperceptible** effects.

12.6.6 Waste Management and Local Waste Infrastructure

The proposed continuation in quarrying activities will not generate any new waste streams or additional quantities of wastes. Current waste management practices will be maintained and waste will be managed by suitable qualified, permitted and licenced operators. It is considered that the impact on the local waste infrastructure will be **negligible** during the assessment period resulting in effects that are **imperceptible.**

12.6.7 Geological Resource and Local Economy

The geology of the Site is described in detail in Chapter 6 (Land, Soils and Geology). The Proposed Development will result in a permanent loss of the geological resource within the confines of the Site. This extraction of aggregate is considered an acceptable use of the resources at the Site and material extracted from the Proposed Development will be used as raw material in the construction industry.

Therefore, potential impacts from the Proposed Development's extraction of the geological resources and economic use is considered to be **low** (beneficial) resulting in effects that are **slight.**

12.6.8 'Do-Nothing' Scenario

A 'do-nothing scenario' where the Proposed Development is not granted planning permission would not result in any significant adverse effects to the material assets surrounding the Site.

Table 6.2: Evaluation of Initial Impacts and their Effect Significance

Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect *
Electrical Infrastructure / Utilities	Medium	Disruption to electrical supplies as a result of Site activities.	Negligible (adverse)	Imperceptible
Gas Infrastructure / Utilities	Medium	Impacts to gas supplies by consumption from Site activities.	Negligible (neutral)	Imperceptible
Gas Infrastructure / Utilities	Medium	Disruption to gas supplies and damage to the supply network as a result of Site activities, (e.g. excavation and blasting).	Negligible (adverse)	Imperceptible
Telecommunication Infrastructure / Utilities	Medium	Disruption to telecommunications networks as a result of Site activities.	Negligible (adverse)	Imperceptible
Water Supplies	Medium	Impacts to water supplies by consumption from Site activities.	Negligible (adverse)	Imperceptible
Water Supplies	Medium	Impacts to the Liffey Aqueduct to the north of the Site from Site activities (e.g. excavation and blasting).	Negligible (adverse)	Imperceptible
Water Supplies	Medium	Impacts to quality of surrounding water supplies (groundwater well users) from quarrying activities on Site.	Negligible to low (adverse)	Imperceptible to Slight
Water Supplies	Medium	Impacts to quantity of surrounding water supplies (groundwater well users) from quarrying activities on Site.	Negligible (adverse)	Imperceptible
Wastewater Networks	Medium	Impacts or impairment of local wastewater networks as a result of Site activities or contributions.	Negligible (adverse)	Imperceptible
Surface Water Infrastructure	Medium	Impacts or impairment of local surface water networks as a result of periodic discharge during higher rainfall events.	Negligible (adverse)	Imperceptible

Receptor	Sensitivity	Source of Impact/Description of Change*	Impact Magnitude*	Level of Effect *
Waste Management Infrastructure	Medium	Impacts or impairment of local waste management infrastructure as a result of Site activities generating wastes.	Negligible (adverse)	Imperceptible
Geological Resource	Medium	Use of the underlying geological used as an economic resource for aggregate and supply to the construction industry.	Low (beneficial)	Slight

* Taking account of embedded mitigation

12.7 Mitigation

No additional mitigation measures other than those detailed separately in the following chapters of this EIAR are required:

- Chapter 6 – Water;
- Chapter 7 – Air Quality and Climate;
- Chapter 8 – Noise and Vibration;
- Chapter 10 – Landscape and Visual Impact; and
- Chapter 11 – Traffic.

12.8 Monitoring

The chapters identified in the above Section 12.7 contain monitoring measures as appropriate for the protection of the surrounding environment (including water, air, noise, and vibration).

Chapter 8 Noise and Vibration identifies that the operations in the northern section of the Proposed Development will deploy a vibration monitor at the Irish Water pipeline during all blasting events on the northern face of the quarry. Vibration limits from blasting are recommended in Department of Environment Heritage and Local Government (now Department of Environment Climate and Communications), EPA and Irish Concrete Federation Environmental Guidelines. The vibration limit from blasting should not exceed a peak particle velocity of 12 mm/s when measured in any three mutually orthogonal planes at a receiver location when blasting occurs at a frequency of once per week or less. Any amendments in monitoring locations or thresholds will be agreed with Irish Water prior to excavations in these northern areas.

12.9 Residual Effects

The assessment concludes that the Proposed Development will not give rise to significant adverse effects on material assets surrounding the Site. In all cases the residual effect will be **Not Significant and not greater than Slight.**

12.10 Cumulative Impacts

There are no extractive industries, other developments or committed planned development within the vicinity of the Site which will have a significant cumulative effect with the Proposed Development on the Material Assets identified above.

12.11 Difficulties Encountered

No particular difficulties were encountered in the preparation of this chapter of the EIAR.

APPENDIX 12.1

ESB Utility Maps

ESB Networks

TITLE:

20210204-065_A0

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 04-Feb-2021

** SCALE: 1:2500

** SCALE WHEN PRINTED ON AN A0 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

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WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING:
(A) UP-TO-DATE MAP RECORDS. (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES.
(C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A0 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

X,Y: 298543 , 226662

X,Y: 301445 , 226662

X,Y: 301445 , 224739

COLMANSTOWN WEST
624X 15

COLMANSTOWN N

266 50
COLMANSTOWN

COLMANSTOWN EAST

KEATING PARK UPPER
487X 15

KEATING PARK MID.
640X 50

TRUCK + MACHINERY
641X 100 DV

TOOTEHILL
235 200 DV

911X 15 DV

TOOTEHILL N
234 33

BROADFIELD COURT

BZ797

BZ795

BROADFIELD DRIVE

EXISTING SP. TFR.

CROCKSH
237 15 DV

CARRIGEEN
236 15

BRUNKARD
594X 50

CROOKSHANE COTTAGES
479X 33

CROOKSHANE REILLY

BUSTYHILL NTH
270 15

BUSTYHILL STH
570X 33

BUSTYHILL MID.
575X 15

BUSTYHILL EAST
287 G 630 DV

BUSTYHILL LWR
219Y 50 DV

BUSTYHILL WEST
288 15

CASTLEWARDEN METEOR

COLMANSTOWN STH
268 15

FALLONS MACHINERY
642X 50

WINDMILL HO
269 5

WINDMILL QUARRY NO
897 S MV

WINDMILL VIEW
587X 25

WINDMILL HILL EAST

CARRIGEEN UPPER

CARRIGEEN LOWER

STEELSTOWN

STEELSTOWN MIDDLE

STEELSTOWN EAST

STEELSTOWN S

STEELSTOWN LOWER

NEWTOWN LOWER

BROOKFIELD

CROCKSHANE S W

CROOKSHANE SOUTH

GLEBE

ROGERS

RUSTIC PATH

REDGAP MID

REDGAP

REDGAP WEST

CARRIGEEN SOUTH

CARRIGEEN SOUTH WEST

NEWTOWN EAST

METER POS

PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES IN ADVANCE OF THE WORKS:

FOR HIGH VOLTAGE OVERHEAD LINES: (38KV AND HIGHER VOLTAGES)
CONTACT: ALAN BROWN, ESB TRANSMISSION, KYLEMORE WAY,
DUBLIN 8, D08-E398. PHONE: 087 9273970 EMAIL: ALAN.BROWN@ESB.IE

FOR HIGH VOLTAGE UNDERGROUND CABLES: (38KV AND HIGHER VOLTAGES)
CONTACT: GARETH PAISLEY, ESB TRANSMISSION, KYLEMORE WAY,
DUBLIN 8, D08-E398. PHONE: 087 9374867 EMAIL: GARETH.PAISLEY@ESB.IE

APPENDIX 12.2

GNI Utility Maps



Important Safety Notice: Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1850 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health and Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 289 389) or can be downloaded at www.hsa.ie.

Legal Notice: Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the"Information"). The Information should not be relied on for accurate distance or depth of cover measurements.

Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation,direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.

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- Aurora Telecom Duct
- Aurora Telecom Sub Duct
- Aurora Telecom Inserted Gas Pipe

Aurora TELECOM

Aurora Telecom Queries - 01-8926166 (Office Hours)
Aurora_Network_Queries@gasnetworks.ie
Aurora Telecom Emergency Only 1850 427399 / 01 2030120

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted
- Abandoned Pipe

C=?	Cover (depth in metres)		Pressure Monitor
CP	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

** Please contact GNI on 1850-427747 for specific information

DIAL BEFORE YOU DIG 1850 42 77 47
In Emergency call 1850 20 50 50 Gas Networks Ireland

Gas Networks Ireland

GAS NETWORK INFORMATION

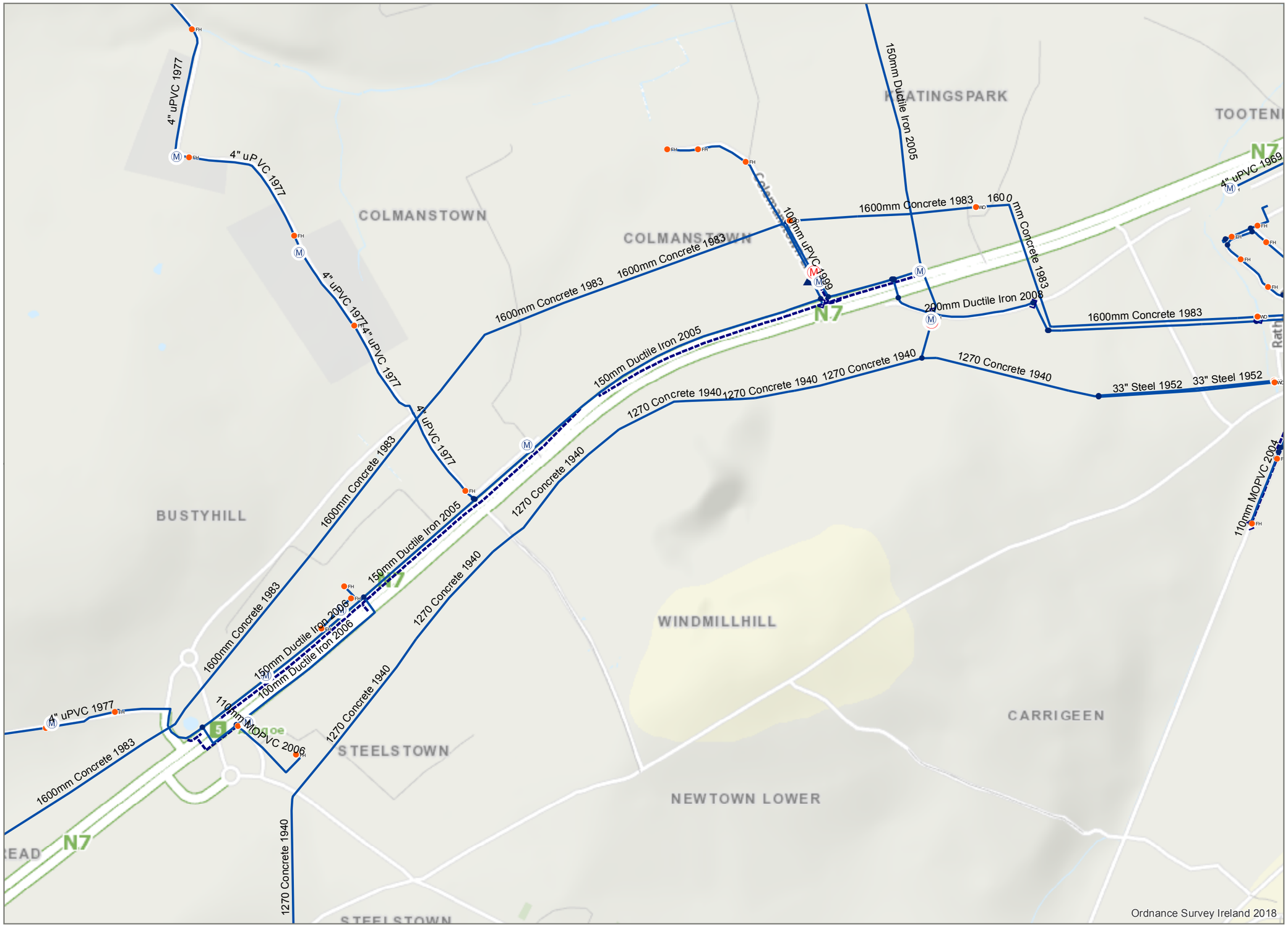
Description:

Location: 699936,725753

Plot Date: 10/11/2020 13:31	Scale: 5000 @ A3
Plotted By: 1017	Ref ID: *1017_10112020133154*

APPENDIX 12.3

Irish Water Utility Maps



N

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Water Distribution
Quarry Rathcoole, Co. Dublin

UISCE ÉIREANN : IRISH WATER



Legend

Non Boundary Meter
- Meter

Boundary Meter
- District (Boundary Meter)

Water Hydrants
- Fire Hydrant
- Washout

Pump Stations
- Pump Stations

Water Fittings
- Cap
- Other Fitting

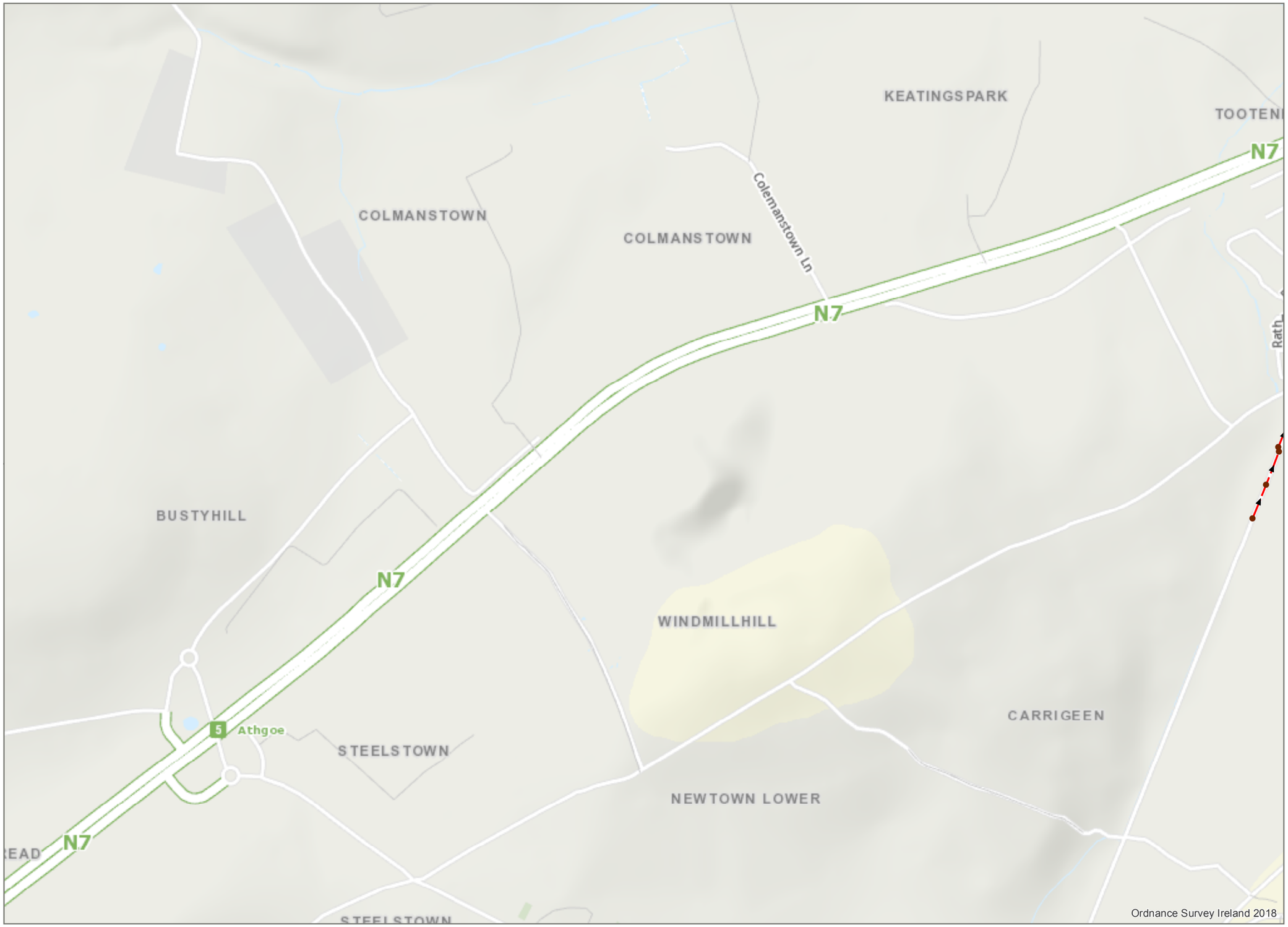
Water Mains(Irish Water Owned)
- Potable Water

Water Abandoned Lines
- Water Abandoned Lines

0 65 130 260 m

Coordinate System: TM65 Irish Grid Projection: Transverse Mercator	
Scale @ A3:	**1:8,000**
Drawing No.:	**IW-AGG-2018-000**
Drawn By:	**LFN**
Checked By:	**<Add Name>**
Approved By:	**<Add Name>**
Drawn Date	**10/11/2020**
Checked Date:	**<dd/mm/yyyy>**
Approved Date:	**<dd/mm/yyyy>**

DRAFT



N

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Sewer Distribution
Quarry Rathcoole, Co. Dublin

UISCE ÉIREANN : IRISH WATER



Legend

Sewer Manholes

- Standard

Sewer Mains (Irish Water)

- Gravity - Foul

0 65 130 260 m

Coordinate System: TM65 Irish Grid
Projection: Transverse Mercator

Scale @ A3:	**1:8,000**
Drawing No.:	**IW-AGG-2018-000**
Drawn By:	**LFN**
Checked By:	**<Add Name>**
Approved By:	**<Add Name>**
Drawn Date	**10/11/2020**
Checked Date:	**<dd/mm/yyyy>**
Approved Date:	**<dd/mm/yyyy>**

DRAFT

13.0 INTERACTIONS AND INTER-RELATIONSHIPS

13.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Golder Associates Ireland Ltd (Golder) for the L Behan Aggregates and Recycling Ltd Section 37L Application (of the Planning and Development (Amendment) (No. 2) Regulations 2015) to An Bord Pleanála, (ABP). The Application has been made for the proposed quarrying activities (the Proposed Development) located at the lands at Windmillhill, south of Rathcoole in South Dublin (the Site).

This chapter of the EIAR describes interactions/inter-relationships between environmental effects in the area surrounding the Proposed Development.

The assessment directly covers the physical extent of the EIAR study boundary as shown in Figure 13.1, and the assessment area has been extended as appropriate to identify the relevant interacting effects surrounding the Proposed Development.

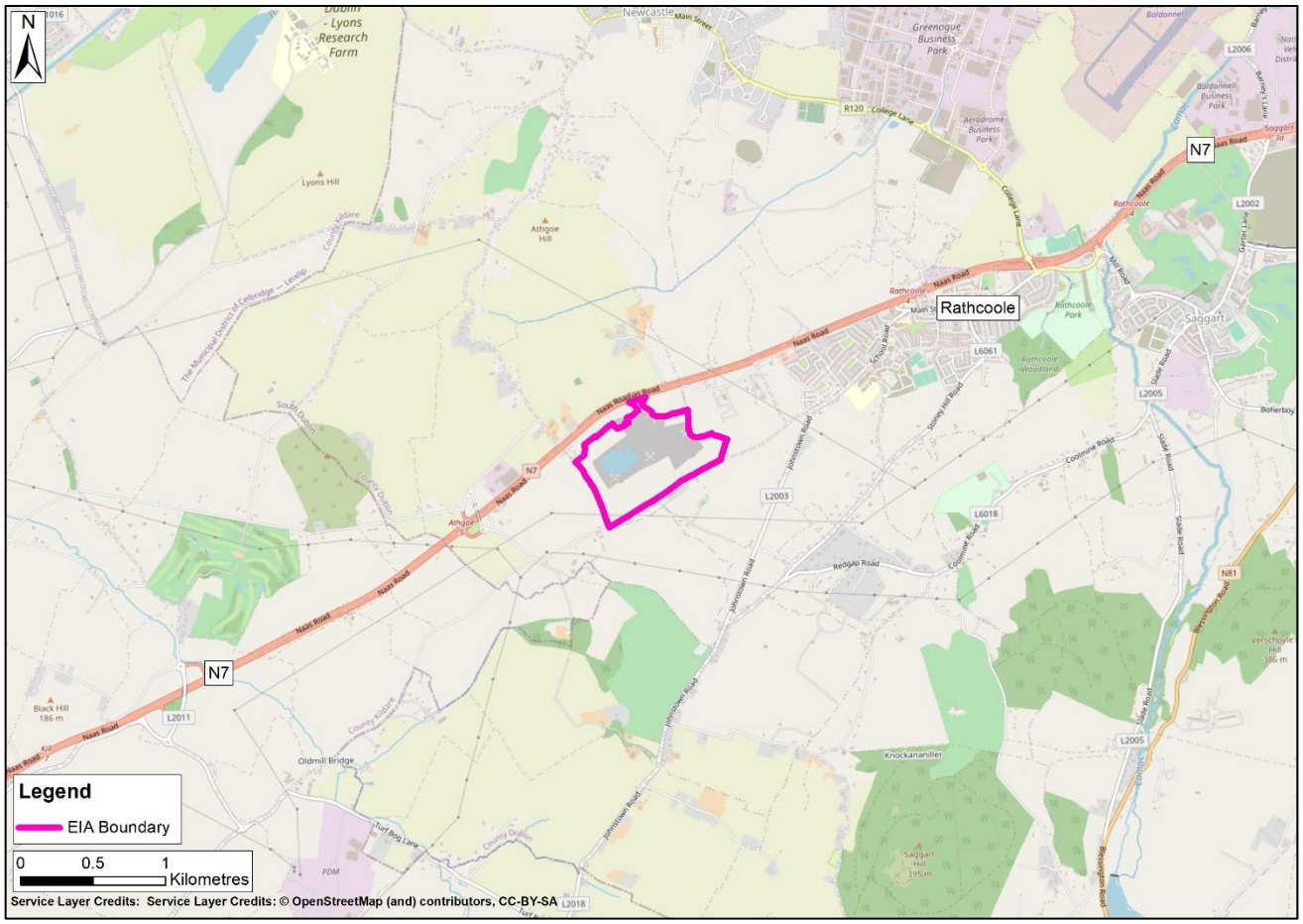


Figure 13.1: EIAR Study Boundary

Environmental factors are inter-related to some degree, and these interactions can exist on many levels. This chapter summarises the primary interactions between the environmental topics and provides a matrix to coherently display them.

The overall objective of the assessment in this chapter is to identify whether additional mitigation is required that would not otherwise have been identified in the individual study areas for these interacting effects.

The overall EIAR Project Team contributed to the compilation of this chapter.

13.1.1 Proposed Development Description

The Proposed Development will consists of further development of a quarry over an area of 26.87 ha. that largely coincides with an existing operational quarry void currently at an average working depth of approximately 173 mAOD and final floor of approximately 150 mAOD. It is proposed to laterally extend the existing quarry void to the north by approximately 4.1 ha. (over a total of 5.16 ha. to accommodate screening berms) and to also further extract the existing quarry void to a final average depth of 150 mAOD, east and west of a centrally located existing administration and processing plant area. The proposal includes for restoration to agricultural and amenity use upon completion of proposed extraction. The proposal duration is 20 years to reflect anticipated extraction of remaining reserve within 10 – 15 years, depending on market conditions and a further 2 - 5 years for restoration.

The existing quarry is accessed at a single location from the N7. The reserve consists of sandstone (greywacke) and is currently extracted by blasting and mechanical means. The excavated material is crushed at the working face by mobile plant and transported to the central processing area for washing and grading. The further development of the quarry relates to further extraction only and is to utilise the extant existing administration and processing plant area and quarry access.

13.2 Methodology

This assessment has been made with reference to the 'Guidelines on the information to be contained in environmental impact assessment reports', published in 'draft' by the EPA in August 2017 (EPA, 2017 Draft Guidelines). These guidelines were drafted by the EPA with a view to facilitating compliance with the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU, together the 'EIA Directive'). The assessment also considered 'Advice Notes for Preparing Environmental Impact Statements', also published in 'draft' by the EPA in September 2015.

The descriptive terminology used follows a 'matrix approach' to environmental assessment which is based on the characteristics of the impact (magnitude and nature) and the value (sensitivity) of the receptor. The terminology and method have been summarised in Chapter 1, Section 1.7 of this EIAR.

For the assessment of interacting effects, a matrix has been provided in Table 13.1 identifying through professional judgment the specific topics within the EIAR where the effects potentially interact/inter-relate with each other.

Table 13.1: Behan Quarry Section 37L Application Environmental Interactions.

	Pop. & Human Health	Ecology & Biodiversity	Land, Soils & Geology	Water	Air Quality & Climate	Noise & Vibration	Cultural Heritage	Traffic & Transport	Landscape & Visual	Material Assets
Pop. & Human Health										
Ecology & Biodiversity										
Land, Soils & Geology										
Water										
Air Quality & Climate										
Noise & Vibration										
Cultural Heritage										
Traffic & Transport										
Landscape & Visual										
Material Assets										

Population and Human Health

Continued quarrying activity at the Proposed Development has the potential to cause interacting effects between the surrounding population and human health and water, air quality, noise, traffic and transport, landscape and visual, and material assets.

Potential effects to the human environment from the Proposed Development activities include impacts on water which may affect groundwater quality and quantity in local wells. Potential impacts to human health may arise from dust generating activities on the Site and increases in concentrations of airborne particles and nitrogen dioxide due to plant emissions. Impacts to human health from excess noise and vibration associated with the Proposed Development may result in direct effects to site workers and also annoyance and effects on mental health at the surrounding residential receptors.

Visual impacts from the Proposed Development relate to the effect on views and on the general visual amenity experienced by people.

Site activities from the continued activity at the Proposed Development have the potential to impact or cause disruption to local services or utilities.

These interactions have been considered in the relevant chapters of this EIAR: Chapter 3 Population and Human Health, Chapter 6 – Water, Chapter 7 – Air Quality and Climate, Chapter 8 – Noise and Vibration, Chapter 10 – Landscape and Visual, Chapter 11 – Traffic and Transport, and Chapter 12 – Material Assets.

In summary, these assessments have identified that such interacting effects with the human environment are **not significant**.

Ecology and Biodiversity

There is potential for interacting effects between ecology and biodiversity and land, soils and geology, water, air quality, noise and vibration and landscape and visual.

Adverse impacts to the soil, water and air environment have the potential to deteriorate habitat quality both on and off-site.

Similar to human receptors, impacts from excess noise and vibration generated by the Proposed Development may result in stress to some species and effects on biodiversity and habitats surrounding the Site.

Elements of the Proposed Development will alter landscape features permanently. A large proportion of habitat to be altered by the extension of the Proposed Development will be improved agricultural grassland. With the extension of the Site, the degradation of hedgerow habitat and habitat severance has the potential to cause stress to species associated with hedgerow habitat.

These interactions have been considered in the relevant chapters of this EIAR: Chapter 4 – Ecology and Biodiversity, Chapter 5 Land, Soils and Geology, Chapter 6 – Water, Chapter 7 – Air Quality and Climate, Chapter 8 – Noise and Vibration and Chapter 10 – Landscape and Visual.

In summary, these assessments have identified that such interacting effects with the surrounding ecology and biodiversity are **not significant**.

Land, Soils and Geology

The continued activities at the Proposed Development create the potential for interacting effects between soil and geology, water, and cultural heritage.

Excavated materials will arise as a result of the soil stripping and the removal of rock. These activities will have the potential to cause changes in the underlying water environment and also to damage undiscovered cultural heritage features.

These interactions have been considered in the EIAR in Chapter 5 – Land, Soils and Geology, Chapter 6 – Water, and Chapter 9 – Cultural Heritage.

In summary, these assessments have identified that the interacting effects with land, soils and geology and water and cultural heritage are **not significant**.

Cultural Heritage

The continued activity provides potential for interacting effects between cultural heritage and air quality, noise and vibration, and landscape and visual impact.

The proposed blasting of rock will generate vibration which has the potential to damage cultural heritage features in the surrounds of the Site. In addition, extraction activities which will generate dust could holistically affect the setting of cultural heritage assets within the wider study area. Also, alterations in the landscape and visual amenity of the wider Site may have the potential to impact the value of recorded monuments and also unrecorded features.

These interactions have been considered in Chapter 5 – Land, Soils and Geology, Chapter 7 – Air Quality and Climate, Chapter 8 – Noise and Vibration.

In summary, this assessment has identified the above interacting effects as **not significant**.

Material Assets

The Proposed Development has the potential for interacting effects between material assets and noise and vibration.

The blasting of rock generated vibration will have the potential to damage material assets surrounding the Site (e.g. water supply infrastructure), and disrupt supply for the relevant users.

These interactions have been considered in Chapter 3 – Population and Human Health, Chapter 8 – Noise and Vibration and Chapter 12 – Material Assets.

In summary, this assessment in the EIAR has identified interacting effects between noise and vibration and material assets as being **not significant**.

13.3 Conclusions

It has been concluded that there will be no significant interactions between any of the various environmental topic areas as a result of the continued operation of the Proposed Development.

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14.0 MITIGATION AND MONITORING MEASURES

14.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Golder Associates Ireland Ltd (Golder) for the L Behan Aggregates and Recycling Ltd (LBAR) Section 37L Application (of the Planning and Development (Amendment) (No. 2) Regulations 2015) to An Bord Pleanála, (ABP). The Application has been made for the proposed quarrying activities (the Proposed Development) located at the lands at Windmillhill, south of Rathcoole in South Dublin (the Site).

The purpose of this chapter is to collate the mitigation and monitoring measures identified in the EIAR that are considered necessary to protect the environment during the continued extraction and restoration phases of the Proposed Development.

The design of the Proposed Development takes environmental constraints and considerations into account, with embedded mitigation a fundamental component of the design that enables many potential environmental impacts to be avoided entirely. Where environmental impacts cannot be avoided by embedded mitigation, additional mitigation and monitoring measures have been recommended in the EIAR. These are collated and presented in this chapter.

The EIAR Project Team contributed to the compilation of this chapter.

14.2 Mitigation Measures

Mitigation and environmental commitments have been identified as general requirements which will help to avoid, reduce or offset potential impacts and are relevant to a number of the environmental aspects addressed in the EIAR.

General environmental mitigation measures specified within the EIAR are provided in Table 14.1.

Specific mitigation measures specified within the EIAR technical assessments are provided in Table 14.2 to Table 14.12 below.

The timing of the implementation of the mitigation measures is indicated within the tables as:

Operational Phase: During the ongoing continued extraction at the Proposed Development, (10-15 years, medium-term); and

Restoration Phase: The undertaking of the physical works to fully restore the extracted site upon cessation of extraction activities, (2-5 years, short-term).

The term of duration has been identified in accordance with the ‘Guidelines on the information to be contained in environmental impact assessment reports’, published in ‘draft’ by the Environmental Protection Agency (EPA) in August 2017.

14.3 Monitoring Measures

A number of environmental monitoring activities are to be continued during the operational and restoration phases. These monitoring activities are required to confirm the effectiveness of the mitigations, to define the quality of the surrounding environmental, and to establish if there are any trends in environmental parameters.

Environmental monitoring requirements have been identified in the specific chapters of the EIAR. The frequency of these monitoring requirements have been collated and provided in a schedule displayed in Table 14.13.

Table 14.1: General Environmental Mitigation Requirements

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
GM1	The Applicant will implement the Environmental Management Plan (EMP) at their Site. The purpose of the system is to: ■ Minimise the environmental impact of the operation. ■ Ensure compliance with environmental legislation. The EMP contains the mitigation measures and plans identified in the EIAR, and the following Sections. LBAR shall incorporate into the EMP and implement the conditions set out in the planning approval. The EMP shall set out all the intended methods to manage potential environmental impacts from the operation and restoration of the Proposed Development. The EMP is a live document and will be reviewed on a regular basis and updated accordingly by LBAR, in particular the document shall be reviewed on receipt of planning approval in accordance with the relevant planning conditions.	Operational and Restoration Phase
GM2	The key elements of the EMP that will be updated accordingly throughout the duration of the Proposed Development include: Appointment of and maintenance of an Environmental Officer by LBAR for the duration of the activities. The documentation and record of any environmental incidents on Site, and the actions taken for implementing appropriate corrective and preventative measures. The review and application of relevant guidance that have inform the environmental performance of the Proposed Development. Ongoing training of environmental awareness for all staff. The documentation, compilation and review of environmental monitoring results. Periodic review of the EMP.	Operational and Restoration Phase
GM3	The appointed Environmental Officer shall ensure that the EMS is fully implemented during the operation and restoration phases in agreement with South Dublin County Council (SDCC), to prevent or reduce the impacts identified in the impact assessment.	Operational and Restoration Phase
GM4	The Applicant will implement the Restoration Plan at their Site. This plan will identify the methods by which the restoration works will be managed to meet these commitments and requirements. The Restoration Plan will be carried out in accordance with the provisions of the EMP.	Operational and Restoration Phase
GM5	The appointed Environmental Officer shall ensure that the Restoration Plan is fully implemented during the restoration phase in agreement with SDCC, to ensure that the Site is restored in the interest of environmental sustainability, visual amenity, traffic safety, adjoining residential amenity, and proper planning and sustainable development of the area..	Restoration Phase
GM6	**NOTE: Any further general environmental mitigation measures within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.2: Specific Environmental Mitigation Requirements – Population and Human Health

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
PHH1	**Population** Nuisance to the local population from noise, vibration, dusts, landscape and visuals impacts, and impacts to groundwater and surface waters will be mitigated during the operation at the Proposed Development as per the specific mitigation measures and best practices identified in the respective chapters of the EIAR, (Land, Soils and Geology (Chapter 5), Water (Chapter 6), Air Quality and Climate (Chapter 7), Noise and Vibration (Chapter 8); Traffic (Chapter 11) and Landscape and Visual (Chapter 10)). A revised EMP will be developed for the Site in line with further conditions resulting from the grant of planning permission for the Site. The EMP shall provide provisions for the mitigation of nuisance and the management of the Site in respect to the local environment and local population.	Operational and Restoration Phase
PHH2	**Employment and Economic Factors** Employment and other economic factors related to the proposed continuation have been determined to have beneficial impacts, therefore no mitigation measures are proposed for the operation and restoration of the proposed development.	Operational and Restoration Phase
PHH3	**Amenity** Nuisance to the local amenity and recreation areas from noise, vibration, dusts and traffic will be mitigated during the operation. Specific mitigation measures and best practices have been discussed in the respective chapters of the EIAR, Air Quality and Climate (Chapter 7), Noise and Vibration (Chapter 8) and Material Assets (Chapter 12).	Operational and Restoration Phase
PHH4	**Land Use** There are no specific mitigation measures identified in relation to Land Use.	Operational and Restoration Phase
PHH5	**Human Health, and Health and Safety** Good environmental practice for water, air, and noise and vibration management have been specified in the Water, Air Quality and Climate, and Noise and Vibration chapters of the EIAR. Measures will be detailed in the EMP and followed during the operation and restoration at the Site.	Operational and Restoration Phase
PHH6	**Air** - Fine particulates such as $PM_{2.5}$ and PM_{10} have a potential for negative effects on human health and may arise primarily from vehicle emissions. Of these finer particulates, the IAQM (2016) guidance states that quarries are more likely to experience suspended dust in the sub-coarse fraction (PM_{10}-$PM_{2.5}$) as opposed to the fine ($PM_{2.5}$) fraction. The suspension of fine particulates will be managed through the same mitigation measures employed for the management of deposited dust, (See Table 14.6).	Operational and Restoration Phase
PHH7	**Water** – For the protection of groundwater and local wells, it is proposed that the mitigation measures (See Table 14.5) which are currently in place at the Site are continued into the future.	Operational and Restoration Phase
PHH8	**Noise and Vibration** - Noise and vibration from the Site can also have indirect impacts to surrounding residential developments	Operational and Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
	through annoyance and effects on mental health. Blasting takes place in the quarry in order to extract rock. If managed incorrectly this activity has the potential to impact off-site sensitive receptors and damage property. It is proposed that the mitigation measures (See Table 14.7 and Table 14.8) which are currently in place at the Site are continued into the future.	
PHH9	**Health and Safety** - The predominant health and safety concerns for the human environment relates to the possibility of humans and livestock straying into the quarry area and from blast related activity at the Site. To mitigate against such events the following are in place at the Site: ▪ Fencing will continue to be actively maintained at the Site to ensure that the risk of injury to civilians and livestock is minimised. The entrance gate will continue to be locked and controlled by the sites' management; ▪ Exposed edges in the proposed extension will be appropriately protected with safety berms. These edges will also be sign-posted appropriately to identify any potential hazard; and ▪ Blasting will take place at the Site using licenced and experienced operators, (See Table 14.8).	Operational and Restoration Phase
PHH10	**Health and Safety Training** - The applicant is committed to providing appropriate information, training and supervision to employees who will be operating at the Application Site.	Operational and Restoration Phase
PHH11	**Site Personal Protective Equipment** - All site employees, contractors and subcontractors are required to wear a minimum personal protective equipment (PPE) whilst on-site, these are steel toed boots and a high visibility jacket or vest. Other task specific PPE which will be used at the Application Site include, safety glasses/goggles, hard hats, gloves and hearing protection.	Operational and Restoration Phase
	NOTE: Any further mitigation measures related to Population and Human Health detailed within authorisation or consents to be included in this section and adhered to.	Operational and Restoration Phase

Table 14.3: Specific Environmental Mitigation Requirements – Ecology and Biodiversity

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
EB1	**Hydrocarbons/Chemical Safeguards & Protection of Site water** Proposed mitigation measures are outlined as follows (these are already implemented at the existing quarry Site): ■ All soil / overburden stockpiles will be covered (i.e. vegetated) to minimise the risk of rain / wind erosion; ■ Restoration of topsoil and overburden will be carried out on a phased basis to speed up restoration biodiversity value as defined in the restoration plan; ■ All plant and machinery will continue to be regularly serviced before being used on Site; ■ Mobile plant fuelling will take place in a designated area of the Site with appropriate drip trays/nappies in place. Static plant or tracked excavators will refuel over a drip tray with an absorbent mat. In addition, spill kits will be maintained on site to deal with all spills and leaks, and spill training will be provided to relevant staff members; ■ Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water; ■ Fuel and oil containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores; ■ Containers and bunding for storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored; ■ Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; ■ Drip-trays will be used for fixed or mobile plant such as pumps and generators to retain oil leaks and spills; ■ Only designated trained operators will be authorised to refuel mobile plant on Site; ■ Procedures and contingency plans will be set up to deal with emergency accidents or spills; and, ■ An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor and key personnel trained in their use.	Operational and Restoration Phase
EB2	**Protection of Retained Habitat** To protect retained hedgerows and trees, such vegetation will be protected with secure fencing prior to the commencement of extractive works on Site. This protection will be designed following NRA guidance (NRA, 2005), in particular, with regard to root protection areas and fencing specifications (unless otherwise advised by a suitably qualified arboriculturalist). Dust suppression will be implemented in accordance with best practice guidance (CIRIA, 2016).	Operational and Restoration Phase
EB3	**Habitat Compensation** Planting will be required to mitigate for required tree and hedge removal and a restoration plan will require replacement of any trees and shrub species removed on a “like for like” basis (as a minimum). Consideration will be given towards hawthorn, blackthorn mix with individual alder and birch (to form native tree hedges) and deciduous trees (native tree species include oak, alder, birch). Full details are provided in the accompanying restoration plan.	Operational and Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
EB4	**Mammals** Bat activity surveys including passive monitoring will be undertaken for a minimum of five nights and emergence surveys at structures identified with potential to host roosting bats (B_01 to B_03) will also be undertaken. Transect surveys will be carried out at emergence and/or re-entry to gather information on bat activity and to identify any activity which may indicate the presence of a roost or key commuting routes. Monitoring will be carried out to understand the ecological context and significance of the identified main badger sett and the impact of further loss of badger foraging habitat, including a bait marking study. A camera trap survey at the sett will be carried out (under appropriate license) to seek to determine if breeding is occurring within the sett.	Operational and Restoration Phase
EB5	**Birds** A breeding bird (including Peregrine Falcon) survey for the Site is currently being undertaken. Preliminary results indicate that a female Peregrine is again at the Site sat on eggs. The result of this work will form the basis of a Peregrine falcon management and monitoring plan for the Site.	Operational and Restoration Phase
EB6	**Invasive Species** Measures will be implemented throughout Site works to safeguard against the spread of any invasive non-native species (such as buddleia, cotoneaster, Japanese knotweed or rhododendron). Indeed, where possible such plants will be removed from the Site (and disposed of appropriately, following an appropriate method statement). As such, an invasive species survey will be undertaken within the appropriate window for this type of work which is likely to be within the growing season (April to September inclusive).	Operational and Restoration Phase
EB7	**NOTE: Any further mitigation measures related to Ecology and Biodiversity detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.4: Specific Environmental Mitigation Requirements – Land, Soils and Geology

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
LSG1	If evidence of previously unidentified potential contamination (either visual or olfactory) is identified during works, construction good practice and management procedures will be followed that may include investigation and assessment works	Operational and Restoration Phase
LSG2	The management of the existing quarry faces, and silt ponds will be in accordance with the Health and Safety Authority's *'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008*, (as amended),and the recommendations of geotechnical appraisals carried out on site	Operational and Restoration Phase
LSG3	The Applicant will maintain a Complaints Register. This register will record complaints of an environmental nature related to the operation. In each entry the Applicant will record the date and time of the complaint, the name of the complainant (if provided), and will give details of the nature of the complaint. A record shall also be kept of any response made in the case of each complaint	Operational and Restoration Phase
LSG4	**NOTE: Any further mitigation measures related to Land, Soils and Geology detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.5: Specific Environmental Mitigation Requirements – Water

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
W1	Sludge from the wheel washes should be collected and disposed of correctly, if there are any concerns over potential contamination in the sludge, this should be tested to determine an appropriate disposal route. Wastewater from the wheel washes should be discharged via the on-site hydrocarbon interceptor.	Operational and Restoration Phase
W2	Vehicles and plant on Site will be well maintained, vehicle check should be carried out to assess the condition, fuelling should take place in the refuelling area with appropriate drip trays/ nappies.	Operational and Restoration Phase
W3	Maintenance of vehicles and plant on site should be carried out on hardstanding in the refuelling area where the hydrocarbon interceptor is located.	Operational and Restoration Phase
W4	An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor and key personnel trained in their use.	Operational and Restoration Phase
W5	Any disused / redundant boreholes on the site should be properly decommissioned as to not pose additional potential pathways for surface contamination to reach the groundwater table.	Operational and Restoration Phase
W6	Discharges to the on-site culvert should be further delineated to determine the flow path once it has been discharged from the Site and joined the M7 roadway drainage system.	Operational and Restoration Phase
W7	Welfare facilities and septic tanks will continue to be well maintained to reduce the potential for leaks.	Operational and Restoration Phase
W8	Dewatering and pumping from the quarry pits should be kept to a minimum (volume and duration) to avoid changes to the groundwater elevation and flow direction and to further protect the supply for other water users.	Operational and Restoration Phase
W9	Bottled water should continue to be used for drinking water on-site	Operational and Restoration Phase
W10	Establish an Environmental Management Plan (EMP) for the Site and establish good record keeping of incidents and water use including pumping rates during future activities	Operational and Restoration Phase
W11	Berms constructed of topsoil and overburden should be covered until vegetation is established to minimise the risk of rain/wind erosion and sediment loading of quarry ponds.	Operational and Restoration Phase
W12	Stockpiles on the floor of the quarry area should be covered to minimise the risk of rain/wind erosion and potential migration of material, if storage in this area is for long time periods (i.e. not temporary)	Operational and Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
W13	The Silt ponds should be inspected regularly for signs of any hydrocarbon contamination or for structural defects that may cause a leak of material or collapse of infrastructure;	Operational Phase
W14	Material in the silt ponds should be tested to ensure no contamination is present prior to reworking during the restoration phase. If any contamination is present the material should be removed from site using an appropriate disposal route rather than reworked.	Restoration Phase
W15	Bi-annual groundwater monitoring shall be undertaken to ensure that no off-site pollution of groundwater water is occurring. This will include measurements of groundwater levels and groundwater quality.	Operational and Restoration Phase
W16	Monthly water quality monitoring of the discharge water will be undertaken to ascertain the quality of the water exiting the Site.	Operational Phase
W17	Daily records will be kept of on-site abstraction, water usage and discharge volumes.	Operational Phase
W18	Waste production on-site should be minimised and all residual waste is handled in accordance with relevant legislation and is removed from the Site by licensed hauliers	Operational and Restoration Phase
W19	All plant and machinery utilised will continue to be regularly serviced and maintained. This regular servicing and inspection of machinery will reduce the risk of leakages from plant and machinery impacting ground conditions.	Operational and Restoration Phase
W20	**NOTE: Any further mitigation measures related to Water detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.6: Specific Environmental Mitigation Requirements – Air Quality and Climate

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
AQC1	Dust monitoring will continue to be carried out monthly at the designated monitoring locations, however their exact locations may change as excavation progresses. These will be repositioned within the site boundary at the closest location to the relevant sensitive receptor;	Operational and Restoration Phase
AQC2	The timing of operations will be optimised in relation to meteorological conditions, for example overburden/topsoil will not be stripped during dry periods to reduce potential dust emissions;	Operational and Restoration Phase
AQC3	Material in outdoor stockpiling will be located within the quarry floor to take advantage of shelter from the wind to minimise dust erosion;	Operational and Restoration Phase
AQC4	Overburden mounds will be seeded to eliminate wind-blown dust;	Operational Phase
AQC5	Safety/screening berms will remain 2 m high and 2 m wide, and seeded to eliminate wind-blown dust;	Operational Phase
AQC6	A water bowser will be available on Site for dust suppression/dampening to minimise dust blow during working hours;	Operational and Restoration Phase
AQC7	Conveyors will remain partially enclosed where possible	Operational Phase
AQC8	Crushing and screening equipment are fitted with dust suppression systems;	Operational Phase
AQC9	Plant will be regularly maintained;	Operational and Restoration Phase
AQC10	On site speed restrictions (<15 kph) will be maintained in order to limit the generation of fugitive dust emissions; and	Operational and Restoration Phase
AQC11	All vehicles exiting the existing site will exit through the existing wheel-wash.	Operational and Restoration Phase
AQC12	Emissions monitoring of the asphalt manufacturing plant should be undertaken to provide an indication of the actual impact of the plant. There is currently no actual monitoring data available for the plant.	Operational Phase
AQC13	Emissions from vehicles during the extraction and restoration phases of quarrying activities can add to the receiving air environment. With regards to climate impacts, it is anticipated that CO2 will be emitted from vehicle exhausts during the construction, operational and restoration phases of existing and proposed development. As CO2 is a key gas linked to climate change, the following mitigation measures will be put in place to limit vehicle and plant emissions from the mining activities:	Operational and Restoration Phase
AQC14	No vehicles or plant will be left idling unnecessarily;	Operational and Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
AQC15	Vehicles and plant will be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery will be stopped immediately, and any problem rectified before being used;	Operational and Restoration Phase
AQC16	Engines and exhaust systems will be regularly serviced according to the manufacturer's recommendations and maintained to meet statutory limits/opacity tests; Full loads used in road haulage in order to minimise the carbon footprint per load of exported materials; and	Operational and Restoration Phase
AQC17	Minimising the double handling of materials.	Operational and Restoration Phase
AQC18	Carbon release from the progressive stripping of soil and overburden will be minimal, however it's contribution to carbon emissions is noted. Overburden will be stockpiled on the quarry site within the screening berms, which will be planted. Coupled with the ecological screening areas set aside, the perimeter berms will ensure that the carbon loss through soil stripping is neutral. In addition, during extraction of greywacke, excess topsoil and overburden generated will be used in the progressive restoration of worked-out areas.	Operational Phase
AQC19	Soils stripping during wetter periods will also ensure that carbon losses are reduced compared with warmer drier periods.	Operational Phase
AQC20	**NOTE: Any further mitigation measures related to Air Quality detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.7: Specific Environmental Mitigation Requirements – Noise

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
N1	A noise monitoring programme will be maintained at N1 bi-annually. This will determine compliance with threshold noise levels specified in the EPA Guideline Document for Extractive Industries (2006), and the Irish Concrete Federation Environmental Code (2nd Edition, 2005)	Operational and Restoration Phase
N2	Site activities will only take place during the permitted hours of operation and will be monitored to determine compliance with the conditioned noise limits. There will be no activities on site on Sundays or Public Holidays;	Operational and Restoration Phase
N3	Perimeter screening berms will be constructed along the boundaries of the proposed extended operational area to reduce noise propagation beyond the quarry boundary;	Operational and Restoration Phase
N4	All haul roads will be kept clear and maintained in a good state of repair to minimise noise from rattling and bouncing of mobile plant;	Operational and Restoration Phase
N5	Heavy goods vehicles entering and leaving the quarry will have tailgates securely fastened;	Operational and Restoration Phase
N6	Plant will be operated in a proper manner with respect to minimising noise emissions, e.g. minimisation of drop heights, no unnecessary revving of engines, plant used intermittently not left idling;	Operational and Restoration Phase
N7	Plant will be subject to regular maintenance, i.e. all moving parts kept well lubricated, the integrity of silencers and acoustic hoods maintained;	Operational and Restoration Phase
N8	Internal haul roads will be designed so as to have as low a gradient as possible so as to minimise excessive revving of vehicle engines on-site;	Operational and Restoration Phase
N9	The use of vehicle horns will be discouraged during the daytime period and is banned during the early morning periods before 10:00;	Operational and Restoration Phase
N10	Out of hours activity (where permitted by the local authority) will only include the loading of trucks from stockpiles and the operation of the asphalt plant, which are relatively low noise activities. Quarry operations such as blasting, excavation or crushing will not occur outside normal operating hours;	Operational Phase
N11	10 kmph speed limit on access road;	Operational and Restoration Phase
N12	All site plant, machinery and vehicles will shut down when not in use;	Operational and Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
N13	All pneumatic rock breakers will be fitted with dampeners;	Operational Phase
N14	Pumps and mechanical static plant will be housed in acoustic enclosures;	Operational Phase
N15	Drop heights for materials will be minimised; and	Operational and Restoration Phase
N16	Low noise level reverse warning alarms consistent with site safety to be utilised.	Operational and Restoration Phase
N17	**NOTE: Any further mitigation measures related to Noise detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.8: Specific Environmental Mitigation Requirements – Vibration

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
V1	Blast events will be conducted by an approved blasting contractor in accordance with best practice in this field, and potential impacts associated with the activity will therefore be minimised.	Operational Phase
V2	The use of delayed blasting techniques whereby each blast event takes place in a series of timed small blasts rather than a single large blast will be employed to minimise vibrations in the rock body.	Operational Phase
V3	All shot holes will be drilled to exact specifications by specialist contractors. Any features encountered during drilling such as cavities or soft material will be recorded by the drilling contractor and this information will be subsequently passed on to the shot-firer so that the correct charge will be used. This will ensure safe and efficient blasting of the rock face.	Operational Phase
V4	In addition to implementing the necessary blast specifications, the quarry operator will provide appropriate advance warning of blasts to neighbouring residents, undertake required environmental monitoring and record any complaints arising, as detailed below.	Operational Phase
V5	A warning sign will be posted at the quarry entrance on the day of each blast and will be removed following each blast;	Operational Phase
V6	Residents will be notified of blasting times by means of a phone call or text message prior to the blast taking place;	Operational Phase
V7	The blast operator signals 30 seconds prior to each blast;	Operational Phase
V8	The blast operator signals after each blast under Garda supervision;	Operational Phase
V9	Blasting will occur between 09:00 to 18:00 Monday to Friday. Blasting does not take place on Saturdays;	Operational Phase
V10	Vibration monitoring records will continue to be maintained by the Quarry Manager and will be available for display to local residents that may have been affected by site operations;	Operational Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
V11	The quarry manager will maintain a written complaints log in which all complaints made by local residents are detailed. This will ensure that the concerns of local residents who may be affected by site activities are considered during the management of activities at the quarry site.	Operational Phase
V12	**NOTE: Any further mitigation measures related to Vibration detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.9: Specific Environmental Mitigation Requirements – Cultural Heritage

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
CH1	Geophysical survey of the two additional extraction areas to be undertaken. The results of this geophysical survey will inform the development of the mitigation strategy, including the need for further intrusive archaeological investigation. If required, this may range from archaeological supervision of soil stripping work by a licensed archaeologist, to trial trenching and targeted evaluation, to broader, more extensive archaeological excavation.	Operation Phase
CH2	To ensure the protection of assets AR-01, AR-02, AR-03, AR-04 and AR-05 from inadvertent direct impacts, the area will be clearly demarcated and the presence, significance and protections afforded to these assets will be communicated to all staff working on site, as part of their environmental induction.	Operation Phase
CH3	**NOTE: Any further mitigation measures related to Cultural Heritage detailed within authorisation or consents to be included in this section and adhered to.**	Operation and Decommissioning Phase

Table 14.10: Specific Environmental Mitigation Requirements – Landscape and Visual Impact

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
LV1	Management/Improvement of the retained site boundary hedgerows and trees: The existing site boundary hedgerows and trees to be surveyed and appraised in terms of (a) species mix - for biodiversity and maximum screening (height, density of foliage), and (b) intactness/continuity. Generic improvements and spot fixes to be made where required to optimise the health of the hedgerows, their biodiversity value and visual screening function.	Operational Phase
LV2	Reprofiling of the existing mounds on the south-eastern and south-western boundaries of the Site, where required, in order to help reduce the prevalence of these structures on views within the locality.	Operational Phase
LV3	Woodland planting added to existing and new earth mounds (within the Proposed Development). These will be planted with a woodland species mix (including tree and shrub species), to form a substantial belt of woodland along the hillside. This will soften the form of the constructed mound, add to the height of the mound as a visual screen, and contribute to vegetation/habitat in the landscape generally.	Operational Phase
LV4	Annual review/management of the new boundary planting to ensure that it becomes established and provides adequate visual screening, with generic improvements and spot fixes (including supplementary planting, or thinning) to be implemented where required.	Operational Phase
LV5	Management/Improvement of site boundary hedgerows: A final survey and appraisal of the site boundary hedgerows in terms of (a) species mix - for biodiversity and maximum screening (height, density of foliage), and (b) intactness/continuity. Generic improvements and spot fixes to be made where required to optimise the health of the hedgerows, their biodiversity value and visual screening function.	Restoration Phase
LV6	Management/Improvement of woodlands on the mounds: A final survey of the woodland planted earth mounds, with generic improvements and spot fixes (including supplementary planting or thinning) to be implemented where required.	Restoration Phase
LV7	Re-vegetation/colonisation of site outside of excavation: In accordance with current best practice recommendations the areas between the excavation and the woodland-planted earth mounds around the perimeter of the site will be allowed to re-vegetate/colonise naturally. This results in greater biodiversity and habitats most appropriate to the site conditions.	Restoration Phase
LV8	Removal of built infrastructure: All buildings and redundant infrastructure to be removed from site and the lands prepared for natural re-vegetation/colonisation.	Restoration Phase
LV9	Lake formation in quarry void to a level of 155mAOD: Engineered shallow areas on the floor of the quarry will initially provide islands and will ultimately be covered by water as the quarry fills to its natural level (determined by the water table), forming a permanent lake. The	Restoration Phase

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
	shallow areas will provide suitable substrate for aquatic invertebrates, with gentle grading of shoreline and marginal planting added (to be determined at the time, with the advice of an ecologist).	
LV10	Quarry benches: At a number of locations (to be determined at the time, with the advice of an ecologist) a mixture of trees and shrub species will be planted in an engineered substrate to form patches of habitat. This will create a platform for a more diverse flora to develop naturally and provide habitat and food resources for birds, mammals, insects and other invertebrates.	Restoration Phase
LV11	Quarry faces: Whilst recognising the geological heritage value of the exposed quarry faces, it is proposed that some native tree and shrub species be planted in/on fissures and ledges, to help break up the bare profile of the quarry face. Other plant species will be allowed to find and colonise the area by natural means and these will include various mosses, lichens, algae, ferns, flowering plants, etc. The gradually increasing plant diversity over time will in turn ensure that a corresponding diverse list of animal species (birds, mammals, butterflies and other insects, other invertebrates, etc.), can become established.	Restoration Phase
LV12	Safety measures: An agricultural fence to be installed around the edge of the excavation, to act as a visual indicator of the edge and a physical barrier for people and animals. Signage as required around edges to notify of danger.	Restoration Phase
LV13	**NOTE: Any further mitigation measures related to Landscape and Visual Impacts detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.11: Specific Environmental Mitigation Requirements – Traffic

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
T1	Following geometric assessment of the current left-in/left-out junction arrangement on the N7, the following amendments shall be necessary on the westbound on-slip: ■ Nose length of 75m with a ratio of 1:25 to be provided; ■ Auxiliary lane to be extended to 160m; and ■ Auxiliary Lane Taper to be extended to 75m.	Operational and Restoration Phase
T2	**NOTE: Any further mitigation measures related to Cultural Heritage detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

Table 14.12: Specific Environmental Mitigation Requirements – Material Assets

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
MA1	Consultation with be undertaken with Irish Water prior to commencing the excavations proposed in the north of the Site. The methods and precautionary measures required to protect water supply infrastructure and facilitate these works will be agreed with Irish Water. The agreed measures will be updated in the EMP.	Operational and Restoration Phase
MA2	Any works required to other material assets on or around the Proposed Development (electricity, telecommunications, etc.) will be carried out in conjunction with the relevant provider to ensure minimal disruption to the existing users.	Operational and Restoration Phase
MA3	Mitigation measures regarding discharges to the on-site culvert will be implemented.	Operational Phase
MA4	**NOTE: Any further mitigation measures related to Material Assets detailed within authorisation or consents to be included in this section and adhered to.**	Operational and Restoration Phase

14.4 Monitoring Measures

A number of environmental monitoring activities are to be continued during the operational and restoration phases. These monitoring activities are required to confirm the effectiveness of the mitigations, to define the quality of the surrounding environmental, and to establish if there are any trends in environmental parameters.

Environmental monitoring requirements have been identified in the specific chapters of the EIAR. The frequency of these monitoring requirements have been collated and provided in a schedule displayed in Table 14.13

Population and Human Health

Monitoring for the protection of population and human health during the operational and restoration phase will be carried out in accordance with the wider environmental monitoring programme for the protection of water, air quality, noise and vibration.

Further monitoring in respect to the site health and safety will be dependent on the specific site practices and tasks being carried out. Monitoring will be accordance with the site specific safety statement and associated risk assessments (LBAR, Safety Statement, Revision 08 January 2020).

Ecology and Biodiversity

Bat activity surveys including passive monitoring will be undertaken for a minimum of five nights and emergence surveys at three structures identified with potential to host roosting bats will also be undertaken. Transect surveys will be carried out at emergence and/or re-entry to gather information on bat activity and to identify any activity which may indicate the presence of a roost or key commuting routes.

Monitoring will be carried out to understand the ecological context and significance of the identified main badger sett and the impact of further loss of badger foraging habitat, including a bait marking study. A camera trap survey at the sett will be carried out (under appropriate license) to seek to determine if breeding is occurring within the sett.

A breeding bird (including Peregrine Falcon) survey for the Site is currently being undertaken. Preliminary results indicate that a female Peregrine is again at the Site sat on eggs. The result of this work will form the basis of a Peregrine falcon management and monitoring plan for the Site.

Land, Soils and Geology

The monitoring programme at the Site will include regular stability surveys of the quarry faces and regular monitoring of groundwater quality in monitoring wells.

Water

The following water monitoring will be carried out at the Site going forward:

- Groundwater level – groundwater levels should be monitored at the four borehole locations (BH1-BH4) and also at the on-site ponds (SW1-SW2) on a minimum of a quarterly basis to monitor the effects of pumping and dewatering from the excavated areas.
- Groundwater quality – groundwater quality should be monitored on a minimum of a quarterly basis to capture any off-site migration of impacts on water quality. As a minimum, monitoring should be completed at the four borehole locations (BH1-BH4) and also at the on-site ponds (SW1-SW2).
- Discharge water quality – monthly quality samples should be collected at the culvert discharge point to assess the quality of water leaving the Site. Reassessment of the effect should be carried out if quality exceeds surface water EQS threshold values for inland waters.

- Abstraction, usage and discharge volumes – daily records of abstractions, discharges and on-site water usage should be kept going forward, in order to appropriately characterise water movements on-site and off-site.

Air Quality and Climate

Dust monitoring will continue to be carried out monthly at the designated monitoring locations, however their exact locations may change as excavation progresses. These will be repositioned within the site boundary at the closest location to the relevant sensitive receptor.

It is recommended that emissions monitoring of the asphalt manufacturing plant is undertaken in order to understand the actual emissions resulting from it's operation.

Noise

A noise monitoring programme will be maintained at N1 bi-annually. This will determine compliance with threshold noise levels specified in the EPA Guideline Document for Extractive Industries (2006), and the Irish Concrete Federation Environmental Code (2nd Edition, 2005).

Free-field noise levels attributable to the operation of the entire quarry complex, when measured at the nearest noise sensitive receptor, shall not exceed 55 dB (A) (60 minute L_{Aeq}) during permitted operating hours, and shall not exceed 45 dB(A) (15 minute L_{Aeq}) at any other time.

No audible or impulsive noise shall be permitted outside permitted operating hours.

Vibration

Vibration blast monitoring will be undertaken during blast activities at the closest NVSRs to blasting locations.

Monitoring of vibration levels at local residences will be conducted in agreement and with the consent of local residents.

Vibration blasting monitoring will record PPV, air overpressure, distance to each blast and maximum instantaneous charge levels (MIC).

The vibration levels from blasting should not exceed a peak particle velocity of 12 mm/sec when measured in any three mutually orthogonal directions at sensitive receptors.

Blasting should not give rise to air overpressure values at sensitive locations which are in excess of 125 dB(Lin) max peak. To allow for wind fluctuations and weather conditions, 95% of all air over-pressure levels measured at the nearest noise sensitive locations should conform to the specified limit value. No individual air over-pressure value should exceed the limit value by more than 5 dB(Lin).

Cultural Heritage

Beyond the phased archaeological mitigation strategy, no long-term or on-going monitoring for cultural heritage is proposed.

Traffic and Transport

Since there are no significant effects anticipated, no monitoring has been proposed with respect to effects from operational traffic associated with the Proposed Development.

Landscape and Visual

Ongoing monitoring and maintenance measures will be required as per the mitigation measures outlined previously in this chapter.

Material Assets

There are no specific monitoring measures required or proposed in relation to material assets other that those identified above for the protection of surrounding utilities from blasting effects at the Site. These measures will be employed to ensure that significant negative effects on material assets will be avoided, prevented or reduced during the continued operation of the Proposed Development.

Table 14.13: LBAR - Environmental Monitoring Schedule

LBAR Environmental Monitoring	Q1			Q2			Q3			Q4		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Groundwater (Levels) *Quarterly*												
Groundwater (Quality) *Quarterly*												
Discharge Water (Quality) *Monthly*												
Dust Monitoring *Monthly*												
Noise Monitoring *Bi-annual*												
Vibration Monitoring *Monitoring conducted during each blast.*												
Boundary Inspections *Monthly*												

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REPORT

Stage 1 Screening For Appropriate Assessment

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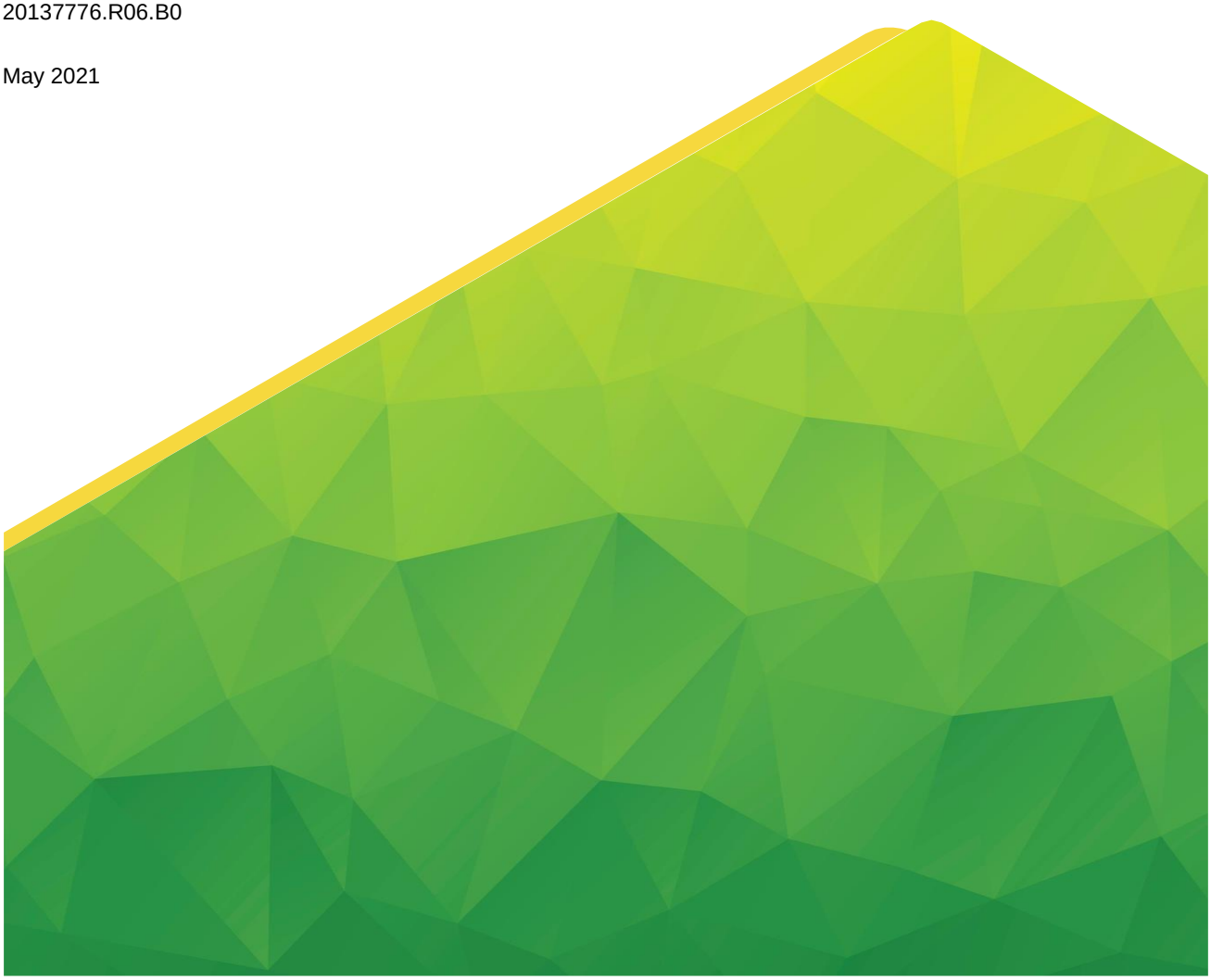


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1.0 INTRODUCTION

This report presents a Stage 1 Screening for Appropriate Assessment (AA) to assess the potential effects that may occur to Natura 2000 sites and associated qualifying species as a result of proposed expansion activities (the Project) at the existing quarry site at Windmill Hill, Rathcoole, Co. Dublin ('the Site'). This Screening for Appropriate Assessment comprises an appraisal of potential impacts on European designated conservation sites within a 15 km radius of the Site or where an ecological pathway e.g. terrestrial or aquatic exists between a site and a Natura 2000 site. In this instance, Natura 2000 sites within Dublin Bay ca. > 34 km from the Site are also included as there is a potential aquatic pathway. This AA Screening has been prepared by **Freddy Brookes MSc., MCIEEM – Senior Ecologist,** Golder Associates (Golder).

The terms of reference of this report are set out below.

1.1 Terms of Reference

This screening has been undertaken in accordance with the requirements of the EU Habitats Directive (Directive 92/43/EEC). Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora – the 'Habitats Directive' - provides legal protection for habitats and species of European importance. Article 2 of the Directive requires the maintenance or restoration of habitats and species of European Community interest, at a favourable conservation status. Articles 3 - 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as *Natura 2000*. Natura 2000 sites are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC).

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans or projects affecting Natura 2000 sites. Article 6(3) establishes the requirement for Appropriate Assessment:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Article 6(4) deals with the steps that should be taken when it is determined, as a result of Appropriate Assessment, that a plan/project will adversely affect a European site. Issues dealing with alternative solutions, imperative reasons of overriding public interest and compensatory measures need to be addressed in this case.

Article 6(4) states:

> *"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*
>
> *Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."*

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of the Habitats Regulations, 1997 (S.I. No. 94 of 1997) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011).

1.2 Project Description and Potential for Effects

The Project seeks permission to extend quarrying extraction in a North Easterly and North Westerly direction. The continued activity of aggregate extraction and processing at the Site will consist of:

- The continuation of rock extraction by drilling, blasting, digging and rock-breaking of greywacke rock by benching;
- The continuation of mobile crushing, and screening of the blasted rock into specific fragment sizes;
- The continuation of use of supporting infrastructure including: an office (with welfare facilities), aggregate processing plant, water recycling plant and silt press, asphalt plant, bagging plant, maintenance shed and all associated works;
- The continuation of loading of materials onto trucks for sale and distribution; and
- The restoration of the Site as extraction of materials progresses throughout the life of the quarry (and as market conditions dictate).

Given the nature of the Project, the operational impacts are summarised below:

- Land take (permanent loss);
- Habitat modification through anthropogenic effects;
- Disturbance to habitats and species through noise from traffic and blasting;
- Individual species disturbance / mortality; and
- Impacts of dust as a result of extraction activities.

Potential direct and indirect impacts from water quality and quantity are as follows:

- Local (Site based) Impacts of dust and Site runoff (sediments, fuel, etc.) as a result of quarrying activities; and
- Impacts on surface water quality within the Site.

There are two areas for the proposed extensions at the Site that involve new land take, to the north west and north east (refer Figure 1 below). The land take combined area is ca. 5.19 ha (this includes out to the perimeter safety berms, shown as the cyan polygons).



Figure 1: Land Take for Project development in the Operational Phase

1.3 Approach and Planning Precedent

This stage 1 screening is presented with embedded design parameters detailed in section 1.3 below. These measures are not intended to be interpreted as mitigations to address a likely significant effect to a Natura 2000 site(s). Planning precedent[1] dictates that mitigation should only be presented as part of stage two in the appropriate assessment (AA) process if required to minimise likely significant effect.

1.4 Embedded Design Parameters

Embedded design parameters considered for this assessment are detailed as follows:

- Septic tanks used on the Site are maintained to prevent leaks to ground and the water environment. Equally welfare facilities on the Site and all plumbing are well maintained;
- Wheel washing is undertaken on the Site to reduce the deposition of material on the surrounding road network that could get into the water environment. Wastewater from the wheel washes is contained rather than disposed of directly to ground;
- A concrete plant is present on the Site which by design is constructed such that no direct discharges to ground are allowed;

[1] Court of Justice of the European Union (CJEU) in the matter of People Over Wind and Sweetman v Coillte Teoranta (C-323/17)

- Pumped water is only discharged at the discharge culvert when not used by the recycling and concrete facilities. Discharged water does not come into contact with 'dirty' water from the recycling facility;
- Refuelling takes place on hardstanding in a designated area of the Site and plant is well maintained to prevent uncontained releases of hydrocarbons to the ground (as confirmed by water quality results). It is noted that a hydrocarbon interceptor was also installed at the Site;
- Runoff from the floor (and faces) of all areas of the extraction area slope towards a low elevation point on the Site to prevent any surface water run-off flowing from the Site; and
- Generally, works outside of the excavation areas are undertaken above the groundwater table limiting the connectivity of the groundwater with any potential impacts.

2.0 METHODS

2.1 Desktop Review and Data Collation

A desktop review was conducted of available published and unpublished information, including data available on the NPWS http://www.npws.ie, Geological Survey Ireland (GSI), and Environment Protection Agency (EPA) web-based databases. In addition, reports pertaining to Site operations including previous EIAR submissions and Natura Stage 1 screening assessments have been used as reference materials.

2.2 Screening for Appropriate Assessment

This report has been prepared with reference to the following documents:

- European Communities (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC;
- European Communities (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats Directive' 92/43/EC;
- Department of Environment Heritage and Local Government (2009, Revision Notes 2010). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities; and
- European Communities (2007) Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC.

Appropriate Assessment is carried out in stages, as recommended by the above-referenced Guidance Documents. There are four stages as follows:

2.2.1 Stage 1: Screening

This initial stage aims to identify the likely impacts of the project on a Natura 2000 site, either alone or in combination with other projects or plans. The impacts are examined to establish whether these impacts are likely to be significant. Assessment of the significance of effects is carried out in consultation with the relevant nature agencies.

2.2.2 Stage 2: Appropriate Assessment

The aim of this stage is to identify the conservation objectives of the site and to assess whether or not the project, either alone or in combination with other projects or plans will result in adverse effects on the integrity of the site, as defined by the conservation objectives and status of the site. Stage 2 is carried out in consultation with the relevant nature agencies. Where it cannot be demonstrated that there will be no adverse effects on the site, it is necessary to devise mitigation measures to avoid, where possible, any adverse effects.

2.2.3 Stage 3: Assessment of Alternative Solutions

This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site. If alternative solutions have been identified that will either avoid

any adverse impacts or result in less severe impacts on the site, it will be necessary to assess their potential impact by recommencing the assessment at Stage One or Stage Two as appropriate. However, if it can be reasonably and objectively concluded that there is an absence of alternatives, it will be necessary to proceed to Stage Four of this assessment methodology.

2.2.4 Stage 4: Assessment where Adverse Impacts Remain

For sites that host priority habitats and species, it is necessary to consider whether or not there are human health or safety considerations or environmental benefits flowing from the project. If such considerations do exist, then it will be necessary to carry out the Stage Four assessments of compensatory measures. If no such considerations exist, then establish whether there are other imperative reasons of overriding public interest (IROPI) before carrying out the Stage Four assessments. Where IROPI exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the site will be necessary before the project or plan can proceed.

This report is for Screening (stage 1) for Appropriate Assessment only.

3.0 BASELINE AND HISTORIC SITE CONDITIONS

3.1 Baseline Conditions

3.1.1 Habitats

Habitats

The Site was surveyed by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM on the 25th and 26th January 2021 and 23rd February 2021 (O'Donnell, 2021) and an ecological walkover survey incorporating a Phase 1 habitat and flora assessment was carried out in accordance with the Heritage Council's guidelines (Smith *et al*. 2011). The dominant habitats present were classified according to Fossitt (2000) and key botanical species were identified (Figure 2 below). Any other records of interest (e.g. invasive plant species) were also marked on field maps and/or locations were recorded.

The Site based habitat appraisal was supplemented in a desk-based context and via information sharing between Golder colleagues who had attended the Site in early 2020.

Ecological Survey methods were in general accordance with those outlined in the following documents:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping;
- Phase 1 Habitat Survey methodology (Joint Nature Conservation Committee (JNCC), 1990, revised 2010); and
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

As previously indicated, aerial photographs and Site maps assisted the habitat survey. Habitats have been named and described following Fossitt (2000). No habitats protected under the Habitats Directive Annex I were identified during Site survey.

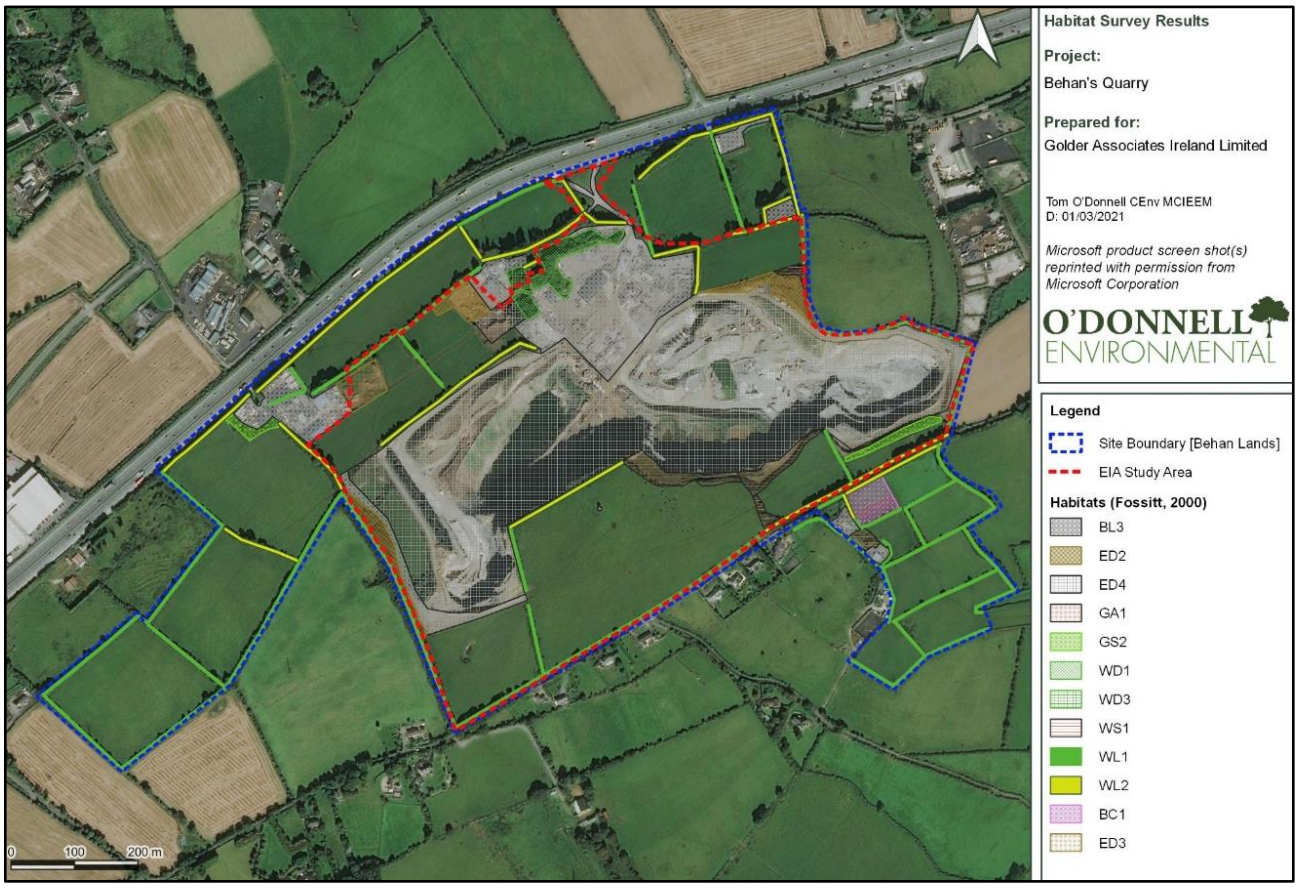


Figure 2: Habitat Map of the Site - O'Donnell Environmental (2021).

Fauna

The primary considerations for all protected and notable species at the Site are based upon the availability of suitable habitat. In all cases the likelihood of presence or indeed absence was addressed in congruence with an assessment of habitat availability to maintain a species at a favourable conservation status at the Site level. Where doubt over presence is perceived a conservative prediction is made in favour of likely presence. It is noteworthy that some species may have colonised the Site as a consequence of the transition from pastoral flat habitat toward the availability of cliff faces as a consequence of quarrying activities, for example peregrine falcon, which is discussed later in the report.

3.1.2 Aquatic Habitats and Receptors

The assessment considers the potential for hydrological connectivity between the Site and surface water features, and also considered what effects could be afforded to aquatic fauna and habitat receptors. It is important to note that no ditches or streams cross the Site. The Site is located within the River Giffeen catchment which is part of the River Liffey system which enters Dublin Bay, parts of which are designated SAC and SPA. The Highdown Hill stream leading to the River Giffeen is located approximately 1km to the north of the Site. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site. There are no formal discharges to surface water features from Site operations though some elements of hydrological connectivity occur between the Site, a culvert and the N7 motorway surface water management system. This pathway eventually meets the River Griffeen and this is further described in the sections below.

Local Surface Water Features

Local surface water features are predominantly fed by rainfall runoff from higher topographical areas which collect in natural gullies and form headwaters for tributaries to larger streams and rivers. The river network in the area surrounding the Site is shown in Figure 3.

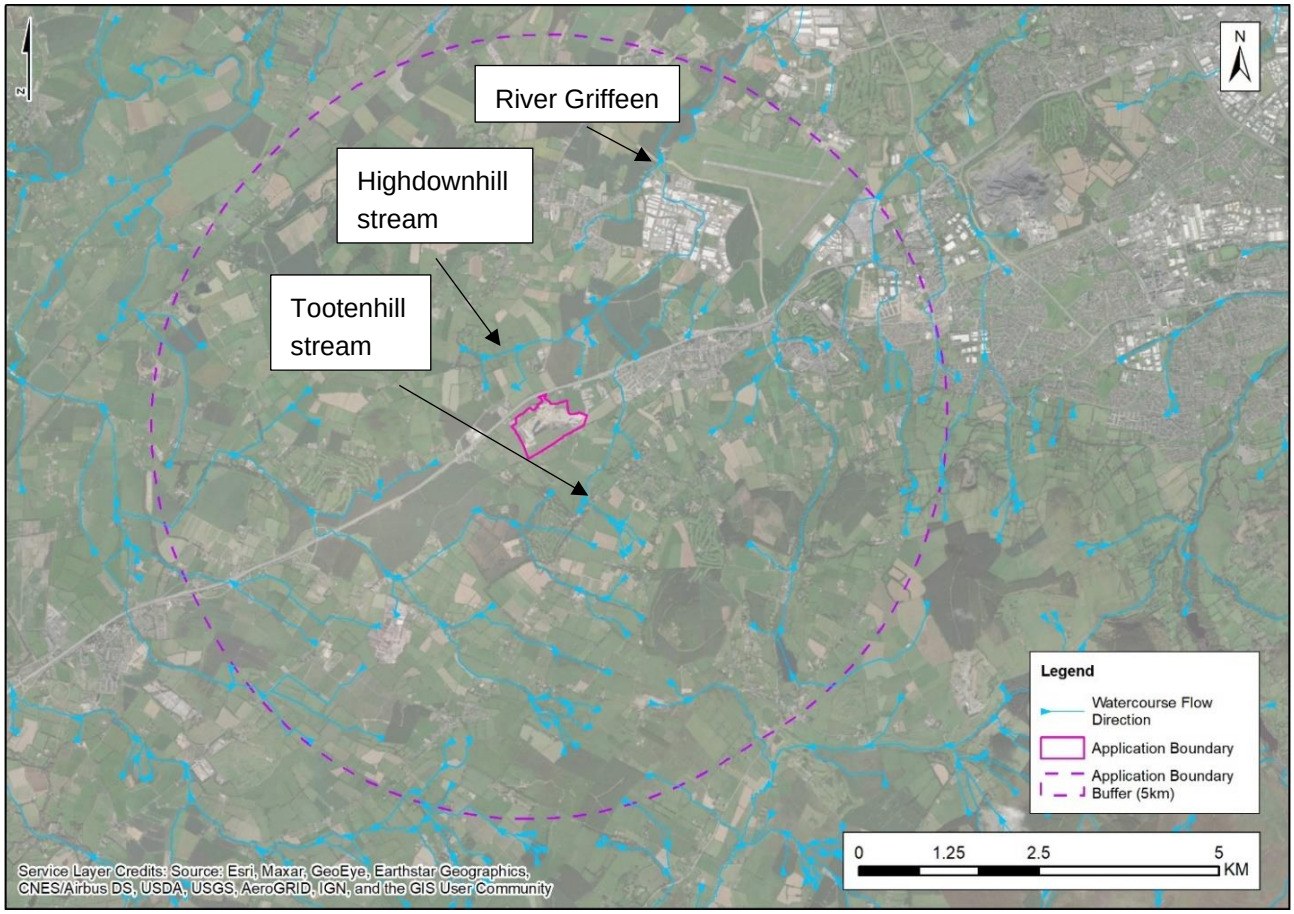


Figure 3: Local River Network in the Vicinity of the Site.

2020-2021 Surface Water Quality Investigations

During the 2020-2021 monitoring period surface water samples were taken by Golder from a number of locations. Importantly, in the context of this assessment, a monitoring location associated with the '*the western pond area'* (SW1) was sampled. This source/pathway route is worthy of evaluation as it is assumed for the purpose of this assessment to discharge untreated via a culvert and the N7 motorway to a tributary of the River Griffeen close to Rathcoole. Potential for downstream ecological connectivity with Dublin Bay and associated Natura 2000 sites is relevant to the results of this sampling.

The western pond area (SW1) is considered to be a mixture of rainfall and groundwater and is pumped to the discharge culvert near the Site entrance. Samples from SW1 were collected in June 2020 and January 2021. All other surface water samples were collected during January 2021. Each sample was tested at a UKAS accredited Element Materials Technology laboratory for the following parameters:

- Dissolved metals: Arsenic, Boron, Cadmium, Calcium, Chromium, Copper, Lead, Magnesium, Mercury, Nickel, Potassium, Selenium, Sodium (2021 only), and Zinc;
- Total Hardness (Dissolved as $CaCO_3$);
- MTBE. Benzene, Toluene, Ethylbenzene, m/p Xylene, o-Xylene;

- Extractable Petroleum hydrocarbons (C8-C40);
- Sulphate;
- Chloride;
- Nitrate as NO_3;
- Nitrite as NO_2;
- Orthophosphate as PO_4;
- Total Oxidised Nitrogen;
- Ammoniacal Nitrogen as NH_4;
- Total Alkalinity as $CaCO_3$;
- Dissolved Oxygen (2020 only);
- Electrical Conductivity (2020 only);
- pH (2020 only);
- Total Organic Carbon; and
- Total Dissolved Solids.

The results of the groundwater and surface water quality analysis at the Site are summarised below and compared with the Environmental Quality Standards (EQS) for inland surface waters, as outlined in the European Communities Environmental Objectives (Surface Water) Regulations S.I. No.272/2009 including amendment S.I. No.386/2015. Where a screening value does not exist the UK EQS were applied (Freshwaters specific pollutants and operational EQS and Freshwaters priority hazardous substances, priority substances and other pollutants[2]).

Surface water is generally shown to be of good quality in 2020-2021 at SW1. Concentrations of arsenic within the on-site western pond (SW1) were observed to exceed the Annual Average (AA) EQS value for inland surface water in both the June 2020 and January 2021 samples. The slightly elevated concentrations of arsenic in these samples are attributed to leaching of the metal from the surrounding rock into groundwater (Chapter 6). The threshold value for arsenic was exceeded on four occasions in samples collected from MW2, Office Well, and the Chipping Plant Well in 2007 and Well A in 2013. Concentrations ranged from 10 mg/l to 35 mg/l compared to a threshold value of 7.5 mg/l. The elevated arsenic concentrations are interpreted by Golder to be naturally occurring rather than related to plant or facilities at the Site. Arsenic is often naturally elevated in groundwater hosted in greywacke or shales, with poorly productive bedrock having increased probability of higher concentrations (McGrory et al., 2017).

No other exceedances were identified to exceed the standards during the 2020 and 2021 monitoring. For completeness, the surface water data for SW1 presented in Byrne Environmental (2015) was also compared against the same surface water screening values as the most recent set of samples. No exceedances were found. Results from 2015 and 2020/21 indicate that water quality at SW1 was reasonably good. Indications from before this date would rely on Water Framework Directive (WFD) status for waterbodies associated with any Site connectivity. The Site is located in the WFD Kilcullen Groundwater body (which is generally described as poorly productive and of 'good' water quality) and the WFD surface water catchment for Liffey and Dublin

[2] https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit#screening-tests-freshwaters

Bay via the River Griffeen. The River Griffeen is not designated as a salmonid river (EPA, 2021) but is known to contain large trout (IFI, 2019). To the north and the east of the Site the River Griffeen (which is a tributary of the Liffey River system) is classified as 'good' (Figure 4) under the River Waterbody WFD 2013-2018 system.

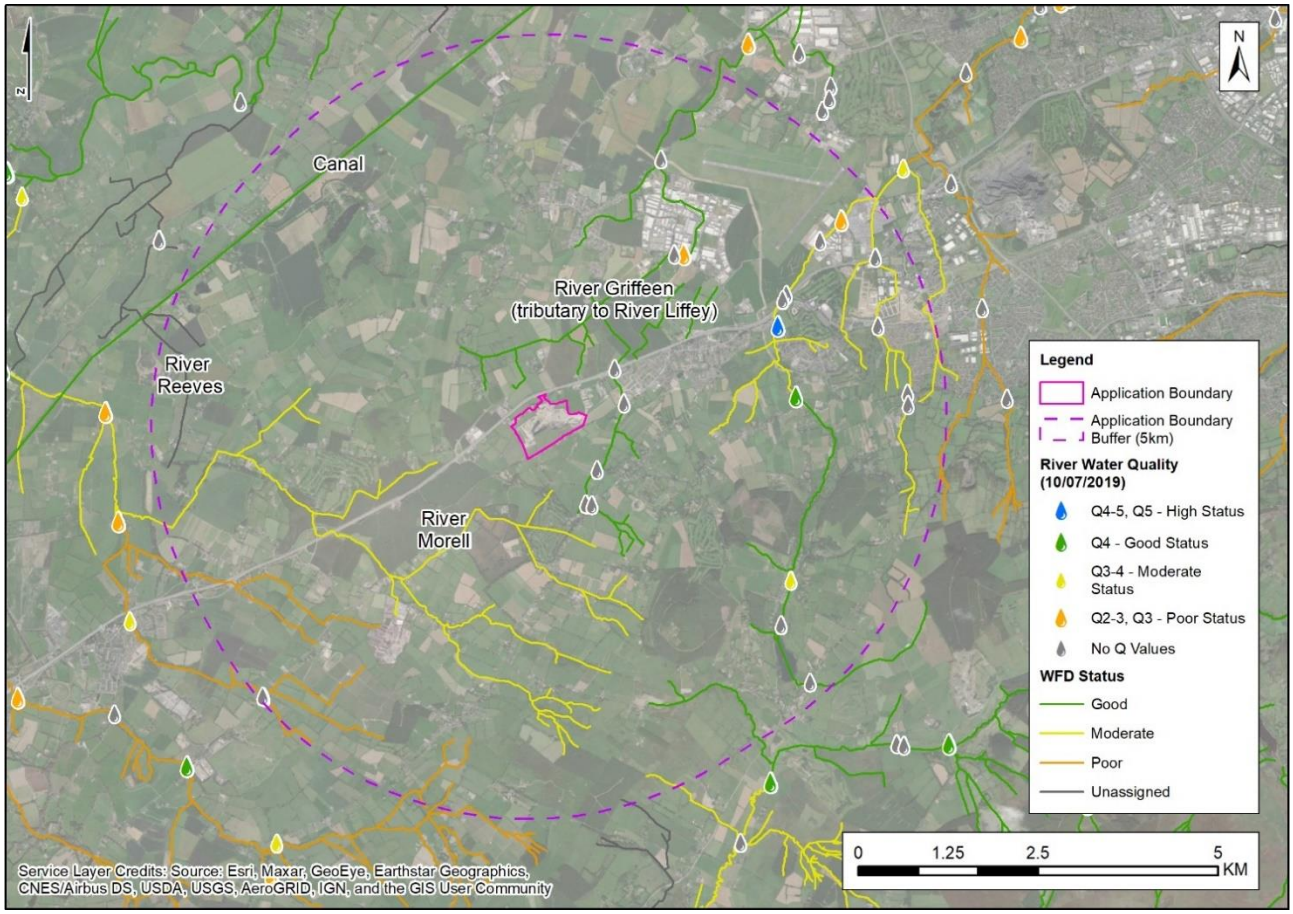


Figure 4: Local River WFD Designations, EPA River Quality Values, EPA Monitoring Stations (after EPA, 2021 and GSI, 2021)

Site Water and Groundwater Interaction

As described in Chapter 6, a summary of the 2021 Site water requirements and management scheme, as derived from walkovers carried out in 2020 and 2021, is shown in Figure 5 and Figure 6. An on-Site well supplies toilet flushing water to the office buildings and is also used to supply the four wheelwash facilities located in the northern area.

An operational water supply is also required at the Site for use in the recycling plant and concrete plant. Operational water is pumped from the pond in the flooded western pit area for use in the central plant area. Any pumped water that is not used as part of the recycling and concrete plant activities, or temporarily stored in the water tank, is allowed to discharge to a culvert located adjacent to the Site entrance. Overflow from the water tank is returned to the flooded pit area if necessary. A drainage survey of the culvert used for discharge (during periods of higher rainfall) was carried out in 2021 and identified a piped flow path north towards the N7 dual carriageway, where it joins the road's drainage system. The discharge culvert is not in connectivity with the Irish Water public supply mains which runs through the Site boundary near the entrance.

Wastewater is generated at the Site via the recycling plant and welfare facilities and is handled separately to the operational and potable water supplies. Wastewater generated from the recycling plant is pumped to a silt tank, where flocculant is added. The wastewater is then either transferred to the silt press or one of the silt

pond areas shown on Figure 6, where silt settles from the water and the water is either allowed to evaporate or discharge to ground.

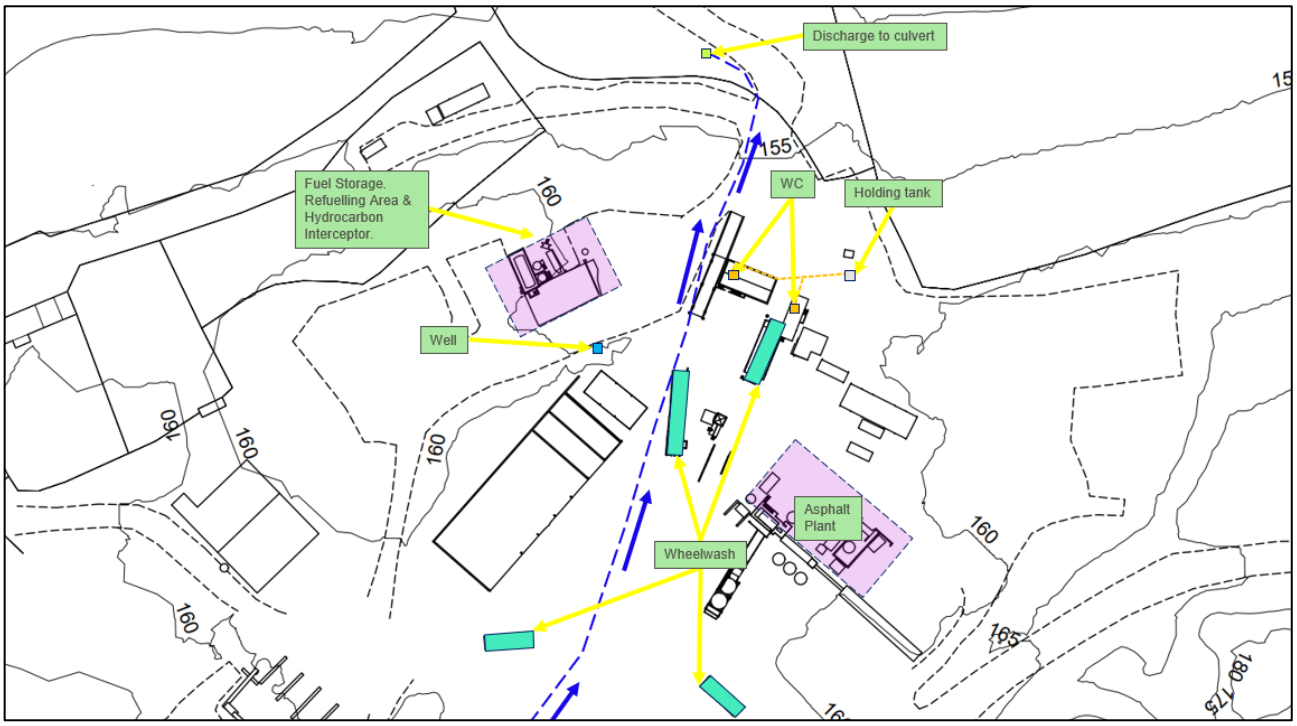


Figure 5: 2021 Site Layout, Key Infrastructure and Water Management in the Northern Area of the Site.

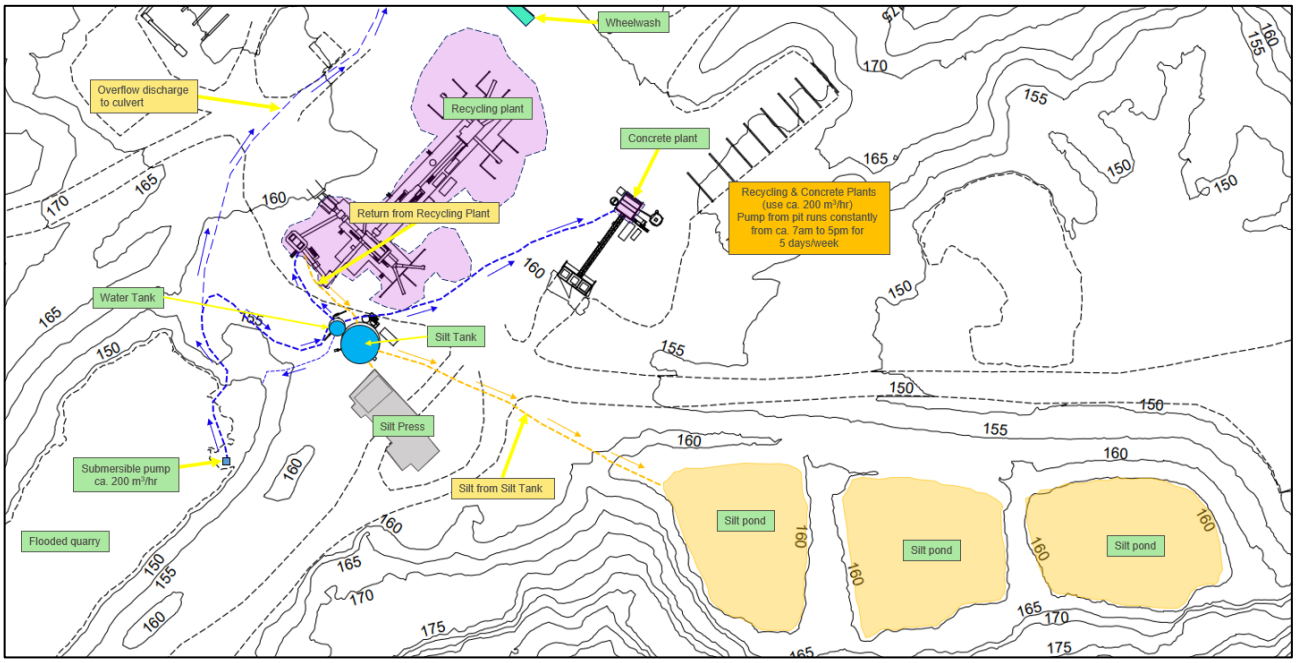


Figure 6: 2021 Site Layout, Key Infrastructure and Water Management in the Central and Southern Areas of the Site.

Some infiltration and recharge from groundwater appears to occur in the standing water bodies within the Site but this relationship between Site and groundwater appears to be locally confined to the surrounding groundwater body and limits the movement of Site water to a maximum distance of 100 m from the Site (Chapter 6 of the EIAR). Future extraction as part of Project implementation will continue to operate under the same management systems.

Baseline Operational and Project Summary

In summary, there is no groundwater connectivity beyond ca. 100 m from the Site and this will not change as a result of further extraction owing to a lack of groundwater connectivity. There are no discharges to surface water features on or outside of the Site. A culvert used for Site discharge (during periods of higher rainfall) uses a piped flow path north towards the N7 dual carriageway, where it joins the road's drainage system. Water quality via this pathway is identified as being of good quality and with the exception of a minor arsenic exceedance no other exceedances were identified during the 2020 and 2021 monitoring. This result was also comparable with monitoring documented by Byrne Environmental (2015).

The status of surface water with connectivity to the Site ranges from 'poor' status in 1991 to 'good' within the River Griffeen (which is a tributary of the Liffey River system) during the WFD period (2013-2018 status). The Project proposals will not result in any measurable adverse contribution to ground or surface water quality.

3.2 Natura 2000 Sites

Sites of international importance, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), are collectively known as Natura 2000 sites. These sites contain examples of some of the most important natural and semi-natural ecosystems in Europe. The designated search area was 15 km from the Site for Natura 2000 sites and it also included Natura 2000 sites beyond this distance where hydrological connectivity was possible (Table 1 and Figure 7 below).

Table 1: Natura 2000 Sites within 15 km and Dublin Bay

Natura 2000 Site	SAC/SPA (Key qualifying features)	Approximate distance to Site (KM)
Red Bog	SAC – Selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (numbers in brackets are Natura 2000 codes): [7140] Transition Mires	8.1
Glenasmole Valley	SAC – The site is selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): Orchid-rich Calcareous Grassland* [6410] Molinia Meadows [7220] Petrifying Springs*.	8.1
Wicklow Mountains	SAC – Selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3160] Dystrophic Lakes; [4010] Wet Heath; [4030] Dry Heath; [4060] Alpine and Subalpine Heaths; [6130] Calaminarian Grassland; [6230] Species-rich Nardus Grassland*; [7130] Blanket Bogs (Active)*; [8110] Siliceous Scree; [8210] Calcareous Rocky Slopes; [8220] Siliceous Rocky Slopes; [91A0] Old Oak Woodlands; and [1355] Otter (*Lutra lutra*).	8.1

Natura 2000 Site	SAC/SPA (Key qualifying features)	Approximate distance to Site (KM)
Rye Water Valley/Carton	SAC – The site is selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [7220] Petrifying Springs* [1014] Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)	9.7
Poulaphouca Reservoir	SPA – The site is designated under the E.U. Birds Directive, of special conservation interest for the following species: Greylag Goose and Lesser Black-backed Gull.	9.6
Wicklow Mountains	SPA – The site is designated under the E.U. Birds Directive, of special conservation interest for the following species: Merlin and Peregrine.	11.9
South Dublin Bay SAC and South Dublin Bay and River Tolka SPA.	SACs and SPAs associated with Dublin Bay. South Dublin Bay SAC Mudflats and sandflats not covered by seawater at low tide [1140]. Annual vegetation of drift lines [1210]. Salicornia and other annuals colonising mud and sand [1310]. Embryonic shifting dunes [2110]. South Dublin Bay and River Tolka SPA. Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]. Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144].	Ca. 34 km (measured in terms of possible hydrological pathway).

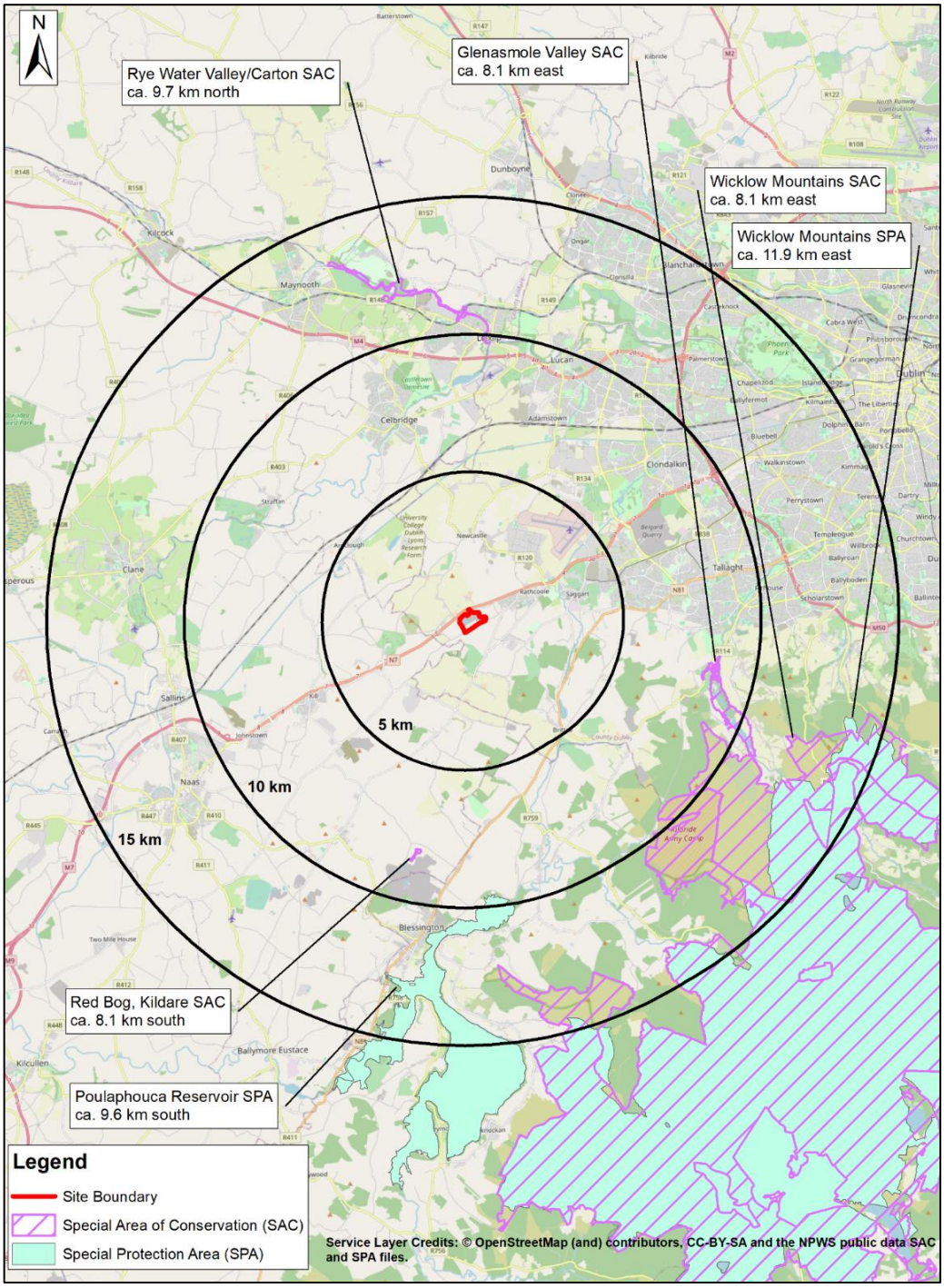


Figure 7: Natura 2000 Sites within 15 km of the Site.

3.3 Screening Assessment

Throughout this stage 1 screening assessment it is important to reiterate the key focus points required. In essence, will Project proposals create the potential or indeed actual degradation (likely significant effect) of Natura 2000 sites and associated qualifying species. The following sections serve to further evaluate this question.

3.3.1 Water

Proposed additional quarrying works have minimal potential to adversely affect surface and groundwater quality as indicated in the accompanying Water chapter (Chapter, 6). As previously stated, there are no dynamic

surface water features on the Site and no discharges to watercourses that would lead to a measurable adverse contribution. The relationship between standing surface water caused by excavations and the surrounding bedrock is confined to the Site scale (ca. 100m) and contained as such to avoid degradation of neighbouring groundwater that may be in continuity with watercourses in the Liffey catchment.

The nearest surface water feature to the Site is the Tootenhill Stream which flows in a north-easterly direction about 0.75 km to the east of the Site. The main potential polluting impact associated with the Site and the proposed Project activities is the introduction of hydrocarbons to the underlying groundwater. Given the embedded design parameters (plant and machinery maintenance) and absence of bedrock/groundwater pathways it is considered very unlikely that hydrocarbon pollution will occur at the Site and the risk of pollution to surrounding groundwater environment is deemed to be very low.

Given the above, in a worst case scenario an item of machinery associated with the Project could leak hydraulic fluid or hydrocarbon. In this instance the spill would be contained at the scene and collected if possible. Residual spill would be contained within the Site subject to dilution and evaporation over an extended period of time and pollutants would be contained at the Site scale. As such, no risks would be afforded to Natura 2000 habitat or species as defined by the source pathway model of likelihood.

Air Quality – Dust

Dust deposition is the predominant risk which may arise from Project activities arising from soil/aggregate movement and dust mobilised from vehicle movements. However, given the embedded design parameters dust deposition and residual effects to Natura 2000 habitat or species are considered highly unlikely. The nearest SACs are over 8 km from the Site. Advice provided within the Design Manual for Roads and Bridges (DMRB)[3] suggests that at distances > 200 m dust impacts to designated habitats are likely to be 'low'. Accordingly, given the low risk of dust mobilisation on Site, embedded design parameters and distance to the nearest Natura 2000 site it is considered unlikely that dust deposition will have an impact on any nearby Natura 2000 designations.

Noise

Of the Natura 2000 designations in the search area, it is considered that the SPAs would be sensitive to noise disturbance, given that they are designated on the basis of supporting bird species. Activities within Site which may contribute to increased noise levels include traffic movements and quarrying activities including periodic blasting. The closest SPAs to the Site are the Poulaphouca Reservoir and Wicklow Mountains situated 9.6 km and 11.9 km away respectively. Given the distance of the SPAs from the Site, it is considered that over this distance the noise levels within the Site will have a negligible impact on the SPAs. A noteworthy result from previous ecological surveys of the Site is the presence of Peregrine falcon (*Falco peregrinus*) which are known to make use of cliffs that would have not existed prior to quarrying.

The Peregrine falcon is listed on Annex I of the Birds Directive. As described in the ecology chapter within an EIAR for the Site produced in 2015 (Byrne Environmental, 2015) a single Peregrine was seen flying above the quarry Site to the west. It was subsequently seen to roost on the cliff face above the waterbody. Due to the timing of this observation it cannot be concluded that breeding/nesting is occurring however it strongly indicates that this may be the case. During the survey of 2010 (Byrne Environmental, 2015) which also took place in November) Peregrine was not recorded although confirmation of its presence was made during both breeding and winter seasons as part of the 2007- 2011 Bird Atlas project (Balmer *et al*., 2013).

Irrespective of the fact that the Peregrine would not have nesting habitat if it were not for the quarry, the question of whether breeding peregrine are likely to be disturbed by Site operations is a key question. The relative

[3] The Highways Agency, Transport Scotland, Welsh Assembly Government & The Department for Regional Development Northern Ireland Design Manual for Roads and Bridges LA105 Air Quality

frequency of records over multiple breeding seasons indicates that breeding habitat has remained viable and even optimal perhaps.

A survey of quarry-nesting Peregrines conducted in the Republic of Ireland between 1991 and 1993 estimated that 65 quarries were occupied by Peregrines. There was a marked east/west gradient in occupancy with most occupied quarries in the east. Occupation of quarries by Peregrines is primarily influenced by cliff height (Moore *et al* 1997). This study went on to conclude that the effect of quarry activity was not significant in either analysis indicating that Peregrines nest in quarries with moderately high cliffs irrespective of whether they are in active use or not. Indeed, some of the Peregrines in this study nested on recently blasted cliff-faces and most birds in active quarries appeared quite unaffected by the intensive activity and noise going on below them. In the absence of interference to eyries or their occupants, breeding birds will ignore most human disturbance (Ratcliffe, 1993).

The continued presence of breeding Peregrine at the Site would indicate a level of tolerance to anthropogenic disturbance caused by quarrying activities. In essence, there is no evidence to suggest that this species, which is protected under the Habitats Directive, will be subject to adverse significant effect when considering proposed activities at the Site. This species, and other breeding birds, will be surveyed during Spring 2021 and a Peregrine management plan will be created for the Site.

4.0 STAGE 1 SCREENING ASSESSMENT CRITERIA

4.1 Describe any likely direct, indirect or secondary impacts of the Project (either alone or in combination with other plans or projects) on the Natura 2000 sites by virtue of:

Size and Scale	None – the size and scale of the Natura 2000 sites will not be affected.
Land-take	None from Natura 2000 sites and no further land take is required from the Site as the quarry is already in place.
Distance from Natura 2000 site or key features of the site	■ Red Bog SAC 8.1 km; ■ Glenasmole Valley SAC 8.1 km; ■ Wicklow Mountains SAC 8.1 km; ■ Rye Water Valley/Carton SAC 9.7 km; ■ Poulaphouca Reservoir SPA 9.6 km; ■ Wicklow Mountains SPA 11.9 km; and ■ Dublin Bay (SAC and SPAs) ca. 34 km.
Resource requirements (water abstraction etc.)	No resources from a Natura site are required or have been required.
Emissions (disposal to land, water or air)	There are no proposed emissions to water that could affect Natura 2000 sites. Possible hydrological pathways have been identified between the Site and Natura 2000 sites but there is no evidence to suggest that water quality has the potential to have a likely significant effect on water quality for downstream receptors. Air emissions from the Site are unlikely to cause impacts on the Natura 2000 sites due to the absence of ecological pathways and negligible emissions.
Excavation requirements	There are no excavation requirements within the Natura 2000 sites or those that could affect Natura 2000 sites through source pathway modelling.

Transportation requirements	Transportation of goods to and from Site will not affect Natura 2000 sites in a way that would be measurable.
Duration of construction, operation, decommissioning etc.	It is anticipated that extraction of the remaining reserve at the Project Site will occur over 10 to 15 years, depending on market conditions with a further 2 to 5 years for restoration that will remediate the quarry void to agricultural /amenity use and remove the quarry processing plant.
Other	None.

4.2 Describe any likely changes to the site arising as a result of:

Reduction of habitat area	None to Natura 2000 sites.
Disturbance to key species	Disturbance to key species is not possible owing to the distance between the Site and Natura 2000 sites including the absence of ecological pathways or synergies. Peregrine may be afforded a positive impact via habitat creation that would otherwise not have existed.
Habitat or species fragmentation	There has been no habitat or species fragmentation due to the operations at the Site. The Site is not part of the Natura 2000 sites in question and no resources are required from them. Designated habitats and species of the SACs/SPAs will not be directly or indirectly impacted given their distance from the Site.
Reduction in species density	No reduction in species density is anticipated.
Changes in key indicators of conservation value (water quality etc.	None.
Climate change	No measurable contribution.

4.3 Describe any likely impacts on the Natura 2000 sites as a whole in terms of:

Interference with the key relationships that define the structure of the site:	No impacts are likely to be afforded.
Interference with key relationships that define the function of the site	No impacts are likely to be afforded.

4.4 Provide indicators of significance as a result of the identification of effects set out above in terms of:

Loss (Estimated percentage of lost area of habitat)	There will be no habitat loss.
Fragmentation	There will be no habitat fragmentation.
Disruption and disturbance	Disturbance and disruption to species is considered unlikely. Species for which the Natura 2000 sites have been designated for are highly unlikely to utilise the Site or be influenced by the Site due to distance and / or a lack of environmental connectivity between sites. Peregrine falcon seem tolerant of Site activity and have been present at the Site over many years.
Change to key elements of the site (e.g. water quality etc.)	None. The Project will not result in any measurable adverse effects on surface and groundwater quality, availability, flow or distribution.

4.5 Cumulative Impact

Cumulative impacts are defined as impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project (European Communities, 1999). A review of the relevant County Council planning website was undertaken for details of other developments in the area which may lead for the potential for cumulative impacts to arise. Proposed developments identified were mainly for dwelling or extension/alterations to dwellings and light industrial infrastructure development. As such, it is considered that no cumulative impacts will be derived from this application and subsequent implementation.

4.6 Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is unknown

As described within this Stage 1 assessment, it is considered certain that the implementation of the Project at the Site will not cause a likely significant effect on the Natura 2000 sites pertinent to this Stage 1 Screening Assessment. There is a high level of confidence in the likely degree of the magnitude of impacts in accordance with the Project and as such it is concluded objectively that significant effects will not be afforded.

The following key considerations contributed towards this conclusion:

- The Site's operation will occur as a nearly closed loop system regarding discharges with no aquatic or terrestrial connectivity with Natura 2000 receptors as defined within this report. Discrete water discharges via the N7 motorway have been sampled in recent years and there is no evidence of water quality being adversely affected by this contribution; and
- There is sufficient distance between the Site and all Natura sites that the Site will not cause disturbance / displacement of those species that form part of the qualifying interests of the Natura 2000 designation. On a precautionary basis the presence of peregrine falcon on the Site will be subject to measures detailed within the accompanying biodiversity chapter which state that a breeding bird (including Peregrine Falcon) survey will be undertaken at the next opportunity, this has commenced in March 2020. The result of this work will form the basis of a Peregrine falcon management and monitoring plan for the Site.

5.0 DATA COLLECTED TO CARRY OUT THE ASSESSMENT

The assessment was carried out by:

Freddy Brookes MSc., MCIEEM – Senior Ecologist Golder Associates.

Reviewed by:

Steve Mustow, MCIEEM, FCIWEM, CEnv, CWEM, Director of Environmental Management, Golder Associates

Sources of Data:

Existing information from NPWS, GSI, and EPA.

Level of assessment completed:

Desktop study and Screening report.

6.0 REFERENCES

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