

An
Bord
Pleanála

Report to Inspector (Appendix to main report) R314374_App1

Development

Substitute consent application for a
Quarry, Redcross, Co. Wicklow

Type of Application

Substitute Consent

Topic:

**EIA: Water resources, hydrology and
aquatic environment**

Adequateness of information for
purpose of Environmental Impact
Assessment: water resources,
hydrology and aquatic environment

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1 Introduction

1.1 Scope of ‘Report to Inspector’

1.1.1 This report to the Inspector and available to the Board is a written record of my review and examination of the submitted information provided by the applicant as it relates to water resources, hydrology and the aquatic environment around the development. In my capacity of Inspectorate Environmental Scientist, I have the relevant expertise to provide a professional opinion as to the adequacy of the information for the Inspector and the Board to undertake Environmental Impact Assessment (EIA) of the substitute consent sought for the quarry operations at Ballybarney, Redcross, Co. Wicklow.

I have reviewed and examined the following documents including relevant appendices and figures (plans and particulars):

- PD Lane Associates (January 2009) Hydrogeological Investigation
- Remedial EIAR (rEIAR) with particular focus on Chapter 6 (Water)

The documents have been reviewed with respect to the following current best practice guidance:

EPA (2022) Guidelines on the information to be contained in environmental impact assessment reports.

1.2 Expertise and technical content of Environmental Reports

1.2.1 The water chapter of the rEIAR was prepared by a suitably qualified and experienced Hydrogeologist from Golder Associates Ireland Limited – WSP Ireland Consulting. I also note that the submitted Hydrogeological Investigation Report (2009) prepared as part of an application for planning permission to Wicklow County Council was prepared by PD Lane Associates (WTG Ireland). The scope structure and content of the rEIAR is in accordance with good practice guidance.

1.2.2 Scientific information on hydrogeology, hydrology, groundwaters and surface waters is adequate and covers (in so far as possible) the period of review (1990 – 2022). The assessment involved 2 site visits, field monitoring and water sampling, desktop review of previous site-specific reports and review of historic water monitoring information. I am satisfied that the on-site water quality monitoring surveys were undertaken in line with good practice methods and INAB and/or ISO17025 accredited laboratories were used for the analysis of samples taken and results reports. The above provides a robust baseline for the impact appraisal as part of the rEIAR.

2 Consideration of the Likely Impacts on Waters

2.1.1 Groundwater Quality

The rEIAR reports on groundwater quality investigations undertaken over 3 historical periods of time (2009, 2016 and 2017) during the review period (1990 – 2020). Sample results were compared against the relevant standards at the time of sampling including Drinking Water Regulations (SI 278 of 2007), EC Environmental Objectives (Groundwater) Regulations, 2010 (SI 9 of 2010), Drinking Water Standards, 2014 (SI 122 of 2014). The findings of these investigations indicate that the ground water quality was generally good with the following exceptions. Elevated manganese and iron were recorded however these metals are naturally occurring in Irish groundwaters and are not indicators of anthropogenic contamination. The presence of elevated manganese and iron can indicate low-oxygen conditions in groundwaters, and data provided does show correlation between low oxygen conditions and elevated manganese and iron on this site. Faecal coliforms were recorded in 2016 and 2017 in 2 boreholes downgradient of the on-site wastewater treatment system which indicates the samples were taken from the dispersal field from the soakaway/polishing filter. One elevated result for Diesel Range Organics (DRO) and Mineral Oil was recorded in 2008 but was not reproduced in samples taken on the same day from other boreholes which indicates a localised issue. Subsequent analysis for DRO

and Mineral Oils in 2009, 2016 and 2017 showed all samples below the threshold values.

2.1.2 To provide a more recent assessment, groundwater samples were collected from 5 boreholes (1 upgradient and 4 downgradient) in 2020, 2021 and 2022 and analysed for an appropriate range of parameters. The results were compared against EC Environmental Objectives (Groundwater) Regulations, 2010 (SI 9 of 2010) as amended by SI 366 of 2016 and EU Drinking Water Regulations, 2014 (SI 122 of 2014) as amended by SI 464 of 2017. Elevated iron and manganese were again noted in this round of sampling. Elevated ammoniacal nitrogen was recorded in boreholes both upgradient and downgradient of the site indicating a potential off-site source of organic nitrogen.

2.1.3 The rEIAR reports that based on the results reported, any changes in groundwater quality during the period of review resulting from activities relating to the operation of the site are of low magnitude, direct, short term and reversible. I am satisfied that the rEIAR provides sufficient information to make a robust decision regarding the quality of groundwaters and I agree with this conclusion.

2.2 Groundwater Quantity

2.2.1 Groundwater level data is reproduced from the 2008 (AWN) investigations and compared to those from the 2022 (Golder) study. The comparison highlights that groundwater level contours in 2022 were generally lower than they were in 2008. The area to the NW of the site has been excavated below the water table since pre-2008 and this area acts as a 'low pressure' directional pull for groundwater to the east and south of the site. It is anticipated groundwater from the north of the site is recharged from the surface watercourse that flows along the boundary however deeper groundwaters from this direction may flow to the 'low pressure' area within

the site. The interpreted groundwater elevation contours suggest a cone of depression exists in the area from which water is pumped before being discharged to surface waters. The surface waterbody present within the site can be any combination of rainwater/surface water from within the site, groundwater and recharge from the stream to the north of the site. This water is pumped from the site to avoid flooding the low-lying parts of the quarry and if the pumping were ceased, the levels on the floor of the quarry would quickly rise to equilibrium with the water table.

2.2.2 The magnitude of change in the boreholes varies depending on distance from the deepest excavated area in the NW of the site. The boreholes closest to the deep excavation area (MW4 and MW5) demonstrate the largest drop in groundwater levels from 2008 to 2022 (see table 1). This highlights the drop in groundwater within the deposits of sand and gravel in the eastern and central part of the quarry. Groundwater levels in BH1 and BH2 have been impacted less despite being similar distances from the deep excavation as MW4 and MW5 which indicates the groundwater levels in non-sand and gravel deposits have not been impacted to the same extent.

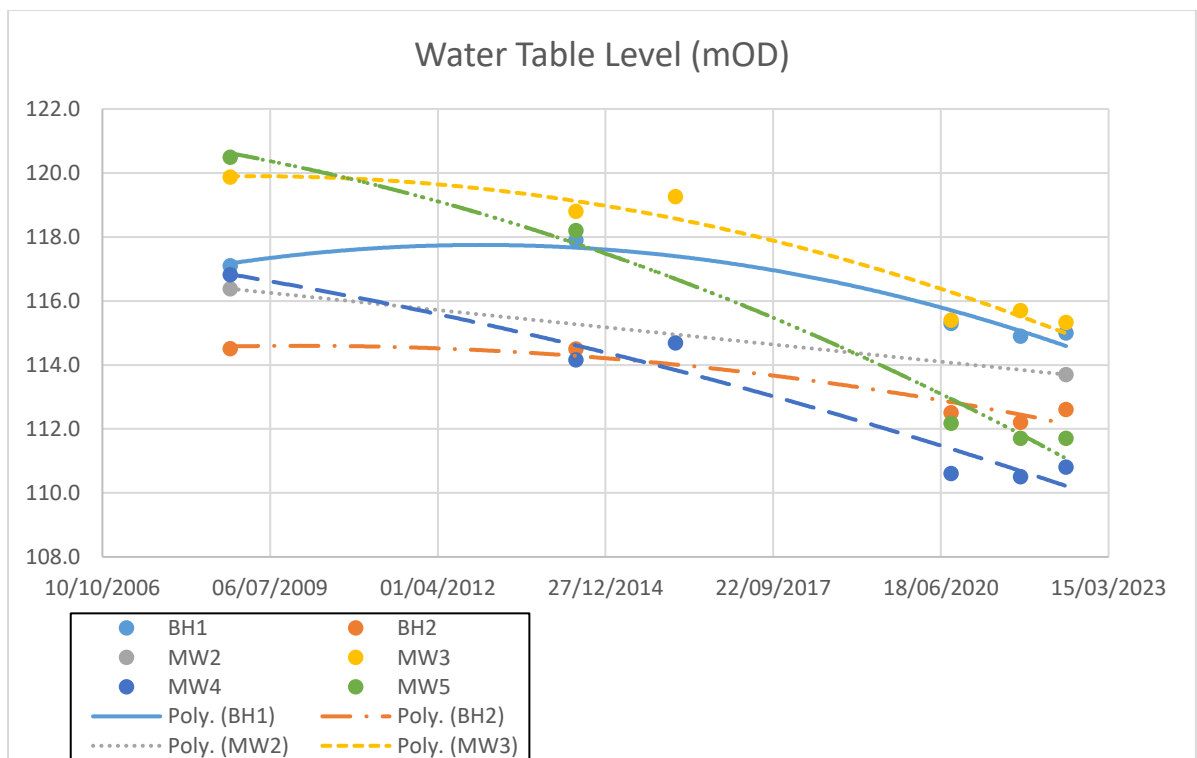


Figure 1. Groundwater Elevation Contours (mOD) 2008-2022 with trendlines

Water Table Level (mOD)							
	11/10/2008	7/4/2014	2/18/2016	8/17/2020	10/5/2021	7/4/2022	Change (m) 2008 - 2022
BH1	117.1	117.9		115.3	114.9	115.0	2.1
BH2	114.5	114.5		112.5	112.2	112.6	1.9
MW2	116.4					113.7	2.7
MW3	119.9	118.8	119.3	115.4	115.7	115.3	4.5
MW4	116.8	114.2	114.7	110.6	110.5	110.8	6.0
MW5	120.5	118.2		112.2	111.7	111.7	8.8

Table 1. Borehole groundwater elevation data (mOD) 2008 – 2022 with calculated change in level

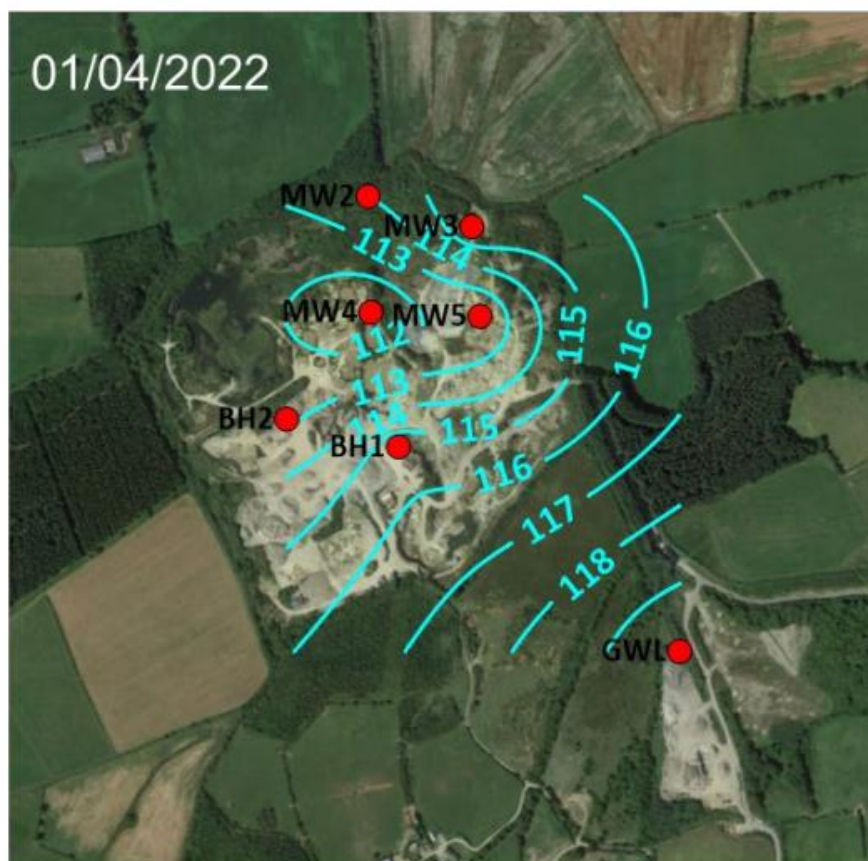


Figure 2. Groundwater Elevation Contours (mOD) 2022 with Borehole locations (Golder, 2023)

The rEIAR reports that any changes in groundwater levels during the period of review resulting from activities relating to the operation of the site are of low magnitude, direct, short term and reversible. I am satisfied that the rEIAR provides sufficient information to make a robust decision regarding the quantity of groundwaters and I agree with this conclusion. These measured changes in water levels within the quarry are normal for a dewatered sand and gravel quarry operation.

2.2.3 Surface Water Quality

2.2.4 Connectivity between the site and the surface water is minimal with one location to the NW of the site where surface water from the standing pool is pumped via a series of settlement ponds into the Newbawn stream. The rEIAR reports on surface water quality investigations undertaken in the Newbawn stream over 4 historical periods of time (2008, 2016, 2017 and 2020-2022) during the review period (1990 – 2022). Sample results were compared against the relevant standards at the time of sampling including EC Environmental Objectives (Surface Waters) Regulations, 2009 (SI 272 of 2009) and compared against the EC (Quality of Salmonid Waters) Regulations, 1988 (SI 293 of 1988) The findings of these investigations indicate that the surface water quality was generally good. Elevated levels of Ammoniacal Nitrogen were recorded in 2022 upstream of the site, indicating an off-site source of organic Nitrogen. In 2016, elevated levels of copper were reported both upstream and downstream of the discharge point from the quarry with the higher reading being recorded upstream. Subsequent sampling for copper in the surface waters in 2020, 2021 and 2022 found levels were all below the limit of detection for analysis. Copper is found naturally in upland soils and rocks in parts of Ireland but is also used as Copper Sulphate in sheep treatment products in rural settings. Elevated Suspended Solids results were encountered upstream and downstream of the discharge from the site in 2022 again indicating off-site sources were likely.

2.2.5 The rEIAR reports that based on the results reported, any changes in surface water quality in the Newbawn stream during the period of review resulting from activities relating to the operation of the site are of low

magnitude, direct, short term and reversible. I am satisfied that the rEIAR provides sufficient information to make a robust decision regarding the quality of surface waters and I agree with this conclusion.

2.3 Surface Water levels

2.3.1 Flow levels in the Newbawn stream were measured in 2008, 2016, 2017 and in the more recent study undertaken by Golder in 2022. Measurements were taken along the stretches to the east and north of the site boundary. During the 2008 study, the flow in the Newbawn Stream was observed to decrease along the northern boundary of the site. This was reported to be due to the dewatering activity taking place at the time in the NW corner of the site as extraction of aggregates from below the water table took place. The flow was observed to increase again downstream of the site due to recharge and direct discharges from the site. Subsequent flow studies (2016, 2017 and 2022) have not demonstrated any significant reduction in flows in the Newbawn stream due to the operational activities in the site.

2.3.2 The rEIAR reports that any changes in surface water levels during the period of review resulting from activities relating to the operation of the site are of low magnitude, direct, short term and reversible. I am satisfied that the rEIAR provides sufficient information to make a robust decision regarding the quantity of surface waters and I agree with this conclusion.

3 Assessment of Water Framework Directive (WFD) Compliance

3.1 Surface Water

The quarry is located within the AVONMORE_070 waterbody (IE_EA_10A050500) for surface waters which has a WFD Risk rating of “Not at Risk” which means it is on target to achieve/maintain “Good Status” by 2027. In 2019, as part of the national characterisation programme undertaken for the second cycle of the Water Framework Directive, the EPA carried out a characterisation assessment for the

AVONMORE_070 which involved consultation with stakeholders and state agencies and no significant pressures were identified in this waterbody during that process.

The EPA carry out water quality monitoring at two stations within the AVONMORE_070 waterbody. Operational Monitoring (water sampling and analysis) is carried out on the Avonmore River at Avondale 3km d/s of Rathdrum (RS10A050400). This location is 50m d/s from the confluence of the Newbawn stream with the Avonmore river and can be considered a surrogate monitoring location for impacts from the stream draining the quarry on the AVONMORE_070 waterbody. A review of water quality parameters from this monitoring location for the period 2007-2020 is summarised in the following graphs:

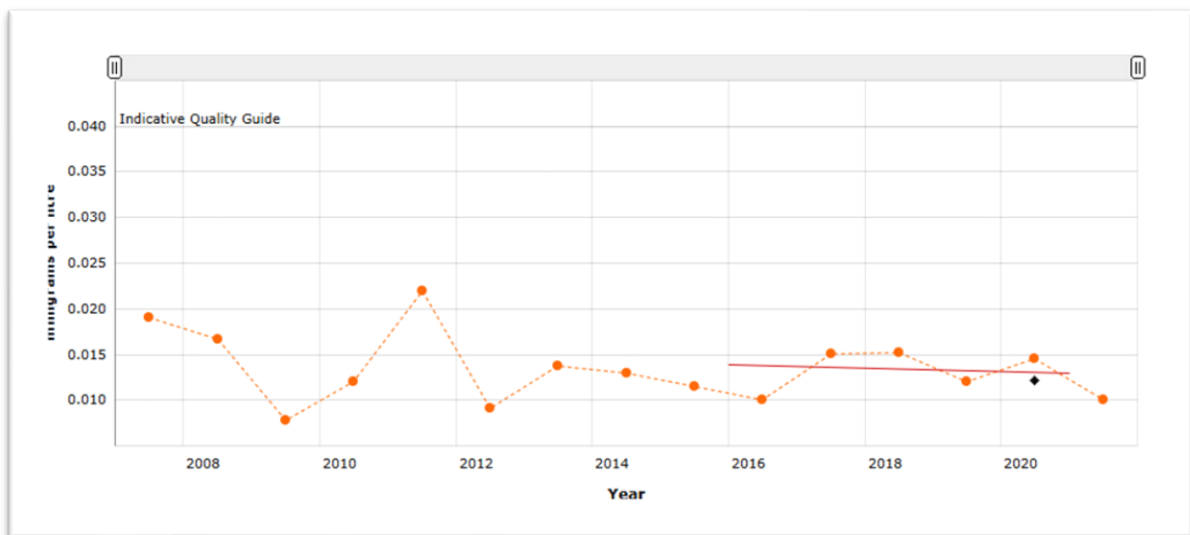


Figure 3. Total Ammonia (as N) at RS10A050400 for the period 2007 – 2020

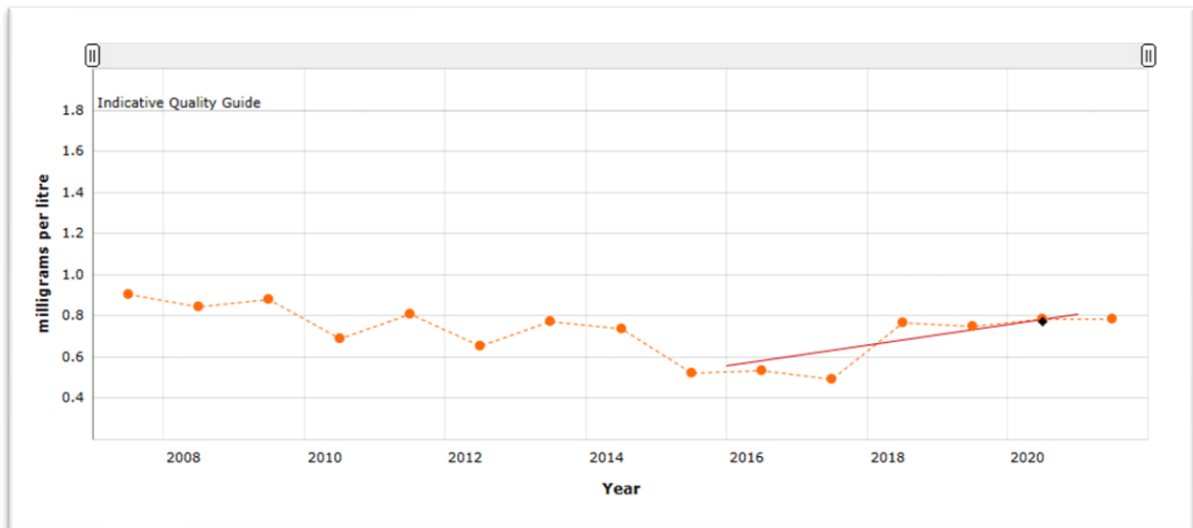


Figure 4. Total Oxidised Nitrogen (as N) at RS10A050400 for the period 2007 – 2020

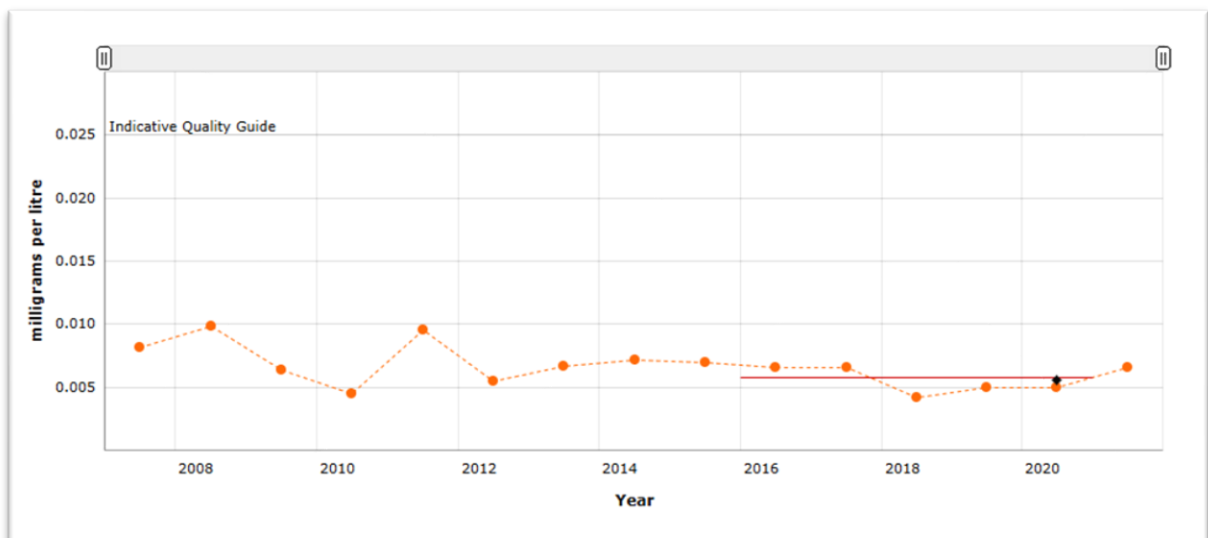


Figure 5. Ortho-Phosphate (as P) at RS10A050400 for the period 2007 – 2020

Both Ammonia (Total) and ortho-Phosphate readings are indicative of High-Status quality ($\leq 0.040\text{mgN/L}$ and $\leq 0.025\text{mgP/L}$ respectively) and demonstrate a downward trend. Total Oxidised Nitrogen readings indicate Good-Status conditions and an upward trend. I have reviewed the EPA database for surface water quality at this location and can also confirm that Dissolved Oxygen, Biochemical Oxygen Demand and Suspended Solids data show that these parameters have indicated water quality of Good or High Status in the period 2007 - 2020.

Biological monitoring is carried out routinely by the EPA on the Avonmore River at Lion's Bridge (RS10A050500) which is located at the lower reaches of the AVONMORE_070 waterbody. This site is approximately 4km d/s of the confluence of the Newbawn stream with the Avonmore river and the biological quality is measured by Q-values. The Q-values for the period 1974 – 2024 are detailed below:

Station Code	1974	1981	1985	1990	1994	1997	2000	2003	2006	2009	2012	2015	2018	2020	2024
RS10A050500	5	5	5	5	4	4	4-5	4	4-5	4	4	4	3-4	4	4

Figure 6. Q-Values for the Avonmore River at Lion's Bridge (RS10A050500)

The AVONMORE_070 waterbody has maintained a Q-value indicating Good or High Status for 50 years except for one period (2018-2020) when the rating dropped to Q 3-4 (Moderate Status). The EPA Assessment for 2018 recorded the following note “The paucity of pollution sensitive macroinvertebrate fauna and dominance of pollution tolerant species indicated an unwelcome decline in the lower reaches at Lions Bridge (0500)”. The cause of this decline is not identified, and the 2020 Q-value showed a return to satisfactory conditions which has been maintained into the latest assessment in 2024.

The quarry in question is located within the AVONMORE_070 waterbody which is on target to achieve Good Status in the 3rd Cycle of the Water Framework Directive. The data submitted in the rEIAR when considered along with the EPA's water quality data for the Avonmore River demonstrate no significant impact from the quarrying activities at the site in question during the period of review.

3.2 Groundwaters

3.2.1 Groundwater Quality

The quarry is located within the Wicklow Groundwater waterbody (IE_EA_G_076) which has a WFD Risk rating of “At Risk”. The EPA have identified Nutrients as the significant issue and agriculture and “unknown” as the significant pressures. The environmental objective for the waterbody is to achieve Good Status and it is currently classed at Good Status, despite being “At Risk”. The “At Risk” rating arises from Nitrate and Chloride levels in the waterbody trending upwards and distance to threshold values for both parameters being regarded as “Near”.

The closest EPA groundwater monitoring location to the quarry is a surveillance borehole located 3.5km SE of the site at Redcross, Co. Wicklow (GWIE_EA_G_07634000010). The water quality at this site has been deemed to be of Good Status for Ammonia (Total), Chloride, Nitrate (as NO₃) and ortho-Phosphate (as P). This monitoring site is not considered to be hydraulically connected to the lands under consideration here, and further interrogation of this data is unnecessary.

3.2.2 Groundwater Quantity

The quarry in question is located within the Wicklow Groundwater waterbody (IE_EA_G_076) which is on course to achieve its target of Good Status in the 3rd Cycle of the Water Framework Directive when assessed on quantity. The quantitative tests to assess if a groundwater waterbody is at risk of failing the WFD objectives are:

- Is there evidence of saline or other intrusions due to change in groundwater levels?
- Are there impacts on the environmental objectives of associated surface waters?
- Are there impacts on the groundwater-dependent terrestrial ecosystems due to alterations in groundwater levels?
- Is there an exceedance of the available groundwater resource by the long-term annual abstraction through assessing water balances.

The 2016-2021 status assessment for the Wicklow Groundwater waterbody (IE_EA_G_076) showed that all 4 of the above tests passed the assessment and were at 'Good' status. There is no evidence of any saline intrusion in the groundwater at this location, based on available chloride monitoring data. In addition, there is no evidence that the environmental objectives of associated surface water bodies have been compromised by the activities in the quarry. There are no groundwater-dependent terrestrial ecosystems associated with the groundwater at this location. In terms of long-term abstraction and water balances, the Wicklow Groundwater waterbody covers an area of 1,396km² and the quarry site in question is 0.23km² in size which represents 0.02% of the entire waterbody in area. The water balance calculations to assess compliance with WFD are carried out as a minimum at

waterbody scale (EC-Technical Report-2015-90) and in any case, the water abstracted from the groundwater at this site is delivered to the surface waterbody adjacent to it where it can then recharge to groundwaters or continue to supply surface waters hence remains within the same hydrological system.

The data submitted in the rEIAR when considered along with the EPA's groundwater status data demonstrate no significant impact on groundwater quantity from the quarrying activities at the site in question during the period of review.

4 Conclusion

Following review and examination of the material submitted as part of the application for substitute consent for the quarry at Ballybarney, Redcross, Co. Wicklow my findings and recommendations are as follows:

Remedial EIA: water resources, hydrology and aquatic environment.

No third-party submissions were received in relation to this application. I consider that the information and assessment provided by the applicant in remedial EIAR is adequate, conforming to best professional practice in terms of methodology, reporting and assessment and that the Board can be confident that a finding of no significant effects on the Water Resource as part of the remedial EIA can be reached.

Signed:



Finbarr Quigley BSc. M.Sc.
Inspectorate Scientist

25th February 2025