

JSPPE

J Sheils Planning & Environmental Ltd

Roadstone Ltd.

Emissions Compliance Report

Garryhesta Pit

Knockanemore, Ovens

County Cork

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EMISSIONS COMPLIANCE REPORT

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Emissions Compliance Report

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1. SURFACE WATER

Surface water quality monitoring results for the local stream (SW1) and the pond (SW2) are presented below. The locations of the sampling points are shown on Figure 1 below. SW1 is located upstream of the proposed site and SW2 is located downstream of the site.



FIGURE 1 LOCAL DRAINAGE MAP

Results of the laboratory analysis for surface water sampling carried out in February 2017 (Round 1) and March 2017 (Round 2) are shown alongside relevant water quality regulations in Table 1 and Table 2 below. In addition, Environmental Objectives Surface Water Regulations (S.I. 272 of 2009) are shown in Table 3. Original laboratory reports are included in EIAR Appendix 5.5.2 which accompanies this Waste Licence Application.

A third round of surface water sampling was completed at the same time as the groundwater monitoring well sampling (discussed further below) and the results for the Round 3 surface water sampling are shown in Table 1 which is included in EIAR Appendix 5.5.3. Original laboratory reports are included in EIAR Appendix 5.5.2.

Table 1 Local Stream Surface Water Quality Results (SW1)

Location	Units	Date			2006 /44/ EC	
		Jan 2017	Feb 2017	Mar 2017	Salmonid	Cyprinid
pH	pH Units	7.9	7.9	8	-	-
BOD	mg/L	<1.0	1.3	<1.0	≤3	≤6
Total Ammonia	mg/L	0.03	0.05	<0.02	≤0.04	≤0.02
Suspended Solids	mg/L	<2	6	<2	≤25	≤25
Total Nitrogen	mg/L	6.5	5.8	6	-	-
Total Phosphorus	mg/L	<0.04	0.04	<0.04	-	-
DRO	µg/L	<10	<10	<10	-	-

Table 2 Pond Surface Water Quality Results (SW2)

Location	Units	Date			2006 /44/ EC	
		Jan 2017	Feb 2017	Mar 2017	Salmonid	Cyprinid
pH	pH Units	8.1	7.8	8.1	-	-
BOD	mg/L	<1.0	1.3	<1.0	≤3	≤6
Total Ammonia	mg/L	0.06	0.05	<0.02	≤0.04	≤0.02
Suspended Solids	mg/L	<2	16	9	≤25	≤25
Total Nitrogen	mg/L	5.3	5.4	4.8	-	-
Total Phosphorus	mg/L	0.04	0.10	0.05	-	-
DRO	µg/L	<10	<10	<10	-	-

Round 1 and Round 2 Surface Water Sampling

Total suspended solids were between <2 and 6mg/L in the stream samples, which is below the Freshwater Fish Directive (2006/44/EC) for both Salmonid and Cyprinid waters. The suspended solid range in the pond samples were slightly higher (<2 – 16mg/L) but were still below the directive values.

Ammonia N in the January and February stream samples exceeded the Freshwater Fish Directive (2006/44/EC) for Cyprinid waters. The stream sample in February exceeded the Freshwater Fish Directive (2006/44/EC) for both Salmonid and Cyprinid waters. There was no exceedance of the ammonia in the March stream sample. Ammonia N in the January and February pond samples exceeded the Freshwater Fish Directive (2006/44/EC) for both salmonid and Cyprinid waters and there was no exceedance in the March pond sample. The source of ammonia is likely to be agricultural related.

BOD was between <1.0 and 1.3mg/L in both the stream and pond samples, which is below the Freshwater Fish Directive (2006/44/EC) for both Salmonid and Cyprinid waters.

Total nitrogen was between 4.8 and 6.5mg/L in all samples (stream and pond) with the overall range been slight higher in the stream samples.

Total phosphorus was below or at the laboratory detection limit (0.04mg/L) in the stream samples and they were slightly more elevated in the pond samples (range 0.04 – 0.1mg/L). The pond is bounded by agricultural land to the south and the variation in phosphorus is likely to be agricultural related.

There was no detection of diesel range organics (DROs) in any of the pond or stream samples.

Table 3 Surface Water Regulation Threshold Values

Parameter	Threshold Values (mg/L)
BOD	High status ≤ 1.3 (mean)
	Good status ≤ 1.5 mean
Ammonia-N	High status ≤ 0.04 (mean)
	Good status ≤ 0.065 (mean)
Ortho-phosphate	High status ≤ 0.025 (mean)
	Good status ≤ 0.035 (mean)

In comparison to the Environmental Objectives Surface Water Regulations (S.I. 272 of 2009) values as shown in Table 3 above, all results for ammonia N were below the “Good Status” threshold with 50% of the samples (3 no.) also been below the “High Status”. All results for BOD were within the “High Status” range.

Round 3 Surface Water Sampling

Total suspended solids were $<5\text{mg/L}$ in both samples, which is below the Freshwater Fish Directive (2006/44/EC) for both Salmonid and Cyprinid waters.

BOD was reported to be between 1.1 (SW1) and 1.5mg/L (SW2) which is below the High Status and Good Status surface water regulations threshold value respectively.

Ortho-phosphate was reported to be between 0.008 (SW1) and $<0.005\text{mg/L}$ (SW2) which is below the High-Status surface water regulations threshold value.

2. SEWER

The existing welfare facilities including toilets provided in the quarry will be utilised by the proposed development. A holding tank is provided which is emptied on a routine basis by a certified waste collection contractor to an approved waste facility. As such there will be no discharge to sewer and/or surface, groundwater.

3. AIR

The impact of dust is usually monitored by measuring rates of dust deposition (DoE, 1995). There are currently no Irish statutory standards relating specifically to dust deposition thresholds for inert dust. There are a number of methods to measure dust deposition but only the German TA Luft Air Quality Standards specify a method of measuring dust deposition – The Bergerhoff Method (German Standard VDI 2119, 1972). It is the only enforceable method available. On this basis, both the DoEHLG (2004) and EPA (2006) recommended that the following TA Luft dust deposition limit value be adopted at site boundaries associated with quarry developments – total dust deposition (soluble and insoluble): 350 mg/m²/day (when averaged over a 30-day period).

Dust deposition monitoring has been carried out at the site in compliance with condition No. 13 of existing planning permission (QR19 06/11798 & PL04.225332) for the quarry development. Dust monitoring is carried out at three monitoring locations (D1, D2, D3) (Refer to EIAR Figures 1.3 & 3.6). This condition is also in accordance with guidance issued by both the Department of the Environment and the EPA in relation to dust deposition monitoring for these types of developments and will continue to be applied. Recent monitoring results are provided in Table 4 below.

Cork County Council have recently issued notification of decision to grant planning permission for the soil recovery facility at Garryhesta (P.A. Ref. 18/05155). Condition No. 19 of this permission is consistent with the above Emission Limit Values. i.e. *“the operator of the site shall ensure that dust deposition arising out of the demolition and construction activities on site shall not exceed 350 mg/m²/dav at the site boundary averaged over 30 days”*.

Table 4 Dust Deposition Results (mg/m²/day)

Period	D1	D2	D3
Jan-17	128	No access	No access
Feb-17	119	No access	No access
Mar-17	136	Contaminated	60
Apr-17	81	Organic	70
May-17	Contaminated	Contaminated	58
Jun-17	52	180	52
Jul-17	101	173	43
Aug-17	131	Contaminated	125
Sep-17	122	191	70
Oct-17	Contaminated	Contaminated	Contaminated
Nov-17	71	Contaminated	92
Dec-17	76	125	266
Jan-18	168	Contaminated	158
Feb-18	278	84	155

It is evident that a number of the monitoring points are prone to contamination by organic leaf matter. This is due to the proximity of these locations to boundary vegetation. Growth of vegetation comprising predominantly gorse also prevented access to monitoring locations on a number of occasions. Following a recent review Roadstone have relocated the dust monitoring stations to more suitable open locations as shown by Environmental Monitoring Plan EIAR Figure 3.6. It is also proposed to establish an additional dust monitoring station (D4) on the southern boundary of the landholding.

The existing dust monitoring programme will allow on-going monitoring of fugitive dust emissions from the site, thereby assisting in ensuring compliance with the accepted TA Luft dust deposition limit value be adopted at site boundaries associated with quarry developments – total dust deposition (soluble and insoluble): 350 mg/m²/day (when averaged over a 30-day period). This limit is in accordance with condition No. 13 of existing planning permission (QR19 06/11798 & PL04.225332) for the quarry development.

4. NOISE

4.1 Emission Limit Value

The following are Environmental noise limits based on Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016) as produced by the Environmental Protection Agency (EPA 2016). It should be noted *“that the guidance within this document relates to the assessment and measurement of noise in relation to Agency scheduled activities only”*.

Table 5 Recommended General Noise Limit Criteria (For EPA Scheduled Activities (NG4, 2016))

Daytime Noise Criterion, dB L _{Ar,T} (07:00 to 19:00hrs)	Evening Noise Criterion, dB L _{Ar,T} (19:00 to 23:00hrs)	Night-time Noise Criterion, dB L _{Ar,T} (23:00 to 07:00hrs)
55dB	50dB	45dB

Where tonal and/or Impulsive noise is identified a rating level based on the penalty as outlined in Table 6 is to be applied to the measured L_{Aeq}.

Table 6 Recommended Tonal/Impulsive Noise Ratings

Period	Sound Characteristic	Correction to L _{Aeq} to Arrive at Rating Level L _{Ar,T} (dB)
Daytime & Evening	Tonal/Impulsive	5
Night-time	Tonal/Impulsive noise from the facility should not be audible at any NSL	

If more than one adjustment is potentially applicable for the type or character of a given single sound source (i.e. a source that is both tonal and impulsive), only a single adjustment shall be applied.

The EPA Guidance Note (NG4) also addresses a number of specific activities including Quarrying and Mining Operations. Detailed guidance in relation to noise and vibration associated with these activities is provided in the Agency publication Environmental Management in the Extractive Industry (EPA, 2006a). Section 3.5 Noise & Vibration of this document sets out appropriate Emission Limit Values (ELV's) and deals with control of noise, vibration and air overpressure i.e.

In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:

Daytime (08:00 — 20:00) L_{Aeq} (1 hour) 55 dB (A)

Nighttime (20:00 — 08:00) L_{Aeq} (1 hour) 45 dB (A)

(Note: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dBA).

These same “*appropriate Emission Limit Values (ELV’s)*” for quarry developments are also set out in the 2nd Edition of the Irish Concrete Federation Environmental Code (ICF, 2005). As acknowledged in these guidelines “*the Code has gained national recognition and has now become a reference document in the Department of the Environment, Heritage and Local Government’s “Quarries and Ancillary Activities – Guidelines for Planning Authorities” and in the EPA “Environmental Management in the Extractive Industry (Non-Scheduled Minerals) – Guidelines for Operators”.*

These levels are also consistent with guidance issued by the Department of the Environment: “*Quarries and Ancillary Activities – Guidelines for Planning Authorities (2004) DOEHLG*”.

The most recent noise limit imposed at the quarry is in accordance with Condition No.32 of Planning Permission (QR19 06/11798 & PL04 225332). i.e.

“During the operation of the quarry, the noise level from within the site, measured at noise sensitive locations in the vicinity, shall not exceed an L_{Aeq} value of 55 dB(A) during the period 0800 hours to 1800 hours from Monday to Friday (inclusive) and 0800 hours to 1600 hours on Saturdays and an L_{Aeq} 15mins value of 45 dB(A) at any other time”.

Cork County Council have recently issued notification of decision to grant planning permission for the soil recovery facility at Garryhesta (P.A. Ref. 18/05155). Condition No. 24 of this permission is consistent with the above Emission Limit Values. i.e.

“Noise levels emanating from the proposed development when measured at the boundary of the nearest noise sensitive locations which require protection from disturbance, shall not exceed 55 dBA (30-minute Leq) between 08.00 hours and 20.00 hours Mondays to Saturdays inclusive and shall not exceed 45 dBA (15-minute Leq) at any other time. Measurements shall be made in accordance with I.S.O. Recommendations R.1996/1 “Acoustics Description and Measurement of Environmental Noise, Part 1: Basic Quantities and Procedures. “If the noise contains a discrete, continuous note (whine, hiss, screech, hum, etc.), or if there are distinct impulses in the noise (bangs, clicks, clatters, or thumps), or if the noise is irregular enough in character to attract attention, a penalty of +5 dBA should be applied to the measured noise level and this increased level shall be used in assessing compliance with the specified levels. (Ref. BS 4142 Section 7.2)”.

It is considered that the noise limit imposed at the proposed SRF should be in accordance with condition No. 24 of notification of decision to grant planning permission for the soil recovery facility at Garryhesta (P.A. Ref. 18/05155) being consistent with both the EPA (2006a) and DoEHLG(2004b) guidelines as detailed above.

Adoption of the above ELV's will ensure that there is no significant impact on noise sensitive receptors in the vicinity of the site.

4.2 Noise Monitoring

Roadstone currently carry out noise monitoring on a quarterly basis in accordance with the EMS for the quarry.

The Garryhesta Facility is regulated by Cork County Council and in compliance with Condition No.32 of Planning Permission (QR19 06/11798 & PL04.225332). which places a daytime noise limit of 55dB(A) at the nearest sensitive receptors.

Noise monitoring is carried out at 5 monitoring locations at the quarry (N1-N5). A copy of a recent noise monitoring survey undertaken by Southern Scientific Ltd is included in EIAR Appendix 5.6. The report provides a description of noise sources at each monitoring location during survey period. This report includes a figure showing the locations of the monitoring points.

These locations are listed in Table 7 below.

Table 7 Noise Monitoring Locations

ID	Location
N1	Boundary position at north east of site
N2	Boundary position at south east of site
N3	Boundary position at east of site
N4	Boundary position at north of site (west of quarry entrance)
N5	Boundary position at north of site (further west of N4)

A summary of recent noise surveys results is provided in Table 8 below.

The results demonstrate the measured day time L_{Aeq} was within 55dB(A) at N1.

Noise from local road traffic impacted on noise measured at N2 and N3.

According to the monitoring reports provided by Southern Scientific Ltd. noise generated from traffic on the N22 significantly impacted the noise levels measured at monitoring locations N4 & N5. The L_{A10} is the A-weighted sound level, which is exceeded for 10% of the measurement interval and is usually used to quantify traffic noise or other short

duration/passing events. Examination of the Noise monitoring reports shows the LA₁₀ for both N4 and N5 tend to be typically greater than 80 dB(A).

Noise from quarry activities, which are mainly confined to the south of the quarry, was generally not audible at any of the monitoring these locations and therefore did not contribute significantly to the measured noise levels. There was no significant tonal component to the noise measured at any of the monitoring locations.

A recent monitoring report has been included with EIAR Appendix 5.6).

It is evident from analysis of the above results that the noise environment in the immediate vicinity of the existing quarry site is determined primarily by noise from the National Primary road (N22), and low-level noise emissions from the vehicles and plant within the quarry.

Table 8 Noise Monitoring Results

GARRYHESTA NOISE MONITORING					
Date	N1 L _{Aeq} , 30 min	N2 L _{Aeq} , 30 min	N3 L _{Aeq} , 30 min	N4 (Traffic N22) L _{Aeq} , 30 min	N5 (Traffic N22) L _{Aeq} , 30 min
05/09/2013	46	42	41	58	60
11/12/2013	47	43	40	56	57
05/03/2014	48	44	40	57	57
23/09/2014	44	41.5	44.5	51.6	57
26/11/2014	45.2	48.5	49	55	54.7
26/03/2015	46.5	48.1	53.1	59.1	59.3
15/06/2015	43.1	34.7	34.9	52.6	55
29/07/2015	42.9	47.5	47.1	60.2	55.5
15/12/2015	49	46.1	44.8	60.7	63.5
09/02/2016	48	46.6	50.3	61.6	59.8
27/05/2016	39.6	40.3	44.1	51.6	52.9
11/08/2016	46.4	44.3	46	61.7	54.6
21/11/2016	45.2	52.3	52.2	59.1	55.5
21/02/2017	51.5	59.0	55.3	80.2	75.9
10/05/2017	41.7	58.1	52.3	79.1	73.9
24/07/2017	48.2	59.1	52.7	78.9	77.2

An additional noise monitoring station (N6) is to be established on the southern boundary of the landholding for future reference. Noise monitoring location N5 is also to be slightly relocated to the north western boundary due to difficulties with access and vegetation growth. The Environmental Monitoring locations are shown on EIAR Figure 3.6.

5. GROUNDWATER

Monitoring well drilling at the site was completed by Southern Pumps Drilling between 11th and 25th October 2017 when 4 no. monitoring wells were installed in the area of the proposed infill site (MW1 – MW4). Drilling logs for the monitoring wells are included in EIAR Appendix 5.5.1. The locations of the on-site monitoring wells are shown on Figure 2.

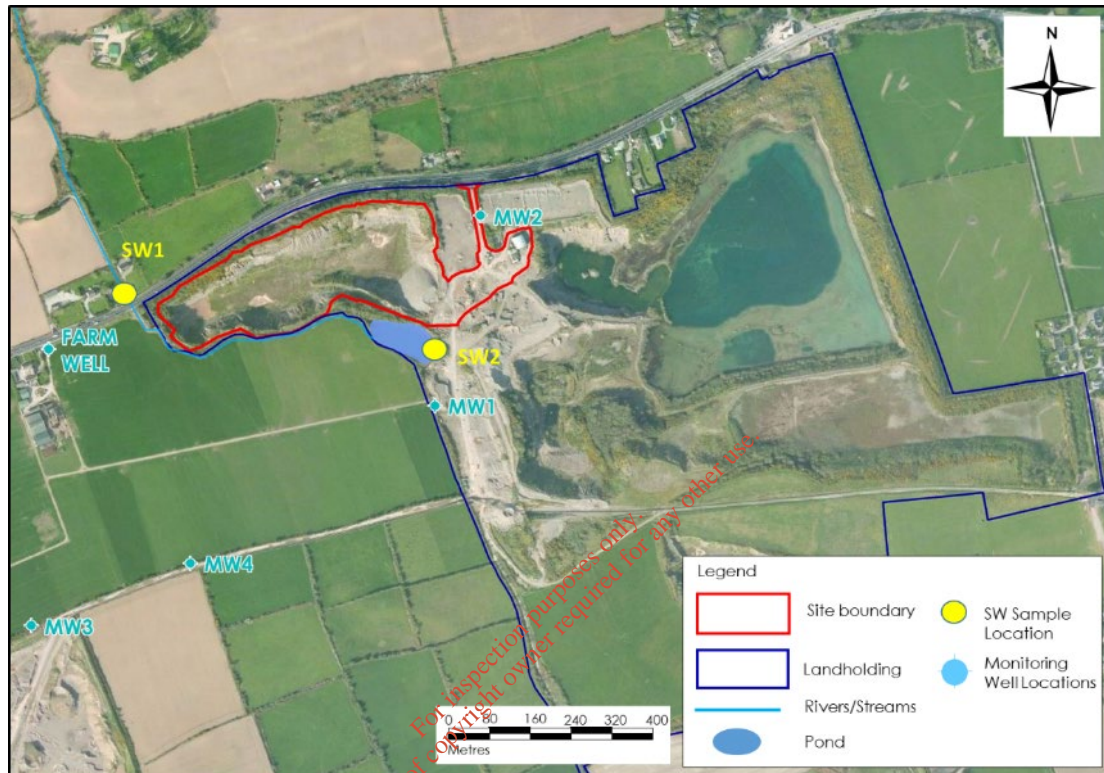
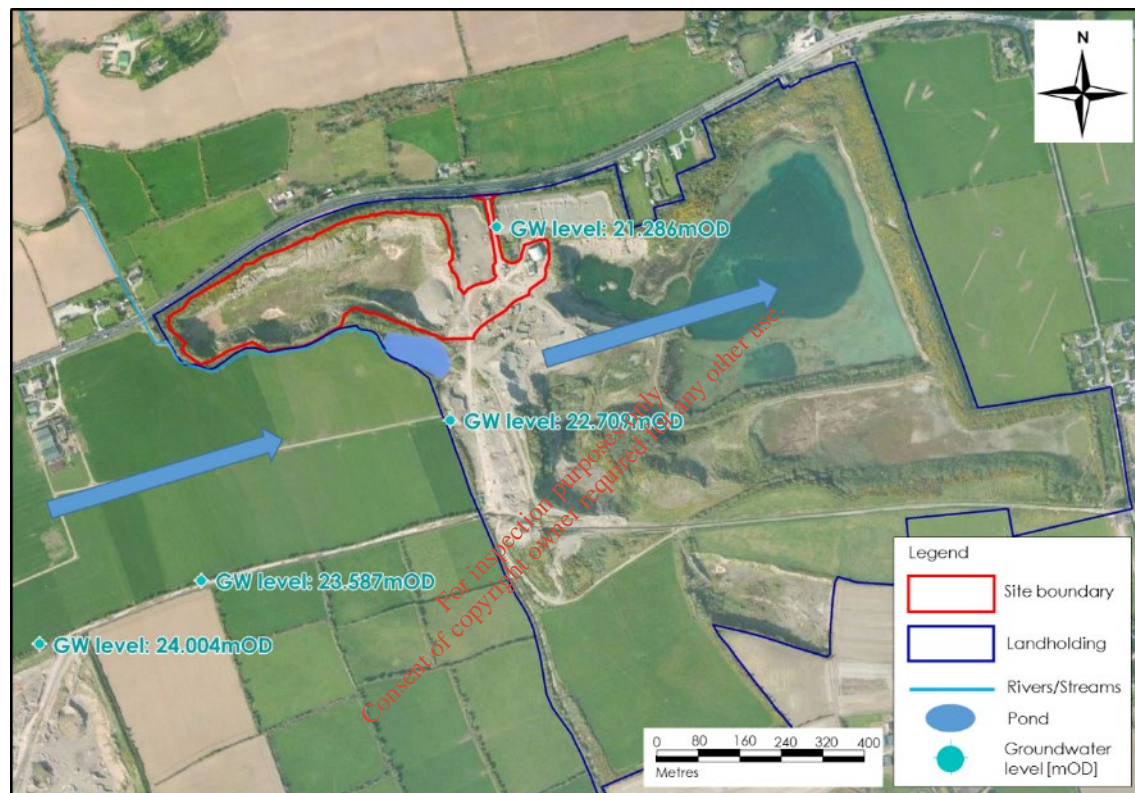


FIGURE 2 MONITORING WELL LOCATIONS

Groundwater level monitoring data for the on-site monitoring wells measured on 27th October 2017 are shown in Table 9 below. Groundwater levels at the site on that day varied between 21.286 and 24.004mOD. Based on the groundwater level elevations (mOD), the groundwater flow direction is down the valley in an easterly / north-easterly direction towards the River Lee as shown in Figure 3 below.

Table 9 Monitoring Well Groundwater Levels and Elevations

Location	Depth of Well (mbgl)	WL (mbgl)	WL (m OD)
MW1	40.25	28.372	22.709
MW2	38.4	31.161	21.286
MW3	38.6	27.622	24.004
MW4	36.0	28.505	23.587

**Figure 3 Groundwater Levels and Flow Direction**

(See Figure 2 For Well Location Numbering)

Groundwater quality monitoring was completed at the on-site monitoring wells (MW1 & MW2) and also at the farm well to the west of the site. The groundwater flow direction at the site is to the east / northeast and therefore the farm well is directly up-gradient of the site, while MW2 is directly down-gradient of it. MW1 and MW3 are to the south and are across gradient to the site.

Purging (pumping), field hydrochemistry monitoring and sampling of the on-site monitoring wells and the local farm well was completed on 27th October 2017.

Field hydrochemistry parameters [temperature, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Dissolved Oxygen (DO), and pH] were recorded prior to sampling. Data from this monitoring is presented in Table 10 below.

The groundwater hydrochemistry is typical of a sand and gravel aquifer comprising Devonian sand and gravels (the sands and gravels are mapped to be underlain limestone and this bedrock is also likely to influence hydrochemistry in the sand and gravel aquifer).

However, the EC, TDS and pH are notably lower in MW2 and the Farm Well and this is likely due to their location at the base of the valley side which rises steadily just north of the site. Surface water runoff from the slopes of the valley side is likely to drain into the sand and gravels at the base of the valley and mix with the groundwater flowing down the valley towards the River Lee (surface water will have a lower TDS and pH than groundwater). The hydrochemistry in MW1, MW3 and MW4 is likely to be more representative of the sand and gravel aquifer itself as they are further south within the main body of the sand and gravel aquifer and less likely to be influenced by surface water runoff from the valley sides.

Table 10 Groundwater Field Hydrochemistry

Location	Temp (°C)	EC (µs/cm)	TDS (mg/L)	DO (%)	pH
MW1	12.25	671	576	53	7.3
MW2	13.2	494	414	79	6.7
MW3	12.3	724	622	13	7.3
MW4	12.8	689	572	96	7.2
Farm Well	12.6	490	416	93	6.8

Groundwater samples¹ from MW1, MW2 and the Farm Well were delivered to ELS Laboratories in Cork on the same day as sampling. The results are shown in Table 2 which is included in EIAR Appendix 5.5.3 where the results are compared with relevant groundwater regulation and drinking water values. Original laboratory reports are included in EIAR Appendix 5.5.2.

All metals (dissolved) were below the relevant groundwater threshold values with the exception of manganese in MW2 and this likely due to a variation in local geology or groundwater flow from the bedrock on the valley side to the north of the well location.

Manganese is a naturally occurring groundwater mineral and dissolves readily in groundwater where DO levels are low.

Nitrate is relatively elevated in MW2 and the Farm Well and this is likely due agricultural practices such as fertiliser / slurry spreading on the lands surrounding the site. Ammonia is also slightly elevated in MW2 compared to the other wells and the only obvious local source is possibly private septic tanks / wastewater treatment units at houses to the north of the site (upslope).

All water samples recorded a BOD of less than 1mg/L which indicates an acceptable level of water quality.

6. STORM WATER

During infilling there will no pathway for surface water to leave the site other than by recharging into groundwater.

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