Noeleen Keavey

Subject: FW: Clashford Facility - Reg. No W0265-01
Attachments: JSPE 173_L25.pdf; JSPE 173_L27_15_11_17.pdf; P1317-1_0020_Clashford RF Water SamplingReport_20171023.pdf; JSPE_173_L23.pdf

Importance: High

From: James McCaldin [mailto:james.mccaldin@meathcoco.ie]
Sent: 22 November 2017 14:11
To: Brian Meaney <B.Meaney@epa.ie>; Ewa Babiarczyk <E.Babiarczyk@epa.ie>
Cc: Caroline Corrigan <caroline.corrigan@meathcoco.ie>; Larry Whelan <larry.whelan@meathcoco.ie>
Subject: Clashford Facility - Reg.# WO265-01

Brian, Ewa,

I intend to address your letter of 1st November 2017 by this email. I have sought guidance from MCC Planning in relation to question 1.

The answers for question 1.

- The Clashford Facility is planning compliant by way of its compliance with the restoration condition of its quarry registration under QY36.
- This restoration condition does not permit the processing of C&D Waste.
- The attachment 'JSPE 173' is the compliance submission agreed with the Planning Authority which the letter dated on the 16/10 refers.

The answer for question 2.

For ease of understanding, we requested from the PH consultant (for illustration purposes) that a drawing be submitted clearly outlining the land for each Waste Facility Permit issued. Attached is 'JSPE 173 15 11 17.' We believe this drawing to be accurate. At this time, I am uncertain about the file WMP 2005/1.

The answer for question 3.

With reference to Section 55 notice issued, I attach Water Sampling Report for the recently installed well GW5 'P1317-1_0020' which does not highlight pollution. I also attach conformation of steps to access attenuation pond 'JSPE 173 L23'

We hope you find this information satisfactory and that it aids your decision making process. We would welcome a conclusion to this waste license application process as it has taken some considerable time.

Regards,

James.

****

Mr Billy Joe Padden,
Executive Planner,
Planning Department,
Meath County Council,
Buvinda House,
Dublin Road,
Navan,
Co. Meath,
C15 Y291

JSPE
J Sheils Planning & Environmental Ltd
31 Athlumney Castle, Navan, Co Meath
Phone/Fax: Ireland +353 46 9073997
Mobile: John Sheils +353 87 2730087
Email: johnsheils@jspe.ie

Date: 10th October 2017
Our Ref: JSPE_173_L25

RE: Clashford Recovery Facility Ltd – Restoration of quarry at Naul, Co. Meath.

Dear, Mr Padden,

Please find enclosed copy of restoration plan (Figure No. B.2.4, Revision E) for the quarry at Clashford, Naul, Co. Meath including area being restored in accordance with Condition No. 16 of P.A. Reg. Ref.QY36, QC 17.QC2085, which was imposed under Section 261 of the Planning and Development Act 2000, as amended. The area remaining to be restored (c. 4.7 ha) is shown dashed in Cyan. For your information we have also included a copy of Cross Sections (Figure No. B.2.5, Revision C) showing the final land profile for the restored lands.

We would be grateful if you could confirm in writing that the restoration scheme submitted for the quarry lands is to the satisfaction of Meath County Council Planning Department. We would also be grateful if Meath County Council could confirm same with the EPA with respect to the current Waste Licence Application (W0265-01).

Following on from clarification of the planning history of the site we would be grateful if Meath County Council could lift the Section 55 Notice, Environmental Order No. A02789/2017.

Please do not hesitate to contact us if you require any further information in relation to this matter.

Yours Sincerely,
For J Sheils Planning & Environmental Ltd

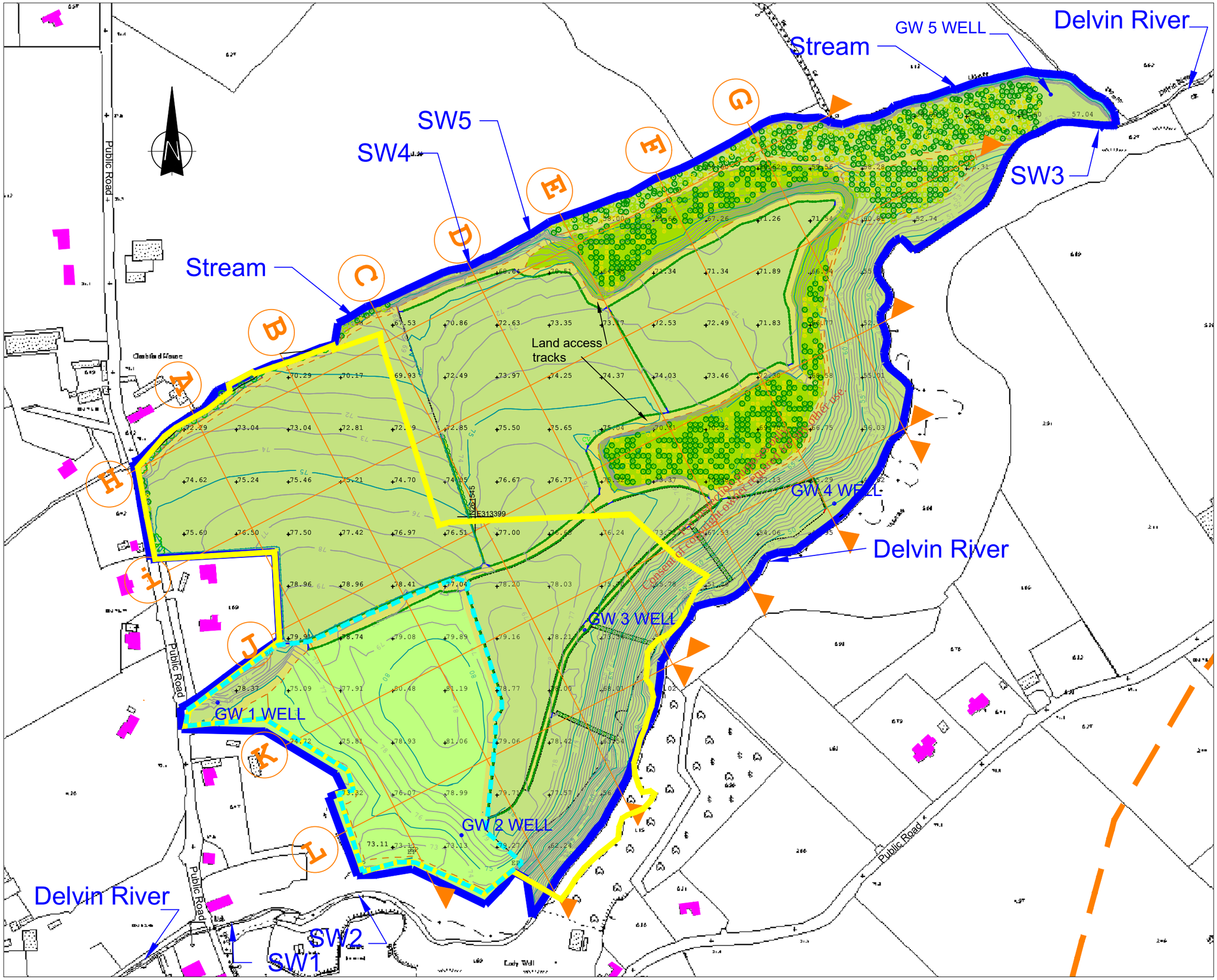
John Sheils MSCSI MRICS

Enc. Schedule of Plans, Drawings & Maps

cc. Mr James McCaldin & Larry Whelan, Environment Section

Schedule of Plans, Drawings & Maps

Figure No.	Revision	Title	Scale	Size
B 2.4	E	Site Restoration Plan	3500	A3
B 2.5	C	Cross Sections	3500	A3



- Landholding (33.4 ha)
- Section 261 Quarry Registration (P.Ref. QY36, QC 17.QC2085)
- Lands remaining to be restored (6/10/2017)
- Residences
- 500m from Site Boundary
- Restored Area
- Restored Area (Planted)
- Contours
- Spot Levels (mAOD)
- Sections
- GW 1 WELL Groundwater Monitoring
- SW Surfacewater Monitoring

Monitoring Points National Grid Coordinates

GW1 = IG Coords E313153, N261367
GW2 = IG Coords E313387, N261240
GW3 = IG Coords E313508, N261437
GW4 = IG Coords E313747, N261559
GW5 = IG Coords E313952, N261950

SW1 = IG Coords E313170, N261158
SW2 = IG Coords E313291, N261184
SW3 = IG Coords E314000, N261917
SW4 = IG Coords E313399, N261785
SW5 = IG Coords E313456, N261816

Digital Raster Extract Ordnance Survey Data 2500 mapping
OS Sheets 2649 - A & B, 2582 - C & D
NG Centre Point Coords X, Y = 313399, 261545

Scale 1:3500

0m 40m 120m

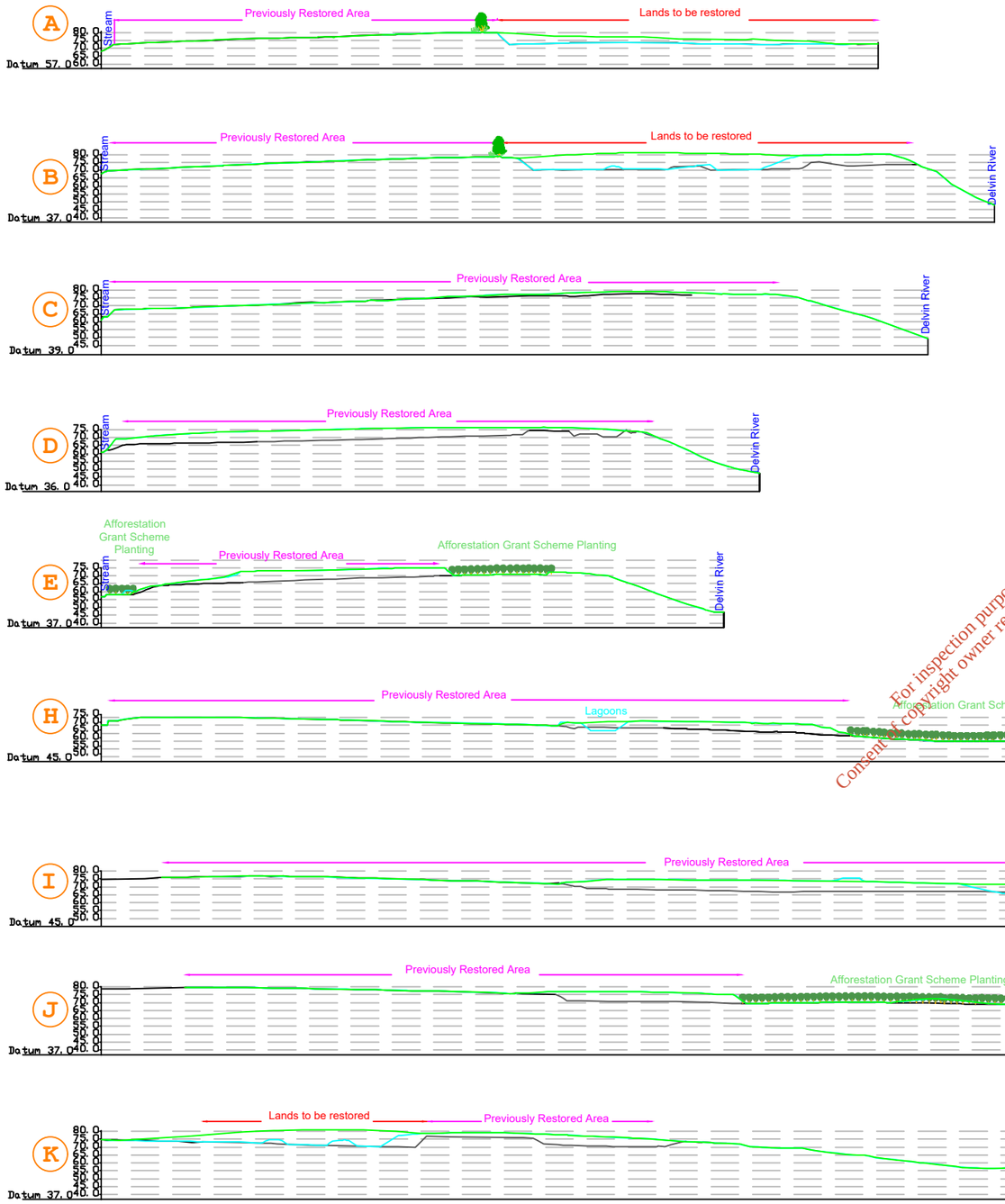
JSPE
31 Athlumney Castle,
Navan, Co Meath
Phone/Fax: 046 9073997
Mobile: John Sheils 087/ 273 0087
Email: john.sheils@jspe.ie
J SHEILS PLANNING & ENVIRONMENTAL LTD

CLIENT **Clashford Recovery Facility Ltd**

DRAWING **SITE RESTORATION PLAN**

LOCATION **NAUL TOWNLAND**
Naul, Co. Meath.

Drawn by: John Sheils	Scale: 1 /3500	
Checked by: John Sheils	Job No.: JSPE 170	
Date: 06/10/17	Figure No.: B 2.4	Rev.: E



Legend

- Final Landform Profile (mAOD)
- Existing Ground Profile (mAOD) - 2009
- Existing Ground Profile (mAOD) - 2016
- Lands to be restored

Minimum Fill Depth <1m
Maximum Fill Depth 10m
Average Fill Depth 5.4m

Scale 1:3500

JSPE
31 Athlumney Castle,
Navan, Co Meath
Phone/Fax: 046 9073997
Mobile: John Sheils 087/ 273 0087
Email: john.sheils@jspe.ie
J SHEILS PLANNING & ENVIRONMENTAL LTD

CLIENT: **Clashford Recovery Facility Ltd**

DRAWING: **CROSS SECTIONS**

LOCATION: **NAUL TOWNLAND**
Naul, Co. Meath.

Drawn by: John Sheils	Scale: 1 /3500	
Checked by: John Sheils	Job No.: JSPE 173	
Date: 06/10/17	Figure No.: B 2.5	Rev.: C

Mr James McCaldin,
Environment Section,
Meath County Council,
Buvinda House,
Dublin Road,
Navan,
Co. Meath,
C15 Y291

JSPE
J Sheils Planning & Environmental Ltd
31 Athlumney Castle, Navan, Co Meath
Phone/Fax: Ireland +353 46 9073997
Mobile: John Sheils +353 87 2730087
Email: johnsheils@jspe.ie

Date: 15th November 2017
Our Ref: JSPE_173_L27

Re: Environmental Order No. A02789/2017 (Section 55 Notice (WMA Act, 1996, as amended) - Clashford Recovery Facility, Naul, Co. Meath.

Dear Mr McCaldin,

Following on from your email of 9/11/17 please find attached details of the following information as requested. i.e.

- Details of each Waste Management Permit along with each phase clearly marked on an A3 Drawing.
- Dates of commencement and completion marked on each phase.
- Map showing actual completed infilled areas and permitted boundary

For ease of reference we have marked the various boundaries and relevant details on a copy of the Site Restoration Plan for the Quarry (Drawing No. 173_1 Attached). Details with respect to date of grant, commencement and completion of Waste Management Permits/Phases are shown (where known) in the legend.

As previously advised Phase 3 of the area relating to Waste Permit (WMP 2005/25) is the only area remaining to be restored by importation of soils and stones. This area is also within the area relating to P.A. Reg. Ref.QY36, QC 17.QC2085. As you are aware the Waste Licence application (Reg. No. W0265_01) is still under consideration by the EPA and as such the Waste Permit (WMP 2005/25) remains valid.

We trust that this addresses the matters raised. Please contact us if you require any further clarification with respect to this matter.

Yours Sincerely,
For J Sheils Planning & Environmental Ltd

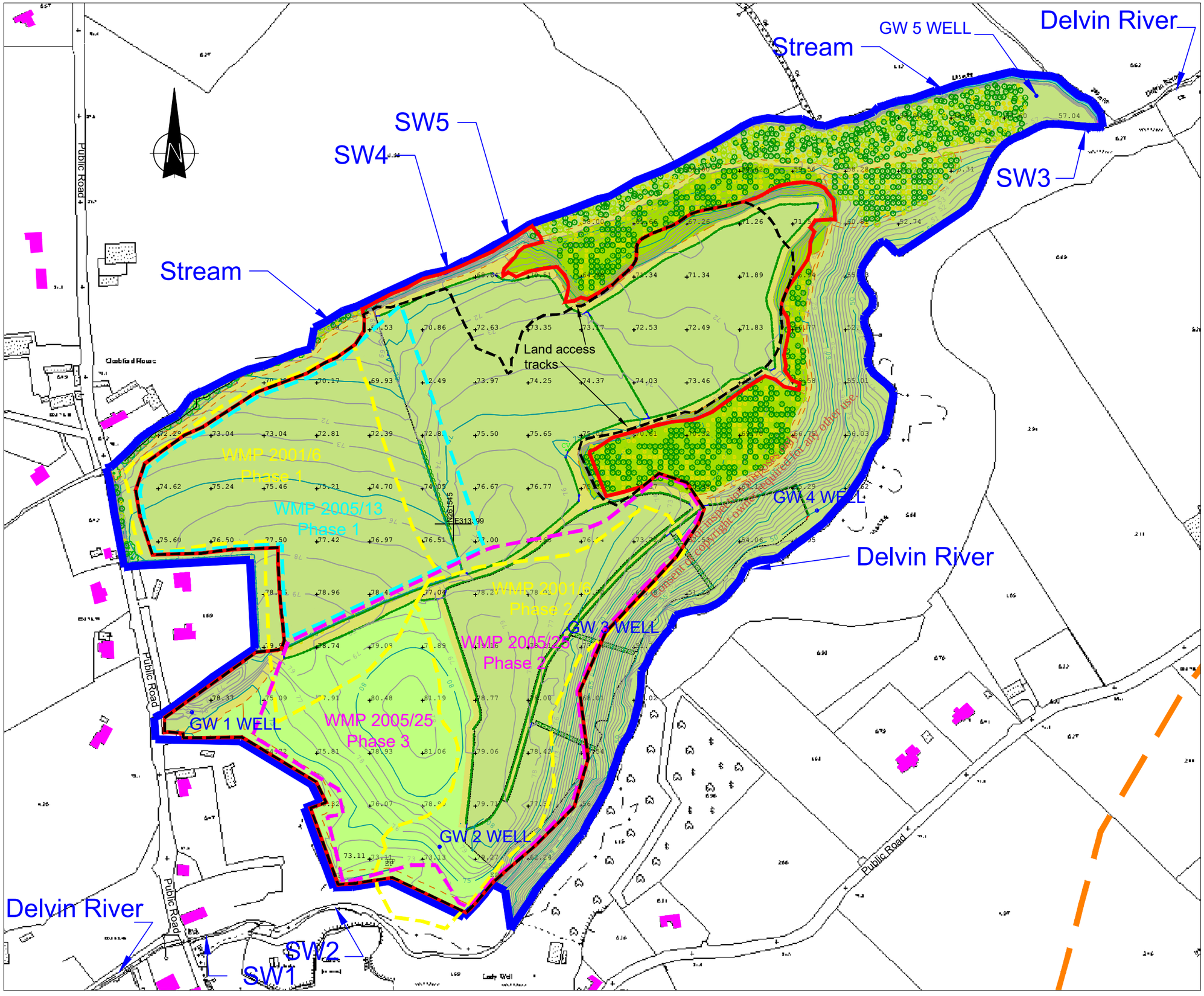
John Sheils

John Sheils MSCSI MRICS

cc. James McCaldin, Caroline Corrigan & Larry Whelan, Environment Section

Drawing No. 173_1

Site Restoration Plan showing WMP Areas



Landholding (33.4 ha)

Waste Licence Application Area (c.22.3 ha)

Waste Licence Application Area 2009 (c. 20.8 ha)

Waste Management Permit (WMP 2001/6)
Date of Grant/Commencement not known as application submitted by John Barnett & Associates on behalf of P&B Connolly (Dublin) Ltd.

Waste Management Permit (WMP 2005/13)
Granted 30/05/05
Commencement 01/06/05
Ceased by 28/02/06

Waste Management Permit (WMP 2005/25)
Granted 30/11/05
Commencement 9/12/05
Phase 2 Completed during 2011
Phase 3 to be completed (Waste Permit remains valid as Waste Licence Application W0265-01 under consideration).

Residences

500m from Site Boundary

Lands remaining to be restored (13/11/2017)

Restored Area

Restored Area (Planted)

Contours

Spot Levels (mAOD)

GW 1 WELL Groundwater Monitoring

SW Surfacewater Monitoring

Digital Raster Extract Ordnance Survey Data 2500 mapping
OS Sheets 2649 - A & B, 2582 - C & D
NG Centre Point Coords X, Y = 313399, 261545

Scale 1:3500

0m 40m 120m

JSPE
31 Athlumney Castle,
Navan, Co Meath
Phone/Fax: 046 9073997
Mobile: John Sheils 087/ 273 0087
Email: john.sheils@jspe.ie

J SHEILS PLANNING & ENVIRONMENTAL LTD

CLIENT
Clashford Recovery Facility Ltd

DRAWING
SITE RESTORATION PLAN
Showing WMP Areas

LOCATION
NAUL TOWNLAND
Naul, Co. Meath.

Drawn by: John Sheils	Scale: 1 /3500		
Checked by: John Sheils	Job No.: JSPE 170		
Date: 14/11/17	Figure No.: 173_1	Rev.: 1	

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co.Waterford
Ireland

tel: +353 (0)58 44122
fax: +353 (0)58 44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Date: 23rd October 2017
Our Ref: P1317-1_0020

Meath County Council
County Hall
Railway Street
Navan
County Meath
C15 AW81

Dear Sirs,

Re: Seasonal Water Quality Monitoring at Clashford Waste Recovery Facility, The Naul, Co. Meath

1. INTRODUCTION

Hydro-Environmental Services (HES) was requested to complete a round of surface water and groundwater sampling at Clashford Recovery Facility, The Naul, Co. Meath. A site location map is shown below as **Figure A**.

The purpose of this report is to present a description of the sampling methodologies used, and to provide presentation and interpretation of the resulting independent laboratory analytical data.

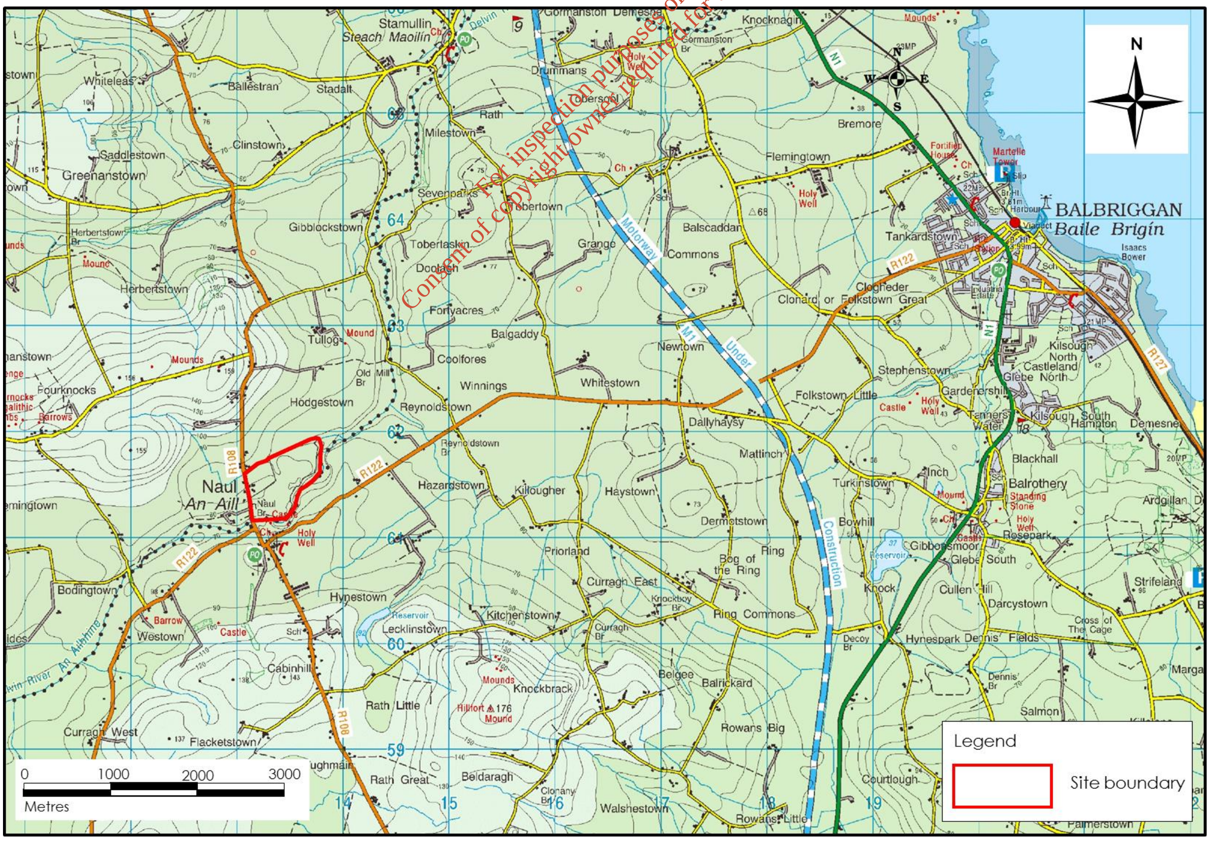


Figure A: Site Location Map

2. NEW MONITORING WELL DRILLING

A new groundwater monitoring well was installed at the site on 04th August 2017. The drilling works were completed by O'Rourke well drilling from Wexford. The drilling was completed using a truck mounted 2011 Drilltech T25KW drilling rig.

Summary details for the installed monitoring well are presented in **Table A**. A geological log for this well is attached as Appendix I.

Table A: Summary monitoring well construction details

Well ID	GW-5
Well location (ING)	E313,952, N261,950
Drilling diameter soils/subsoils	8" (200mm, from 0-11.5mbgl)
Drilling diameter in competent bedrock	6" (155mm, from 11.5-30.48 mbgl)
Total depth of well (mbgl)	30.48
Overburden depth (mbgl)	11.5
Water strikes (mbgl)	13.5 Increase in water between 20-30mbgl
Well screen/casing diameter	2" (50mm)
Grout seal interval (mbgl)	0 – 13.60
Sand plug (mbgl)	13.6-14.1
Pea gravel (mbgl)	14.1 – 30.48
2" screen interval (mbgl)	15.14 – 30.48
2" plain casing interval (mbgl)	0-15.14
Steel casing interval (mbgl)	0 - 11.69
Water level from top of plastic casing (04/08/17)	8.80
Water level from top of steel casing (12/09/17)	9.75

3. PREVIOUS WATER QUALITY DATA

Groundwater sampling was completed previously at the site in 2009 and 2014. There are no other historical water quality data available for these locations. Grid references for groundwater monitoring well locations are presented in **Table B** below, and locations are shown on **Figure B**.

GW-2, GW-3, GW-4 and GW-5 are all location down-gradient of the site, between the fill area and the Delvin River. The direction of groundwater flow at the site is from the northwest towards the southeast in the direction of the Delvin River. The exceedances of IGV values noted from 2014 data for Ammoniacal N, chloride and microbial pathogens are most likely related to land spreading of organic fertilizer at the land which was completed at that time to encourage grass growth following restoration. This issue is discussed in detail in the 2014 EIS.

ID	Easting	Northing	Location
GW-1	313,153	261,367	Up-gradient
GW-2	313,387	261,240	Down-gradient
GW-3	313,508	261,437	Down-gradient
GW-4	313,747	261,559	Down-gradient
GW-5	313,952	261,950	Down-gradient

Table B: Groundwater Monitoring Locations

In addition to these groundwater sampling events, surface water sampling from the local stream was also completed [on 08th March 2014] at locations SW1 (upstream) and SW2 (downstream). These locations are also illustrated on **Figure B.** Recent surface water samples were taken at SW-1 to SW-5 on 12th September 2017.

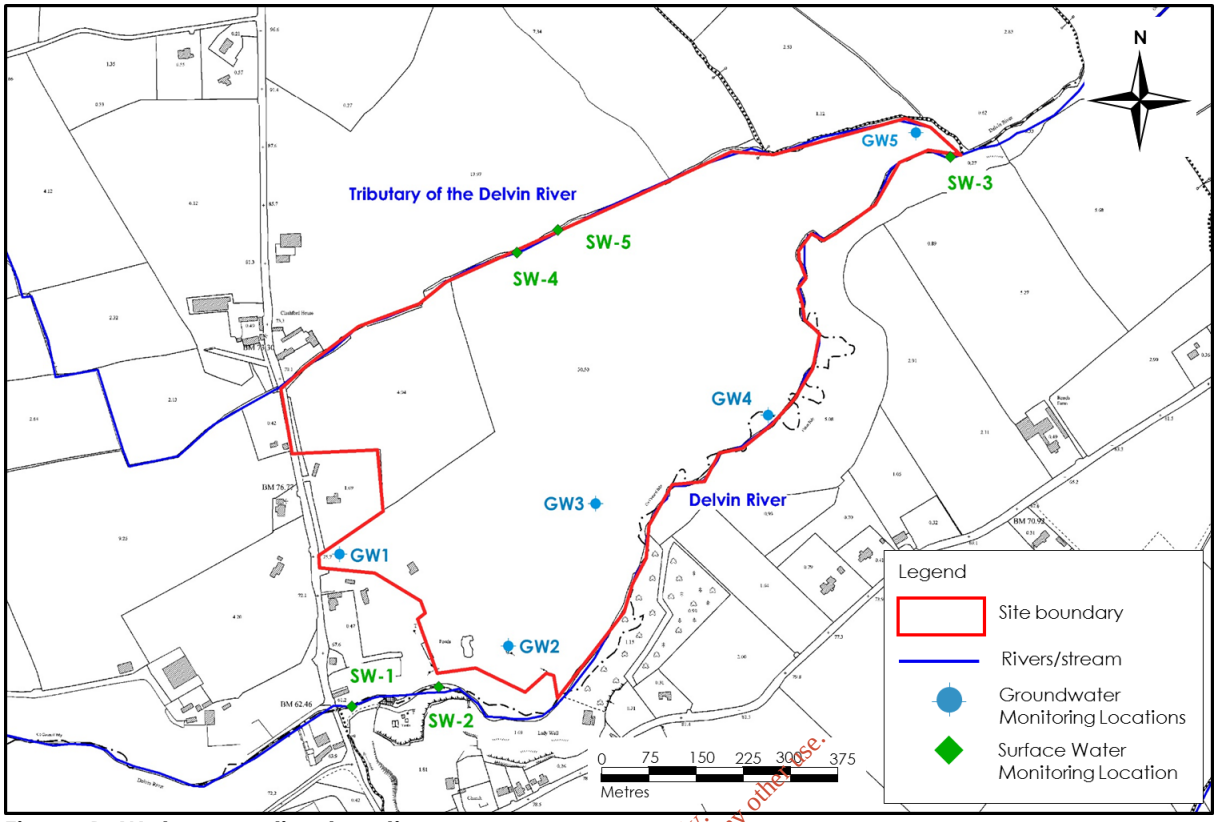


Figure B: Water sampling locations

4. SAMPLING METHODOLOGIES

The sampling methodology that was used on 12th September 2017 for both groundwater wells and surface water is outlined as follows:

- Prior to purging the well for groundwater sampling, the water level in the well was recorded using a dipper groundwater level measurement device.
- To purge the wells, a 16mm tube/piping was installed within the well casing and the top of the tubing was connected to a suction pump. The pump was operated to purge water slowly from the well.
- Purging of the wells was completed until 3 well volumes was abstracted, and until water chemistry, colour and smell had stabilised.
- Visual observations (colour) and olfactory observations (smell) were also recorded during purging/sampling.
- The pumped water was tested for standard field chemistry parameters (pH, EC, temperature, DO) to ensure they were stable before sampling was completed. The sample was taken from the end of the rising main. A calibrated YSI 556 water quality meter was used for field chemistry monitoring.
- Nitrile gloves were used at all times by personnel during the sampling.
- Water sampling was completed using the appropriate laboratory sample bottles.
- All sample bottles were labelled with the sample number, well number, site location, and date and time of sampling.
- The groundwater sample bottles were cleaned and stored in a cooler box for transport to the laboratory.
- Groundwater samples were analysed for the suite of parameters comparable to previous monitoring at the site.
- Following the groundwater sampling at each monitoring well, surface water samples were then taken. The flowing surface water was tested for the same standard field chemistry parameters as that used for the groundwater samples.

- The surface water sample bottles were cleaned and stored in a cooler box for transport to the laboratory.
- Surface water samples were analysed for the suite of parameters comparable to previous monitoring events.
- The completed laboratory Chain of Custody form (for Exova Jones Environmental, Deeside UK) were included in the sample pack that was shipped to the laboratory.
- Samples were kept cool during transport using a cooler box and ice bars.
- The samples were couriered delivered to Exova Jones Environmental by Hydro-Environmental Services on the same day as the sampling was completed.
- Exova Jones Environmental are UKAS accredited.

5. SEPTEMBER 2017 WATER SAMPLING RESULTS

5 no. surface water and 4 no. groundwater samples were taken at the subject site on 12th September 2017 and subsequently analysed against the relevant EQS's. All surface water and groundwater data are tabulated in **Appendix II** and **Appendix III** respectively [at the end of this report].

Original laboratory results for the 2017 groundwater and surface water sampling are contained in **Appendix IV.**

Groundwater results

Total Alkalinity concentrations vary between 230mg/L and 398mg/L across all sampling locations and dates and they are representative of typically conditions at the site.

Ammoniacal Nitrogen exceeded the IGV limit in GW-4 (at 0.24mg/l), however the concentration is significantly reduced compared to the two samples taken in 2014 (0.65-1.4mg/L) indicating an improvement in groundwater quality relative to the 2014 conditions.

Chloride concentrations for GW-3 (60.9mg/l), GW-4 (102.3mg/l) and GW-5 (51.3mg/l) exceed the IGV limit (30mg/l). Animal waste is a rich source of chloride and these concentration levels may indicate pollution related to slurry spreading. As discussed in Section 3, a likely source of elevated nitrogen and chloride is land spreading of organic fertilizer to aid in the revegetation process at the site. The highest chloride level detected continues to be in GW-4 but it has decreased from concentrations of 120.4mg/l and 127.9mg/l, measured in 2014, to its current concentration of 102.3mg/l.

All groundwater samples indicate the absence of any microbial pathogens or hydrocarbons in local groundwater which is an improvement on the 2014 environment where both total and faecal coliforms were detected in GW-3 and GW-4.

Manganese concentrations for all four samples exceeded the IGV limit (0.05mg/l), however manganese is a naturally occurring groundwater mineral and dissolves readily in groundwater in low dissolved oxygen conditions. It is consistently high at all locations, and is therefore considered to be naturally occurring in local bedrock.

Surface water results

A lower EC was recorded in the surface water samples, between 491 and 638µS/cm, compared to 559-938µS/cm for groundwater, suggesting a higher content of dissolved ionic salts in the groundwater wells compared to the surface water.

The surface water pH level were in the neutral range, between 7.94 and 8.03 for all surface water sample locations.

Of note are the nitrogen based parameters, which are not significantly elevated but do indicate a drop in water quality, particularly at monitoring points SW4 and SW5, relative to

unpolluted watercourses. Typically, tillage, livestock or use of fertilisers are likely sources for a high nitrogen results (both organic and inorganic) and this is feasible given the location of the sampling points and the surrounding land uses.

Runoff for agricultural land can also be responsible for increased phosphate concentrations. Similarly to the surface water nitrogen concentrations recorded, the total phosphate concentration is higher than unpolluted watercourses (0.13-0.06mg/L) but is likely to be a reflection of the agricultural land uses in the catchment.

6. CONCLUSIONS

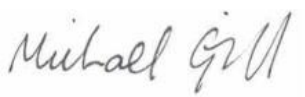
Our report conclusions are presented as follows:

- One new groundwater monitoring well (GW-5) was drilled at the Clashford site on 4th August 2017.
- Overall, both surface water and groundwater sampling results indicate an improvement in water quality at the site from 2014 to 2017, with general decreasing trend in all parameters that were reported as elevated in 2014. However, there are still elevated concentrations of certain parameters detected which are likely to relate to the use of organic fertilizers to assist in the restoration of vegetation cover at the site.
- A round of water sampling was completed on 12th September 2017. Sampling was completed to a specific methodology, and the results from independent laboratory analysis indicate the following:
    - The majority of groundwater quality parameters are within the IGV limit that demonstrate that local groundwater at the site is of relatively good quality.
    - The manganese concentration in all groundwater wells exceeded the IGV limit. This is likely to be a natural occurrence due to manganese naturally occurring in the bedrock.
    - The chloride concentration of three wells exceeded the IGV limit. This may be a result of slurry spreading on at the site to aid vegetation regeneration.
    - GW-3 contained elevated levels of potassium and GW-4 contained elevated ammoniacal nitrogen which may be attributed to the application of organic fertilizer on the site.
- A round of surface water sampling was also completed in September 2017. Sampling was completed to a specific methodology, and the results from independent laboratory analysis indicate the following:
    - Local surface water was generally of good quality, but did contain elevated nitrogen concentrations, and this is attributed to local agricultural land use. In addition, the nitrogen concentrations as measured in 2017 were significantly lower than that of the discharge point nitrogen concentration in 2014.

7. CLOSURE

I trust the above meets your current requirements. Please contact the undersigned if any further information is required.

Yours sincerely,



Michael Gill
B.A., B.A.I., M.Sc., Dip Geol, MIEI, MCIWEM

APPENDIX I
GEOLOGICAL LOG FOR MONITORING WELL GW-5

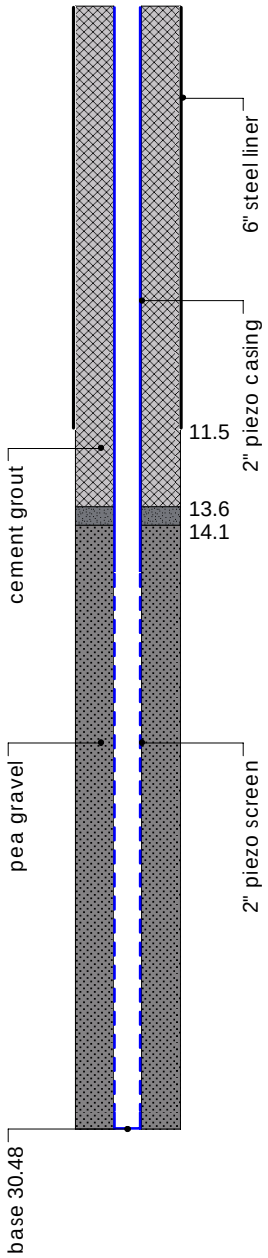
WATER WELL DRILLING LOG

WELL NUMBER: GW -5

PROJECT NUMBER: P1317-1
SITE: Clashford, The Naul, Co Meath
CLIENT: Clashford Recovery Facility Ltd
DRILLING CONTRACTOR: O Rourke Well Drilling

DATE STARTED: 04/08/2017
DATE FINISHED: 04/08/2017
LOGGED BY: M.Gill
FLUSH: Air

EASTING: 313952
NORTHING: 261950
ELEVATION:



Flush Colour	H2O Inject.	Water Strikes	Fractures	Airlift Q (gal/hr)	Comments	Elevation	Meters Below Ground Surface	Lithology	Formation Description
						0.00	0		Ground Surface
					8" drilling to 0-11.5mbgl, 6" drilling from 11.5 to30.0mbgl				MADE GROUND of grey brown, sandy gravel
					Brown flush in weathered rock				CLAY
							5		
							10		
						-11.50			Weathered siltstone bedrockwith brown water flush
		▽			water strike at 13.5mbgl		15		
						-18.30			Dark grey SILTSTONE with red and brown staining
		▽			Airlifting 500-600gph, cleaning as airlifting occuring		20		
					Softer rock between 21 and 24.4	-21.30			Dark grey SILTSTONE with red and brown staining
						-22.90			Dark grey SILTSTONE
		▽			Airlifting 800gph increase in water between 20-30mbgl		25		
						-30.48	30		Total Depth of Borehole
							35		

REMARKS:
Geosock installed over full length of well screen
water level after install - 8.80mbTOC uPVC pipe

PAGE 1 of 1

SCALE As shown

HYDRO-ENVIRONMENTAL SERVICES 22 Lower Main Street Dungarvan Co. Waterford Tel: 058-44122 Fax: 058-44244 Email: info@hydroenvironmental.ie

APPENDIX II
SURFACE WATER SAMPLE RESULT TABLES

Appendix II
Clashford Recovery Facility, The Naul, Co. Meath
Summary of 2009 and 2017 Surface Water Chemistry Data

Sample Date	Upstream	Discharge	Downstream	SW1	SW2	SW3	SW4	SW5	EQS - Surface Water mg/l	Water Guidelines		
										2009 SW Regs AA (mg/l)	2009 SW Regs MAC (mg/l)	Salmonid water regulations SI 293/1988
	13/01/2009	13/01/2009	13/01/2009	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017				
Parameters												
Alkalinity (mg/l)	220	165	220	332	324	330	256	268	-	-	-	-
Ammoniacal Nitrogen as N (mg/l)	<0.08	**0.31**	<0.08	**0.04**	**0.16**	**0.05**	**0.05**	**0.05**	0.04	0.04	0.09	1
Arsenic (mg/l)	0.001	0.0051	0.0015	<0.0025	<0.0025	<0.0025	<0.0025	0.0026	0.025	0.025	-	-
Barium (mg/l)	0.034	0.037	0.034	0.031	0.031	0.019	0.028	0.029	-	-	-	-
Boron (mg/l)	0.05	0.06	0.05	0.046	0.039	0.039	0.021	0.024	-	-	-	-
Cadmium(mg/l)	0.00027	0.00028	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00008	0.00008	0.0002	-
Calcium (mg/l)	94	109	96	118.2	116.5	118.1	86.5	87.6	-	-	-	-
Chloride (mg/l)	31	64	34	27.1	27.9	27.8	28.5	28.4	-	-	-	0.005
Chromium (mg/l)	<0.001	0.019	<0.001	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.034	0.034	-	-
Conductivity (µS/cm @ 20'C)	506	692	529	638	610	627	491	505	-	-	-	-
Copper (mg/l)	<0.05	<0.05	<0.05	<0.007	<0.007	<0.007	<0.007	<0.007	0.03	0.03	-	-
Cyanide (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	-	-
Dissolved Oxygen	11.5	11.3	11.7	9	10	10	10	10	-	-	-	50% or ≥9(mg/L)
Fluoride	<0.1	0.25	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	0.5	-	-
Iron#	0.18	0.37	0.23	0.052	0.027	0.027	0.039	0.04	-	-	-	-
Lead(mg/l)	<0.002	0.004	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	0.0072	0.0072	-	-
Magnesium (mg/l)	8	10	8	9.6	9.9	10.2	8.9	8.9	-	-	-	-
Manganese#	0.06	0.08	0.06	0.049	0.039	0.024	0.053	0.054	-	-	-	-
Mercury (mg/l)	<0.00005	<0.00005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.001	0.00005	0.00005	0.00007	-
Nickel#	<0.10	<0.10	<0.10	<0.002	<0.002	<0.002	<0.002	<0.002	0.02	0.02	-	-
Nitrate as NO3 (mg/l)	25	2	23	5.4	4.8	4.7	14.5	14.4	-	-	-	-
Nitrite as NO2 (mg/l)	<0.2	<0.2	<0.2	<0.02	**0.06**	**0.06**	<0.02	<0.02	0.05	-	-	0.05
pH	7.9	7.8	7.9	7.96	8	7.94	8.03	8	6-9	-	-	6-9
Phosphate (low Level), ortho	0.08	0.11	0.1	0.21	0.33	0.32	0.13	0.13	-	-	-	-
Phosphorus (mg/l)	0.09	0.27	0.07	**0.091**	**0.131**	**0.126**	**0.063**	**0.057**	0.025	0.045	0.025	-
Potassium (mg/l)	2	7	3	4	4.5	4.4	3.2	3.2	-	-	-	-
Residue on Evaporation @ 180'C	340	508	318	406	405	412	326	317	-	-	-	-
Selenium(mg/l)	0.0015	0.002	0.0016	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-
Silver	<0.01	0.02	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-
Sodium	14	44	17	12.2	13.8	14	14.7	14.9	-	-	-	-
Sulphate	27	151	41	36	37.6	35.1	26.4	27.9	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-
TOC	3.6	6.6	4	3	4	4	4	3	-	-	-	-
TON	5.8	0.51	5.2	1.2	1.1	1.1	3.3	3.3	-	-	-	-
Total Phenols by colourimetry	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.008	0.008	0.046	-
Zinc#	0.18	0.03	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	0.1	0.1	-	-
Faecal Coliforms (cfu/100ml)	>100	18	>100	-	-	-	-	-	-	-	-	-
Total Coliforms (ctu/100ml)	>100	>100	>100	-	-	-	-	-	-	-	-	-

'-' means no data available
bold - above EQS or water quality guidelines

APPENDIX III
GROUNDWATER SAMPLE RESULT TABLES

Appendix III
Clashford Recovery Facility, The Naul, Co. Meath
Summary of 2014 and 2017 Groundwater Chemistry Data

Sample Date	GW2	GW3	GW4	GW3	GW4	GW2	GW3	GW4	GW5	GW Interim Guideline Value mg/l (Groundwater Assessment Criteria)
Date	**05/08/2014**	**11/08/2014**	**05/08/2014**	**10/09/2014**	**10/09/2014**	**12/09/2017**	**12/09/2017**	**12/09/2017**	**12/09/2017**	
Parameters										
Total Alkalinity as CaCO3 (mg/l)	278	270	230	280	398	286	292	372	310	no abnormal change
Ammoniacal Nitrogen as NH4 (mg/l)	0.08	<0.03	**1.4**	<0.03	**0.65**	0.06	<0.03	**0.24**	0.08	0.15
Dissolved Calcium (mg/l)	90.7	119.1	109.3	102.2	169.1	78.1	130.4	147.2	101	200
Chloride (mg/l)	25	**110.1**	**120.4**	**48.6**	**127.9**	27.4	**60.9**	**102.3**	**51.3**	30
Conductivity(uS/cm @ 20'C)	629	938	1140	755	1245	559	877	938	-	1000
Dissolved Iron (mg/l)	0.028	<0.020	0.154	<0.02	**1.981**	0.188	<0.02	**4.157**	<0.02	0.2
Lead(mg/l)	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	0.01
Magnesium (mg/l)	22.9	30.7	19.5	23.6	22	19.2	30.1	17.7	17.4	50
Manganese (mg/l)	**0.455**	**0.104**	**0.937**	**0.05**	**2.683**	**0.395**	**0.064**	**2.219**	**0.052**	0.05
Nitrate (mg/l)	0.7	0.2	0.4	3	<0.2	<0.2	<0.2	2	0.5	25
Nitrite (mg/l)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	**0.15**	0.1
pH	7.72	7.62	**10.64**	7.7	7.46	-	-	-	-	>=6.5 and <=9.5
Ortho Phosphate as PO4 (mg/l)	<0.06	<0.06	<0.06	<0.06	<0.06	<0.03	<0.03	<0.03	**0.06**	0.03
Total Phosphorus (µg/l)	34	460	54	315	97	-	-	-	-	
Dissolved Potassium (mg/l)	1.9	**9.9**	**75.2**	**7.5**	5.2	1.5	**8.3**	3.1	3.7	5
Dissolved Sodium (mg/l)	20.2	26.6	94.8	21.3	70.1	18.7	23.6	35	28	150
Sulphate (mg/l)	73.97	90.82	138.27	84.88	70.39	48.6	177.4	36	44.7	200
Turbidity NTU	0.3	0.5	0.5	0.9	1.1	1.4	1.9	3.9	0.8	
EPH (C8 - C40) (µg/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	
C8 - C40 Mineral Oil (µg/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Faecal Coliforms (cfu/100ml)	0	**>100**	**20**	**10**	**30**	0	0	0	0	0 counts per 100ml
Total Coliforms (cfu/100ml)	**3**	**>100**	**600**	**40**	**97**	0	0	0	0	0 counts per 100ml

bold - exceeds IGV

APPENDIX IV
ORGINAL LABORATORY RESULT FOR 2017 SAMPLES

Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

Hydro-Environmental Services
22 Lower Main Street
Dungarvan
Co Waterford

4225

Attention :	Michael Gill
Date :	28th September, 2017
Your reference :	P1317-1
Our reference :	Test Report 17/15401 Batch 1
Location :	Clashford
Date samples received :	14th September, 2017
Status :	Final report
Issue :	1

Nine samples were received for analysis on 14th September, 2017 of which nine 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.

Compiled By:

Phil Sommerton BSc
Project Manager

Client Name: Hydro-Environmental Services
Reference: P1317-1
Location: Clashford
Contact: Michael Gill
JE Job No.: 17/15401

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	1-6	7-12	13-18	19-24	25-30	31-35	36-40	41-45	46-50		LOD/LOR	Units	Method No.
Sample ID	P1317-1-SW1	P1317-1-SW2	P1317-1-SW3	P1317-1-SW4	P1317-1-SW5	P1317-1-GW2	P1317-1-GW3	P1317-1-GW4	P1317-1-GW5				
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G				
Sample Date	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017				
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017				
Dissolved Arsenic #	<2.5	<2.5	<2.5	<2.5	2.6	<2.5	<2.5	5.3	<2.5		<2.5	ug/l	TM30/PM14
Dissolved Barium #	31	31	19	28	29	46	47	108	81		<3	ug/l	TM30/PM14
Dissolved Boron	46	39	39	21	24	32	57	26	33		<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	ug/l	TM30/PM14
Dissolved Calcium #	118.2	116.5	118.1	86.5	87.6	78.1	130.4	147.2	101.0		<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5		<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	ug/l	TM30/PM14
Total Dissolved Iron #	52	27	27	39	40	188	<20	4157	<20		<20	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/l	TM30/PM14
Dissolved Magnesium #	9.6	9.9	10.2	8.9	8.9	19.2	30.1	17.7	17.4		<0.1	mg/l	TM30/PM14
Dissolved Manganese #	49	39	24	53	54	395	64	2219	52		<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	-	-	-	-		<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2	<2	<2	<2	<2	<2	<2		<2	ug/l	TM30/PM14
Dissolved Phosphorus #	91	131	126	63	57	-	-	-	-		<5	ug/l	TM30/PM14
Dissolved Potassium #	4.0	4.5	4.4	3.2	3.2	1.5	8.3	3.1	3.7		<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3	-	-	-	-		<3	ug/l	TM30/PM14
Dissolved Silver	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/l	TM30/PM14
Dissolved Sodium #	12.2	13.8	14.0	14.7	14.9	18.7	23.6	35.0	28.0		<0.1	mg/l	TM30/PM14
Dissolved Zinc #	<3	<3	<3	<3	<3	<3	<3	<3	17		<3	ug/l	TM30/PM14
Total Phosphorus	-	-	-	-	-	35	41	52	62		<5	ug/l	TM30/PM14
EPH (C8-C40) #	-	-	-	-	-	<10	<10	<10	<10		<10	ug/l	TM5/PM30
C8-C40 Mineral Oil (Calculation)	-	-	-	-	-	<10	<10	<10	<10		<10	ug/l	TM5/PM30
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-		<0.01	mg/l	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	-	-		<0.3	mg/l	TM173/PM0
Sulphate as SO4 #	36.0	37.6	35.1	26.4	27.9	48.6	177.4	36.0	44.7		<0.5	mg/l	TM38/PM0
Chloride #	27.1	27.9	27.8	28.5	28.4	27.4	60.9	102.3	51.3		<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	5.4	4.8	4.7	14.5	14.4	<0.2	<0.2	2.0	0.5		<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	0.06	0.06	<0.02	<0.02	<0.02	<0.02	0.04	0.15		<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4	0.21	0.33	0.32	0.13	0.13	<0.03	<0.03	<0.03	0.06		<0.03	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	1.2	1.1	1.1	3.3	3.3	<0.2	<0.2	0.5	<0.2		<0.2	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-		<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N #	0.04	0.16	0.05	0.05	0.05	-	-	-	-		<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	-	-	-	-	-	0.06	<0.03	0.24	0.08		<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	332	324	330	256	268	286	292	372	310		<1	mg/l	TM75/PM0
Dissolved Oxygen	9	10	10	10	10	-	-	-	-		<1	mg/l	TM59/PM0
Electrical Conductivity @25C #	638	610	627	491	505	559	877	938	<2		<2	uS/cm	TM76/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Hydro-Environmental Services
Reference: P1317-1
Location: Clashford
Contact: Michael Gill
JE Job No.: 17/15401

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

J E Sample No.	1-6	7-12	13-18	19-24	25-30	31-35	36-40	41-45	46-50		LOD/LOR	Units	Method No.
Sample ID	P1317-1-SW1	P1317-1-SW2	P1317-1-SW3	P1317-1-SW4	P1317-1-SW5	P1317-1-GW2	P1317-1-GW3	P1317-1-GW4	P1317-1-GW5				
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G				
Sample Date	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017	12/09/2017				
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017	14/09/2017				
pH #	7.96	8.00	7.94	8.03	8.00	-	-	-	-		<0.01	pH units	TM73/PM0
Total Organic Carbon #	3	4	4	4	3	<2	2	3	<2		<2	mg/l	TM60/PM0
Total Solids #	406	405	412	326	317	-	-	-	-		<5	mg/l	TM20/PM0
Turbidity	-	-	-	-	-	1.4	1.9	3.9	0.8		<0.1	NTU	TM34/PM0
Total Cations	7.32	7.34	7.45	5.77	-	6.33	10.22	10.40	7.79		<0.00	mmolc/l	TM30/PM14
Total Anions	8.24	8.13	8.19	6.71	-	7.50	11.25	11.11	8.58		<0.00	mmolc/l	TM0/PM0
% Cation Excess	-5.91	-5.11	-4.73	-7.53	-	-8.46	-4.80	-3.30	-4.83			%	TM0/PM0

Client Name: Hydro-Environmental Services

Reference: P1317-1

Location: Clashford

Contact: Michael Gill

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
17/15401	1					Liquid Samples were received at a temperature above 9°C.

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

JE Job No.: 17/15401

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. 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.

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

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

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.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) 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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental 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

JE Job No: 17/15401

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
TM0	Not available	PM0	No preparation is required.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM34	Turbidity by 2100P Turbidity Meter	PM0	No preparation is required.				
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.				
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			

JE Job No: 17/15401

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
TM59	Determination of Dissolved Oxygen using the Hach HQ30D Oxygen Meter	PM0	No preparation is required.				
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.				

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Report No: HYDR-474120917
Document No: EF0011

CERTIFICATE OF ANALYSIS

Client **Hydro Environmental Services**
22 Lower Main Street
Dungarvan
Co. Waterford

Date Received 12/09/2017
Date Reported 13/09/2017
Order Number N/A

For the Attention of: Hydro Environmental Services

Sample Reception 4 sample(s) received in good condition.

Comments N/A

Note: A # next to the result indicates that there was insufficient sample to carry out testing as per SOP .

Report Authorised by: Olwen Maher

Olwen Maher
Deputy Microbiology Manager

Conditions:
1. *Results in this report relate only to the items tested*
2. *Reports may not be reproduced except in full without the approval of ALS Life Sciences Ltd*
3. *All queries regarding this report should be addressed to the Technical Manager at the above address*
4. *A * next to a method reference signifies that ALS Life Sciences Ltd is NOT INAB accredited for this method*
5. *Results reported as CFU/cm^2 are calculated based on information supplied by customer regarding area swabbed*
6. *CFU indicates Colony Forming Units, MPN indicates Most Probable Number*
7. SUBCON* indicates analysis subcontracted to approved subcontractors who do not hold accreditation for this test
8. SUBCON^ indicates analysis subcontracted to approved subcontractors who hold accreditation for this test

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Report No: HYDR-474120917
Document No: EF0011

CERTIFICATE OF ANALYSIS

Date Received 12/09/2017
Date Reported 13/09/2017
Order Number N/A

Sample Type Water
Client ID P1317-1 - GW2 Date sampled: 12.09.2017 @ 11.00am
Date Tested 12/09/2017
ALS ID 2819365

Test	Result	Unit	Method
Coliforms	0	MPN/100ml	SP 196 Based on ISO 9308-2 (2012)
Faecal coliforms	0	MPN/100ml	SP 200 based on the IDEXX Colilert 18 test kit.

Sample Type Water
Client ID P1317-1 - GW3 Date sampled: 12.09.2017 @ 11.00am
Date Tested 12/09/2017
ALS ID 2819366

Test	Result	Unit	Method
Coliforms	0	MPN/100ml	SP 196 Based on ISO 9308-2 (2012)
Faecal coliforms	0	MPN/100ml	SP 200 based on the IDEXX Colilert 18 test kit.

Sample Type Water
Client ID P1317-1 - GW4 Date sampled: 12.09.2017 @ 11.00am
Date Tested 12/09/2017
ALS ID 2819367

Test	Result	Unit	Method
Coliforms	0	MPN/100ml	SP 196 Based on ISO 9308-2 (2012)
Faecal coliforms	0	MPN/100ml	SP 200 based on the IDEXX Colilert 18 test kit.

Sample Type Water
Client ID P1317-1 - GW5 Date sampled: 12.09.2017 @ 11.00am
Date Tested 12/09/2017
ALS ID 2819368

Test	Result	Unit	Method
Coliforms	0	MPN/100ml	SP 196 Based on ISO 9308-2 (2012)
Faecal coliforms	0	MPN/100ml	SP 200 based on the IDEXX Colilert 18 test kit.

Report Authorised by: Olwen Maher

Olwen Maher
Deputy Microbiology Manager

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JSPE
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31 Athlumney Castle, Navan, Co Meath
Phone/Fax: Ireland +353 46 9073997
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Email: johnsheils@jspe.ie

Date: 25th August 2017
Our Ref: JSPE 173_L23
Your Ref: A02789/2017/ WM20/2017

Re: Environmental Order No. A02789/2017 (Section 55 Notice (WMA Act, 1996, as amended) - Clashford Recovery Facility, Naul, Co. Meath.

Dear Mr. Whelan,

Following on from our previous response of 18th August 2017, we wish to provide the following up date with respect to progress on site.

We wish to confirm that our client has now completed the installation of steps and handrails to form access to the monitoring point at the attenuation pond as agreed on site by EPA/ Meath County Council staff with the Permit Holder.

Details with respect to the steps and additional borehole installation are shown by the attached photographs.

As per our previous corespondence we would be grateful if you could expedite the necessary arrangements regarding a meeting with your colleagues in Planning and Environment and contact us next week with respect to same.

Yours Sincerely,
For J Sheils Planning & Environmental Ltd,

John Sheils MSCSI MRICS

cc. Mr Larry Whelan, SEO, Environment
cc. Mr Billy Joe Padden, Exec. Planner

Photograph 1: Installation of steps and handrails to form access to the monitoring point

Photograph 2: Groundwater Monitoring Well Installation, The Naul, Clashford, Co. Meath.