Inchamore Wind Farm
Inchamore, Co. Cork / Co. Kerry

App 8.1 - App A2 (01) SI - Peat Depth - Tile 1

Legend

Development Layout

WF
- Red Line 23
- 230313 Site Layout
- Turbine Locations
- Proposed Met Mast
- Watercourse Crossings
- Proposed On-Site Substation

UGC
- Inchamore Grid Connection Route

Geology

3188-A2-IWF Peat Depth Probe Data
- 0.0 - 0.1m
- 0.1 - 0.5m
- 0.5 - 2.0m
- 2.0 - 3.5m

Base Maps

Bing Aerial

OpenStreetMap

Project ID:604162 Inchamore Wind Farm
Projection:ITM
Drawn by: Sven K.
Reviewed by: Sven K.
Version: 21/09/2022

References/Sources:
Environmental Protection Agency (EPA)
Geological Services Ireland (GSI)
Bing Aerial / GeoHive / Open Street Map / Google Roads
GDEM Elevation Contours
Phase 1 (250m Grid Peat Depth - Greensource

Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Scale: 0 0.076 0.152 km

RSK

T1
T2
T3
Met Mast
WC1
WC2
Substation

N

6 JUN 2023

T1 T5
T2 T4

Inchamore Wind Farm
Inchamore, Co. Cork / Co. Kerry

App 8.1 - App A2 (01) SI - Peat Depth - Tile 2

Legend

Development Layout

WF
- Red Line 23
- 230313 Site Layout
- Turbine Locations
- Watercourse Crossings
- Proposed Borrow Pits
- Borrow Pit
- Proposed On-Site Substation

UGC
- Inchamore Grid Connection Route

Geology

3188-A2-1WF Peat Depth Probe Data
- 0.0 - 0.1m
- 0.1 - 0.5m
- 0.5 - 2.0m

Base Maps

Bing Aerial

OpenStreetMap

Project ID:604162 Inchamore Wind Farm
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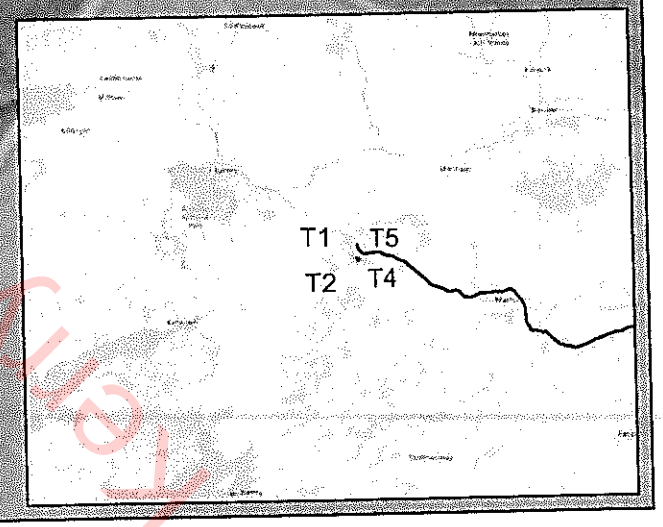
Phase 1 (250m Grid Peat Depth - Greensource

Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Scale: 0 0.076 0.152 km

RSK

T4
T5
WC3
Borrow Pit
N



Appendix B

SI Appendix B - Peat & Subsoil Survey Database

Inchamore WF, Co. Cork

ared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

Peat & Slope Stability Risk Assessment

$FoS = \frac{c'}{\gamma z \sin\alpha \cos\alpha}$ (FoS RAW)

$FoS = \frac{c'}{\gamma z \sin\alpha \cos\alpha} + \text{Adjustment Value}$ (FoS ADJ)

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note	Parameter Values: Slope Angle α (Degrees)	Slope Angle (For Excel Formula) α (Radians)	Undrained Shear Strenght (Conservative Value) c' (kPa)	Bulk Unit weight of Peat (Conservative Value) γ (kN/m3)	Scenario A: Depth to failure plane i.e. Peat Depth z (m)	Scenario B: Surcharge Equivalent Placed Fill Depth i.e. +1m z (m)	Scenario A: FoS RAW Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Scenario B: FoS RAW Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	FoS Adjustment Coefficient μ	FoS Adjustment Value #	Scenario A: FoS ADJ Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Scenario B: FoS ADJ Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Significant Feature Ranking Cefficient μSF	Scenario A: RR SF Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors RR-SF	COEFFICIENT μ	Scenario B: RR SF Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors RR-SF	COEFFICIENT μ	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient μDist	RR D Risk Ranking Acounting for Distance to Sensitive Receptors RR-D	Risk Category	RR D Risk Ranking Acounting for Distance to Sensitive Receptors RR-D	Risk Category
Depth Probe	DP001	T1	512342.945	578329.888	0.1	B - Very Shallow (0.01-0.5m)	5.76569		5.76569	0.10063	3.5	11	0.10	1.10	31.83	1.0	2.89	1.0	2.0	0.0	31.83	1.0	2.89	1.0	2.0	2.0	1.0	2.0	1.0	420.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP002	T1	512346.945	578342.885	0.1	B - Very Shallow (0.01-0.5m)	5.76569		5.76569	0.10063	3.5	11	0.10	1.10	31.83	1.0	2.89	1.0	2.0	0.0	31.83	1.0	2.89	1.0	2.0	2.0	1.0	2.0	1.0	419.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP003	T1	512380.938	579012.87	0.2	B - Very Shallow (0.01-0.5m)	2.54332		2.54332	0.044389	3.5	11	0.20	1.20	35.89	1.0	5.98	1.0	2.0	0.0	35.89	1.0	5.98	1.0	2.0	2.0	1.0	2.0	1.0	414.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP004	T1	512388.935	578941.885	0.1	B - Very Shallow (0.01-0.5m)	5.89515		5.89515	0.10289	3.5	11	0.10	1.10	31.14	1.0	2.83	1.0	2.0	0.0	31.14	1.0	2.83	1.0	2.0	2.0	1.0	2.0	1.0	379.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP005	T1	512395.934	578926.883	0.1	B - Very Shallow (0.01-0.5m)	10.09382	Rocky outcrop east west steep incline	10.09382	0.17617	3.5	11	0.10	1.10	18.44	1.0	1.68	1.0	2.0	0.0	18.44	1.0	1.68	1.0	2.0	2.0	1.0	2.0	1.0	368.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP006	T1	512401.932	578848.905	0.7	C - Shallow (0.5-2.0m)	6.0615	Cut peat. Photo 11 50	6.0615	0.105793	3.5	11	0.70	1.70	4.33	1.0	1.78	1.0	2.0	0.0	4.33	1.0	1.78	1.0	2.0	2.0	1.0	2.0	1.0	348.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP007	T1	512411.931	578971.879	0.6	C - Shallow (0.5-2.0m)	2.61166		2.61166	0.045582	3.5	11	0.60	1.60	11.65	1.0	4.37	1.0	2.0	0.0	11.65	1.0	4.37	1.0	2.0	2.0	1.0	2.0	1.0	368.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP008	T1	512440.923	578785.918	2.1	D - Moderately Deep (2.0-3.5m)	4.97205		4.97205	0.086779	3.5	11	2.10	3.10	1.75	1.0	1.18	2.0	2.0	0.0	1.75	1.0	1.18	2.0	2.0	2.0	1.0	4.0	2.0	311.5	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP009	T1	512447.913	578987.875	1	C - Shallow (0.5-2.0m)	3.12206		3.12206	0.05449	3.5	11	1.00	2.00	5.85	1.0	2.93	1.0	2.0	0.0	5.85	1.0	2.93	1.0	2.0	2.0	1.0	2.0	1.0	343.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP010	T1	512458.921	579048.862	0.0001	A - Rock (0.0m)	0.87893	Rock	0.87893	0.01534	3.5	11	0.00	1.00	207449.24	1.0	20.74	1.0	2.0	0.0	207449.24	1.0	20.74	1.0	2.0	2.0	1.0	2.0	1.0	357.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP011	T1	512465.919	579020.866	1.2	C - Shallow (0.5-2.0m)	0.87893	Rocky adjacent	0.87893	0.01534	3.5	11	1.20	2.20	17.29	1.0	9.43	1.0	2.0	0.0	17.29	1.0	9.43	1.0	2.0	2.0	1.0	2.0	1.0	348.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP012	SITE	512466.462	578343.316	0.2	B - Very Shallow (0.01-0.5m)	6.63083		6.63083	0.11573	3.5	11	0.20	1.20	13.87	1.0	2.31	1.0	2.0	0.0	13.87	1.0	2.31	1.0	2.0	2.0	1.0	2.0	1.0	507.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP013	SITE	512508.746	578204.739	0.4	B - Very Shallow (0.01-0.5m)	8.10263		8.10263	0.141418	3.5	11	0.40	1.40	5.70	1.0	1.63	1.0	2.0	0.0	5.70	1.0	1.63	1.0	2.0	2.0	1.0	2.0	1.0	518.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP014	T1	512513	579076	1.1	C - Shallow (0.5-2.0m)	2.52049		2.52049	0.043991	3.5	11	1.10	2.10	6.58	1.0	3.45	1.0	2.0	0.0	6.58	1.0	3.45	1.0	2.0	2.0	1.0	2.0	1.0	345.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP015	T1	512521.906	578733.929	0.0001	A - Rock (0.0m)	6.05489	Rock	6.05489	0.105678	3.5	11	0.00	1.00	30334.02	1.0	3.03	1.0	2.0	0.0	30334.02	1.0	3.03	1.0	2.0	2.0	1.0	2.0	1.0	245.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP016	T1	512524	579140	0.0001	A - Rock (0.0m)	2.08887	Rock	2.08887	0.036458	3.5	11	0.00	1.00	87351.72	1.0	8.73	1.0	2.0	0.0	87351.72	1.0	8.73	1.0	2.0	2.0	1.0	2.0	1.0	397.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP017	T1	512528	579008	0.0001	A - Rock (0.0m)	4.37171	Rock	4.37171	0.076301	3.5	11	0.00	1.00	41863.31	1.0	4.19	1.0	2.0	0.0	41863.31	1.0	4.19	1.0	2.0	2.0	1.0	2.0	1.0	287.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP018	T1	512533	579036	0.0001	A - Rock (0.0m)	3.27531	Rock	3.27531	0.057165	3.5	11	0.00	1.00	55781.75	1.0	5.58	1.0	2.0	0.0	55781.75	1.0	5.58	1.0	2.0	2.0	1.0	2.0	1.0	288.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP019	T1	512532	579219	2.1	D - Moderately Deep (2.0-3.5m)	4.90234		4.90234	0.085562	3.5	11	2.10	3.10	1.78	1.0	1.21	2.0	2.0	0.0	1.78	1.0	1.21	2.0	2.0	2.0	1.0	4.0	2.0	450.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP020	SITE	512542.156	578444.87	0.5	B - Very Shallow (0.01-0.5m)	10.08572		10.08572	0.176028	3.5	11	0.50	1.50	3.69	1.0	1.23	2.0	2.0	0.0	3.69	1.0	1.23	2.0	2.0	2.0	1.0	4.0	2.0	383.4	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP021	T1	512543	579001	0.0001	A - Rock (0.0m)	3.35734	Rock	3.35734	0.058597	3.5	11	0.00	1.00	54424.85	1.0	5.44	1.0	2.0	0.0	54424.85	1.0	5.44	1.0	2.0	2.0	1.0	2.0	1.0	271.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP022	SITE	512543.901	578712.934	1.4	C - Shallow (0.5-2.0m)	3.67259	Rocky adjacent	3.67259	0.064099	3.5	11	1.40	2.40	3.56	1.0	2.07	1.0	2.0	0.0	3.56	1.0	2.07	1.0	2.0	2.0	1.0	2.0	1.0	234.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP023	T1	512544	579108	2.6	D - Moderately Deep (2.0-3.5m)	2.00689		2.00689	0.035027	3.5	11	2.60	3.60	3.50	1.0	2.53	1.0	2.0	0.0	3.50	1.0	2.53	1.0	2.0	2.0	1.0	2.0	1.0	350.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP024	T1	512545	579027	2.8	D - Moderately Deep (2.0-3.5m)	2.39487		2.39487	0.041798	3.5	11	2.80	3.80	2.72	1.0	2.01	1.0	2.0	0.0	2.72	1.0	2.01	1.0	2.0	2.0	1.0	2.0	1.0	287.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP025	T1	512548.902	579095.851	1.5	C - Shallow (0.5-2.0m)	2.00689	Rocky adjacent photo	2.00689	0.035027	3.5	11	1.50	2.50	6.06	1.0	3.64	1.0	2.0	0.0	6.06	1.0	3.64	1.0	2.0	2.0	1.0	2.0	1.0	337.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP026	T1	512550	579167	2.5	D - Moderately Deep (2.0-3.5m)	1.48867		1.48867	0.025982	3.5	11	2.50	3.50	4.90	1.0	3.50	1.0	2.0	0.0	4.90	1.0	3.50	1.0	2.0	2.0	1.0	2.0	1.0	391.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP027	T1	512550	579019	2.2	D - Moderately Deep (2.0-3.5m)	3.35734		3.35734	0.058597	3.5	11	2.20	3.20	2.47	1.0	1.70	1.0	2.0	0.0	2.47	1.0	1.70	1.0	2.0	2.0	1.0	2.0	1.0	278.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP028	T1	512554	579029	3	D - Moderately Deep (2.0-3.5m)	2.39487		2.39487	0.041798	3.5	11	3.00	4.00	2.54	1.0	1.91	1.0	2.0	0.0	2.54	1.0	1.91	1.0	2.0	2.0	1.0	2.0	1.0	282.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP029	T1	512556.9	579007.851	2.5	D - Moderately Deep (2.0-3.5m)	2.00689	Rocky adjacent photo	2.00689	0.035027	3.5	11	2.50	3.50	3.64	1.0	2.60	1.0	2.0	0.0	3.64	1.0	2.60	1.0	2.0	2.0	1.0	2.0	1.0	334.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP030	T1	512569	579056	3	D - Moderately Deep (2.0-3.5m)	4.10768		4.10768	0.071693	3.5	11	3.00	4.00	1.48	1.0	1.11	2.0	2.0	0.0	1.48	1.0	1.11	2.0	2.0	2.0	1.0	4.0	2.0	293.5	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP031	T1	512570	579177	2.1	D - Moderately Deep (2.0-3.5m)	1.88168		1.88168	0.032842	3.5	11	2.10	3.10	4.62	1.0	3.13	1.0	2.0	0.0	4.62	1.0	3.13	1.0	2.0	2.0	1.0	2.0	1.0	395.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP032	T1	512580	579018	0.1	B - Very Shallow (0.01-0.5m)	7.22121		7.22121	0.126034	3.5	11	0.10	1.10	25.52	1.0	2.32	1.0	2.0	0.0	25.52	1.0	2.32	1.0	2.0	2.0	1.0	2.0	1.0	257.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP033	T1	512583	579002	1.1	C - Shallow (0.5-2.0m)	7.22121		7.22121	0.126034	3.5	11	1.10	2.10	2.32	1.0	1.22	2.0	2.0	0.0	2.32	1.0	1.22	2.0	2.0	2.0	1.0	4.0	2.0	243.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP034	T1	512591	578975	0.0001	A - Rock (0.0m)	6.88087	Rocky adjacent	6.88087	0.120094	3.5	11	0.00	1.00	26750.90	1.0	2.67	1.0	2.0	0.0	26750.90	1.0	2.67	1.0	2.0	2.0	1.0	2.0	1.0	218.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP035	SITE	512591.89	578663.944	1.2	C - Shallow (0.5-2.0m)	5.14745	Rocky adjacent	5.14745	0.08984	3.5	11	1.20	2.20	2.97	1.0	1.62	1.0	2.0	0.0	2.97	1.0	1.62	1.0	2.0	2.0	1.0	2.0	1.0	218.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP036	T1	512594	579134	1.1	C - Shallow (0.5-2.0m)	1.44436		1.44436	0.025209	3.5	11	1.10	2.10	11.48	1.0	8.01	1.0	2.0	0.0	11.48	1.0	8.01	1.0	2.0	2.0	1.0	2.0	1.0	346.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP037	SITE	512610.753	578641.295	0.0001	A - Rock (0.0m)	7.67632		7.67632	0.133977	3.5	11	0.00	1.00	24035.57	1.0	2.40	1.0	2.0	0.0	24035.57	1.0	2.40	1.0	2.0	2.0	1.0	2.0	1.0	213.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP038	T1	512614	579091	2.5	D - Moderately Deep (2.0-3.5m)	4.16378		4.16378	0.072672	3.5	11	2.50	3.50	1.76	1.0	1.26	2.0	2.0	0.0	1.76	1.0	1.26	2.0	2.0	2.0	1.0	4.0	2.0	298.8	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP039	SITE	512622.547	578532.831	0.8	C - Shallow (0.5-2.0m)	8.54745		8.54745	0.149181	3.5	11	0.80	1.80	2.71	1.0	1.20	2.0	2.0	0.0	2.71	1.0	1.20	2.0	2.0	2.0	1.0	4.0	2.0	265.2	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP040	SITE	512632.938	578538.051	0.2	B - Very Shallow (0.01-0.5m)	9.23341		9.23341	0.161153	3.5	11	0.20	1.20	10.05	1.0	1.67	1.0	2.0	0.0	10.05	1.0	1.67	1.0	2.0	2.0	1.0	2.0	1.0	253.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP041	T1	512635	579052	2	C - Shallow (0.5-2.0m)	3.50155		3.50155	0.061148	3.5	11	2.00	3.00	2.61	1.0	1.74	1.0	2.0	0.0	2.61	1.0	1.74	1.0	2.0	2.0	1.0	2.0	1.0	254.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP042	SITE	512636.010	578210.109	0.1	B - Very Shallow (0.01-0.5m)	9.20516		9.20516	0.16066	3.5	11	0.10	1.10	20.15	1.0	1.83	1.0	2.0	0.0	20.15	1.0	1.83	1.0	2.0	2.0	1.0	2.0	1.0	479.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP043	T1	512645	579030	0.0001	A - Rock (0.0m)	4.87526	Rock	4.87526	0.085089	3.5	11	0.00	1.00	37574.96	1.0	3.76	1.0	2.0	0.0	37574.96	1.0	3.76	1.0	2.0	2.0	1.0	2.0	1.0	230.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP044	T1	512651	579011	0.2	B - Very Shallow (0.01-0.5m)	5.95167		5.95167	0.103876	3.5	11	0.20	1.20	15.43	1.0	2.57	1.0	2.0	0.0	15.43	1.0	2.57	1.0	2.0	2.0	1.0	2.0	1.0	210.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP045	SITE	512655.487	578646.68	0.0001	A - Rock (0.0m)	7.72005	Rock	7.72005	0.13474	3.5	11	0.00	1.00	23902.71	1.0	2.39	1.0	2.0	0.0	23902.71	1.0	2.39	1.0	2.0	2.0	1.0	2.0	1.0	173.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP046	T1	512657	579131	1.4	C - Shallow (0.5-2.0m)	4.51586		4.51586	0.078817	3.5	11	1.40	2.40	2.90	1.0	1.69	1.0	2.0	0.0	2.90	1.0	1.69	1.0	2.0	2.0	1.0	2.0	1.0	315.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP047	T1	512657	579131	1.1	C - Shallow (0.5-2.0m)	4.51586		4.51586	0.078817	3.5	11	1.100	2.10	3.69	1.0	1.83	1.0	2.0	0.0	3.69	1.0	1.83	1.0	2.0	2.0	1.0	2.0	1.0	315.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP048	T1	512657.878	579097.85	1.2	C - Shallow (0.5-2.0m)	4.63283		4.63283	0.080858	3.5	11	1.20	2.20	3.29	1.0	1.80	1.0	2.0	0.0	3.29	1.0	1.80	1.0	2.0	2.0	1.0	2.0	1.0	287.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP049	T1	512671	578968	0.0001	A - Rock (0.0m)	8.54413	Rock	8.54413	0.149123	3.5	11	0.00	1.00	21656.48	1.0	2.17	1.0	2.0	0.0	21656.48	1.0	2.17	1.0	2.0	2.0	1.0	2.0	1.0	163.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP050	SITE	512686	579093	1	C - Shallow (0.5-2.0m)	6.01069		6.01069	0.104906	3.5	11	1.00	2.00	3.06	1.0	1.53	1.0	2.0	0.0	3.06	1.0	1.53	1.0	2.0	2.0	1.0	2.0	1.0	267.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP051	T2	512689.869	578676.941	0.3	B - Very Shallow (0.01-0.5m)	9.62354	Rocky adjacent	9.62354	0.167962	3.5	11	0.30	1.30	6.43	1.0	1.48	1.0	2.0	0.0	6.43	1.0	1.48	1.0	2.0	2.0	1.0	2.0	1.0	127.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP052	T2	512707.055	578640.467	0.0001	A - Rock (0.0m)	8.58034		8.58034	0.149755	3.5	11	0.00	1.00	21567.82	1.0	2.16	1.0	2.0	0.0	21567.82	1.0	2.16	1.0	2.0	2.0	1.0	2.0	1.0	133.1	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP053	SITE	512722	579066	0.95	C - Shallow (0.5-2.0m)	6.02249		6.02249	0.105112	3.5	11	0.95	1.95	3.21	1.0	1.56	1.0	2.0	0.0	3.21	1.0	1.56	1.0	2.0	2.0	1.0	2.0	1.0	226.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP054	SITE	512730	578854	0.1	B - Very Shallow (0.01-0.5m)	8.59535		8.59535	0.150017	3.5	11	0.10	1.10	21.53	1.0	1.96	1.0	2.0	0.0	21.53	1.0	1.96	1.0	2.0	2.0	1.0	2.0	1.0	35.2	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
Depth Probe	DP055	SITE	512757	579021	1.1	C - Shallow (0.5-2.0m)	10.02816		10.02816	0.175024	3.5	11	1.10	2.10	1.69	1.0	0.88	4.0	2.0	0.0	1.69	1.0	0.88	4.0	2.0	2.0	1.0	8.0	4.0	170.6	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
Depth Probe	DP056	T2	512772.851	578615.953	0.0001	A - Rock (0.0m)	9.15998	Rock	9.15998	0.159872	3.5	11	0.00	1.00	20245.52	1.0	2.02	1.0	2.0	0.0	20245.52	1.0	2.02	1.0	2.0	2.0	1.0	2.0	1.0	88.0	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP057	T2	512776.85	578592.958	0.2	B - Very Shallow (0.01-0.5m)	9.60824		9.60824	0.167695	3.5	11	0.20	1.20	9.67	1.0	1.61	1.0	2.0	0.0	9.67	1.0	1.61	1.0	2.0	2.0	1.0	2.0	1.0	112.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP058	T3	512786.851	579087.851	0.9	C - Shallow (0.5-2.0m)	8.27299		8.27299	0.144391	3.5	11	0.90	1.90	2.48	1.0	1.18	2.0	2.0	0.0	2.48	1.0	1.18	2.0	2.0	2.0	1.0	4.0	2.0	225.7	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP059	T2	512806.844	578632.949	0.1	B - Very Shallow (0.01-0.5m)	10.32984	Rocky adjacent	10.32984	0.18029	3.5	11	0.10	1.10	18.04	1.0	1.64	1.0	2.0	0.0	18.04	1.0	1.64	1.0	2.0	2.0	1.0	2.0	1.0	62.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP060	T3	512811	579022	1	C - Shallow (0.5-2.0m)	12.51684		12.51684	0.21846	3.5	11	1.00	2.00	1.50	1.0	0.75	4.0	2.0	0.0	1.50	1.0	0.75	4.0	2.0	2.0	1.0	8.0	4.0	157.0	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
Depth Probe	DP061	T2	512811.843	578615.953	0.1	B - Very Shallow (0.01-0.5m)	10.19738	Rocky adjacent	10.19738	0.177978	3.5	11	0.10	1.10	18.26	1.0	1.66	1.0	2.0	0.0	18.26	1.0	1.66	1.0	2.0	2.0	1.0	2.0	1.0	74.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP062	T2	512815.991	578491.767	0.2	B - Very Shallow (0.01-0.5m)	11.45979		11.45979	0.200011	3.5	11	0.20	1.20	8.17	1.0	1.38	1.0	2.0	0.0	8.17	1.0	1.38	1.0	2.0	2.0	1.0	2.0	1.0	174.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP063	T2	512819.841	578667.942	0.1	B - Very Shallow (0.01-0.5m)	8.95796	Rocky adjacent	8.95796	0.156346	3.5	11	0.10	1.10	20.69	1.0	1.88	1.0	2.0	0.0	20.69	1.0	1.88	1.0	2.0	2.0	1.0	2.0	1.0	28.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
Depth Probe	DP064	T3	512837	579015	0.4	B - Very Shallow (0.01-0.5m)	10.70068	Deeply eroded drain	10.70068	0.186762	3.5	11	0.40	1.40	4.36	1.0	1.25	2.0	2.0	0.0	4.36	1.0	1.25	2.0	2.0	2.0	1.0	4.0	2.0	149.3	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
Depth Probe	DP065	T2	512848.835	578655.944	0.1	B - Very Shallow (0.01-0.5m)	7.50129	Rocky adjacent	7.50129	0.130922	3.5	11	0.10	1.10	24.58	1.0	2.23	1.0	2.0	0.0	24.58	1.0	2.23	1.0	2.0	2.0	1.0	2.0	1.0	20.2	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
Depth Probe	DP066	T2	512852	578578	0.1	B - Very Shallow (0.01-0.5m)	7.07017		7.07017	0.123398	3.5	11	0.10	1.10	26.05	1.0	2.37	1.0	2.0	0.0	26.05	1.0	2.37	1.0	2.0	2.0	1.0	2.0	1.0	83.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP067	T2	512896.554	578530.495	0.0001	A - Rock (0.0m)	8.89802	Rocky	8.89802	0.1553	3.5	11	0.00	1.00	20821.41	1.0	2.08	1.0	2.0	0.0	20821.41	1.0	2.08	1.0	2.0	2.0	1.0	2.0	1.0	92.0	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP068	T2	512902.143	578511.339	0.3	B - Very Shallow (0.01-0.5m)	8.89802		8.89802	0.1553	3.5	11	0.30	1.30	6.94	1.0	1.60	1.0	2.0	0.0	6.94	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	104.3	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP069	T3	512940.817	579093.849	0.9	C - Shallow (0.5-2.0m)	9.24406	Cut peat photo	9.24406	0.161339	3.5	11	0.900	1.90	2.23	1.0	1.06	2.0	2.0	0.0	2.23	1.0	1.06	2.0	2.0	2.0	1.0	4.0	2.0	254.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP070	T2	512948	578538	0.5	B - Very Shallow (0.01-0.5m)	11.33164		11.33164	0.197774	3.5	11	0.50	1.50	3.30	1.0	1.10	2.0	2.0	0.0	3.30	1.0	1.10	2.0	2.0	2.0	1.0	4.0	2.0	60.0	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
Depth Probe	DP071	T3	512967	579286	0.0001	A - Rock (0.0m)	4.87812	Cut peat	4.87812	0.085139	3.5	11	0.00	1.00	37553.14	1.0	3.75	1.0	2.0	0.0	37553.14	1.0	3.75	1.0	2.0	2.0	1.0	2.0	1.0	442.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP072	T3	512968	579286	0.6	C - Shallow (0.5-2.0m)	4.87812	Uncut peat	4.87812	0.085139	3.5	11	0.60	1.60	6.26	1.0	2.35	1.0	2.0	0.0	6.26	1.0	2.35	1.0	2.0	2.0	1.0	2.0	1.0	442.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP073	T3	512980	579238	0.0001	A - Rock (0.0m)	6.08375	Cut peat	6.08375	0.106181	3.5	11	0.00	1.00	30162.28	1.0	3.02	1.0	2.0	0.0	30162.28	1.0	3.02	1.0	2.0	2.0	1.0	2.0	1.0	401.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP074	T3	512981	579239	0.6	C - Shallow (0.5-2.0m)	6.08375	Uncut peat	6.08375	0.106181	3.5	11	0.60	1.60	5.03	1.0	1.89	1.0	2.0	0.0	5.03	1.0	1.89	1.0	2.0	2.0	1.0	2.0	1.0	403.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP075	T3	512996	579176	0.1	B - Very Shallow (0.01-0.5m)	8.00388	Cut peat	8.00388	0.139694	3.5	11	0.10	1.10	23.08	1.0	2.10	1.0	2.0	0.0	23.08	1.0	2.10	1.0	2.0	2.0	1.0	2.0	1.0	352.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP076	T3	512997	579176	1.5	C - Shallow (0.5-2.0m)	8.00388	Uncut peat	8.00388	0.139694	3.5	11	1.50	2.50	1.64	1.0	0.92	4.0	2.0	0.0	1.64	1.0	0.92	4.0	2.0	2.0	1.0	8.0	4.0	353.1	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
Depth Probe	DP077	T3	513000	579133	0.1	B - Very Shallow (0.01-0.5m)	7.86543		7.86543	0.137278	3.5	11	0.10	1.10	23.47	1.0	2.13	1.0	2.0	0.0	23.47	1.0	2.13	1.0	2.0	2.0	1.0	2.0	1.0	317.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP078	T3	513000	579134	1.1	C - Shallow (0.5-2.0m)	7.86543	Uncut peat, inferred.	7.86543	0.137278	3.5	11	1.10	2.10	2.13	1.0	1.12	2.0	2.0	0.0	2.13	1.0	1.12	2.0	2.0	2.0	1.0	4.0	2.0	318.5	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP079	T3	513001	579084	1.1	C - Shallow (0.5-2.0m)	10.71365	Cut peat on hill	10.71365	0.186988	3.5	11	1.10	2.10	1.58	1.0	0.83	4.0	2.0	0.0	1.58	1.0	0.83	4.0	2.0	2.0	1.0	8.0	4.0	278.3	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
Depth Probe	DP080	T3	513026.799	579108.846	0.4	B - Very Shallow (0.01-0.5m)	10.70989	Cut peat photo	10.70989	0.186923	3.5	11	0.40	1.40	4.36	1.0	1.24	2.0	2.0	0.0	4.36	1.0	1.24	2.0	2.0	2.0	1.0	4.0	2.0	313.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP081	T3	513028	579064	0.2	B - Very Shallow (0.01-0.5m)	10.73867	Top of steep slope	10.73867	0.187425	3.5	11	0.20	1.20	8.69	1.0	1.45	1.0	2.0	0.0	8.69	1.0	1.45	1.0	2.0	2.0	1.0	2.0	1.0	276.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP082	T3	513052.793	579088.85	1	C - Shallow (0.5-2.0m)	11.97277		11.97277	0.208964	3.5	11	1.00	2.00	1.57	1.0	0.78	4.0	2.0	0.0	1.57	1.0	0.78	4.0	2.0	2.0	1.0	8.0	4.0	310.0	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
Depth Probe	DP083	T3	513054	579101	0.5	B - Very Shallow (0.01-0.5m)	11.97277	Up out of drain	11.97277	0.208964	3.5	11	0.50	1.50	3.14	1.0	1.05	2.0	2.0	0.0	3.14	1.0	1.05	2.0	2.0	2.0	1.0	4.0	2.0	321.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP084	T3	513084	579172	1.3	C - Shallow (0.5-2.0m)	5.33154		5.33154	0.093053	3.5	11	1.30	2.30	2.65	1.0	1.60	1.0	2.0	0.0	2.65	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	383.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP085	T3	513097.782	578888.891	0.1	B - Very Shallow (0.01-0.5m)	10.52563		10.52563	0.183707	3.5	11	0.10	1.10	17.72	1.0	1.61	1.0	2.0	0.0	17.72	1.0	1.61	1.0	2.0	2.0	1.0	2.0	1.0	201.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP086	T3	513098.783	579059.856	0.8	C - Shallow (0.5-2.0m)	7.92501		7.92501	0.138318	3.5	11	0.80	1.80	2.91	1.0	1.29	2.0	2.0	0.0	2.91	1.0	1.29	2.0	2.0	2.0	1.0	4.0	2.0	317.2	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP087	T3	513098.784	579131.84	1.8	C - Shallow (0.5-2.0m)	7.92501		7.92501	0.138318	3.5	11	1.80	2.80	1.29	2.0	0.83	4.0	2.0	0.0	1.29	2.0	0.83	4.0	2.0	4.0	2.0	8.0	4.0	317.2	1.0	2.0	B - Low Risk	4.0	C - Moderate Risk
Depth Probe	DP088	T3	513134.775	579024.861	0.8	C - Shallow (0.5-2.0m)	9.83355		9.83355	0.171628	3.5	11	0.80	1.80	2.36	1.0	1.05	2.0	2.0	0.0	2.36	1.0	1.05	2.0	2.0	2.0	1.0	4.0	2.0	363.1	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP089	T3	513144.909	578641.911	1.1	C - Shallow (0.5-2.0m)	8.46323		8.46323	0.147711	3.5	11	1.10	2.10	1.99	1.0	1.04	2.0	2.0	0.0	1.99	1.0	1.04	2.0	2.0	2.0	1.0	4.0	2.0	318.4	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP090	SITE	513149	579188	0.2	B - Very Shallow (0.01-0.5m)	7.68494	INFERRED, RECENT PLANTING WORK	7.68494	0.134128	3.5	11	0.20	1.20	12.00	1.0	2.00	1.0	2.0	0.0	12.00	1.0	2.00	1.0	2.0	2.0	1.0	2.0	1.0	121.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP091	T3	513158.77	579061.855	0.9	C - Shallow (0.5-2.0m)	7.11033		7.11033	0.124099	3.5	11	0.90	1.90	2.88	1.0	1.36	1.0	2.0	0.0	2.88	1.0	1.36	1.0	2.0	2.0	1.0	2.0	1.0	323.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP092	T3	513176.936	578660.824	1.1	C - Shallow (0.5-2.0m)	6.03585		6.03585	0.105345	3.5	11	1.10	2.10	2.77	1.0	1.45	1.0	2.0	0.0	2.77	1.0	1.45	1.0	2.0	2.0	1.0	2.0	1.0	303.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP093	SITE	513232.887	578535.466	0.2	B - Very Shallow (0.01-0.5m)	7.32049	INFERRED, RECENT PLANTING	7.32049	0.127767	3.5	11	0.20	1.20	12.59	1.0	2.10	1.0	2.0	0.0	12.59	1.0	2.10	1.0	2.0	2.0	1.0	2.0	1.0	155.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP094	SITE	513280.697	578588.869	0.2	B - Very Shallow (0.01-0.5m)	5.82346	INFERRED, VISIBLE	5.82346	0.101639	3.5	11	0.20	1.20	15.76	1.0	2.63	1.0	2.0	0.0	15.76	1.0	2.63	1.0	2.0	2.0	1.0	2.0	1.0	135.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP095	SITE	513325.691	578628.618	0.2	B - Very Shallow (0.01-0.5m)	3.90552	INFERRED, VISIBLE	3.90552	0.068164	3.5	11	0.20	1.20	23.41	1.0	3.90	1.0	2.0	0.0	23.41	1.0	3.90	1.0	2.0	2.0	1.0	2.0	1.0	182.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP096	SITE	513339.509	578641.916	0.15	B - Very Shallow (0.01-0.5m)	7.87911		7.87911	0.137516	3.5	11	0.15	1.15	15.62	1.0	2.04	1.0	2.0	0.0	15.62	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	185.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP097	SITE	513418.002	579383.96	0.1	B - Very Shallow (0.01-0.5m)	4.13463		4.13463	0.072163	3.5	11	0.10	1.10	44.25	1.0	4.02	1.0	2.0	0.0	44.25	1.0	4.02	1.0	2.0	2.0	1.0	2.0	1.0	152.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP098	SITE	513451.963	579182.508	0.2	B - Very Shallow (0.01-0.5m)	4.13463	INFERRED, VISIBLE	4.13463	0.072163	3.5	11	0.20	1.20	22.12	1.0	3.69	1.0	2.0	0.0	22.12	1.0	3.69	1.0	2.0	2.0	1.0	2.0	1.0	142.4	2.0	2.0	B - Low Risk	2.0	B - Low Risk
Depth Probe	DP099	SITE	513463.004	579286.371	0.5	B - Very Shallow (0.01-0.5m)	2.83559		2.83559	0.04949	3.5	11	0.50	1.50	12.88	1.0	4.29	1.0	2.0	0.0	12.88	1.0	4.29	1.0	2.0	2.0	1.0	2.0	1.0	284.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP100	SITE	513467.931	579148.545	1	C - Shallow (0.5-2.0m)	2.6214		2.6214	0.045752	3.5	11	1.00	2.00	6.96	1.0	3.48	1.0	2.0	0.0	6.96	1.0	3.48	1.0	2.0	2.0	1.0	2.0	1.0	280.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP101	SITE	513481.275	578648.72	0.8	C - Shallow (0.5-2.0m)	6.82921		6.82921	0.119192	3.5	11	0.80	1.80	3.37	1.0	1.50	1.0	2.0	0.0	3.37	1.0	1.50	1.0	2.0	2.0	1.0	2.0	1.0	183.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP102	SITE	513492.107	578645.718	0.3	B - Very Shallow (0.01-0.5m)	3.24569		3.24569	0.056648	3.5	11	0.30	1.30	18.76	1.0	4.33	1.0	2.0	0.0	18.76	1.0	4.33	1.0	2.0	2.0	1.0	2.0	1.0	246.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP103	SITE	513492.605	579179.605	0.4	B - Very Shallow (0.01-0.5m)	4.8492	INFERRED, VISIBLE	4.8492	0.084635	3.5	11	0.40	1.40	9.44	1.0	2.70	1.0	2.0	0.0	9.44	1.0	2.70	1.0	2.0	2.0	1.0	2.0	1.0	13.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
Depth Probe	DP104	SITE	[illegible]	[illegible]	0.3	B - Very Shallow (0.01-0.5m)	4.87908	INFERRED, DRAIN	4.87908	0.085156	3.5	11	0.30	1.30	12.52	1.0	2.89	1.0	2.0	0.0	12.52	1.0	2.89	1.0	2.0	2.0	1.0	2.0	1.0	2.3	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
Depth Probe	DP105	SITE	[illegible]	[illegible]	1	C - Shallow (0.5-2.0m)	3.20987		3.20987	0.056023	3.5	11	1.00	2.00	5.69	1.0	2.85	1.0	2.0	0.0	5.69	1.0	2.85	1.0	2.0	2.0	1.0	2.0	1.0	278.9	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk

SI Appendix B - Peat & Subsoil Survey Database
Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

RSK

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note
Depth Probe	DP106	SITE	513493.543	578686.827	0.3	B - Very Shallow (0.01-0.5m)	5.53476	INFERRED, VISIBLE
Depth Probe	DP107	SITE	513494	579382	1	C - Shallow (0.5-2.0m)	3.26679	
Depth Probe	DP108	SITE	513507	578646	0.2	B - Very Shallow (0.01-0.5m)	6.0525	
Depth Probe	DP109	SITE	513540	578652	0.2	B - Very Shallow (0.01-0.5m)	5.2313	
Depth Probe	DP110	SITE	513558.678	578709.629	0.4	B - Very Shallow (0.01-0.5m)	4.78559	
Depth Probe	DP111	SITE	513571	578660	0.1	B - Very Shallow (0.01-0.5m)	7.4715	
Depth Probe	DP112	SITE	513589	578661	0.1	B - Very Shallow (0.01-0.5m)	8.14645	
Depth Probe	DP113	SITE	513637.983	578732.245	0.5	B - Very Shallow (0.01-0.5m)	3.91545	
Depth Probe	DP114	T4	513659.662	579012.863	0.2	B - Very Shallow (0.01-0.5m)	11.1727	
Depth Probe	DP115	T4	513678.657	578822.904	1	C - Shallow (0.5-2.0m)	11.47724	
Depth Probe	DP116	T4	513678.658	578993.867	0.1	B - Very Shallow (0.01-0.5m)	6.62442	
Depth Probe	DP117	T4	513682.656	578820.904	1	C - Shallow (0.5-2.0m)	11.47724	
Depth Probe	DP118	T4	513685.952	578761.999	0.8	C - Shallow (0.5-2.0m)	9.36656	INFERRED, TRACK SIDE
Depth Probe	DP119	T4	513689.655	578879.891	0.5	B - Very Shallow (0.01-0.5m)	9.79765	
Depth Probe	DP120	T4	513714.65	578969.872	0.1	B - Very Shallow (0.01-0.5m)	7.80224	
Depth Probe	DP121	T4	513717	579056	0.3	B - Very Shallow (0.01-0.5m)	11.77141	
Depth Probe	DP122	T4	513719.649	578978.87	0.1	B - Very Shallow (0.01-0.5m)	7.80224	
Depth Probe	DP123	T4	513728	579044	0.05	B - Very Shallow (0.01-0.5m)	11.87142	
Depth Probe	DP124	T4	513744	579023	0.2	B - Very Shallow (0.01-0.5m)	12.26207	
Depth Probe	DP125	T4	513746	579038	0.2	B - Very Shallow (0.01-0.5m)	12.26207	
Depth Probe	DP126	T4	513755.641	578936.879	0.1	B - Very Shallow (0.01-0.5m)	12.34511	
Depth Probe	DP127	SITE	513758.339	578282.564	0.5	B - Very Shallow (0.01-0.5m)	5.00775	
Depth Probe	DP128	T4	513768	579030	0.2	B - Very Shallow (0.01-0.5m)	8.15635	
Depth Probe	DP129	T4	513774	579048	0.1	B - Very Shallow (0.01-0.5m)	8.15635	Rock
Depth Probe	DP130	T4	513781	579006	0.2	B - Very Shallow (0.01-0.5m)	5.08511	
Depth Probe	DP131	T4	513798	578986	0.5	B - Very Shallow (0.01-0.5m)	7.69429	Drain 0.1l/sec
Depth Probe	DP132	T4	513814	578971	0.3	B - Very Shallow (0.01-0.5m)	8.9385	
Depth Probe	DP133	T4	513828	578957	0.05	B - Very Shallow (0.01-0.5m)	6.93389	
Depth Probe	DP134	T4	513844	578940	0.3	B - Very Shallow (0.01-0.5m)	10.06662	
Depth Probe	DP135	T5	513982.59	578541.963	0.6	C - Shallow (0.5-2.0m)	9.03814	
Depth Probe	DP136	T5	514008.584	578534.964	0.5	B - Very Shallow (0.01-0.5m)	7.20536	
Depth Probe	DP137	T5	514016.583	578554.96	0.3	B - Very Shallow (0.01-0.5m)	7.1321	
Depth Probe	DP139	T5	514094.566	578580.954	0.1	B - Very Shallow (0.01-0.5m)	8.42644	
Depth Probe	DP142	T5	514182.903	578674.794	1.2	C - Shallow (0.5-2.0m)	5.54985	
Depth Probe	DP150	SITE	521558	579082	3.6	E - Deep (3.5-6.0m)	0.0001	Flat
Depth Probe	DP151	SITE	512830.264	578519.994	0.5	B - Very Shallow (0.01-0.5m)	8.57213	INFERRED
Depth Probe	DP152	T2	512849.048	578544.284	0.5	B - Very Shallow (0.01-0.5m)	7.6984	INFERRED
Depth Probe	DP153	T2	512867.185	578564.041	0.5	B - Very Shallow (0.01-0.5m)	3.87025	INFERRED
Depth Probe	DP154	T2	512883.703	578588.655	0.5	B - Very Shallow (0.01-0.5m)	6.5471	INFERRED
Depth Probe	DP155	T2	512898.277	578605.496	0.5	B - Very Shallow (0.01-0.5m)	12.38986	INFERRED
Depth Probe	DP156	T2	512911.556	578622.662	0.5	B - Very Shallow (0.01-0.5m)	13.05768	INFERRED
Depth Probe	DP157	T2	512918.357	578630.435	0.5	B - Very Shallow (0.01-0.5m)	13.63092	INFERRED
Depth Probe	DP158	T2	512923.863	578637.56	0.5	B - Very Shallow (0.01-0.5m)	9.73503	INFERRED
Depth Probe	DP159	T2	512935.847	578651.487	0.5	B - Very Shallow (0.01-0.5m)	9.73503	INFERRED
Depth Probe	DP160	T2	512944.915	578665.089	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP161	T2	512955.279	578672.862	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP162	T2	512963.853	578689.38	0.5	B - Very Shallow (0.01-0.5m)	7.25883	INFERRED
Depth Probe	DP163	T2	512982.808	578704.926	0.5	B - Very Shallow (0.01-0.5m)	7.52427	INFERRED
Depth Probe	DP164	T2	512880.789	578718.529	0.5	B - Very Shallow (0.01-0.5m)	12.32755	INFERRED
Depth Probe	DP165	T2	512900.544	578702.011	0.5	B - Very Shallow (0.01-0.5m)	14.02991	INFERRED
Depth Probe	DP166	T2	512913.823	578692.295	0.5	B - Very Shallow (0.01-0.5m)	14.77308	INFERRED
Depth Probe	DP167	T2	512930.341	578679.016	0.5	B - Very Shallow (0.01-0.5m)	7.95622	INFERRED
Depth Probe	DP168	T2	512942	578670.595	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP169	T2	512956.898	578659.907	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP170	T2	512974.711	578650.191	0.5	B - Very Shallow (0.01-0.5m)	7.77752	INFERRED
Depth Probe	DP171	T2	512991.553	578638.855	0.5	B - Very Shallow (0.01-0.5m)	7.79146	INFERRED
Trail Pit	TP01	T5	514105	578650	0.3	B - Very Shallow (0.01-0.5m)	6.5297	
Trail Pit	TP02	T5	513978	578679	1	C - Shallow (0.5-2.0m)	6.22902	
Trail Pit	TP03	T5	513964	578729	0.8	C - Shallow (0.5-2.0m)	5.65128	
Trail Pit	TP04	T4	513750	578906	0.4	B - Very Shallow (0.01-0.5m)	12.16074	
Trail Pit	TP05	T4	513761	579123	0.3	B - Very Shallow (0.01-0.5m)	5.05258	
Trail Pit	TP06	SITE	513543	579269	0.2	B - Very Shallow (0.01-0.5m)	4.07497	
Trail Pit	TP07	T3	512950	578987	0.2	B - Very Shallow (0.01-0.5m)	11.36258	
Trail Pit	TP08	T3	512974	579057	0.2	B - Very Shallow (0.01-0.5m)	9.37515	
Trail Pit	TP09	T3	512989	579081	0.2	B - Very Shallow (0.01-0.5m)	7.6724	
Trail Pit	TP10	SITE	513253	578571	0.5	B - Very Shallow (0.01-0.5m)	8.84214	
Trail Pit	TP11	T2	512781	578602	0.4	B - Very Shallow (0.01-0.5m)	12.43517	
Trail Pit	TP12	T2	512867	578632	0.3	B - Very Shallow (0.01-0.5m)	9.46335	
Trail Pit	TP13	T1	512589	578911	0.1	B - Very Shallow (0.01-0.5m)	6.30381	
Trail Pit	TP14	T1	512554	579045	3.1	D - Moderately Deep (2.0-3.5m)	2.39487	
Trail Pit	TP15	T1	512439	578989	0.3	B - Very Shallow (0.01-0.5m)	3.12206	
Trail Pit	TP16	T1	512293	578980	0.2	B - Very Shallow (0.01-0.5m)	4.67019	Groundwater logged at base
177	177		177	177	177	177	177	71
					111.002	0.000	1253.539	
					3.600	0.000	14.773	
					0.000	0.000	0.000	
					3.600	0.000	14.773	
					0.627	#DIV/0!	7.082	

Inferred value e.g. nearest neighbour or guidance.
Formula driven
Note accompanying
Data needs checking
No data / not done

Peat & Slope Stability Risk Assessment

Point ID	Parameter Values: Slope Angle α (Degrees)	Slope Angle α (For Excel Formula) (Radians)	Undrained Shear Strenght (Conservative Value) c' (kPa)	Bulk Unit weight of Peat (Conservative Value) γ (kN/m3)	Scenario A: Depth to failure plane i.e. Peat Depth z (m)	Scenario B: Surcharge Equivalent Placed Fill Depth i.e. +1m z (m)	Scenario A: FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Scenario B: FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	FoS Adjustment Coefficient μ	FoS Adjustment Value #	Scenario A: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Scenario B: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT μ	Significant Feature Ranking Cefficient μ_{SF}	Scenario A: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT μ	Scenario B: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT μ	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient μ_{Dist}	Scenario A: RR_D Risk Ranking Acounting for Distance to Sensitive Receptors	Risk Category	Scenario B: RR_D Risk Ranking Acounting for Distance to Sensitive Receptors	Risk Category
DP106	5.53476	0.0966	3.5	11	0.30	1.30	11.05	1.0	2.55	1.0	2.0	0.0	11.05	1.0	2.55	1.0	2.0	2.0	1.0	2.0	1.0	2.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP107	3.26679	0.057016	3.5	11	1.00	2.00	5.59	1.0	2.80	1.0	2.0	0.0	5.59	1.0	2.80	1.0	2.0	2.0	1.0	2.0	1.0	281.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP108	6.0525	0.105635	3.5	11	0.20	1.20	15.17	1.0	2.53	1.0	2.0	0.0	15.17	1.0	2.53	1.0	2.0	2.0	1.0	2.0	1.0	11.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP109	5.2313	0.091303	3.5	11	0.20	1.20	17.52	1.0	2.92	1.0	2.0	0.0	17.52	1.0	2.92	1.0	2.0	2.0	1.0	2.0	1.0	42.3	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP110	4.78559	0.083524	3.5	11	0.40	1.40	9.57	1.0	2.73	1.0	2.0	0.0	9.57	1.0	2.73	1.0	2.0	2.0	1.0	2.0	1.0	65.4	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP111	7.4715	0.130402	3.5	11	0.10	1.10	24.68	1.0	2.24	1.0	2.0	0.0	24.68	1.0	2.24	1.0	2.0	2.0	1.0	2.0	1.0	73.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP112	8.14645	0.142182	3.5	11	0.10	1.10	22.68	1.0	2.06	1.0	2.0	0.0	22.68	1.0	2.06	1.0	2.0	2.0	1.0	2.0	1.0	91.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP113	3.91545	0.068337	3.5	11	0.50	1.50	9.34	1.0	3.11	1.0	2.0	0.0	9.34	1.0	3.11	1.0	2.0	2.0	1.0	2.0	1.0	147.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP114	11.1727	0.195	3.5	11	0.20	1.20	8.37	1.0	1.39	1.0	2.0	0.0	8.37	1.0	1.39	1.0	2.0	2.0	1.0	2.0	1.0	191.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP115	11.47724	0.200316	3.5	11	1.00	2.00	1.63	1.0	0.82	4.0	2.0	0.0	1.63	1.0	0.82	4.0	2.0	2.0	1.0	8.0	4.0	218.8	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
DP116	6.62442	0.115618	3.5	11	0.100	1.10	27.77	1.0	2.52	1.0	2.0	0.0	27.77	1.0	2.52	1.0	2.0	2.0	1.0	2.0	1.0	208.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP117	11.47724	0.200316	3.5	11	1.00	2.00	1.63	1.0	0.82	4.0	2.0	0.0	1.63	1.0	0.82	4.0	2.0	2.0	1.0	8.0	4.0	219.3	1.0	1.0	A - Very Low Risk	4.0	C - Moderate Risk
DP118	9.36656	0.163477	3.5	11	0.80	1.80	2.48	1.0	1.10	2.0	2.0	0.0	2.48	1.0	1.10	2.0	2.0	2.0	1.0	4.0	2.0	202.5	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP119	9.79765	0.171001	3.5	11	0.50	1.50	3.79	1.0	1.26	2.0	2.0	0.0	3.79	1.0	1.26	2.0	2.0	2.0	1.0	4.0	2.0	229.0	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP120	7.80224	0.136175	3.5	11	0.10	1.10	23.66	1.0	2.15	1.0	2.0	0.0	23.66	1.0	2.15	1.0	2.0	2.0	1.0	2.0	1.0	244.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP121	11.77141	0.20545	3.5	11	0.30	1.30	5.31	1.0	1.23	2.0	2.0	0.0	5.31	1.0	1.23	2.0	2.0	2.0	1.0	4.0	2.0	254.6	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP122	7.80224	0.136175	3.5	11	0.10	1.10	23.66	1.0	2.15	1.0	2.0	0.0	23.66	1.0	2.15	1.0	2.0	2.0	1.0	2.0	1.0	249.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP123	11.87142	0.207195	3.5	11	0.05	1.05	31.61	1.0	1.51	1.0	2.0	0.0	31.61	1.0	1.51	1.0	2.0	2.0	1.0	2.0	1.0	263.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP124	12.26207	0.214013	3.5	11	0.20	1.20	7.67	1.0	1.28	2.0	2.0	0.0	7.67	1.0	1.28	2.0	2.0	2.0	1.0	4.0	2.0	276.6	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP125	12.26207	0.214013	3.5	11	0.20	1.20	7.67	1.0	1.28	2.0	2.0	0.0	7.67	1.0	1.28	2.0	2.0	2.0	1.0	4.0	2.0	280.3	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP126	12.34511	0.215463	3.5	11	0.10	1.10	15.23	1.0	1.38	1.0	2.0	0.0	15.23	1.0	1.38	1.0	2.0	2.0	1.0	2.0	1.0	287.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP127	5.00775	0.087402	3.5	11	0.50	1.50	7.32	1.0	2.44	1.0	2.0	0.0	7.32	1.0	2.44	1.0	2.0	2.0	1.0	2.0	1.0	224.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP128	8.15635	0.142355	3.5	11	0.20	1.20	11.33	1.0	1.89	1.0	2.0	0.0	11.33	1.0	1.89	1.0	2.0	2.0	1.0	2.0	1.0	301.2	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP129	8.15635	0.142355	3.5	11	0.10	1.10	22.68	1.0	2.06	1.0	2.0	0.0	22.68	1.0	2.06	1.0	2.0	2.0	1.0	2.0	1.0	309.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP130	5.08511	0.088752	3.5	11	0.20	1.20	18.02	1.0	3.00	1.0	2.0	0.0	18.02	1.0	3.00	1.0	2.0	2.0	1.0	2.0	1.0	311.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP131	7.69429	0.134291	3.5	11	0.50	1.50	4.80	1.0	1.60	1.0	2.0	0.0	4.80	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	327.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP132	8.9385	0.156006	3.5	11	0.30	1.30	6.91	1.0	1.59	1.0	2.0	0.0	6.91	1.0	1.59	1.0	2.0	2.0	1.0	2.0	1.0	344.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP133	6.93389	0.121124	3.5	11	0.05	1.05	53.06	1.0	2.53	1.0	2.0	0.0	53.06	1.0	2.53	1.0	2.0	2.0	1.0	2.0	1.0	358.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP134	10.06662	0.175696	3.5	11	0.30	1.30	6.16	1.0	1.42	1.0	2.0	0.0	6.16	1.0	1.42	1.0	2.0	2.0	1.0	2.0	1.0	375.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP135	9.03314	0.157745	3.5	11	0.60	1.60	3.42	1.0	1.28	2.0	2.0	0.0	3.42	1.0	1.28	2.0	2.0	2.0	1.0	4.0	2.0	490.7	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
DP136	7.20536	0.125757	3.5	11	0.50	1.50	5.11	1.0	1.70	1.0	2.0	0.0	5.11	1.0	1.70	1.0	2.0	2.0	1.0	2.0	1.0	512.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP137	7.1321	0.124479	3.5	11	0.30	1.30	8.61	1.0	1.99	1.0	2.0	0.0	8.61	1.0	1.99	1.0	2.0	2.0	1.0	2.0	1.0	527.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP139	8.42644	0.147069	3.5	11	0.10	1.10	21.95	1.0	2.00	1.0	2.0	0.0	21.95	1.0	2.00	1.0	2.0	2.0	1.0	2.0	1.0	601.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP142	5.54985	0.096863	3.5	11	1.20	2.20	2.75	1.0	1.50	1.0	2.0	0.0	2.75	1.0	1.50	1.0	2.0	2.0	1.0	2.0	1.0	685.0	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP150	0.0001	1.75E-06	3.5	11	3.60	4.60	50640.21	1.0	39631.47	1.0	2.0	0.0	50640.21	1.0	39631.47	1.0	2.0	2.0	1.0	2.0	1.0	123.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP151	8.57213	0.149612	3.5	11	0.50	1.50	4.32	1.0	1.44	1.0	2.0	0.0	4.32	1.0	1.44	1.0	2.0	2.0	1.0	2.0	1.0	143.9	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP152	7.6984	0.134362	3.5	11	0.50	1.50	4.79	1.0	1.60	1.0	2.0	0.0	4.79	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	113.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP153	3.87025	0.067549	3.5	11	0.50	1.50	9.45	1.0	3.15	1.0	2.0	0.0	9.45	1.0	3.15	1.0	2.0	2.0	1.0	2.0	1.0	86.6	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP154	6.5471	0.114268	3.5	11	0.50	1.50	5.62	1.0	1.87	1.0	2.0	0.0	5.62	1.0	1.87	1.0	2.0	2.0	1.0	2.0	1.0	57.1	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP155	12.38986	0.216244	3.5	11	0.50	1.50	3.04	1.0	1.01	2.0	2.0	0.0	3.04	1.0	1.01	2.0	2.0	2.0	1.0	4.0	2.0	35.0	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP156	13.05768	0.2279	3.5	11	0.20	1.20	7.23	1.0	1.20	2.0	2.0	0.0	7.23	1.0	1.20	2.0	2.0	2.0	1.0	4.0	2.0	13.4	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP157	13.63092	0.237904	3.5	11	0.50	1.50	2.78	1.0	0.93	4.0	2.0	0.0	2.78	1.0	0.93	4.0	2.0	2.0	1.0	8.0	4.0	3.2	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP158	9.73503	0.169908	3.5	11	0.50	1.50	3.82	1.0	1.27	2.0	2.0	0.0	3.82	1.0	1.27	2.0	2.0	2.0	1.0	4.0	2.0	5.9	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP159	9.73503	0.169908	3.5	11	0.50	1.50	3.82	1.0	1.27	2.0	2.0	0.0	3.82	1.0	1.27	2.0	2.0	2.0	1.0	4.0	2.0	24.0	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP160	6.01271	0.104942	3.5	11	0.50	1.50	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	8.4	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP161	6.01271	0.104942	3.5	11	0.50	1.50	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	4.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP162	7.25883	0.12669	3.5	11	0.50	1.50	5.08	1.0	1.69	1.0	2.0	0.0	5.08	1.0	1.69	1.0	2.0	2.0	1.0	2.0	1.0	26.4	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP163	7.52427	0.131323	3.5	11	0.50	1.50	4.90	1.0	1.63	1.0	2.0	0.0	4.90	1.0	1.63	1.0	2.0	2.0	1.0	2.0	1.0	46.6	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP164	12.32755	0.215158	3.5	11	0.50	1.50	3.05	1.0	1.02	2.0	2.0	0.0	3.05	1.0	1.02	2.0	2.0	2.0	1.0	4.0	2.0	36.2	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP165	14.02991	0.244868	3.5	11	0.50	1.50	2.71	1.0	0.90	4.0	2.0	0.0	2.71	1.0	0.90	4.0	2.0	2.0	1.0	8.0	4.0	23.8	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP166	14.77309	0.257839	3.5	11	0.50	1.50	2.58	1.0	0.86	4.0	2.0	0.0	2.58	1.0	0.86	4.0	2.0	2.0	1.0	8.0	4.0	15.8	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP167	7.95622	0.138862	3.5	11	0.50	1.50	4.64	1.0	1.55	1.0	2.0	0.0	4.64	1.0	1.55	1.0	2.0	2.0	1.0	2.0	1.0	9.0	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP168	6.01271	0.104942	3.5	11	0.50	1.50	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	6.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP169	6.01271	0.104942	3.5	11	0.50	1.50	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	2.3	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP170	7.77752	0.135743	3.5	11	0.50	1.50	4.75	1.0	1.58	1.0	2.0	0.0	4.75	1.0	1.58	1.0	2.0	2.0	1.0	2.0	1.0	2.8	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP171	7.79146	0.135987	3.5	11	0.50	1.50	4.74	1.0	1.58	1.0	2.0	0.0	4.74	1.0	1.58	1.0	2.0	2.0	1.0	2.0	1.0	3.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
TP01	6.5297	0.113965	3.5	11	0.30	1.30	9.39	1.0	2.17	1.0	2.0	0.0	9.39	1.0	2.17	1.0	2.0	2.0	1.0	2.0	1.0	607.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP02	6.22902	0.108717	3.5	11	1.00	2.00	2.95	1.0	1.47	1.0	2.0	0.0	2.95	1.0	1.47	1.0	2.0	2.0	1.0	2.0	1.0	480.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP03	5.65128	0.098633	3.5	11	0.80	1.80	4.06	1.0	1.80	1.0	2.0	0.0	4.06	1.0	1.80	1.0	2.0	2.0	1.0	2.0	1.0	469.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP04	12.16074	0.212245	3.5	11	0.40	1.40	3.86	1.0	1.10	2.0	2.0	0.0	3.86	1.0	1.10	2.0	2.0	2.0	1.0	4.0	2.0	284.1	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
TP05	5.05258	0.088184	3.5	11	0.30	1.30	12.09	1.0	2.79	1.0	2.0	0.0	12.09	1.0	2.79	1.0	2.0	2.0	1.0	2.0	1.0	301.1	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP06	4.07497	0.071122	3.5	11	0.20	1.20	22.44	1.0	3.74	1.0	2.0	0.0	22.44	1.0	3.74	1.0	2.0	2.0	1.0	2.0	1.0	185.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP07	11.36258	0.198314	3.5	11	0.20	1.20	8.24	1.0	1.37	1.0	2.0	0.0	8.24	1.0	1.37	1.0	2.0	2.0	1.0	2.0	1.0	169.3	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP08	9.37515	0.163627	3.5	11	0.20	1.20	9.90	1.0	1.65	1.0	2.0	0.0	9.90	1.0	1.65	1.0	2.0	2.0	1.0	2.0	1.0	240.4	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP09	7.6724	0.133909	3.5	11	0.20	1.20	12.02	1.0	2.00	1.0	2.0	0.0	12.02	1.0	2.00	1.0	2.0	2.0	1.0	2.0	1.0	268.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP10	8.84214	0.154324	3.5	11	0.50	1.50	4.19	1.0	1.40	1.0	2.0	0.0	4.19	1.0	1.40	1.0	2.0	2.0	1.0	2.0	1.0	207.8	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP11	12.49517	0.218082	3.5	11	0.40	1.40	3.77	1.0	1.08	2.0	2.0	0.0	3.77	1.0	1.08	2.0	2.0	2.0	1.0	4.0	2.0	103.1	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
TP12	9.46335	0.165177	3.5	11	0.30	1.30	6.54	1.0	1.51	1.0	2.0	0.0	6.54	1.0	1.51	1.0	2.0	2.0	1.0	2.0	1.0	30.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
TP13	6.30381	0.110022	3.5	11	0.10	1.10	29.15	1.0	2.65	1.0	2.0	0.0	29.15	1.0	2.65	1.0	2.0	2.0	1.0	2.0	1.0	162.5	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP14	2.39487	0.041798	3.5	11	3.10	4.10	2.48	1.0	1.88	1.0	2.0	0.0	2.48	1.0	1.88	1.0	2.0	2.0	1.0	2.0	1.0	294.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP15	3.12206	0.05449	3.5	11	0.30	1.30	19.50	1.0	4.50	1.0	2.0	0.0	19.50	1.0	4.50	1.0	2.0	2.0	1.0	2.0	1.0	351.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
TP16	4.67019	0.08151	3.5	11	0.20	1.20	19.60	1.0	3.27	1.0	2.0	0.0	19.60	1.0	3.27	1.0	2.0	2.0	1.0	2.0	1.0	482.6	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
	177	177	177	177	177	177	177		177				177	177	177	177	177		177	177	177		177				
	1254	22	620	1947	111	288	793741		40030				793741	178	40030	240	356		178	460	240		280				
	15	0	4	11	4	5	207449		39631				207449	2	39631	4	4		2	8	4		4				
	0	0	4	11	0	1	1		1				1	1	1	1	2		1	2	1		1				
	15	0	0	0	4	4	207448		39631				207448	1	39631	3	2		1	6	3		3				
	7	0	4	11	1	2	4484		228				4484	1	226	1	2		1	3	1		2				

$FoS = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$

$FoS = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$ + Adjustment Value

FoS	Factor of Safety
c_u	Undrained Strength
γ	Bulk unit weight
z	Depth to failure plane assumed depth of peat
α	Slope angle

FoS	Factor of Safety
c_u	Undrained Strength
γ	Bulk unit weight
z	Depth to failure plane assumed depth of peat
α	Slope angle

Appendix C

Inchamore Wind Farm
Inchamore, Co. Cork / Co. Kerry

App 8.1 - App C- 3188-A2 (01) IWF SI - TP BH Locations

Legend

Development Layout

WF
- Red Line 23
- 230313 Site Layout
- Turbine Locations
- Site_Entrances
- Proposed Met Mast
- Watercourse Crossings
- Proposed Borrow Pits
- Borrow Pit
- Proposed Temporary Construction Compound
- Proposed On-Site Substation

UGC
- Inchamore Grid Connection Route
- HDD Crossings

Delivery
- Redline-250 Haul Road - 256-Polyline
- Turbine Delivery Route
- Redline-250 Haul Road - 256-Polyline
- Turbine Delivery Route

Geology

3188-A2-IWF SI Trial Pit Data
- Yes, Iron Pan Present

Base Maps

Bing Aerial

OpenStreetMap

Project ID:604162 Inchamore Wind Farm
Projection:ITM
Drawn by: Sven K.
Reviewed by: Sven K.
Version: 21/09/2022

References/Sources:
Environmental Protection Agency (EPA)
Geological Services Ireland (GSI)
Bing Aerial / GeoHive / Open Street Map / Google Roads
GDEM Elevation Contours
Phase 1 (250m Grid Peat Depth - Greensource

Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Scale: 0 0.27 0.54 km

RSK

N

N22 Crossing

Site Entrance

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 646
KERRY COUNTY COUNCIL

Temporary Compound

TP007

T3

T4

T1

Borrow Pit

TP002

TP011

Substation

WC3

WC2

T5

WC1

T2

Met Mast

T1 T5
T2 T4

Appendix D

Inchamore WF, Co. Cork

SI Trial Pit Logs

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling					Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER	TP001	
	Sample number & interval (mbGL) (Sample 10 kg minimum) Red line = Sample obtained from exposed face (Soil) Blue line = Composite sample generated in office or lab) Green line = Groundwater monitoring well (GW)	Non-Natural Ground Percentage (see * below)	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)			Client, Project, Location	JOD (Coillte), Inchamore WF , Cork	
								Minerex work item	A2	
								Page No.	1 of 1	
								Date & time drilled / formed	02/06/2021	
								Logged by (drawn by) [checked by]	SK	
								Drilling / Trial pitting co. & equipment	Excavator	
								Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)	
								Irish Transverse Mercator (ITM)**	514105, 578650	
								Geological description		Natural / Made
N/A		N/A	N/A			0.0		PEAT/PEATY SOIL. Medium Brown		N
						0.5		Sandy Gravelly CLAY w/ Cobbles. Medium Brown		N
						1.0		Boulders / Weathered Bedrock		N
					****	1.5		EOH – Weathered Bedrock / Boulders		
						2.0				
						2.5				
						3.0				
						3.5				
						4.0				

* Non-natural material %s with total % in ( )

NON-DEGRADABLE % (ND): 1 = **Brick**, 2 = **Concrete**, 3 = **Glass**, 4 = **Ceramic tiles**, 5 = **ACMs** (asbestos containing materials such as roof tiles, piping). 6 = **Blue Bangor slate.**

DEGRADABLE % (D): 7 = **Plastic**, 8 = **Metal**, 9 = **Wood / Organic / Leaves / Twigs / Peat**, 10 = **Ash & Clinker**, 11 = **Charcoal**, 12 = **Tarmacadam**, 13 = **Leather, 14 = Coal Tar**

**1-From hand held GPS, 2-Estimated from google maps or 3-Surveyed with theodolite.

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB); - Grey (LG, MG, DG); - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (Fill / made up ground / disturbed natural); N = Natural ground;

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = Single discrete sample (from mbGL) Blue line = Composite sample (generated in office or lab) Green line = Grab sample (collected on site)	Non-Natural Ground Percentage (see * below)	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW), Soil Core (SC), BH Arisings (BHA), Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER: TP002	
								Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
								Minerex work item	A2
								Page No.	1 of 1
								Date & time drilled / formed	02/06/2021
								Logged by (drawn by) [checked by]	SK
								Drilling / Trial pitting co. & equipment	Excavator
								Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)
								Irish Transverse Mercator (ITM)**	513978, 578679
								Geological description	Natural / Made
N/A		N/A	N/A			0.5		**CLAY.** Grey Brown	N
						1.0		**PEAT/PEATY SOIL.** Medium Brown	N
						1.5		Sandy Gravelly **CLAY.** Grey Brown	N
						2.0		Sandy Gravelly Cobbly **CLAY** w/ Boulders. Purplish Grey	N
						2.5		Bigger Boulders	
						3.0		**EOH** – Obstruction (Boulders)	
						3.5			
						4.0			

* **Non-natural material %s with total % in ( )**

NON-DEGRADABLE % (ND): 1 = **Brick**, 2 = **Concrete**, 3 = **Glass**, 4 = **Ceramic tiles**, 5 = **ACMs** (asbestos containing materials such as roof tiles, piping), 6 = **Blue Bangor slate.**

DEGRADABLE % (D): 7 = **Plastic**, 8 = **Metal**, 9 = **Wood / Organic / Leaves / Twigs / Peat**, 10 = **Ash & Clinker**, 11 = **Charcoal**, 12 = **Tarmacadam**, 13 = **Leather**, 14 = **Coal Tar**

** 1-From hand held GPS, 2-Estimated from google maps or 3-Surveyed with theodolite.

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone

F NN or N

RSK

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* — Red line = Single channel sample (from field); Blue line = Composite sample (generated in office or lab); Green line = Clay sample (used in lab)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & (Thickness)	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.5		**PEAT/PEATY SOIL.** Dark Brown; Mixed/Disturbed	N
						1.0		Sandy Gravelly **CLAY.** Brown Grey	N
						1.5		Sandy Gravelly **CLAY** w/ Cobbles and Boulders. Blue Grey / Purple Grey.	N
						2.0			
						2.5		Bigger Boulders	
						3.0		**EOH**	
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP003
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	02/06/2021
Logged by (drawn by) [checked by]	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref: 3188-A2-024, 603679 App D)
Irish Transverse Mercator (ITM)**	0513964, 0578729

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation: NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* — Red line = sample retained; Blue line = Composite sample generated in office or lab; Green line = Duplicate sample for laboratory analysis	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW), Soil Core (SC), BH Arisings (BHA), Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & (Thickness)	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A					**PEAT/PEATY SOIL.** Dark Brown	N
						0.5		Sandy **CLAY.** Medium Brown	N
						1.0		Sandy **CLAY.** Grey	N
						1.5			
						2.0			
						2.5		**EOH** – Big Boulders	
						3.0			
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP004
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	02/06/2021
Logged by (drawn by) (checked by)	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref. 3188-A2-024. 603679 App D)
Irish Transverse Mercator (ITM)**	0513750, 0578906

* Unreliable data. Indication only.

** From hand held GPS

A	B	C	D	E	F
DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder	COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff	LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone	NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural)

N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = Single enviro sample (from field); Blue line = Composite sample (generated in office or lab); Green line = Grab sample (collected in situ)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW), Soil Core (SC), BH Arisings (BHA), Trial Pit Clumps (TPC)	Odour strength & description (None, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & (Thickness)	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
						0.5		Sandy Gravelly **CLAY** w/ boulders. Medium Brown	N
						1.0			
						1.5			
						2.0			
						2.5			
						3.0			
						3.5			
						4.0		**EOH – Boulders**	

INVESTIGATION POINT LOG NUMBER	TP005
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	02/06/2021
Logged by (drawn by) [checked by]	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)
Irish Transverse Mercator (ITM)**	513761, 579123

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = Single discrete sample (from hole) Blue line = Composite sample (generated in office or lab) Green line = Field sample (registered on site)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW) Soil Core (SC), BH Arisings (BHA) Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & *[Thickness]*	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
						0.5		Clayey, Sandy **GRAVEL / TILL** w/ Cobbles	N
						1.0			
						1.5			
						2.0			
						2.5		**EOH** End of turning point, ground level below baseline. Cut side +2m. Peat 0.2mbGL, Brown till 0.3, grey as logged to existing GL.	
						3.0			
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP006	
Client, Project, Location	JOD (Coillte), Inchamore WF, Cork	
Minerex work item	A2	
Page No.	1 of 1	
Date & time drilled / formed:	02/06/2021	
Logged by (drawn by) [checked by]	SK	
Drilling / Trial pitting co. & equipment	Excavator	
Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)	
Irish Transverse Mercator (ITM)**	513543, 579269	

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff

E LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone

F NN or N: NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground

RSK

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

Minerex Template Ref: Drill027. Tel: 01-2964435, Web:

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling					Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER	TP007	
	Sample number & interval (mbGL) (Sample 10 kg minimum) Red line = Single discrete sample (From field) Blue line = Composite sample (generated in office or lab) Green line = Grab sample (collected at GW)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW), Soil Core (SC), BH Arisings (BHA), Trial Pit Clumps (TPC)	Odour Strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)			Client, Project, Location	JOD (Colite), Inchamore WF , Cork	
								Minerex work item	A2	
								Page No.	1 of 1	
								Date & time drilled / formed:	03/06/2021	
								Logged by (drawn by) [checked by]	SK	
								Drilling / Trial pitting co. & equipment	Excavator	
								Doc. Ref.	(File Ref 3188-A2-024, 603679 App D)	
								Irish Transverse Mercator (ITM)**	0512950, 0578987	
								Geological description		Natural / Made
N/A		N/A	N/A			0.0		PEAT/PEATY SOIL. Dark Brown		N
						0.5		Sandy Gravelly CLAY. Medium Brown		N
						1.0		Sandy Gravelly CLAY with cobbles. Blue grey		N
						1.5		Iron stain		
						2.0		Iron stain		
						2.5		Iron stain		
						3.0		EOH – Weathered Bedrock / Boulders		
						3.5				
						4.0				

* Unreliable data. Indication only.

** From hand held GPS

A	B	C	D	E	F
DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder	COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff)	LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone	NN or N

RSK

Write additional help notes on macropores, mottling etc as space allows

F Interpretation: NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = Single Material sample (from Field) Blue line = Composite sample (generated in office or lab) Green line = Other sample observed on site	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Auger (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maOD/M) & *(Thickness)*	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		PEAT/PEATY SOIL. Dark Brown	N
						0.5		Sandy Gravelly CLAY w/ cobbles.	N N N
						1.0			
						1.5			
						2.0			
						2.5			
						3.0		EOH – Weathered Bedrock / Boulders	
						3.5			
						4.0			

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 646
KERRY COUNTY COUNCIL

INVESTIGATION POINT LOG NUMBER	TP008
Client, Project, Location	JOD (Collite), Inchamore WF , Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	03/06/2021
Logged by (drawn by) [checked by]	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref. 3188-A2-024 603679 App D)
Insh Transverse Mercator (ITM)**	512974, 579057

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)*	Non-Natural Ground Percentage	PID (ppm) (Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC))	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & (*Thickness*)	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
								Sandy Gravelly **CLAY** w/ cobbles. Medium Brown	N
						0.5		Sandy Gravelly **CLAY** w/ cobbles and boulders. Medium Brown	N
						1.0			
						1.5		Bigger Boulders	
						2.0		**EOH**	
						2.5			
						3.0			
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP009
Client, Project, Location	JOD (Coillte), Inchamore WF, Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	03/06/2021
Logged by (drawn by) [checked by]	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref. 3188-A2-024; 603679 App D)
Irish Transverse Mercator (ITM)**	612989, 579081

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB); - Grey (LG, MG, DG); - Mustard; - Beige (tan); - Olive; - Mottled; - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) (Sample 10 kg minimum)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (mAODM) & [Thickness]	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A					TOPSOIL	N
								Sandy Gravelly **CLAY**. Brown	
								PEAT/PEATY SOIL. Dark Brown	N
						0.5		Sandy Gravelly **CLAY**. Brown	
								Sandy Gravelly **CLAY**. Blue Grey	
						1.0			
						1.5			
						2.0		Big Boulder	
						2.5		**EOH**	
						3.0			
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP010				
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork				
Minerex work item	A2				
Page No.	1 of 1				
Date & time drilled / formed:	03/06/2021				
Logged by (drawn by) [checked by]	SK				
Drilling / Trial pitting co. & equipment	Excavator				
Doc. Ref.	(File Ref. 3188-A2-024 603679 App D)				
Irish Transverse Mercator (ITM)**	0513253, 0578571				

* Unreliable data. Indication only.

** From hand held GPS

A	B	C	D	E	F
DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder	COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	STIFFNESS: VST - V. Soft ST = Soft F = Firm S = Stiff VS = V. Stiff	LAYER ID, RECOVERY & STONE: % recovery % >10mm stone	F: NN or N

RSK

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural)
N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)*	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); Bit Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & *[Thickness]*	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
						0.5		Very clayey very sandy **GRAVEL.**	N
						1.0			
						1.5			
						2.0		**EOH –** Weathered Bedrock	
						2.5			
						3.0			
						3.5			
						4.0			

INVESTIGATION POINT LOG NUMBER	TP011	
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork	
Minerex work item	A2	
Page No.	1 of 1	
Date & time drilled / formed:	03/06/2021	
Logged by (drawn by) [checked by]	SK	
Drilling / Trial pitting co. & equipment	Excavator	
Doc. Ref.	(File Ref. 3188-A2-024; 603579 App D)	
Irish Transverse Mercator (ITM)**	512781, 578602	

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand - Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation: NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling					Depth in metres below ground level, also (maODM) & (Thickness)	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER	TP012	
	Sample number & interval (mbGL) (Sample 10 kg minimum) Red line = Single discrete sample (from bag). Blue line = Composite sample (generated in office or lab) Green line = Core sample (recovered on site)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)			Client, Project, Location	JOD (Coillte), Inchamore WF , Cork	
								Minerex work item	A2	
								Page No.	1 of 1	
								Date & time drilled / formed:	03/06/2021	
								Logged by (drawn by) (checked by)	SK	
								Drilling / Trial pitting co. & equipment	Excavator	
								Doc. Ref.	(File Ref. 3189-A2-024 603679 App D)	
								Irish Transverse Mercator (ITM)**	512867, 578632	
								Geological description		Natural / Made
N/A		N/A	N/A					PEAT/PEATY SOIL. Dark Brown		N
								Weathered Bedrock		N
						0.5		EOH – Weathered Bedrock		
						1.0				
						1.5				
						2.0				
						2.5				
						3.0				
						3.5				
						4.0				

* Unreliable data. Indication only.

** From hand held GPS

A	B	C	D	E	F
DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder	COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	STIFFNESS: VST - V. Soft ST = Soft F = Firm S = Stiff VS = V. Stiff)	LAYER ID, RECOVERY & STONE: % recovery % >10mm stone	NN or N

RSK

Write additional help notes on macropores, mottling etc as space allows

F Interpretation: NN = Non-natural ground fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling					Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER	TP013	
	Sample number & interval (mbGL) (Sample 10 kg minimum) Red line = Single discrete sample (base bag) Blue line = Composite sample (generated in office or lab) Green line = Grab sample (generated on site)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS), Trial Pit Wall (TPW), Soil Core (SC), BH Arisings (BHA) Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)			Client, Project, Location	JOD (Colltte), Inchamore WF , Cork	
								Minerex work item	A2	
								Page No.	1 of 1	
								Date & time drilled / formed:	03/06/2021	
								Logged by (drawn by) [checked by]	SK	
								Drilling / Trial pitting co. & equipment	Excavator	
								Doc. Ref.	(File Ref. 3188-A2-024. 603679 App D)	
								Irish Transverse Mercator (ITM)**	0512589, 0578911	
								Geological description		Natural / Made
N/A		N/A	N/A					**PEAT/PEATY SOIL.** Dark Brown		N
								Sandy Gravelly **CLAY**		N
						0.5		Sandy Gravelly **CLAY** w/ cobbles and boulder. Blue grey.		
						1.0				
						1.5		**EOH – Boulders**		
						2.0				
						2.5				
						3.0				
						3.5				
						4.0				

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft, ST = Soft, F = Firm, S = Stiff, VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery, % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (*fill / made up ground / disturbed natural*), N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = single discrete sample (from 6 site). Blue line = Composite sample (generated in office or lab). Green line = Grab soil or groundwater sample.	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0		**PEAT/PEATY SOIL.** Dark Brown TP abandoned, deep peat encountered, probe point <5m from TP = 2.0mbGL. See peat probing data for area.	N

INVESTIGATION POINT LOG NUMBER	TP014
Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
Minerex work item	A2
Page No.	1 of 1
Date & time drilled / formed:	03/06/2021
Logged by (drawn by) (checked by)	SK
Drilling / Trial pitting co. & equipment	Excavator
Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)
Irish Transverse Mercator (ITM)**	512554, 579045

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 6 4 6
KERRY COUNTY COUNCIL

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT	B NON-DOMINANT GEOLOGICAL COMPONENT	C COLOUR	D STIFFNESS	E LAYER ID, RECOVERY & STONE	F
Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	Clay - Silt - Sand Gravel - Cobble - Boulder	- Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	VST - V. Soft ST = Soft F = Firm S = Stiff VS = V. Stiff)	% recovery % >10mm stone	NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation
NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling					Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	INVESTIGATION POINT LOG NUMBER	TP015
	Sample number & interval (mbGL) *(Sample 10 kg minimum)* Red line = Single discrete sample (from field) Blue line = Composite sample (generated in office or lab) Green line = Spot sample (collected on site)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)			Client, Project, Location	JOD (Coillte), Inchamore WF , Cork
								Minerex work item	A2
								Page No.	1 of 1
								Date & time drilled / formed:	03/06/2021
								Logged by (drawn by) (checked by)	SK
								Drilling / Trial pitting co. & equipment	Excavator
								Doc. Ref.	(File Ref. 3188-A2-024, 603679 App D)
								Irish Transverse Mercator (ITM)**	512439, 578989
								Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
						0.3		Sandy Gravelly Cobbly **CLAY**, Brown	N
						0.5		**EOH.** Bedrock	
						1.0			
						1.5			
						2.0			
						2.5			
						3.0			
						3.5			
						4.0			

* Unreliable data. Indication only.

** From hand held GPS

A DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit

B NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder

C COLOUR: - Brown (LB, MB, DB) - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange

D STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff)

E LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone

F NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation

NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground)

Borehole/ Trial Pit Design & Completion	Soil (S) / Water (W) / Vapour (V) Sampling: Sample number & interval (mbGL) (Sample 10 kg minimum)	Non-Natural Ground Percentage	PID (ppm) Bagged sample (BS); Trial Pit Wall (TPW); Soil Core (SC); BH Arisings (BHA); Trial Pit Clumps (TPC)	Odour strength & description (none, weak, moderate, strong)	Groundwater occurrence (See legend for symbols used for dry, damp and wet)	Depth in metres below ground level, also (maODM) & [Thickness]	Geology (graphical log)	Geological description	Natural / Made
N/A		N/A	N/A			0.0		**PEAT/PEATY SOIL.** Dark Brown	N
						0.3		Sandy Gravelly Cobbly **CLAY**, Brown	N
						0.5		**EOH.** Bedrock.	
						1.0			
						1.5			
						2.0			
						2.5			
						3.0			
						3.5			
						4.0			

Borehole/ Trial Pit Design & Completion	INVESTIGATION POINT LOG NUMBER: TP016
	Client, Project, Location: JOD (Coillte), Inchamore WF , Cork
	Minerex work item: A2
	Page No.: 1 of 1
	Date & time drilled / formed: 03/06/2021
	Logged by (drawn by) [checked by]: SK
	Drilling / Trial pitting co. & equipment: Excavator
	Doc. Ref.: (File Ref. 3188-A2-024; 603679 App D)
	Irish Transverse Mercator (ITM)**: 512293, 578980

* Unreliable data. Indication only.

** From hand held GPS

A	B	C	D	E	F
DOMINANT GEOLOGICAL COMPONENT: Clay, Silt, Sand, Gravel, Cobble, Boulder deposit	NON-DOMINANT GEOLOGICAL COMPONENT: Clay - Silt - Sand Gravel - Cobble - Boulder	COLOUR (LB, MB, DB): - Brown - Grey (LG, MG, DG) - Mustard - Beige (tan) - Olive - Mottled - Orange	STIFFNESS: VST - V. Soft; ST = Soft; F = Firm; S = Stiff; VS = V. Stiff	LAYER ID, RECOVERY & STONE: % recovery; % >10mm stone	NN or N

Write additional help notes on macropores, mottling etc as space allows

F Interpretation: NN = Non-natural ground (fill / made up ground / disturbed natural); N = Natural ground

GENERAL LEGEND, ABBREVIATIONS AND INSTALLATION DETAILS

BEDROCK

Metamorphic bedrock
Igneous bedrock
Mudstone / Shale bedrock
Siltstone / Sandstone bedrock
Limestone bedrock

COLOUR

Brown (Light, medium, dark)
Grey (Light, medium, dark)
Mustard
Beige (tan)
Olive
Mottled
Orange

GRAIN SIZE (Soil)

Clay (% of)	C(20)
Silt (% of)	St(20)
Sand (% of)	Sd(20)
Gravel (% of)	G(20)
Sand (Fine to Medium)	Sd_{F-M}
Gravel (Fine to Coarse Subangular to angular)	$G_{F-C\ SA-A}$

MONITORING POINT COMPLETIONS

TS/C1/PH1	Terminal Site/Couple no./Phreatic no.
PR/C2/P2	Peat Repository/Couple no./Piezometer no.
H7	Von Post humification scale
	Push-on cap
	Screen
	Casing
	Porous tip
	Drive cone
P1 PH1	Piezometer no. and Phreatic tube no.
	Bentonite pellets
	Cement-Bentonite grout
	Gravel pack, nominal 2-5mm in diameter
	Damp, wet and water strike respectively
1/2/03	Static water table (with date measured and hours since installation)

PLAN SKETCHES

PWS1	Hand dug trial pits / Shallow pit excavations (JCB)
TP1	Percussion Window Sampler (PWS) boreholes
100 BG	FID/PID in ppm Hydrocarbons with BG = background
99.791	Reduced levels - maOD Malin
	Oil pipeline
	Storage tanks (Overground and underground)

OVERBURDEN

(Description uses BS 5930 and GSI guidelines)

BOULDER(S) (>200mm)

COBBLES (60 to 200mm)

GRAVEL (Homogeneous larger sized particles from 2 to 60 mm)

SAND (General, if without grain size description) Particle sizes: 2 to 0.06mm. Three sub-categories distinguishable to the eye)

Coarse **SAND** (2-0.6mm)

Medium **SAND** (0.6-0.2mm)

Fine **SAND** (0.2-0.06mm)

SILT (0.06 - 0.002mm)

CLAYS (<0.002mm)

CONCRETE

TARMACADAM

CRUSHED STONE or AGGREGATE

LANDFILL (eg plastic, glass, wood, domestic waste, concrete etc.)

FILL OR BACKFILLED GROUND (unspecified)

COLLAPSED FORMATION (with possible voids) or **DRILL CHIPPINGS / MATERIAL RETURNED BY AIR FLUSH DRILLING**

LOSS (Blank - white)

TOP SOIL

PEAT (General) (with descriptions such as colour, plant remains evident, distinct H_2S smell etc) (H (Von Post) value associated commonly)

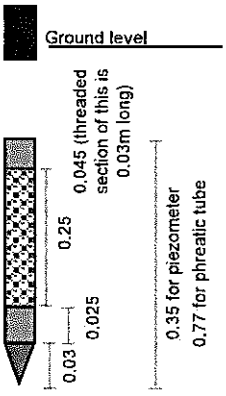
MONITORING POINT DESIGN FOR PEAT SUBSOILS

Push-on, female cap

The cap is loosely fitted to allow easy removal. The piezometer is labelled using indellible ink inside and outside the cap. A small hole is drilled in the side to enable air movement in and out of the piezometer.

Casing up-stand

The upstand is the height of the casing above ground level in meters. The height depends on local groundwater and surface water circumstances. The piezometer number is scrapped onto the side of the casing near the cap as with time the writing on the cap wears off. Upstands vary from 0.3 to 1.0m in height. The convention is allow a higher upstand for those piezometers positioned at a higher level.



Casing

The casing is black or dark grey coloured, flush-threaded, uPVC. The OD is 26.80mm and the ID is 18.40. The casing is flush-threaded to the piezometer tip.

Tube or Piezometer tip

This section is installed opposite the required formation. There are two sections to the piezometer tip. The inner tube section is 18.40mm ID, white in colour and involves extruded microporous polyethylene. The outer comprises grey or black coloured uPVC with 10 x 0.013m diameter holes per 0.10m of piezometer tip. Therefore the surface area exposed to the formation (peat) is small. The piezometer tube tip is flush-threaded, either male or female, to the piezometer casing. Threaded part is 0.03m long. The phreatic tube tip is longer than the piezometer tube tip to allow for greater water level fluctuations.

Drive cone

This is grey coloured, solid, uPVC, pushed or screwed into the tube or piezometer tip. No glue has been used. If the ground is soft, a push-in button cap may be used instead of a drive cone.

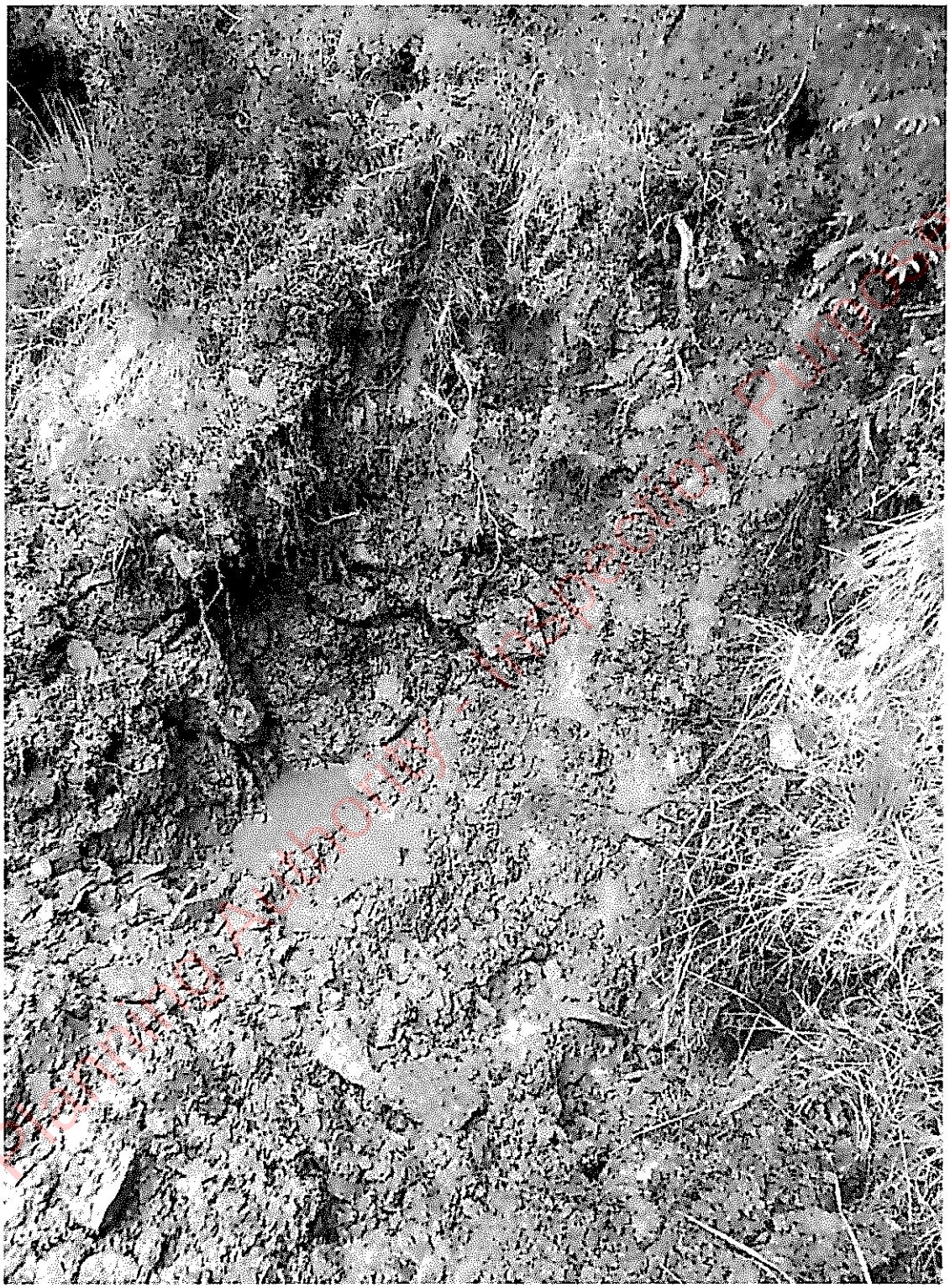
NOTES:-

The phreatic tubes are pushed by hand into the peat. The piezometers are pushed or driven into the peat and mineral soil after a narrow diameter hole has been formed using overburden drilling (Cobra or Percussion Window Sampler) / coring equipment (Gouge corer). The tubes and piezometers have three main functions: water table measurements, water sampling, permeability measurements.

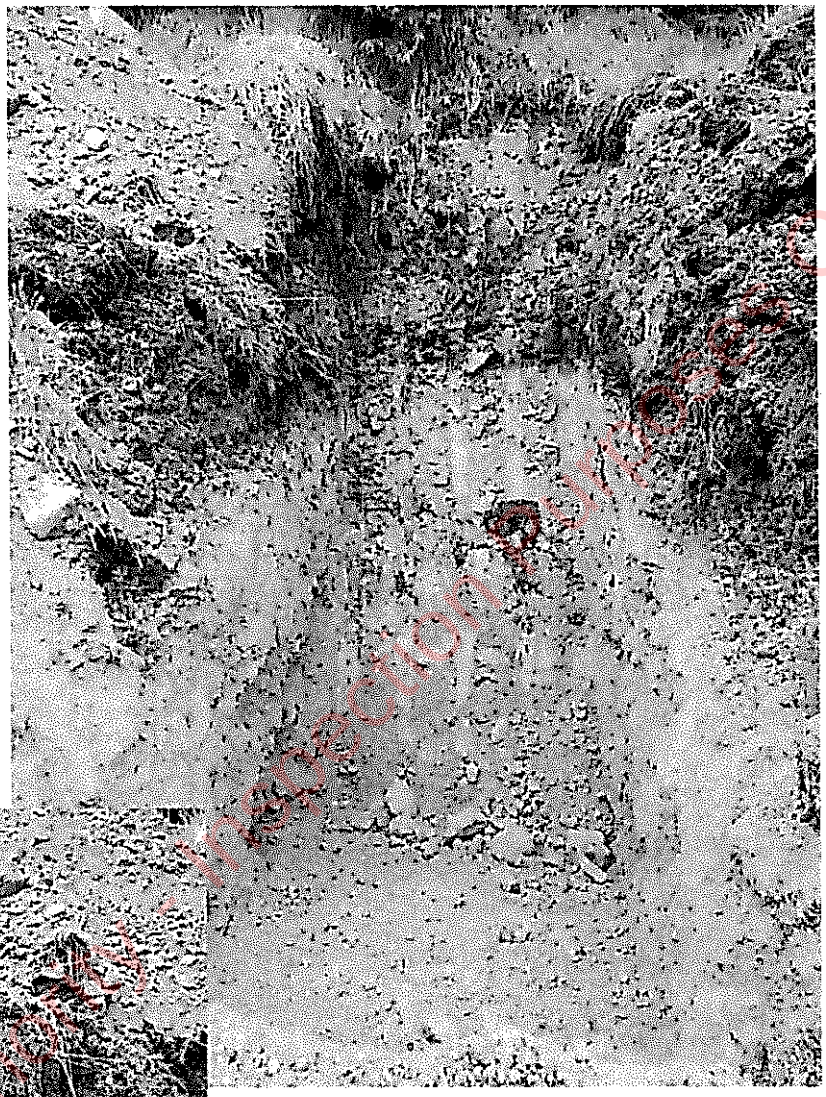
Appendix E

Inchamore WF, Co. Cork

SI Trial Pit Photos

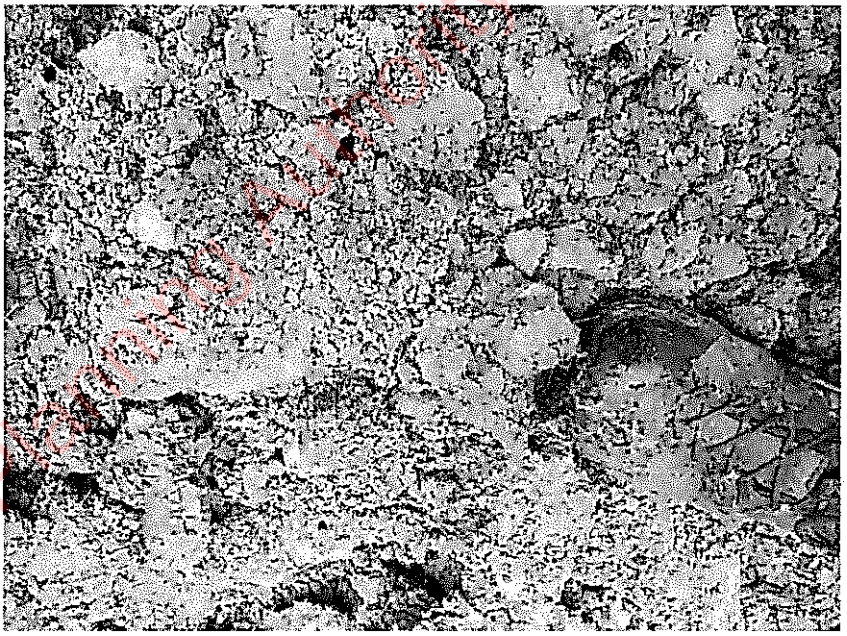


Appendix E – IWF Trial Pit and Site Photos
TP002
(File Ref. 3188-A2-008; 603679 App E)



Appendix E – IWF Trial Pit and Site Photos
TP003
(File Ref. 3188-A2-008; 603679 App E)

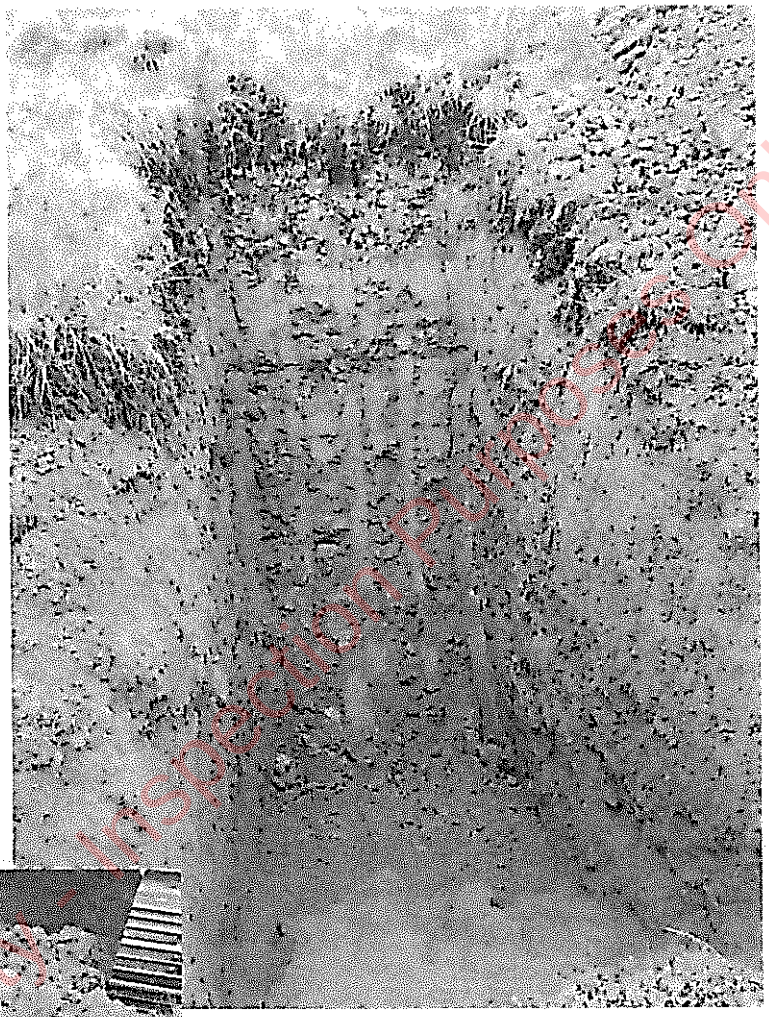
Appendix E – IWF Trial Pit and Site Photos
TP004
(File Ref. 3188-A2-008; 603679 App E)



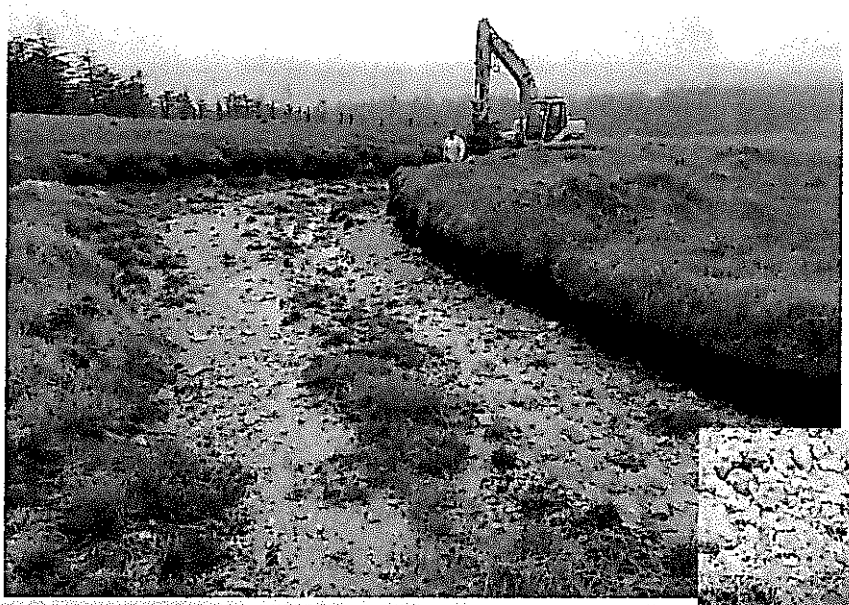
Appendix E – IWF Trial Pit and Site Photos
TP005
(File Ref. 3188-A2-008; 603679 App E)

Appendix E – IWF Trial Pit and Site Photos
TP006
(File Ref. 3188-A2-008; 603679 App E)

Appendix E – IWF Trial Pit and Site Photos
TP007
(File Ref. 3188-A2-008; 603679 App E)



Appendix E – IWF Trial Pit and Site Photos
TP008
(File Ref. 3188-A2-008; 603679 App E)

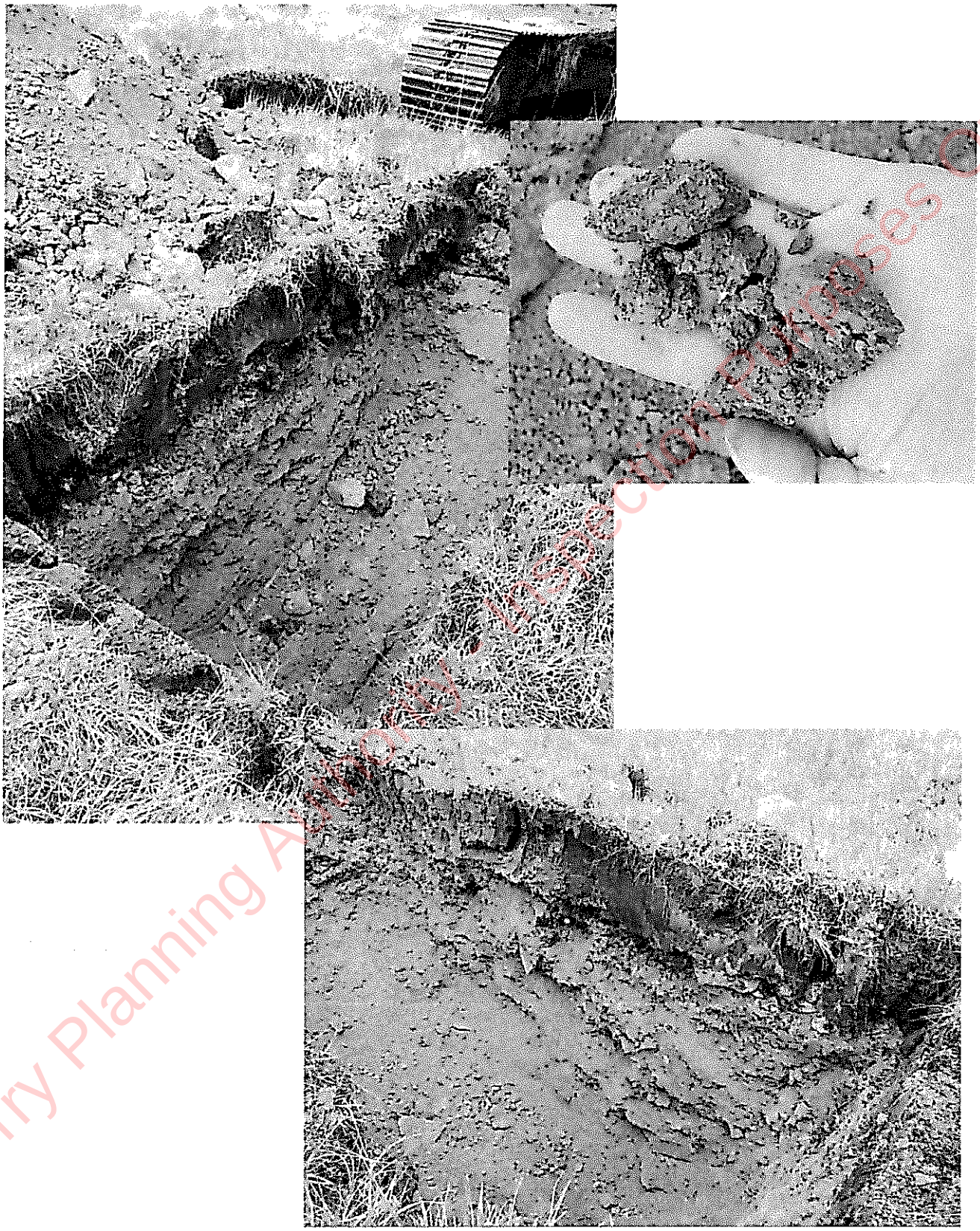


Appendix E – IWF Trial Pit and Site Photos
TP008
(File Ref. 3188-A2-008; 603679 App E)

Appendix E – IWF Trial Pit and Site Photos
TP009
(File Ref. 3188-A2-008; 603679 App E)

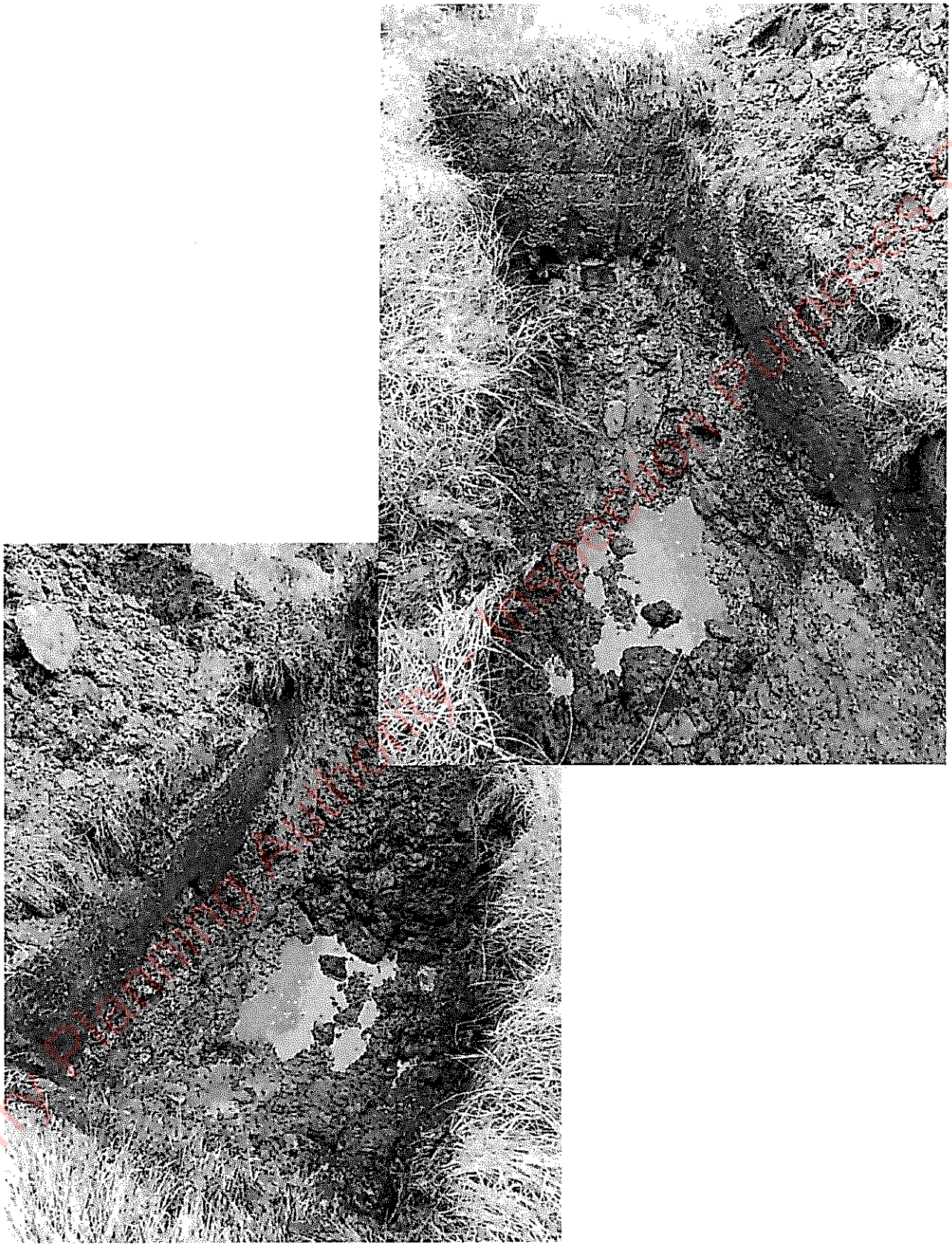
Appendix E – IWF Trial Pit and Site Photos
TP010
(File Ref. 3188-A2-008; 603679 App E)

Appendix E – IWF Trial Pit and Site Photos
TP011
(File Ref. 3188-A2-008; 603679 App E)

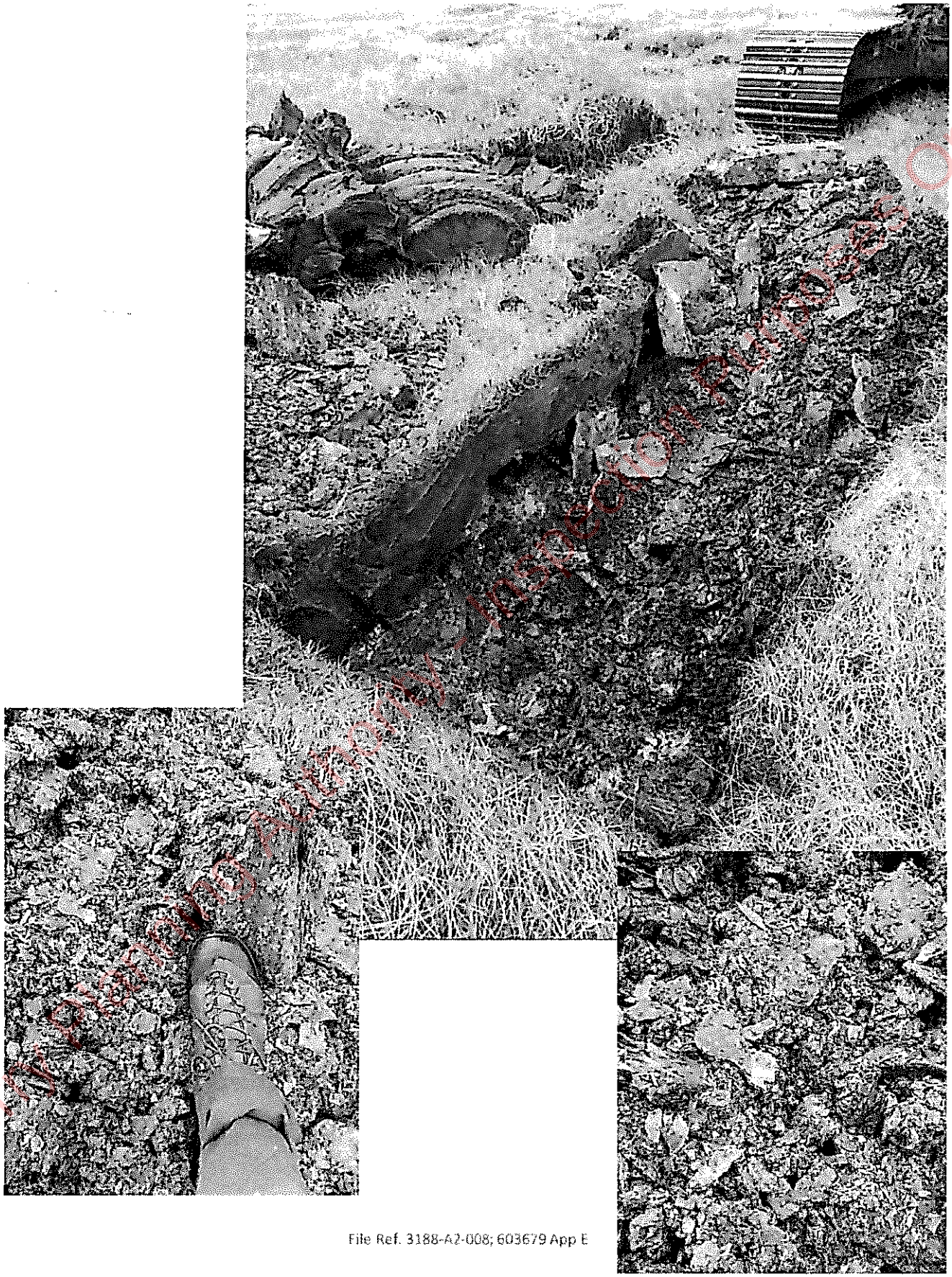


Appendix E – IWF Trial Pit and Site Photos
TP012
(File Ref. 3188-A2-008; 603679 App E)

Appendix E – IWF Trial Pit and Site Photos
TP013
(File Ref. 3188-A2-008; 603679 App E)



Appendix E – IWF Trial Pit and Site Photos
TP015
(File Ref. 3188-A2-008; 603679 App E)



Appendix F

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

**	Drillers Description
Friable	Easily crumbled

SAMPLES

U( )	Undisturbed 102mm diameter sample, ( ) denotes number of blows to drive sampler
U( )F, U( )P	F- not recovered, P-partially recovered
U38	Undisturbed 38mm diameter sample
P(F), (P)	Piston sample - disturbed
B	Bulk sample - disturbed
D	Jar Sample - disturbed
W	Water Sample
CBR	California Bearing Ratio mould sample
ES	Chemical Sample for Contamination Analysis
SPTLS	Standard Penetration Test S lump sample from split sampler

CORE RECOVERY AND ROCK QUALITY

TCR	Total Core Recovery (% of Core Run)
SCR	Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD	Rock Quality Designation (length of solid core greater than 100mm as % of core run)

Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column

If	Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL	Assumed Zone of Core Loss
NI	Non intact

GROUNDWATER

▽	Groundwater strike
▼	Groundwater level after standing period
Date/Water	Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

S	Standard Penetration Test - split barrel sampler
C	Standard Penetration Test - solid 60° cone
SW	Self Weight Penetration
Ivp, HVp (R)	In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F), (C), (R), (P)	Permeability Test
HP	Hand Penetrometer Test

MEASURED PROPERTIES

N	Standard Penetration Test - blows required to drive 300mm after seating drive
x/y	Denotes x blows for y mm within the Standard Penetration Test
x*/y	Denotes x blows for y mm within the seating drive
c_u	Undrained Shear Strength (kN/m^2)
CBR	California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113

Priority Geotechnical Ltd. Tel: 021 4631600 Fax: 021 4638690 www.prioritygeotechnical.ie	Drilled By: GW Logged By: EK	Borehole No. **BH01I** Sheet 1 of 2

Project Name:	Gortyrahily and Inchamore Wind Farms	**Project No.** P21139	**Co-ords:**		**Hole Type** RC
Location:	Gortyrahily, Co.Cork. Inchamore, Co.Cork		**Level:**	m OD	**Scale** 1:50
Client:	Minerex Environmental		**Dates:**	04/06/2021	04/06/2021

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%) TCR	SCR	RQD	Depth (m) / FI (/m)	Level (mOD)	Legend	Stratum Description
		44 (6,8/44 for 85mm) (C)								Driller describes clayey sandy angular GRAVEL.
		~~0 (47 for 85mm/0 for 0mm)~~ (C) 2.80 - 3.50		100	0	0	2.80			Lithology: Red moderately weak SILTSTONE. Weathering: Core is showing minor signs of weathering. Sections 2.8m-3.5m and 5.7m-6.4m are highly fragmented. Fractures: One set identified. Set one has a dip of 60-70 degrees, an undulating rough fracture surface and close to medium spacing. Details: No obvious oxidation discolouration marks. Clay smearing present. Quartz veins present measuring between 2mm-20mm in thickness thickest between 3.5m-5.5m
		3.50 - 4.40	20mm 140mm 40mm	100	56	0	14/m			
		4.40 - 5.70	7mm 190mm 50mm	100	65	8	14/m			
		5.70 - 6.70	20mm 120mm 60mm	100	24	0				
		6.70 - 7.70	20mm 240mm 70mm	100	84	27	7/m			
		7.70 - 8.70	15mm 380mm 150mm	100	74	45	11/m			

Groundwater:

Struck (m bgl)	Level (m bgl)	After (min)	Sealed	Comment
2.50				See shift data for detail.

Hole Information:

Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)
10.50	76	131

Equipment: Soilmec PSM

Method: Compressed air mist.

Remarks:

Borehole terminated at 10.5m bgl.

Shift Data:

Groundwater (m bgl)	Shift	Hole Depth (m bgl)	Remarks
1.85	04/06/2021 08:00	0.00	Start of shift.
	04/06/2021 18:00	10.50	End of borehole.

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Tel: 021 4631600
Fax: 021 4638690
www.prioritygeotechnical.ie

Drilled By:	Borehole No.
GW	**BH01I**
Logged By:	Sheet 2 of 2
EK	

Project Name:	Gortyrahily and Inchamore Wind Farms	**Project No.** P21139	**Co-ords:**		**Hole Type** RC
Location:	Gortyrahily, Co.Cork. Inchamore, Co.Cork		**Level:**	m OD	**Scale** 1:50
Client:	Minerex Environmental		**Dates:**	04/06/2021	04/06/2021

Well	Water Strike (m)	Depth (m)	Type /Fe (min, max, avg)	Coring (%) TCR	SCR	RQD	Depth (m) / FI (/m)	Level (mOD)	Legend	Stratum Description
		8.70 - 9.70	10mm 180mm 150mm	100	76	24	8/m			Lithology: Red moderately weak SILTSTONE. Weathering: Core is showing minor signs of weathering. Sections 2.8m-3.5m and 5.7m-6.4m are highly fragmented. Fractures: One set identified. Set one has a dip of 60-70 degrees, an undulating rough fracture surface and close to medium spacing. Details: No obvious oxidation discolouration marks. Clay smearing present. Quartz veins present measuring between 2mm-20mm in thickness thickest between 3.5m-5.5m
		9.70 - 10.50	60mm 290mm 160mm	100	81	54	3/m 10.50			End of Borehole at 10.500m

10 11 12 13 14 15 16 17 18

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Groundwater:

Struck (m bgl)	Level (m bgl)	After (min)	Sealed	Comment
2.50				See shift data for detail.

Hole Information:

Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)
10.50	76	131

Equipment: Soilmec PSM
Method: Compressed air mist.

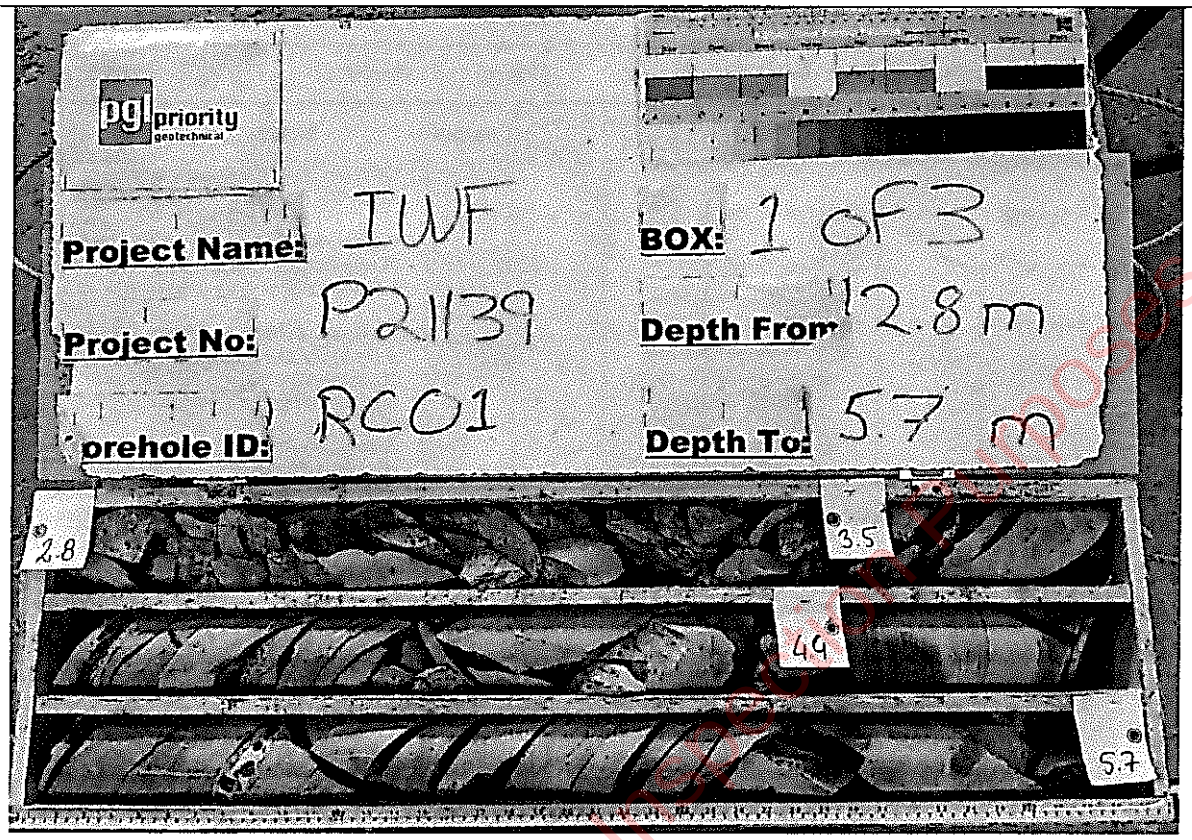
Remarks:
Borehole terminated at 10.5m bgl.

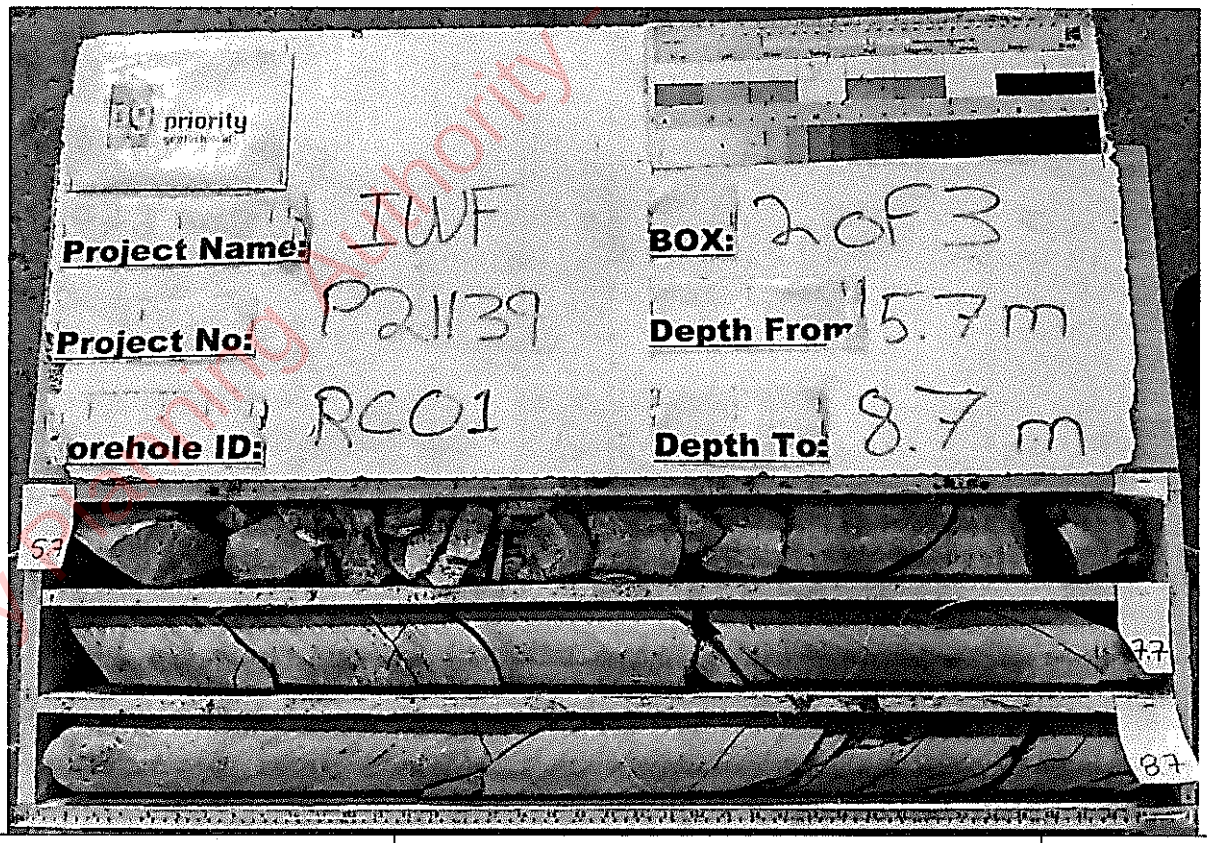
Shift Data:

Groundwater (m bgl)	Shift	Hole Depth (m bgl)	Remarks
	04/06/2021 08:00	0.00	Start of shift.
1.85	04/06/2021 18:00	10.50	End of borehole.

Photographic Record

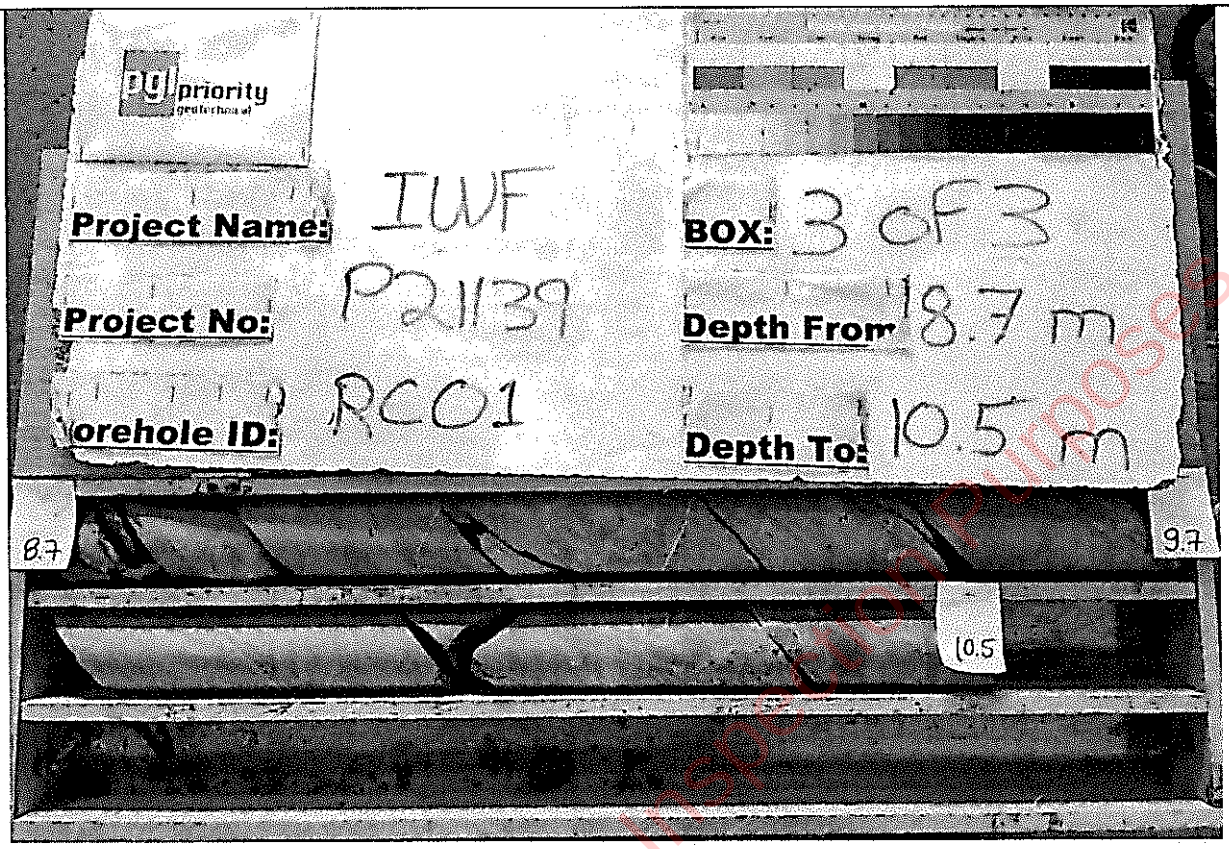
priority geotechnical





Number:	**RC01**	**Project**	Inchamore Wind Farm	
		Project No	P21139	
		Engineer	Minerex	

Photographic Record

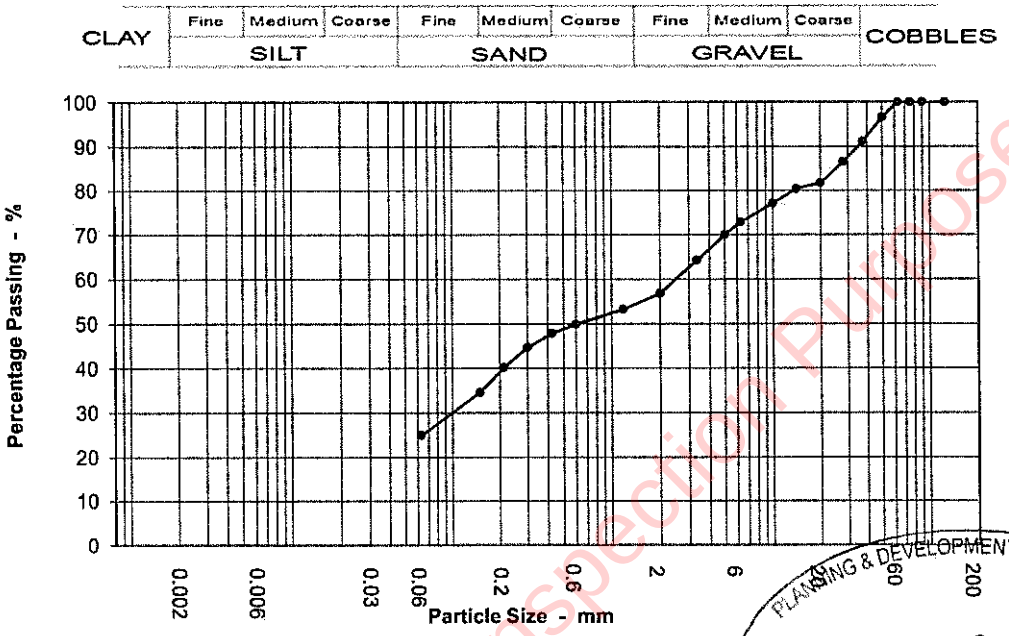


Number:	**RC01**	**Project**	Inchamore Wind Farm
		Project No	P21139
		Engineer	Minerex

KEY TO SYMBOLS - LABORATORY TEST RESULT

U	Undisturbed Sample	
P	Piston Sample	
TWS	Thin Wall Sample	
B	Bulk Sample - Disturbed	
D	Jar Sample - Disturbed	
W	Water Sample	
pH	Acidity/Alkalinity Index	
SO_3	% - Total Sulphate Content (acid soluble)	
SO_3	g/ltr - Water Soluble Sulphate (Water or 2:1 Aqueous Soil Extract)	
+	Calcareous Reaction	
Cl	Chloride Content	
PI	Plasticity Index	
<425	% of material in sample passing 425 micron sieve	
LL	Liquid Limit	
PL	Plastic Limit	
MC	Water Content	
NP	Non Plastic	
Yb	Bulk Density	
Yd	Dry Density	
Ps	Particle Density	
U/D	Undrained/Drained Triaxial	
U/C	Unconsolidated/Consolidated Triaxial	
T/M	Single Stage/Multistage Triaxial	
100/38	Sample Diameter (mm)	
REM	Remoulded Triaxial Test Specimen	
TST	Triaxial Suction Test	
V	Vane Test	
DSB	Drained Shear Box	
RSB	Residual Shear Box	
RS	Ring Shear	
σ_3	Cell Pressure	
σ_1-σ_3	Deviator Stress	
c	Cohesion	
c_	Effective Cohesion Intercept	
ϕ	Angle of Shearing Resistance - Degrees	
ϕ_	Effective Angle of Shearing Resistance	
εf	Strain at Failure	
*	Failed under 1st Load	
**	Failed under 2nd Load	
#	Untestable	
##	Excessive Strain	
p_o	Effective Overburden Pressure	
m_v	Coefficient of Volume Decrease	
c_v	Coefficient of Consolidation	
Opt	Optimum	
Nat	Natural	
Std	Standard Compaction - 2.5kg Rammer	(¶ CBR)
Hvy	Heavy Compaction - 4.5kg Rammer	(§ CBR)
Vib	Vibratory Compaction	
CBR	California Bearing Ratio	
Sat m.c.	Saturation Moisture Content	
MCV	Moisture Condition Value	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP03A2
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Very clayey very sandy GRAVEL	Sample type	B



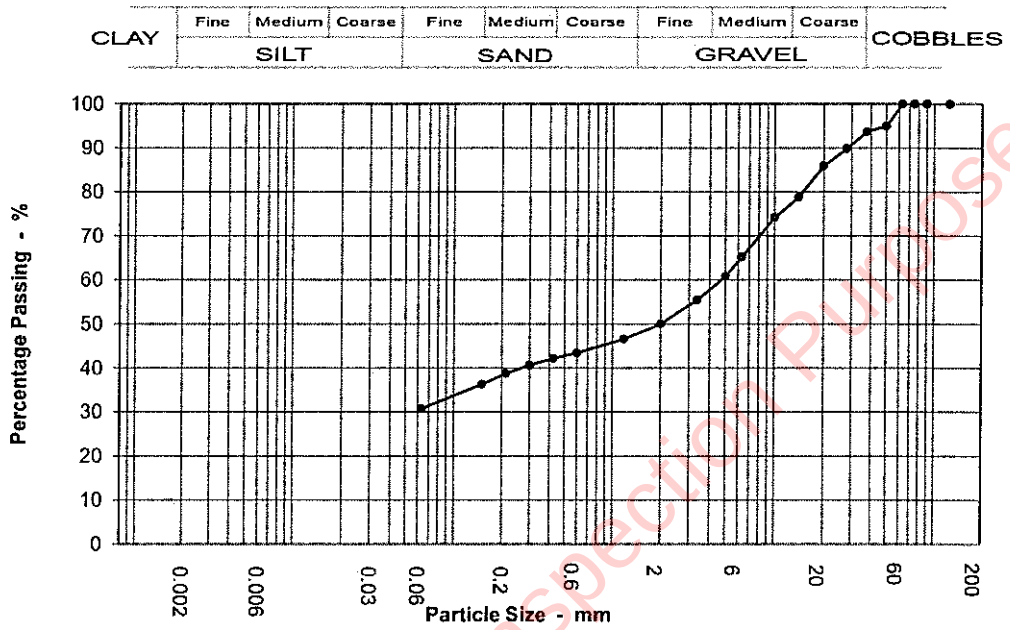
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	91		
28	87		
20	82		
14	80		
10	77		
6.3	73		
5	70		
3.35	64		
2	57		
1.18	53		
0.6	50		
0.425	48		
0.3	45		
0.212	40		
0.15	35		
0.063	25		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	43.0
Sand	32.0
Silt & Clay	25.0

Grading Analysis	
D100	63.00
D60	2.49
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP08A2
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Slightly sandy gravelly CLAY	Sample type	B



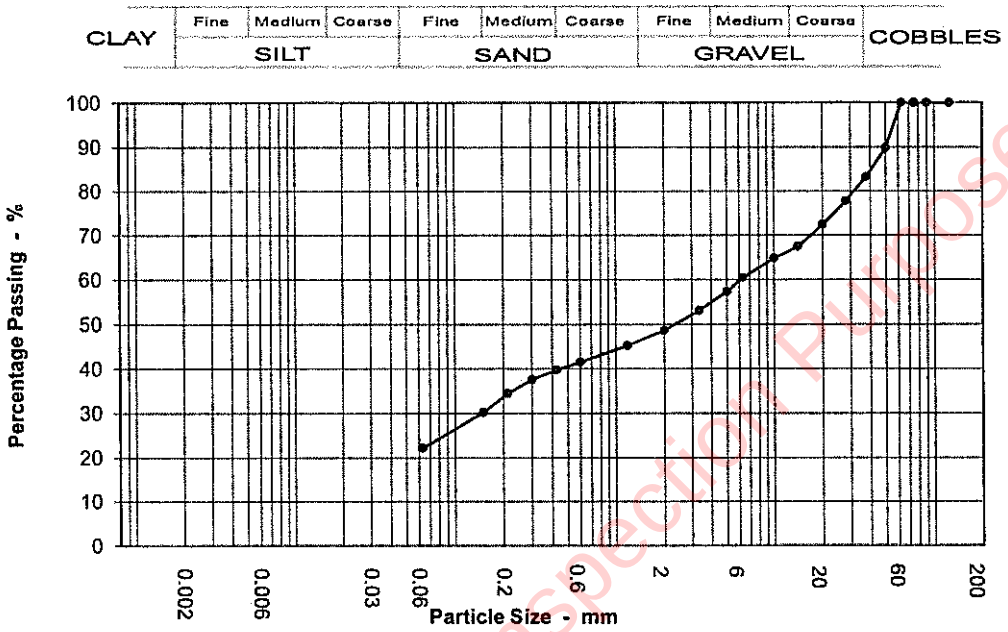
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	94		
28	90		
20	86		
14	79		
10	74		
6.3	65		
5	61		
3.35	55		
2	50		
1.18	47		
0.6	43		
0.425	42		
0.3	41		
0.212	39		
0.15	36		
0.063	31		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	50.0
Sand	19.0
Silt & Clay	31.0

Grading Analysis	
D100	63.00
D60	4.68
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP11A2
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Very clayey very sandy GRAVEL	Sample type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	90		
37.5	83		
28	78		
20	72		
14	67		
10	65		
6.3	60		
5	57		
3.35	53		
2	49		
1.18	45		
0.6	41		
0.425	40		
0.3	38		
0.212	34		
0.15	30		
0.063	22		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	51.0
Sand	26.0
Silt & Clay	22.0

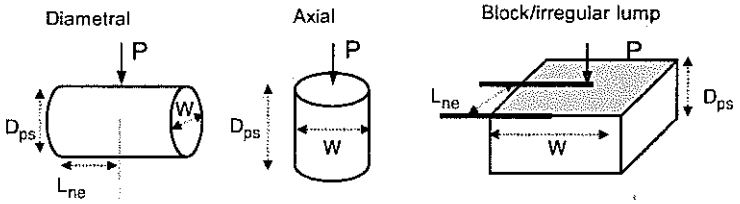
Grading Analysis	
D100	63.00
D60	6.08
D10	
Uniformity Coefficient	

Point Load Strength Index Tests
Summary of Results

Project No.	Project Name
P21139	Inchamore W.F

Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Depth	Ref.	Type	Ref.	Depth		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			I_s	$I_{s(50)}$	
	m				m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BH01I	3.66	RC	C			PURE SILTSTONE	D	U	YES	32.0	76.0	76.0	69.0	1.0	72.4	0.2	0.2	Undulated Rough
BH01I	4.50	RC	C			PURE SILTSTONE	D	U	YES	74.0	76.0	76.0	43.0	50.0	57.2	15.3	16.3	Undulated Rough
BH01I	6.76	RC	C			PURE SILTSTONE	D	U	YES	35.0	76.0	76.0	69.0	5.0	72.4	0.9	1.1	Undulated Rough
BH01I	8.20	RC	C			PURE SILTSTONE	D	P	YES	25.0	76.0	76.0	68.0	1.5	71.9	0.3	0.3	Undulated Rough
BH01I	9.88	RC	C			PURE SILTSTONE	D	U	YES	120.0	76.0	76.0	62.0	7.7	68.6	1.6	1.9	Undulated Rough

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

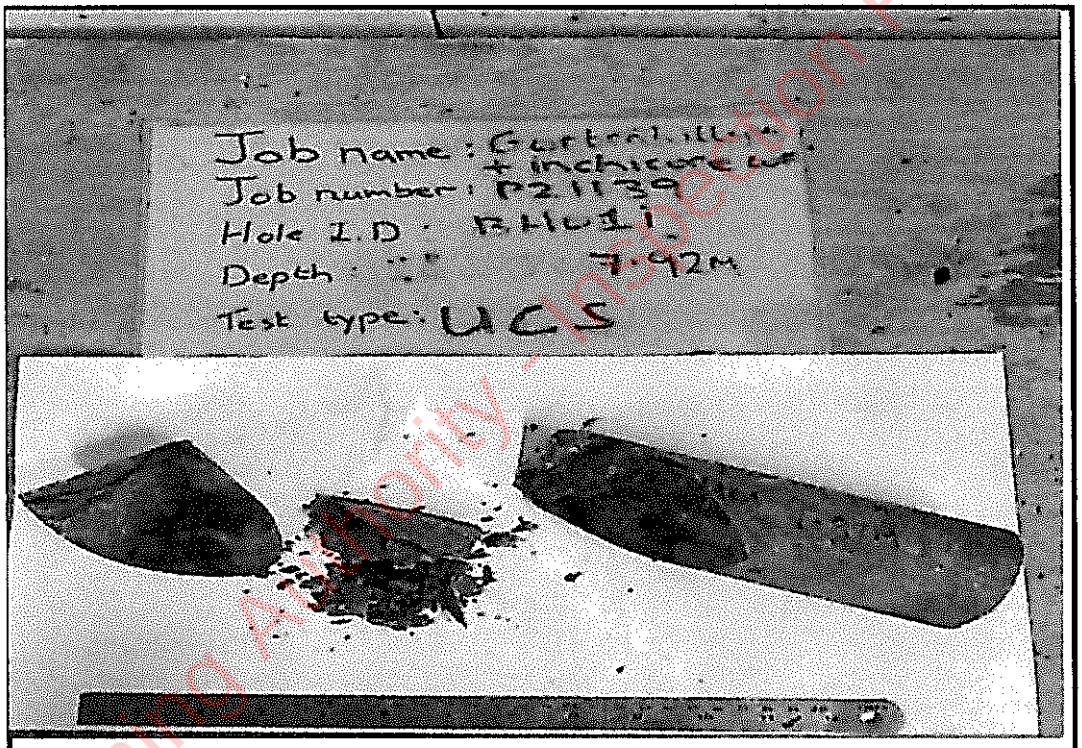


Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise
Detailed legend for test and dimensions, based on ISRM, is shown above.
Size factor, $F = (De/50)^{0.45}$ for all tests.

Date Printed	Approved By	Table
20/08/2021	Cilla	1 sheet 1

Unconfined Compressive Strength, UCS

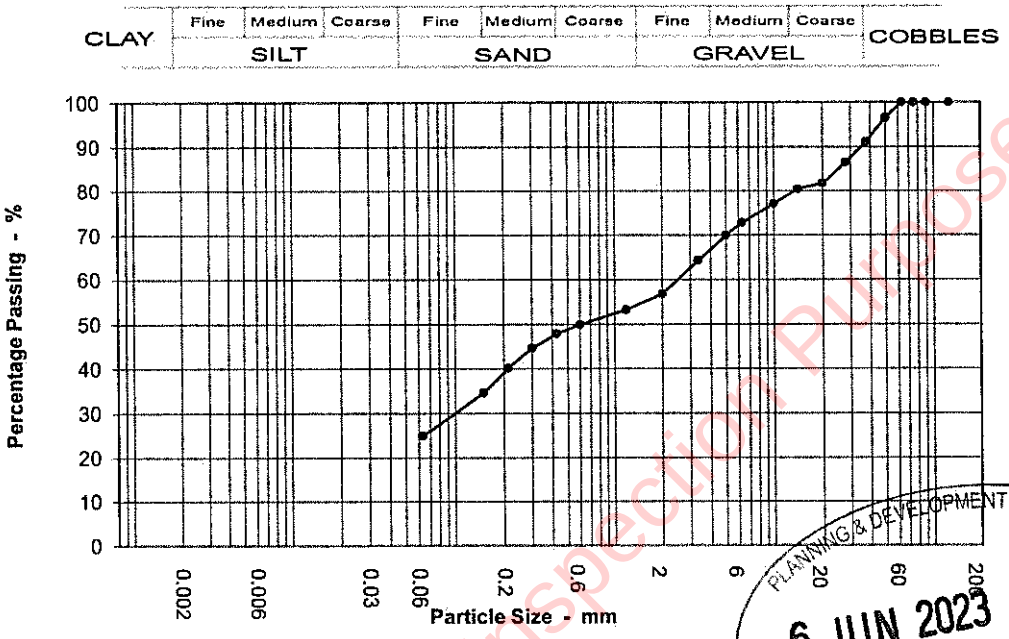
Job Name	Inchamore W.F
Job Number	P21139
Borehole:	BH01I
Depth:	7.92 m
Rock Type	PURPLE SILTSTONE
Bulk Density	2.73 Mg/m^3
Load at Failure, P	23.3 kN
Stress at Failure	5.17 MPa



Failure mode

Appendix G

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP03A2
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Very clayey very sandy GRAVEL	Sample type	B



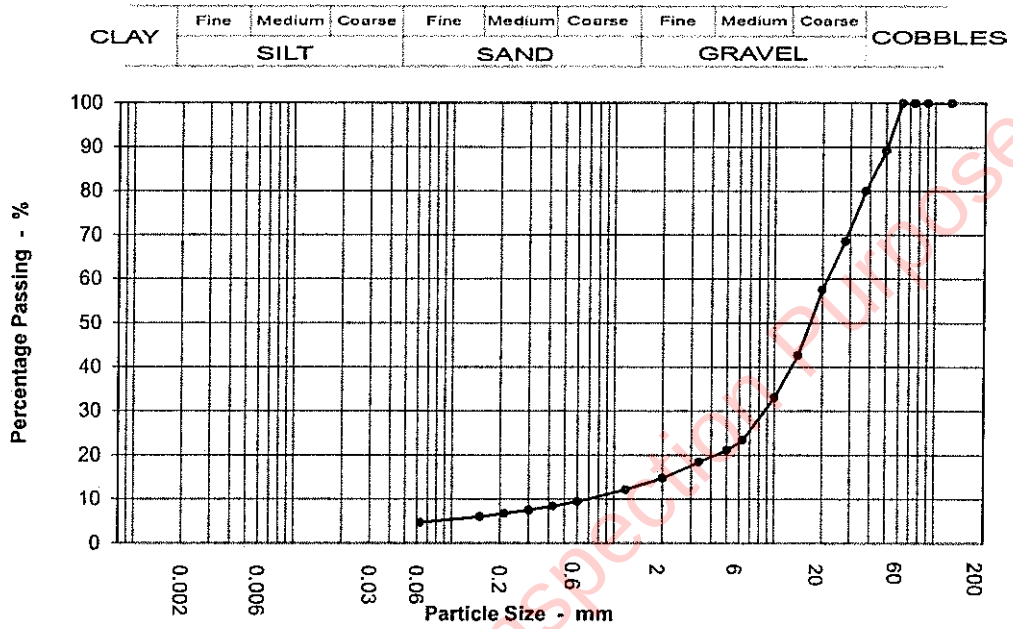
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	91		
28	87		
20	82		
14	80		
10	77		
6.3	73		
5	70		
3.35	64		
2	57		
1.18	53		
0.6	50		
0.425	48		
0.3	45		
0.212	40		
0.15	35		
0.063	25		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	43.0
Sand	32.0
Silt & Clay	25.0

Grading Analysis	
D100	63.00
D60	2.49
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP08A1
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Clayey sandy GRAVEL	Sample type	B



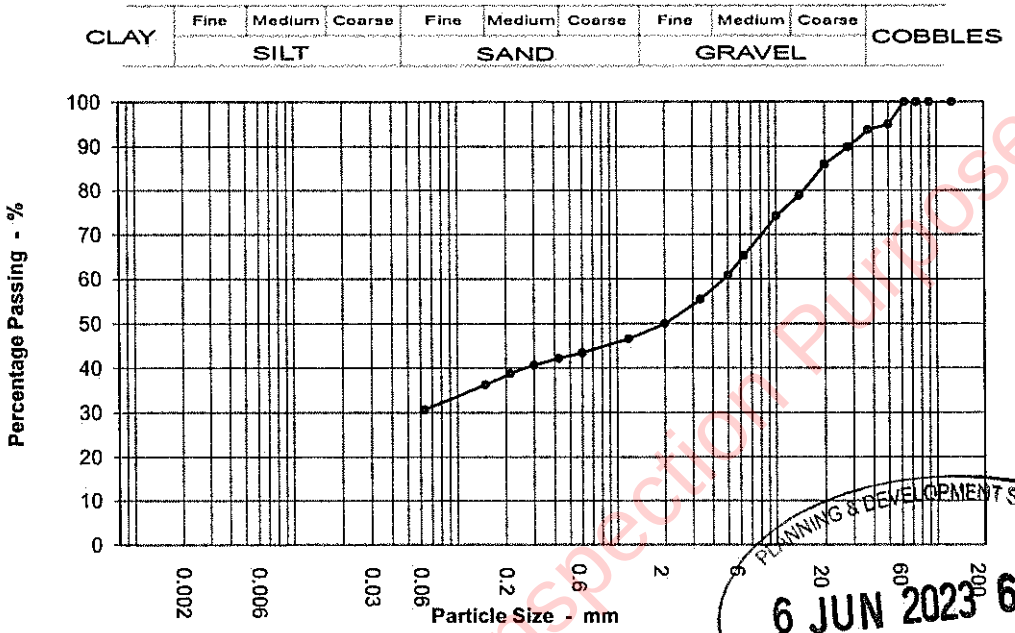
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	89		
37.5	80		
28	69		
20	58		
14	43		
10	33		
6.3	23		
5	21		
3.35	18		
2	15		
1.18	12		
0.6	9		
0.425	8		
0.3	7		
0.212	7		
0.15	6		
0.063	5		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	85.0
Sand	10.0
Silt & Clay	5.0

Grading Analysis	
D100	63.00
D60	21.50
D10	0.70
Uniformity Coefficient	31.00

pg priority geotechnical	PARTICLE SIZE DISTRIBUTION BS 1377 : Part 2 : 1990 : Clause 9	Job Ref	P21139
		Borehole / Pit No	TP08A2
Location	Gortyrahilly and Inchamore W.F	Sample No	
		Depth	0.00 m
Soil Description	Slightly sandy gravelly CLAY	Sample type	B



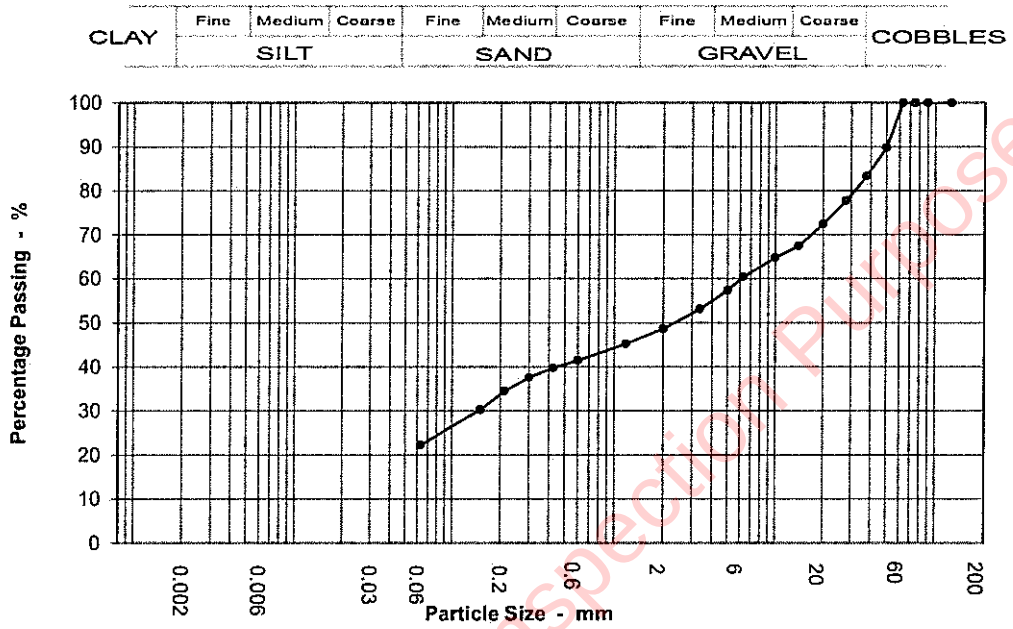
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	94		
28	90		
20	86		
14	79		
10	74		
6.3	65		
5	61		
3.35	55		
2	50		
1.18	47		
0.6	43		
0.425	42		
0.3	41		
0.212	39		
0.15	36		
0.063	31		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	50.0
Sand	19.0
Silt & Clay	31.0

Grading Analysis	
D100	63.00
D60	4.68
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP11A2
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Very clayey very sandy GRAVEL	Sample type	B



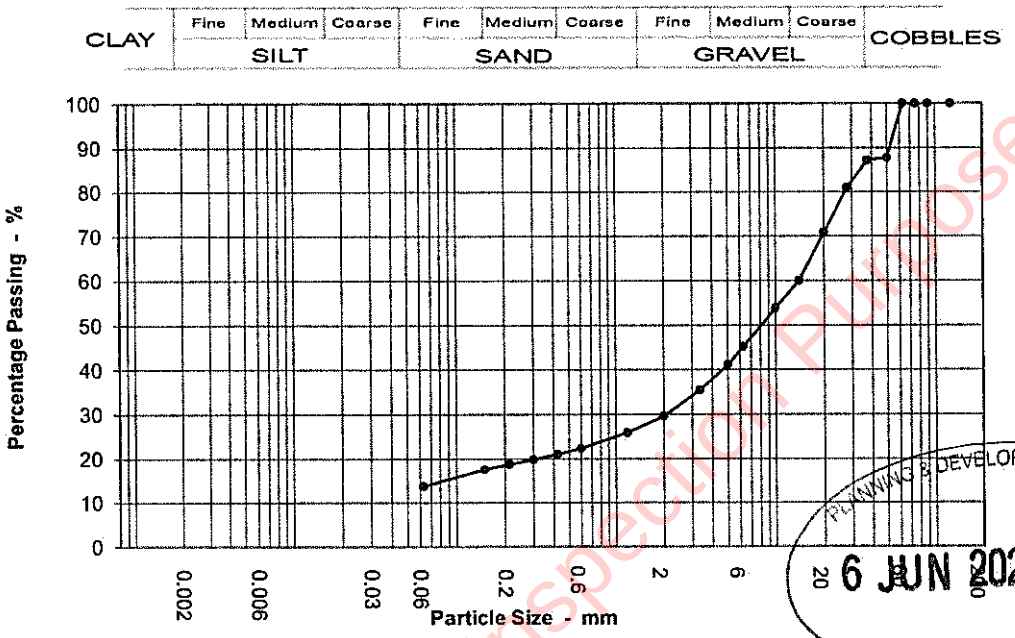
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	90		
37.5	83		
28	78		
20	72		
14	67		
10	65		
6.3	60		
5	57		
3.35	53		
2	49		
1.18	45		
0.6	41		
0.425	40		
0.3	38		
0.212	34		
0.15	30		
0.063	22		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	51.0
Sand	26.0
Silt & Clay	22.0

Grading Analysis	
D100	63.00
D60	6.08
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP13A1
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Clayey sandy GRAVEL	Sample type	B



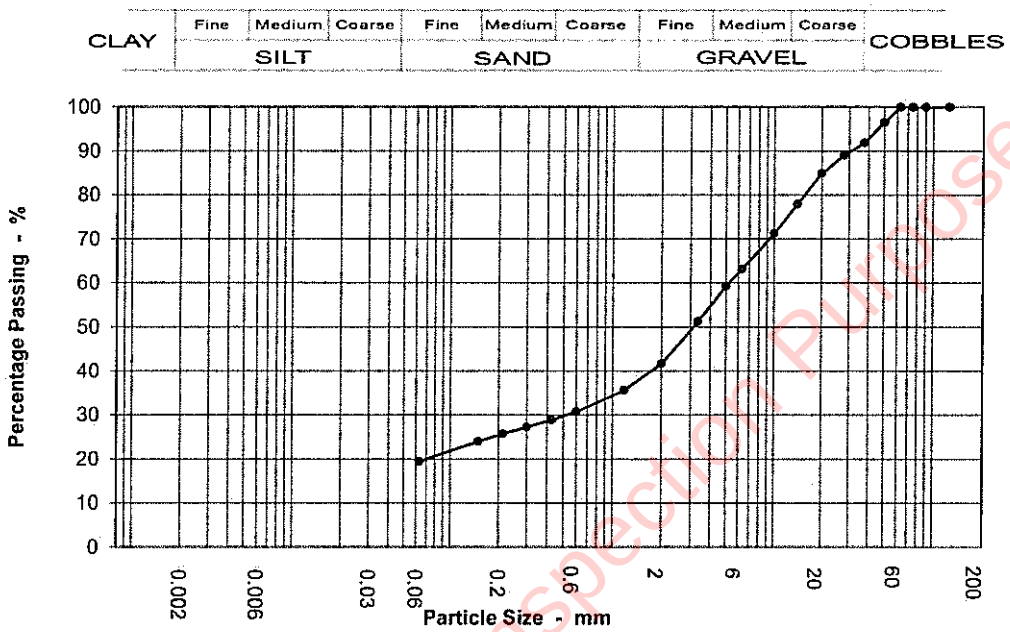
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	88		
37.5	87		
28	81		
20	71		
14	60		
10	54		
6.3	45		
5	41		
3.35	35		
2	30		
1.18	26		
0.6	22		
0.425	21		
0.3	20		
0.212	19		
0.15	18		
0.063	14		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	70.0
Sand	16.0
Silt & Clay	14.0

Grading Analysis	
D100	63.00
D60	14.00
D10	
Uniformity Coefficient	

priority geotechnical	PARTICLE SIZE DISTRIBUTION BS 1377 : Part 2 : 1990 : Clause 9	Job Ref	P21139
		Borehole / Pit No	TP24A1
Location	Gortyrahilly and Inchamore W.F	Sample No	
		Depth	0.00 m
Soil Description	Clayey very sandy GRAVEL	Sample type	B



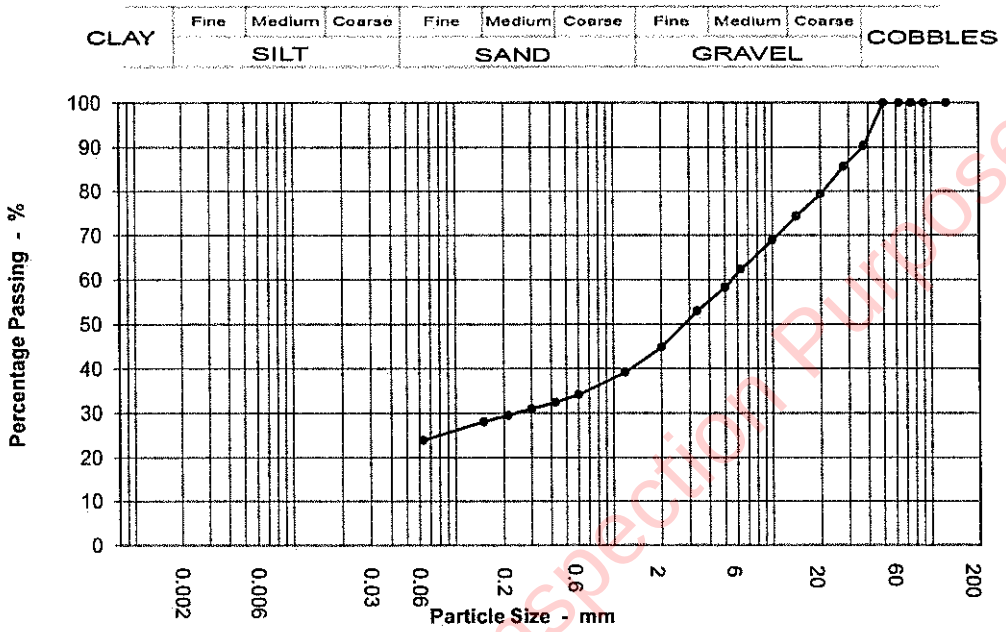
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	92		
28	89		
20	85		
14	78		
10	71		
6.3	63		
5	59		
3.35	51		
2	42		
1.18	36		
0.6	31		
0.425	29		
0.3	27		
0.212	26		
0.15	24		
0.063	19		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	58.0
Sand	22.0
Silt & Clay	19.0

Grading Analysis	
D100	63.00
D60	5.21
D10	
Uniformity Coefficient	

pg priority geotechnical	**PARTICLE SIZE DISTRIBUTION** **BS 1377 : Part 2 : 1990 : Clause 9**	**Job Ref**	**P21139**
		Borehole / Pit No	TP30A1
Location	**Gortyrahilly and Inchamore W.F**	Sample No	
		Depth	0.00 m
Soil Description	Very clayey very sandy GRAVEL	Sample type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	90		
28	86		
20	79		
14	74		
10	69		
6.3	62		
5	58		
3.35	53		
2	45		
1.18	39		
0.6	34		
0.425	32		
0.3	31		
0.212	30		
0.15	28		
0.063	24		

Test Method	
BS 1377 : Part : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 6 4 6
KERRY COUNTY COUNCIL

Sample Proportions	
Cobbles	0.0
Gravel	55.0
Sand	21.0
Silt & Clay	24.0

Grading Analysis	
D100	50.00
D60	5.51
D10	
Uniformity Coefficient	

Appendix H

Inchamore Wind Farm

Inchamore, Co. Cork / Co. Kerry

App 8.1 - App H (a) 3188-A2 (01) IWF SI - GeoHazards - Overview

Legend

Development Layout

WF
- Red Line 23
- 230313 Site Layout
- Turbine Locations
- Site_Entrances
- Proposed Met Mast
- Watercourse Crossings
- Proposed Borrow Pits
- Proposed Temporary Construction Compound
- Proposed On-Site Substation
- BH location
- House Locations

UGC
- Inchamore Grid Connection Route
- HDD Crossings

Delivery
- Redline-250 Haul Road - 256-Polyline
- Turbine Delivery Route
- Redline-250 Haul Road - 256-Polyline
- Turbine Delivery Route

Hydrology
- WFD_RiverWaterbodiesActive
- 25m SW Buffer
- 50m SW Buffer
- 15m Existing Significant Drain Buffer
- A1&A2_Existing Drainage

Topography
- 10 m GDEM Contours
- Bedrock Outcrop (GSI)
- Bedrock Outcrop Observed

Geology

3188-A2-IWF Peat Depth Probe Data
- 0.0 - 0.1m
- 0.1 - 0.5m
- 0.5 - 2.0m
- 2.0 - 3.5m

- Geological Linework (100k GSI)

Landslide Susceptibility
- High
- Moderately High

3188-A2-IWF SI Trial Pit Data
- Yes, Iron Pan Present

Project ID:604162 Inchamore Wind Farm
Projection:ITM
Drawn by: Sven K.
Reviewed by: Sven K.
Version: 13/04/2023

References/Sources:
Environmental Protection Agency (EPA)
Geological Services Ireland (GSI)
Bing Aerial / GeoHive / Open Street Map / Google Roads
GDEM Elevation Contours
Phase 1 (250m Grid Peat Depth - Greensource

Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Scale: 0 200 400 m

RSK

N

R568 (KERRY) 050

N22 Crossing

Site Entrance

Temporary Compound

TP007

T3

T4

T1

TP002

Borrow Pit

BH01

TP011

Substation

WC2

WC3

T5

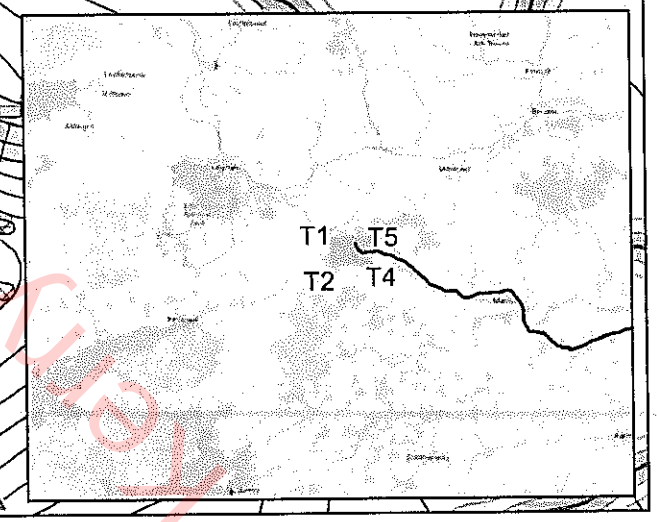
WC1

T2

SUTLANE 020

Met Mast

SUTLANE 010



Inchamore Wind Farm
Inchamore, Co. Cork / Co. Kerry

App 8.1 - App H (b) 3188-A2 (01) IWF SI - GeoHazards - W NW

Legend

Development Layout

WF
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- House Locations

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Delivery
- Turbine Delivery Route

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- WFD_RiverWaterbodiesActive
- 25m SW Buffer
- 50m SW Buffer
- 15m Existing Significant Drain Buffer
- A1&A2_Existing Drainage

Topography
- 10 m GDEM Contours
- Bedrock Outcrop (GSI)
- Bedrock Outcrop Observed

Geology

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- 0.1 - 0.5m
- 0.5 - 2.0m
- 2.0 - 3.5m

Landslide Susceptibility
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- Moderately High

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- Yes, Iron Pan Present

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Scale: 0 100 200 m

RSK

N

Temporary Compound

T1

T3 TP007

T4

TP011

WC2

WC1

WC3

Substation

T2

Met Mast

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T1 T5
T2 T4

Inchamore Wind Farm
Inchamore, Co. Cork / Co. Kerry
App 8.1 - App H (c) 3188-A2 (01) IWF SI - GeoHazards - E SE

Legend

Development Layout

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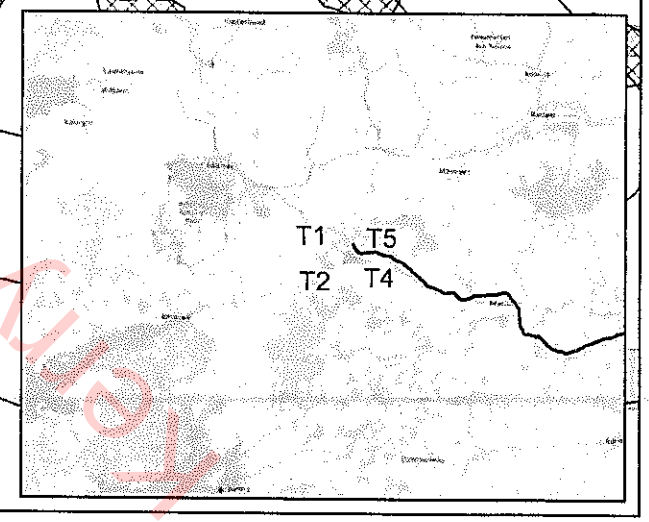
Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Scale: 0 100 200 m

RSK

Temporary Compound
T4
T5
Substation
WC3
SULANE_010
SWANE_020
Borrow Pit
TP002
BH01
N



Appendix I

Appendix I
Stability Risk Matrices and Ratings.

Minerex Environmental

Accounting for Landslide History and Substrate Topology with a view to adjusting calculated FoS (FoS Adjustment = μ_{STop} * μ_{His})		Landslide History (μ_{His})		
		No History of Landslides in the vicinity of site.	Some instances of landslides in the vicinity of site	Recorded landslides occerences within the site
Substrate Topology Characteristics (μ_{Topo})	μ	1	2	4
Substrate is parallel to surface topology.	4	FoS -0.25	FoS - 0.5	FoS - 0.5
Substrate varies from surface topology to a minor extent.	2	FoS + 0.0	FoS -0.25	FoS - 0.5
Substrate varies from surface topology to a significant extent.	1	FoS + 0.25	FoS + 0.0	FoS -0.25

FoS Adjustment Coefficient (μ)			
4	8	16
2	4	8
1	2	4

Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors (RR_{SF} = μ_{FoS} * μ_{SF})		FoS re Slope Stability (μ_{FoS})		
		Acceptable (FoS = >1.3)	Marginally Stable (Acceptable) (FoS = 1-1.3)	Unstable (FoS = <1)
Significant Feature (μ_{SF})	μ	1	2	4
Non-critical infrastructure.	1	Neg.	Neg.	Low
Sensitive receptors e.g. surface water feature	2	Neg.	Low	Mod.
Community, dwellings and buildings.	4	Low	Mod.	High

RR_{SF} Coefficient (μ)		
1	2	4
2	4	8
4	8	16

Acounting for distance to Sensitive Receptors (RR_D = μ_{RRSF} * $\mu_{Dist.}$)		Distance to Sig. Feature ($\mu_{Dist.}$)		
		>150m	50-150m	<50m
Risk Ranking re Significant Feature (μ_{RRSF})	μ	1	2	4
Neg. (RR_{SF} = 1-2)	1	Neg.	Low	Mod.
Low (RR_{SF} = 4)	2	Low	Mod.	High
Mod. (RR_{SF} = 8)	4	Mod.	High	High
High (RR_{SF} = 16)	8	High	High	High

RR_D Coefficient (μ)		
1	2	4
2	4	8
4	8	16
8	16	32

Inchamore Wind Farm, Co. Cork

Appendices

Chapter 9 – Hydrology & Hydrogeology

May 2023

APPENDIX 9.1:

INCHAMORE WIND FARM

SITE SPECIFIC FLOOD RISK ASSESSMENT

Prepared for;

Jennings O' Donovan

Inchamore Windfarm (IWF)

Site Specific Flood Risk Assessment (SFRA)

JENNINGS O'DONOVAN & PARTNERS LIMITED
CONSULTING ENGINEERS

Project no. 603679 R4 (04) IWF SFRA

RSK

MARCH 2023

RSK GENERAL NOTES

Project No.: 603679 R4 (03) IWF SFRA

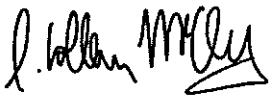
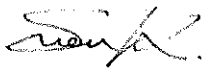
Title: Inchamore Wind Farm Site - Flood Risk Assessment

Client: Jennings O'Donovan

Date: 15/05/2023

Office: RSK Dublin

Status: 03 FINAL

Author	Lissa Colleen McClung	**Technical reviewer**	Sven Klinkenbergh
Signature		Signature	
Date:	01/03/2023	Date:	25/05/2023
Project manager	Sven Klinkenbergh	**Quality reviewer**	
Signature		Signature	
Date:	25/05/2023	Date:	

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APPENDICES

1 INTRODUCTION

RSK Ireland was commissioned to carry out a Flood Risk Assessment by Jennings O'Donovan & Partners (JOD, the Client) on behalf of Coillte and SSE (the Developer/s). The assessment is in support of the planning application for the Inchamore Wind Farm (IWF, The Project) in Co. Cork.

This flood risk assessment has been carried out in accordance with the Department of Housing and Local Government (DEHLG) and the Office of Public Works (OPW) document *"The Planning Process and Flood Risk Management Guidelines for Planning Authorities"* published in November 2009. This Assessment identifies and sets out possible mitigation measures against potential risks of flooding from various sources. Sources of possible flooding include coastal, fluvial, pluvial (direct heavy rain), groundwater and human/mechanical error. This report provides an assessment of the subject site for flood risk purposes only.

RSK (Ireland) Ltd. (RSK), part of RSK Group, is a consultancy providing environmental services in the hydrological, hydrogeological and other environmental disciplines. The company and group provide consultancy to clients in both the public & private sectors. More information can be found at www.rskgroup.com. The principal members of the RSK EIA team involved in this assessment include the following persons;

- Sven Klinkenbergh – B.Sc. (Environmental Science), P.G.Dip. (Environmental Protection) – Associate, Project Manager and EIA Lead Author with c. 10 years industry experience in the preparation of hydrological and hydrogeological reports.
- Project Scientist: Lissa Colleen McClung - B.Sc. (Hons.) Environmental Studies, M.Sc. (Hons.) Environmental Science. Current Role: Graduate Project Scientist
- Project Scientist: Mairéad Duffy – B.Sc. (Environmental Science), M.Sc. (Climate Change). Current Role: Graduate Project Scientist

2 SOURCES OF INFORMATION

2.1 Introduction

Desk Study

2.1.1 EPA

The Environmental Protection Agency (EPA) Maps Application was consulted to identify to local hydrology around the vicinity of the site along with specific Water Framework Directive (WFD) statuses and risks [1].

2.1.2 Flood Maps

Flood Hazard Maps, produced by the Office of Public Works under the Lee, Cork Harbour & Youghal Bay Catchment Flood Risk Management Plan (CFRAM) were investigated to determine present-day risks to flooding in relation to the Project. The Office of Public Works (OPW) mapping study for Ireland is available on their website[2]

2.1.3 Google Earth Pro

National Grid Reference and topography mapping of the study site setting was drawn from Google Earth Pro (2022) *TerraMetrics; version 7.3 (beta),* Inchamore, Cahir Co. Cork, Ireland. 51°95'29.30" N 9°26'19.61" W, Eye alt 4.65 km. Places layers. SIO, NOAA, US Navy, NGA, GEBCO.

2.1.4 GSI

Geological Survey Ireland Spatial Resources from the Department of the Environment, Climate and Communications, were utilised to determine the Site's hydrogeology, site-specific aquifer and vulnerability, borehole/well information, soil and subsoils data as well as Corine 2018 land use classification.[3]

[1] EPA Unified GIS Application (2022)
[2] OPW Flood Maps and Catchment Flood Risk Assessment and Management (CFRAM) Programme (2022)
[3] Geological Survey Ireland Spatial Resources (2022)

2.1.5 OSI

Records from the National mapping agency of Ireland, the Ordnance Survey, were studied, on the websites interactive GeoHive Map Viewer (i.e., First Edition 6-inch map (1839-1842)) to determine the Site's flood history.[4]

[4] Government of Ireland and Ordnance Survey Ireland (2022)

3 SITE DESCRIPTION

3.1 Location

Site Name: Inchamore Wind Farm

Site Address: Carrigalougha Hill, Sheehy Mountains, Inchi More, Co. Cork,

Site Grid Reference ITM: 513376.5, 578930.1

The Site is located 5.9 km west of Ballyvourney, Co. Cork and shares the county boundary between Cork and Kerry. It is 54 km west of Cork City, and 23 km north-east of Kenmare, Co. Kerry. The Project is located within the townlands of Inchamore, Mileeny Derryreag and Derreenaling. The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between 460 metres Above Ordnance Datum (m AOD) in the north-western side of the Site to 350 m AOD towards the eastern side of the Site.

The Site extends to approximately 170 ha of which (c. 145.4 ha) largely consists of low yielding, commercial forestry. The remaining land (24.6 ha) is third party property and the principal land use in the general area consists of a mix of agricultural sheep and cattle grazing, farmland, agricultural structures and open mountain heath.

The proposed Site is shown in **Figure 3.1 Site Location Map with Hydrology**.

Figure 3.1 Site Location Map with Hydrology

3.2 Site Hydrology

Surface water networks draining the site are mapped and presented in **EIAR Chapter 9 - Figure 9.2 –Surface Water Network Wind Farm**.

The Project is situated within the Lee, Cork Harbour and Youghal Bay catchment (ID: 19, Area: 2182km^2). Surface water runoff associated with the Site drains into the Sullane sub catchment and/or Sullane_010 river sub basins. In terms of local drainage and non-mapped surface water features the site characterised by extensive artificial drainage networks including in association with agricultural and land reclamation / improvement works, forestry drainage networks, and cut drains in peat and peat cutting activities.

All surface waters draining from the Site eventually combine in Carrigadrohid Reservoir, from which waters eventually flow to Cork Harbour and into the Celtic Sea.

3.3 Site Soil & Subsoil Geology

Consultation with available soil maps (SIS, EPA, Teagasc) indicate the primary soil type across the Site is that of 'Blanket Peat' while smaller areas of the Site are classified as 'Peaty Gleys - Acid Poorly Drained Mineral Soils with Peaty Topsoil'; 'Acid Brown Earths / Brown Podzolics - Acid Deep Well Drained Mineral'; and 'Podzols (Peaty), Lithosols, Peats with some outcropping rock – Acid Shallow, lithosolic or podzolic type soils potentially with peaty topsoil'. Soils are presented in **EIAR Chapter 8 - Figure 8.4 a – Soils (SIS)**. Several rocky outcrops have been mapped by the GSI, particularly at higher elevations - i.e., the north-western corner of the Site boundary and along the northern and eastern boundary of the Site. Furthermore, many minor rocky outcrops were also observed across the Site during Site walkovers.

Consultation with available subsoil maps, shown in **EIAR Chapter 8 - Figure 8.5 a – Subsoils**, indicate that subsoil types across the Site and include mainly 'Blanket Peat' with small-scale portions of Sandstone Till and areas of Bedrock at or near the surface.

Several rocky outcrops have been mapped by the GSI, particularly at higher elevations - i.e., the north-western corner of the Site boundary and along the northern and eastern boundary of the Site. Furthermore, many minor rocky outcrops were also observed across the Site during Site walkovers. Thin peat and exposed rock were observed at existing cut

and fill locations, in particular, along the existing Site tracks associated with agricultural and forestry practices in the area.

3.4 Site Hydrogeology

The bedrock aquifer underlying the Project has been assigned the GSI aquifer classification of 'Locally Important Aquifer (Ll)' that is; bedrock which is moderately productive only in local zones. Aquifer association with the site is presented in **EIAR Chapter 9 -** Appendix **9.9 b –Bedrock Aquifer Overview.**

There are no mapped karst features within 10 km of the Project.

3.5 Groundwater Vulnerability & Recharge

Presented in **EIAR Chapter 9 - Figure 9.8 a - Aquifer Vulnerability Overview,** consultation with the GSI Groundwater Map Viewer indicates that the Wind Farm Site is underlain by areas classified predominantly mapped as 'Extreme (E)' vulnerability rating which tend to be at lower elevations, with some areas mapped as 'Rock at or Near Surface (X)' vulnerability rating particularly at higher elevations. Both the Turbine Delivery Route and Grid Connection Route traverse land with groundwater vulnerability ratings ranging from 'Moderately Vulnerable' to 'Extreme Vulnerability'

The entirety of the Site and Grid Connection Route are underlain by a Locally Important Aquifer (Ll) which possess a maximum annual recharge capacity of 200 mm effective rain fall.

The Site is characterised by low to very low recharge rates in overburden (soils/subsoils) and very low recharge capacity in the underlying bedrock aquifer, which can be seen in **EIAR Chapter 9 - Figure 9.10 a - Groundwater Recharge Overview.** This implies that, particularly during seasonally wet or extreme meteorological conditions, the majority of water (rain) introduced to the Site will drain off the site as surface water runoff, and the rejected recharge water volumes will likely discharge to surface waters relatively rapidly and locally, i.e., a 'flashy regime'. As such, the surface water network associated with the Site is characterised as having a rapid hydrological response to rainfall.

3.6 The Project

The Project, is comprised of five no. proposed turbines, one met mast and associated ancillary infrastructure (Turbine Foundations, Site Access Roads, Turbine Hardstands,

drainage infrastructure etc.). Each portion of the Site is connected via existing and proposed Site Access Roads which includes for connection to a substation at the Site.

The Project will be connected to the national grid at Ballyvouskill Substation. The Grid Connection Route is approximately 19.9km and comprised of wind farm / forest tracks, public roads and ESB access track. The Grid Connection cable will be buried, with intermittent cable joint bays and other ancillary infrastructure where required.

4 FLOOD RISK ASSESSMENT

4.1 Introduction

4.1.1 Guidelines for FRAs

This Flood Risk Assessment Report follows the guidelines set out in the DEHLG/OPW *Guidelines on the Planning Process and Flood Risk Management* published in November 2009. This assessment will address where surface water and groundwater within or around the site boundary comes from (i.e., the source), how and where it flows (i.e., the pathways) and the people and assets affected by it (i.e., the receptors). This stage aims to quantify the risk posed to the development and to the surrounding environment by this development.

In line with DEHLG Guidelines for Planning Authorities – Flood Risk Management (2009);

Flood Risk Assessment Stage 1, or Preliminary Drainage Assessment

Stage 1 Flood risk identification – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower-level plan or planning application levels;

Flood Risk Assessment Stage 2

Stage 2 Initial flood risk assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and

Flood Risk Assessment Stage 3

Stage 3 Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

4.1.1.1 Sources of Flooding

The components to be considered in the identification and assessment of flood risk are:

- Tidal flooding from high sea levels

- Fluvial flooding from water courses
- Pluvial flooding from rainfall / surface water
- Ground Water –flooding from springs / raised ground water
- Human/mechanical error –flooding due to human or mechanical error

4.1.2 Scoping & Assessing Flood Risk

The two components of flood risk, as outlined in the FRM Guidelines, are the likelihood of flooding and the potential consequences arising from planned works; expressed as:

Flood Risk = Probability of flooding x Consequences of flooding

- *Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. For example, a 1% probability indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e., it has a 1 in 100 (1%) chance of occurring in any one year.*
- *Consequences of flooding depend on the hazards associated with the flooding (e.g., depth of water, speed of flow, rate of onset, duration, wave- action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g., the age profile of the population, the type of development, presence and reliability of mitigation measures etc).*

4.1.3 Assessing Likelihood of Flood Risk

In the FRM Guidelines, the likelihood of a flood occurring in an area is identified and separated into Flood Zones **Figure 4.1 - Indicative Flood Zone Map,** which indicate a high, moderate or low risk of flooding from fluvial or tidal sources, defined as follows:

- Flood Zone A - Where the probability of flooding is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 for river flooding and 0.5% AEP or 1 in 200 for coastal flooding) and where a wide range of receptors would be located and therefore vulnerable.
- Flood Zone B - Where the probability of flooding is moderate (between 0.1% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding and between 0.1% AEP or 1 in 1000 year and 0.5% AEP or 1 in 200 for coastal flooding); and
- Flood Zone C - Where the probability of flooding is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding).

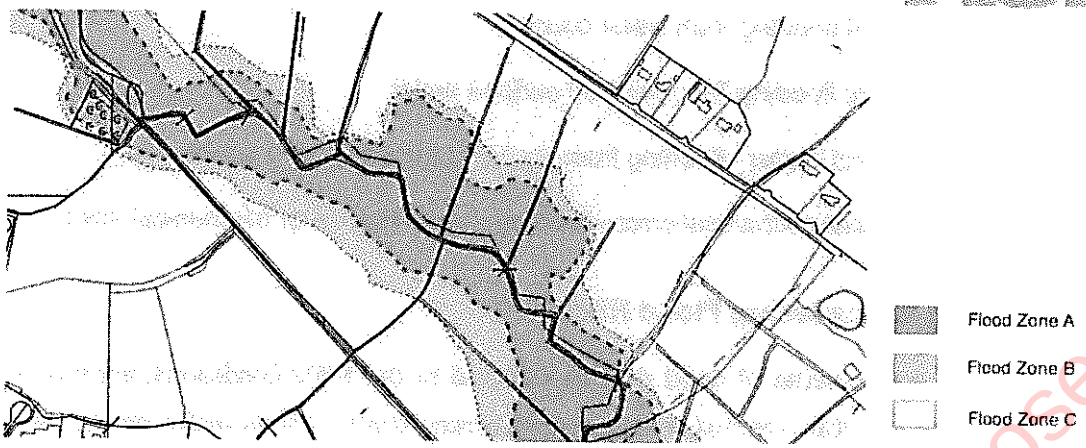

Figure 4.1: Indicative flood zone map (OPW, 2009)

As outlined in the FRM Guidelines, future developments must avoid where possible areas at risk of flooding, as such, essential infrastructure including electricity substations should be located within Flood Zone C. Presented in **Figure 4.2**, from the OPW (2009), a Justification Test is a guiding document that aims to determine the appropriateness of a particular development in areas that may be at risk of flooding. A Justification Test is required to assess such proposals in the light of proper planning and sustainable development objectives.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 4.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test (OPW, 2009)

4.2 Stage 1 – Flood Risk Identification

The flood risk identification stage was carried out in order to establish whether a flood risk exists within the boundaries of the Project or the surrounding vicinity.

4.2.1 Existing Flood Records

Inspection of Base Maps from Ordinance Survey of Ireland records, i.e. First Edition 6-inch map (1839-1842) indicate that Wind Farm Site itself, the Turbine Delivery Route (TDR) and the Grid Connection Route (GCR) are not susceptible to flooding. The National Flood Hazard Mapping database operated by the OPW also confirms there are no areas represented as being low, medium or high probability risk to flood areas within Site boundaries. Furthermore, there have been no recorded flood events on the OPW Database in the immediate vicinity of the Project.

Approximately 1.5 km downgradient (south) of the Site boundary, the OPW (2009) has mapped the Sullane_010 under the 'National Indicative Fluvial Mapping – Present Day' as a Low and Medium Probability Scenario, i.e., a 0.1% AEP and 1% AEP, respectively, as depicted in **Figure 4.3** below.

It should be noted, according to the OPW, the 'Present Day Scenario' is also referred to as the Current Scenario and has been generated using methodologies based on historic flood data, without taking account of potential changes due to climate change. The 'High-End Future Scenario' extents - which have also been mapped approximately 1.5 km downgradient of the Site - were generated taking in the potential effects of climate change using an increase in rainfall of 30%.

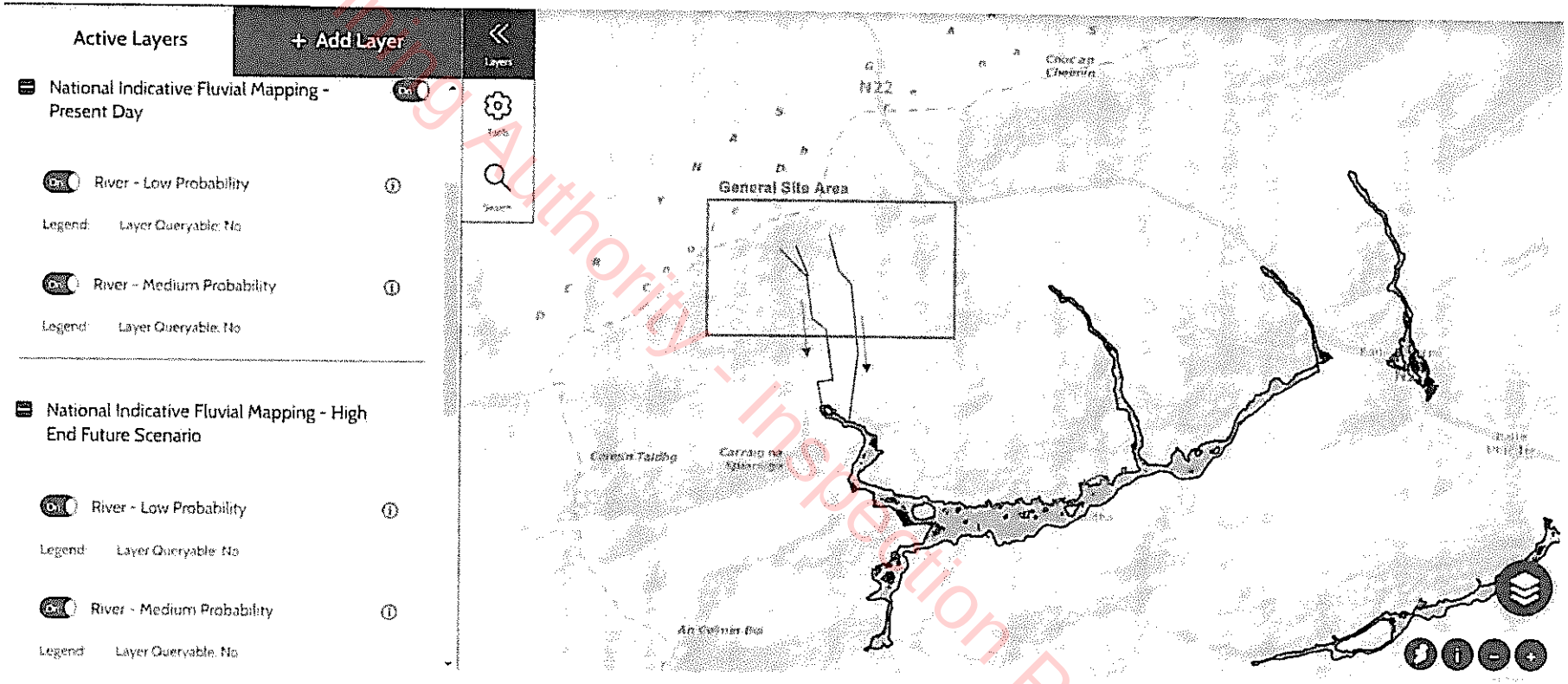

Figure 4.3: National Indicative Fluvial Mapping 'Present Day' or 'Current Scenario' and 'High End Future Scenarios' down stream of the proposed development as mapped by the Office of Public Works Flood Maps (OPW, 2022).

4.2.2 Tidal Flooding

Tidal flooding is caused by elevated sea levels or overtopping by wave action. No coastal flood zones are identified at the site or surrounding area. Bantry Bay is located 30 km southwest of the Site. Due to both the inland nature and significant elevation of the Project, the residual risk from tidal flooding is considered low.

4.2.3 Fluvial Flooding

Fluvial flooding is caused by rivers, watercourses or ditches overflowing. Historic flood maps dating (1839-1842), were reviewed for the Project area and did not indicate a history of flooding at the site from small streams or tributaries found within or near Site boundaries. Furthermore, recent, comprehensive flood-maps, produced by the OPW (2018) under the Lee, Cork Harbour & Youghal Bay Catchment Flood Risk Management Plan (CFRAM) programme do not indicate any flood extents within the proposed Site boundaries, nor its immediate surrounding vicinity. All areas outside the 0.1% AEP flood extent (the Project), are classified as residing in Flood Zone C. Therefore, CFRAM flood-maps confirm that the Project Site resides in Flood Zone C and is a suitable development for this area.

4.2.4 Pluvial Flooding

Pluvial flooding is usually caused by intense rainfall that may only last a few hours, often referred to as flooding from surface water. Surface water flooding can also occur as a result of overland flow or ponding during periods of extreme prolonged rainfall. During pluvial flooding events, water follows natural valley lines, creating flow paths along roads, through and around developments and ponding in low spots, which often coincide with fluvial floodplains in low lying areas. It is generally noted, areas at risk from fluvial flooding will almost certainly be at risk from pluvial flooding. Pluvial flood maps produced as part of the OPW's CFRAM do not indicate pluvial flood zones at the Site, or surrounding area. Therefore, the residual risk from pluvial flooding is considered low.

4.2.5 Groundwater Flooding

Groundwater flooding can occur on some sites in connection with high water tables and increased recharge following long periods of wet weather. Groundwater flooding typically occurs in areas underlain by limestone and where underlying geology is highly permeable with high capacity to receive and store rainfall. The groundwater underneath the site is

located within both a *Locally Important* Aquifer- Bedrock which is Moderately Productive only in Local Zones.

Groundwater observations during SI rotary core drilling indicate that the underlying bedrock is weathered to a minor degree only, with minor volumes of groundwater perched on top of bedrock in the subsoil underlying the site, and no significant water strike encountered (maximum drill depth was approximately 10.5m). Groundwater flow directions are presumed to follow the topography of the area. Groundwater flow paths are considered to be short due to the underlying bedrock aquifer being poorly productive. From reviewing available water level records, and taking into account the elevation of the site, there is no evidence of groundwater flooding within the Project Site.

4.2.6 Project

The Project comprising of new access tracks, hardstands and associated ancillary infrastructure will include land take (Agriculture / Forestry) and the replacement of vegetated lands and soils with relatively impermeable surfaces. This presents the potential for a net decrease in recharge potential (rain percolating through soils to groundwater) and increase in the hydrological response to rainfall (quantity and rate of surface water runoff) at the site, which will potentially adversely impact on flood risk areas within or downstream of the site.

4.2.7 Human and/or Mechanical Error

Construction of drainage channels and enhancement of existing drainage associated with the Project has the potential to impact the hydrological regime at the Site. In particular human error related to poor design, or if poorly managed during construction phase of a development, the installation of drainage channels and associated infrastructure such as culverts or attenuation features can lead to excessive *wetting and/or drying* in areas of the site which does not conform to baseline conditions i.e., localised flooding or excessive draining.

4.2.8 FRA Stage 1 Conclusions

This Flood Risk Assessment was compiled and based on data presented in public records, in accordance with the guidelines set out in the DEHLG/OPW *Guidelines on the Planning Process and Flood Risk Management* published in November 2009. From reviewing the available records there was no evidence of historic flooding at the Site. Furthermore, comprehensive flood maps produced by the OPW under the Lee, Cork Harbour & Youghal

Bay Catchment Flood Risk Management Plan (CFRAM) confirm that the Project resides in a Flood Zone C.

The nature of the development is industrial as opposed to residential or leisure, and as such, this type of development is categorized as a 'Less Vulnerable Development', according to FRM Guidelines. Therefore, the Project is considered an 'appropriate' development for Flood Zone C.

In keeping with the Stage 1 Flood Risk Assessment, the review of available information has identified no flood hazards for the Project.

The Project has the potential to lead to a net decrease in recharge potential and net increase in the hydrological response to rainfall at the site, potentially leading to adverse impacts on flood risk areas downstream of the site. The extent of the risk of flooding and potential impact of a development on flooding elsewhere (downstream) requires FRA Stage 2.

4.3 Stage 2 – Initial Flood Risk Assessment

4.3.1 Assessing Potential Impacts of Development – Sites Downgradient

While the Catchment Flood Risk Management Plan (CFRAM) programme did not indicate any flood extents within the proposed Site boundaries, nor its immediate surrounding vicinity, however downgradient of the site, there are probable flood areas. The closest mapped probable flood areas are associated with;

- The Sullane (030) river approximately ten kilometres to the southeast of the site near Ballymarkeery town.

To highlight, there has been only 1 no. recorded localised flood events between the Site and the CFRAM mapped probable flood areas. This event 'Flooding at Coolea, Milleeny and Derreenaling' took place on 11/09/2015, however no further information about the event was available.

In regard to the Grid Connection Route, there are no recorded historic flood events along the proposed Grid Connection Route. However, there is a portion of the route near the proposed HDD crossing of Stream 3 (ITM: 517767, 583303), that crosses both a National Indicative Fluvial Mapping (NIFM) Medium (1% AEP) and Low (0.1% AEP) probability scenario. Both these risks are mapped for the current and future scenarios.

In regard to the Turbine Delivery Route, there have been several 'Single' and 'Reoccurring' Flood Events along the Sullane, in particular near the townlands of Baile Bhuirne, Macroom and closer to Cork Harbour along the River Lee. It is proposed that the TDR will utilise the Macroom to Ballyvourney Dual Carriageway. Along this route, NIFM flood risks have been identified at the following crossing locations:

- ITM: 519851, 578443
- ITM: 527446, 573948
- ITM: 535259 ,572778

Furthermore, where the Sullane meets the River Lee, south of Macroom CFRAM River Flood Extents have been mapped for the surrounding areas of 0.1%, 1% and 10% AEP, where the Turbine Delivery Route follows the N22.

4.3.2 Assessing Potential Effects of Development – Increased Hydraulic Loading

4.3.2.1 Rainfall and Evapotranspiration

Rainfall data for the region associated with the Project site has been assessed in terms of the following parameters;

- Historical average and max monthly rainfall and effective rainfall. Effective rainfall is calculated as being rainfall minus evapotranspiration equals effective rainfall, or the amount of rainfall which will contribute to surface water runoff discharge volumes and/or groundwater recharge.
- Potential significant storm events including events with a 1 in 100-year return period over 1 hour duration, 25-day duration (inferred using available data).
- Daily 2020 rain (specifically in relation to meteorological conditions at the time of site surveys).

Data from the meteorological stations listed in **Table 4.1**, are used in this assessment[5]. Using data presented in **Table 4.3**, storm event of 25 days duration with a 1 in 100-year return period is inferred to be 498.3mm. For the purpose of this environmental impact assessment, predicted extreme or worst-case values are used, as presented in **Table 4.2:** EIA Specific Assessment Data. Rain fall amounts in the three days preceding baseline sampling events are presented in EIAR **Chapter 9 - Table 9.11: Rainfall Prior to Baseline Sampling Events.**

Table 4.1: EIA Specific Assessment Data (Met Eireann, 2021)

Category	Value
Average Annual Effective Rainfall (Long term) (mm/year)	1,323.41
Max monthly effective rainfall (mm/month)	680.2
1 in 100 Year Rainfall Event (1 hour duration) (mm/hour)	32.5
1 in 100 Year Rainfall Event (25-day duration) (mm/hour)	498.3
Minimum monthly evapotranspiration (mm/month)	9.7

Rainfall trends are presented in **EIAR Chapter 9 - Figure 9.5**.

[5] Met Eireann, Historical Data, Available at; www.met.ie, Accessed March 2021

Table 4.2: Meteorological Stations (Met Eireann, 2021)

Category	Meteorological Station/s & Data Set	Approx. Distance from the Site (km)
Rainfall (Historical Monthly)	M.BALLINGEARY 1948-2020	4
Rainfall (2020/21 Monthly/Daily)	M.BALLINGEARY 1948-2020	4
Evapotranspiration	Cork Airport – 2016-2019 Minimum	50

Table 4.3: Met Eireann Return Period Rainfall Depths (Irish Grid; 113392, 78786)[6]

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 113392, Northing: 78786,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100	150,	200,	250,	500,
5 mins	3.1,	4.0,	4.5,	5.1,	5.6,	5.9,	6.9,	8.0,	8.7,	9.6,	10.4,	11.0	11.9,	12.6,	13.2,	N/A ,
10 mins	4.4,	5.6,	6.3,	7.2,	7.7,	8.2,	9.6,	11.1,	12.1,	13.4,	14.5,	15.4	16.6,	17.6,	18.4,	N/A ,
15 mins	5.1,	6.6,	7.4,	8.4,	9.1,	9.6,	11.3,	13.1,	14.2,	15.7,	17.1,	18.1	19.6,	20.7,	21.6,	N/A ,
30 mins	7.2,	9.2,	10.2,	11.6,	12.5,	13.2,	15.4,	17.8,	19.2,	21.2,	22.9,	24.2	26.2,	27.6,	28.8,	N/A ,
1 hours	10.2,	12.8,	14.2,	16.1,	17.3,	18.2,	21.1,	24.1,	26.0,	28.6,	30.8,	32.5	35.0,	36.9,	38.4,	N/A ,
2 hours	14.3,	17.9,	19.7,	22.2,	23.8,	25.0,	28.8,	32.8,	35.3,	38.6,	41.5,	43.6	46.8,	49.2,	51.2,	N/A ,
3 hours	17.5,	21.7,	23.8,	26.8,	28.7,	30.1,	34.5,	39.2,	42.1,	46.0,	49.3,	51.8	55.5,	58.3,	60.6,	N/A ,
4 hours	20.1,	24.9,	27.3,	30.6,	32.8,	34.4,	39.3,	44.5,	47.7,	52.1,	55.8,	58.5	62.7,	65.7,	68.2,	N/A ,
6 hours	24.6,	30.3,	33.1,	37.0,	39.5,	41.4,	47.2,	53.2,	57.0,	62.1,	66.3,	69.5	74.3,	77.9,	80.7,	N/A ,
9 hours	30.0,	36.8,	40.1,	44.7,	47.6,	49.8,	56.6,	63.7,	68.1,	74.0,	78.9,	82.6	88.1,	92.2,	95.5,	N/A ,
12 hours	34.6,	42.2,	45.9,	51.1,	54.4,	56.9,	64.5,	72.4,	77.2,	83.7,	89.2,	93.4	99.4,	104.0,	107.6,	N/A ,
18 hours	42.3,	51.3,	55.6,	61.7,	65.6,	68.5,	77.4,	86.6,	92.2,	99.8,	106.2,	110.9	117.9,	123.2,	127.4,	N/A ,
24 hours	48.7,	58.9,	63.8,	70.6,	75.0,	78.2,	88.1,	98.3,	104.6,	113.0,	120.1,	125.3	133.1,	138.9,	143.5,	159.0,
2 days	64.3,	76.4,	82.2,	90.2,	95.2,	99.0,	110.4,	122.0,	129.1,	138.5,	146.4,	152.2	160.8,	167.1,	172.2,	189.0,
3 days	77.6,	91.4,	97.9,	106.9,	112.5,	116.7,	129.3,	142.1,	149.9,	160.1,	168.7,	175.0	184.3,	191.2,	196.7,	214.8,
4 days	89.8,	105.0,	112.1,	121.9,	128.1,	132.6,	146.3,	160.1,	168.6,	179.6,	188.6,	195.6	205.5,	212.8,	218.7,	237.9,
6 days	112.1,	129.7,	138.0,	149.3,	156.3,	161.5,	177.1,	192.8,	202.2,	214.7,	224.9,	232.5	243.5,	251.7,	258.2,	279.3,
8 days	132.7,	152.5,	161.8,	174.4,	182.2,	188.0,	205.2,	222.5,	232.9,	246.5,	257.7,	265.9	278.0,	286.8,	293.8,	316.8,
10 days	152.3,	174.1,	184.3,	198.1,	206.6,	212.9,	231.6,	250.3,	261.5,	276.2,	288.3,	297.1	310.0,	319.5,	327.0,	351.5,
12 days	171.2,	194.9,	205.8,	220.7,	229.9,	236.6,	256.7,	276.8,	288.8,	304.4,	317.3,	326.7	340.5,	350.5,	358.5,	384.5,
16 days	207.5,	234.6,	247.1,	263.9,	274.3,	281.9,	304.5,	327.0,	340.4,	357.8,	372.2,	382.6	397.8,	408.9,	417.7,	446.3,
20 days	242.6,	272.7,	286.6,	305.2,	316.7,	325.1,	350.0,	374.6,	389.3,	408.4,	424.0,	435.4	451.9,	463.9,	473.5,	504.4,
25 days	285.2,	318.9,	334.3,	355.1,	367.8,	377.1,	404.6,	431.7,	447.9,	468.8,	485.8,	498.3	516.3,	529.4,	539.8,	573.4,

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

[6] Met Eireann, Rainfall Return Periods, Available at; https://www.met.ie/climate/services/rainfall-return-periods, Accessed October 2022

4.3.2.2 Preliminary Water Balance Assessment

For the purposes of assessing changes in runoff at the site as a function of the Project, the following data compiled from GIS mapping software and **Table 2.5 of Chapter 2** is considered (**FRA Section 3 – Site Description** and **EIAR Chapter 9 – Section 9.3 Baseline Description**);

- Turbine Foundations = 5 No. x 3,064 m^2 = 15,320 m^2
- Turbine Hardstands = 23,700 m^2
- Upgraded Access Roads = 15,998 m^2
- New Access Roads = 41,400m^2
- Meteorological Mast Foundations = 100m^2
- Temporary Construction Compound = 3,640 m^2
- Substation = 1,314 m^2
- Borrow Pit = 38,674 m^2
- 1 in 100-year rainfall event = c. 32.5mm of rainfall in 1 hour.
- Recharge capacity = 20% of Effective Rainfall (Note: This is considered a conservative value i.e., higher potential recharge coefficient in the range associated with the site. In areas of peat the recharge will be considerably less, and considering the capped recharge of the underlying bedrock aquifer the rate of recharge will likely be considerably less across the site, particularly during wet / winter months associated with elevated flood risk generally).
- There are a number of River Flow Estimate (Hydrotools) on the EPA database which detail river discharge rates (Q) including discharge percentile data available for surface water features associated with the site. Consultation with the EPA Hydronet map viewer indicates that the estimated River Discharge (Q) of the Sullare_010, (Segment Code: 19_618), situated directly downstream of the Project c. 2.0 kilometres, has been observed to reach up to c. 0.42m^3/second (January). Further downstream c. 5.2 kilometres, just before the Br nr Coolea Hydrometric station (operational) the river flow has been observed to reach c. 2.06m^3/second (December).

This assessment is considered a simple preliminary water balance assessment for the purposes of qualifying and adding context to potential impacts of the Project in terms of hydrological response to rainfall and flooding. It considers and uses site specific data as well as associated downstream attribute data. (Note: This is not considered advanced modelling for flood risk assessment (FRA Stage 3)).

Table 4.4 summarises a preliminary water balance analysis and potential net increase in runoff for the Site during a 1-in-100-year storm event relative to baseline conditions. Approximate area for the Development (1,701,733 m^2), is calculated for the entire redline boundary landholding for the site.

Table 4.4: Net Increase in Runoff as a function of the Development per Micro-catchment Areas and Baseline Runoff Volumes

(1 in 100 Year Hour Storm Event)

Micro-catchment Areas and Baseline Runoff Volumes (1 in 100 Year Hour Storm Event)								
Development	Approximate Area (m2)	1 in 100 Year Rainfall Event (m/hour Rain)	Capped Recharge Capacity. Percentage of Effective Rainfall (Conservative Value for Water Balanace Calc's)	Rejected Recharge / Runoff (m/hour Rain)	Runoff Discharge Rate (m3/hour)	Runoff Discharge Rate (m3/sec)	Net Increase (m3/sec)	Net Increase as percentage against baseline micro-catchment runoff (%)
Inchamore WF	1,701,733.00	0.0325	20.00%	0.026	44,245.06	12.29	0.253	2.06%
			Total		44245.058	12.29	0.253	2.06%

Water balance calculations allow for the addition of area for hardstand infrastructure required (land take) during the construction and operational phases of the Development. This equates to approximately 140,146 m^2. A 1 in 100-year storm event scenario results in a net increase of surface water runoff associated with the Development, calculated to be c. 0.253m^3/sec, or 2.06% relative to the Site area (redline boundary). This net increase relative to the scale of the Site or the scale of the associated catchment is considered an imperceptible or negligible impact of the Development. With suitable mitigation measures, **Section 4.3.3** below and **Section 9.6.1.2** of **Chapter 9**, the pressure to the surface water bodies and sites downgradient can be reduced to a neutral to beneficial impact.

4.3.3 Mitigation Measures Associated with the Development

Flood Relief Schemes, outlined by the OPW, are in place for Ballymarkeery town (flood area identified above), which include Measures Applicable in All Areas, detailed as:

- Sustainable Urban Drainage Systems (SUDS). Objective: Planning authorities will seek to reduce the extent of hard surfacing and paving and require the use of sustainable drainage techniques to reduce the potential impact of development on flood risk downstream.
- Land Use Management and Natural Flood Risk Management. Objective: during the project-level assessments of physical works and more broadly at a catchment-level to identify any measures, such as natural water retention measures (such as restoration of wetlands and woodlands), that can have benefits for Water Framework Directive, flood risk management and biodiversity objectives.

Under the 2013-2015 Work Programme of the Common Implementation Strategy (CIS) for the Water Framework Directive (WFD), and in response to the 2012 Blueprint to Safeguard Europe's Water Resources proposals, the Working Group Programme of Measures has developed guidance for supporting the implementation of Natural Water Retention Measures (NWRM) in Europe (European Commission, 2015).

The OPW and EPA Catchments Unit in conjunction with Local Authorities are actively adopting and promoting NWRM as part of a broader suite of mitigation measures that

could contribute to the achievement of environmental objectives (WFD) set out in the second River Basin Management Plan (RBMP) (EPA Catchment Unit, 2020).

Flood Relief Scheme and flood risk management Objectives such as Land Use Management and Natural Flood Risk Management are relevant to the Project , whereby; the assessment and design of the Project will qualify and mitigate any potential adverse impact in terms of hydrological response to rainfall and flood risk within or downstream of the site. The objective of mitigation in this respect will be to achieve, at a minimum, a neutral impact, and to identify and promote beneficial impacts (net decrease in hydrological response to rainfall) at the site, particularly in terms of Natural Water Retention Measures (NWRM) as part of baseline conditions, namely; restoration of peatlands, wetlands and woodlands.

To mitigate any net change in hydraulic loading to surface waters during the construction and operational phase of the Project, the following examples will be utilised where appropriate;

- Check dams, dams, other flow restricting infrastructure
- Collector drains
- Permanent stilling ponds
- Attenuation lagoons
- Buffered outfalls to vegetated areas
- Rewetting peatlands
- Controlling dewatering flow/pump rates;
- Restricting pumped water discharge directly to drainage or surface water networks.
- Offline storage ponds, overland sediment traps,
- Floodplain and riparian woodland
- Riverbank restoration
- River morphology and floodplain restoration – removal of embankments, re-meandered river reach
- In stream structure – large woody debris
- Catchment woodlands
- Land and soil management practices – cover crops, cross contour hedgerows.

The Project has the potential to result in increased volumes of runoff during the operational phase relative to baseline conditions. However, with the appropriate environmental engineering controls and mitigation measures, previously outlined, these potential impacts will be reduced.

The combined attenuation capacity of the proposed drainage infrastructure will be designed to attenuate net increase in water runoff, including during extreme storm events relative to greenfield or baseline runoff rates with an additional 20% taking into account of climate change. These mitigation measures required during the construction and operational phases will buffer the discharge rate and reduce the hydrological response to rainfall at the site, maintain (or improve) the hydrological regime at the site, in turn reducing loading on the receiving surface water drainage network. This will mitigate against the potential for rapid runoff and rapid hydrological responses to rainfall, lessening the likelihood to flooding of the drainage network or downstream of the Project.

Mitigation measures will be considered and designed in line with engineering and construction best practices and methodologies, including the following guidance documents (non-exhaustive);

- Scottish Environment Protection Agency (SEPA) (2009) Flood Risk Management (Scotland) Act 2009 – Surface Water management Planning Guidance
- Scottish Environment Protection Agency (SEPA) (2015) Natural Flood Management Handbook
- CIRIA (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance
- CIRIA (2015) The SuDS Manual (C753)

With regard to the risk of flooding along the Grid Connection Route, the cables and cable ducting will be designed and installed to prevent ingress of water during their design life. Furthermore, proposed cable joint bay locations will be located as far as practicable outside of the estimated (AEP) floodplains.

The following observations and recommendations are made with a view to ensuring mitigation measures are designed and deployed effectively;

- The magnitude of potential net increase in runoff as a function for the Project at the Site is considered adverse but imperceptible, that is; quantifiable but without significant impact relative to the appropriate scale (flood risk areas downstream of the site and associated with a much larger catchment compared to the site boundary). However, in terms cumulative runoff and flood risk, and as detailed in general mitigation measures as part of CFRAM areas, detailed engineered design of the Project and with a view to applying mitigation measures adequately and appropriately will be required, that is; drainage, attenuation and associated infrastructure is designed and specified by a competent water infrastructure engineer, which will include modelling of runoff in site drainage, to ensure that all aspects ate sufficiently specified. Drainage modelling, including assessment of inundation rates, lag times and discharge rates, will be particularly useful in sensitive peatland areas, or where particularly sensitive environmental attributes exist downstream, for example, ecological attributes where surface water runoff and surface water quality are linked (**EIAR Chapter 9**).
- Detailed design and specification of drainage, attenuation and associated infrastructure have been included in a detailed Surface Water Management Plan (SWMP, Management Plan 3 in the **CEMP, Appendix 2.1**) prior to the commencement of the construction phase which will include detailed development drainage layout and details regarding construction, maintenance, monitoring and emergency response. It is recommended that this is done in conjunction with relevant stakeholders including relevant authorities and other stakeholders such as landholders etc. in line with River Basin Management practices i.e., engagement at local level.

4.4 FRA Stage 2 – Conclusions

A 1 in 100-year storm event scenario results in a net increase of surface water runoff associated with the Project, calculated to be c. 0.121m^3/second, or 1.01% relative to the Site area (redline boundary). This net increase relative to the scale of the Site or the scale of the associated catchment is considered an adverse but imperceptible to slight impact of the Project.

The Project will use the latest best practice guidance to ensure that flood risk within or downstream of the Site is not increased as a function of the Project, i.e., a neutral impact at a minimum.

Considering the Project does not acutely or significantly impact on a probable flood risk area directly, FRA Stage 3 including advanced flood modelling is not required.

A Surface Water Management Plan (SWMP) (**Appendix 2.1; Management Plan 3**) has been prepared and will be updated prior to the construction phase commencing, with a view to ensuring that the surface water runoff at the Site is managed effectively and does not exacerbate flood risk on site or to the flood risk areas downstream of the site. It is recommended that this is done in consultation with relevant stakeholders.

As the associated drainage - some of which is permeant for the lifetime of the Project, will be attenuated for greenfield run-off, the Project will not increase the risk of flooding elsewhere in the catchment. Based on this information, the Project complies with the appropriate policy guidelines for the area and is at no risk of flooding.

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APPENDIX 9.2:

INCHAMORE WIND FARM

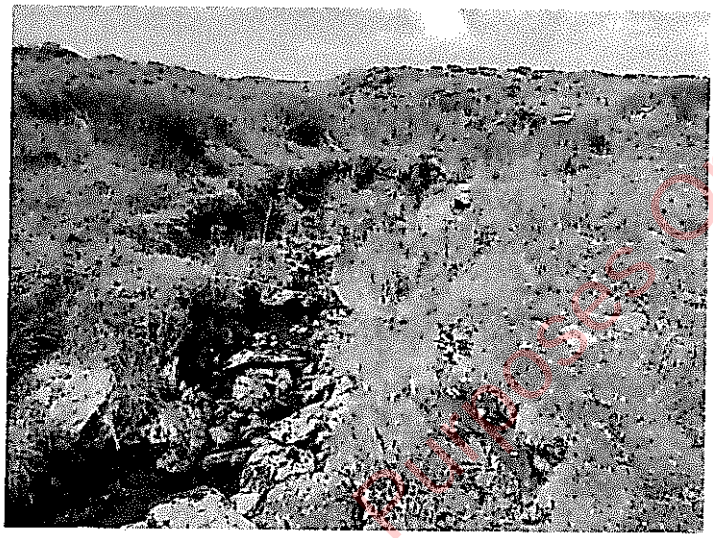
SITE PHOTOGRAPHS

Inchamore WF, Co. Cork

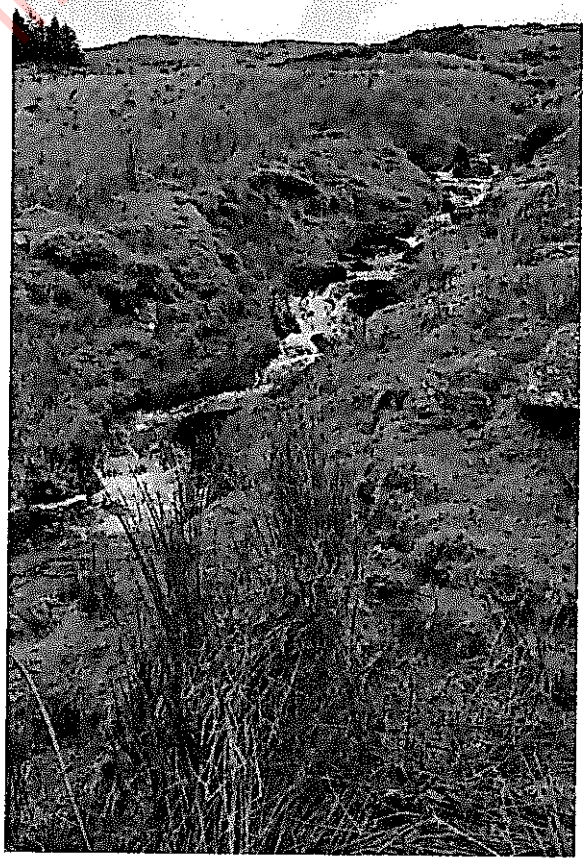
Photographs

Appendix 9.2 – Photographs
Subject: Baseline Surface Water Monitoring Location - SW1
(File Ref. 3188-A2-008; 603679)

Surface Water Sampling R1 12/08/2020 (Dry)



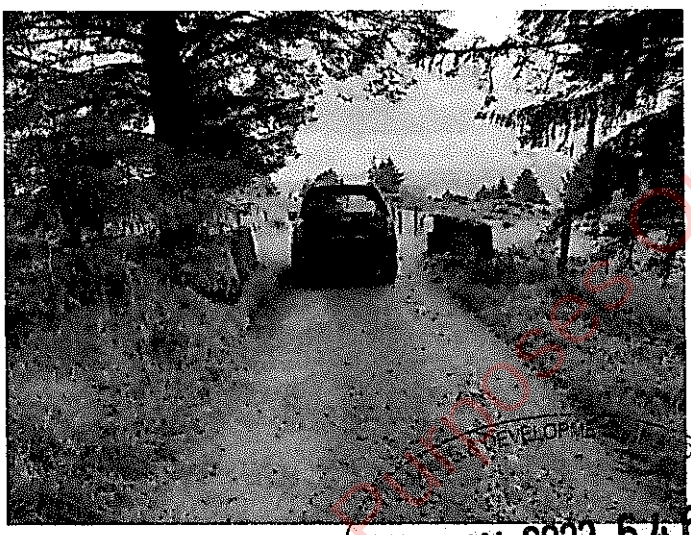
Surface Water Sampling R1 12/08/2020 (Dry)



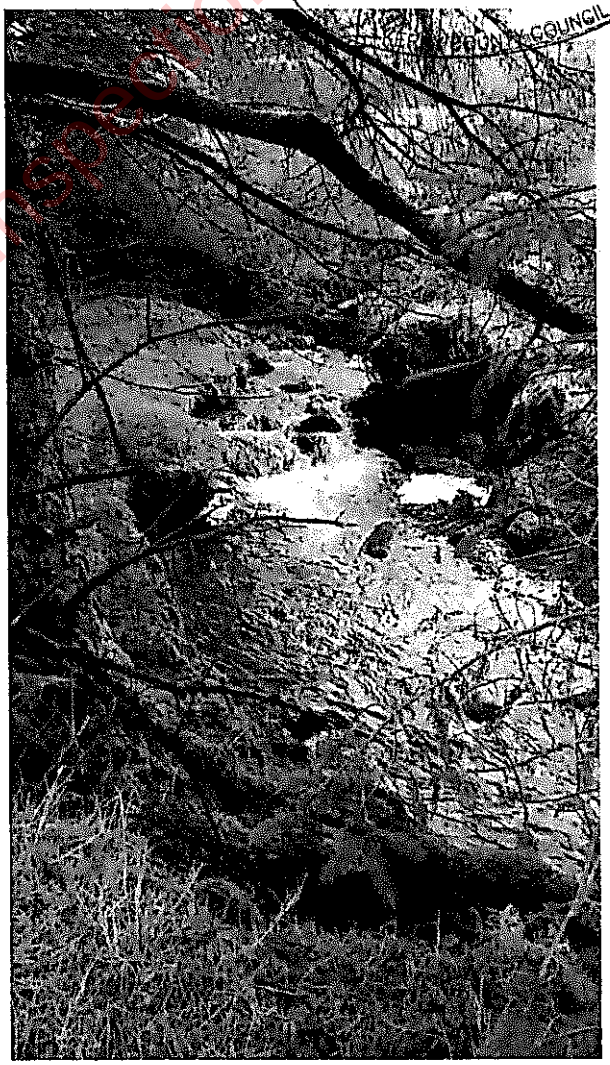
Surface Water Sampling R3 24/02/2021 (Wet)

Appendix 9.2 – Photographs
Subject: Baseline Surface Water Monitoring Location - SW2
(File Ref. 3188-A2-008; 603679)

Surface Water Sampling R1 12/08/2020 (Dry)



Surface Water Sampling R1 12/08/2020 (Dry)



Surface Water Sampling R3 24/02/2021 (Wet)

Appendix 9.2 – Photographs
Subject: Baseline Surface Water Monitoring Location - SW3
(File Ref. 3188-A2-008; 603679)

Surface Water Sampling R1 12/08/2020 (Dry)

Surface Water Sampling R1 12/08/2020 (Dry)

Surface Water Sampling R3 24/02/2021 (Wet)

Appendix 9.2 – Photographs
Subject: Baseline Surface Water Monitoring Location - SW4
(File Ref. 3188-A2-008; 603679)

Surface Water Sampling R1 12/08/2020 (Dry)

Surface Water Sampling R1 12/08/2020 (Dry)

Surface Water Sampling R3 24/02/2021 (Wet)

Preparation for forestry plantation observed during Surface Water Sampling R4 16/03/2021, near SW1.

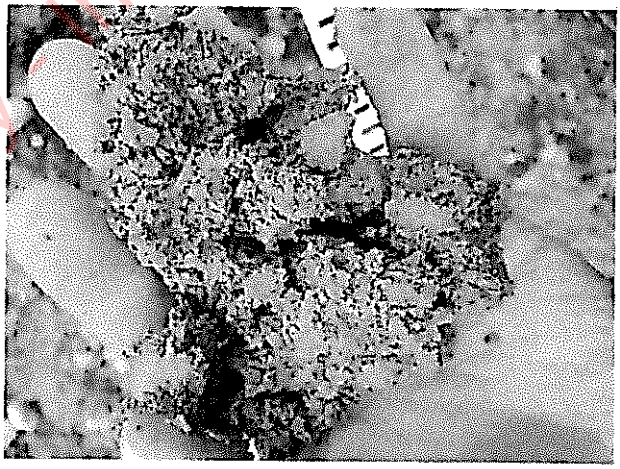
Evidence of peat cutting observed during site surveys 16/06/2020.

Existing artificial / modified drainage observed during site surveys 16/06/2020.

New access track and drainage associated with ongoing forestry activities observed during site surveys 16/06/2020.

Appendix 9.2 – Photographs
Subject: Existing Pressures & Observations
(File Ref. 3188-A2-008; 603679)

Peat and till exposed at new access track and drainage associated with ongoing forestry activities observed during site surveys 16/06/2020.



Peat and till exposed at new access track and drainage associated with ongoing forestry activities observed during site surveys.

Peat and till exposed at new access track and drainage associated with ongoing forestry activities observed during site survey.

APPENDIX 9.3:

HYDROCHEMISTRY DATABASE

Appendix 9.3 - Baseline Surface Water Hydro-Chemistry & Discharge Rate Database.

(Minerex File Ref. 3188-011.xls)

Minerex Environmental

Sample Details	Sampling Event (Date Sampled)		LIMITS re EIA (Ref. NRA) Indicative Limits Re.: Bathing, Drinking Surface Water reg's.				
Sample ID	ALL			SW1	SW2	SW3	SW4
Site	ALL			A2-Inchamore	A2-Inchamore	A2-Inchamore	A2-Inchamore
Project COC Reference - SW R1	12/08/2020	Dry / Low Flow		3188-028-COC1	3188-028-COC1	3188-028-COC1	3188-028-COC1
Project COC Reference - SW R2	26/08/2020	Wet / High Flow		3188-028-COC2	3188-028-COC2	3188-028-COC2	3188-028-COC2
Project COC Reference - SW R3	24/02/2021	Wet / High Flow		3188-028-COC4	3188-028-COC4	3188-028-COC4	3188-028-COC4
Project COC Reference - SW R4	16/03/2021	Dry / Low Flow		3188-028-COC3	3188-028-COC3	3188-028-COC3	3188-028-COC3
Sample Type	ALL	Medium		Surface Water	Surface Water	Surface Water	Surface Water
Grid Reference for Sampling Location	ALL	Irish Grid		513031.2, 578569.0	513613.1, 577609.8	513338.0, 577571.8	512057.7, 577399.8
Field Data - Discharge							
Surface Water Feature	ALL	Type		Ditch	Drain	Drain	Ditch
Description of sample location	ALL	Type		Alongside feature	Road bridge	Road bridge	Road bridge
Width of Water Body	ALL	m		<1.0	1.5	2	3
Depth (d)	ALL	m		<0.2	<0.25	<0.25	<0.5
Total Rain 3 Days Prior (Table 9.11)	12/08/2020	mm/72hours		0.0			
Total Rain 3 Days Prior (Table 9.11)	26/08/2020	mm/72hours		59.7			
Total Rain 3 Days Prior (Table 9.11)	24/02/2021	mm/72hours		47.8			
Total Rain 3 Days Prior (Table 9.11)	16/03/2021	mm/72hours		8.1			
Estimated Discharge Rate (Q)	12/08/2020	l/sec		1 to 2	6 to 8	6 to 8	30
Estimated Discharge Rate (Q)	26/08/2020	l/sec		5 to 6	8 to 10	20 to 25	50 to 60
Estimated Discharge Rate (Q)	24/02/2021	l/sec		5 to 6	10 to 15	20 to 25	50 to 60
Estimated Discharge Rate (Q)	16/03/2021	l/sec		2 to 4	6 to 8	6 to 8	10
Laboratory Data - Hydrochemistry							
Alkalinity, Bicarbonate as CaCO3	12/08/2020	mg/l		9.11	22.5	18	16
Alkalinity, Bicarbonate as CaCO3	26/08/2020	mg/l		4.5	7.5	9	18.6
Alkalinity, Bicarbonate as CaCO3	24/02/2021	mg/l		2.5	4	2	3.5
Alkalinity, Bicarbonate as CaCO3	16/03/2021	mg/l		5.5	7.5	5.5	10.3
Alkalinity, Total as CaCO3	12/08/2020	mg/l		9.11	22.5	18	16
Alkalinity, Total as CaCO3	26/08/2020	mg/l		4.5	7.5	9	18.6
Alkalinity, Total as CaCO3	24/02/2021	mg/l		2.5	4	2	3.5
Alkalinity, Total as CaCO3	16/03/2021	mg/l		5.5	7.5	5.5	10.3
Ammoniacal Nitrogen as N (low level)	12/08/2020	mg/l	0.02	0.0245	0.0121	0.0243	0.028
Ammoniacal Nitrogen as N (low level)	26/08/2020	mg/l	0.02	0.0164	0.0177	0.0321	0.018
Ammoniacal Nitrogen as N (low level)	24/02/2021	mg/l	0.02	0.037	0.036	0.024	0.032
Ammoniacal Nitrogen as N (low level)	16/03/2021	mg/l	0.02	0.04	0.042	0.029	0.042
Apparent Colour	12/08/2020	mg/l Pt/Co		30.8	31.2	97	65.8
Apparent Colour	26/08/2020	mg/l Pt/Co		96	62.7	165	79.3
Apparent Colour	24/02/2021	mg/l Pt/Co		37.4	75.2	52	61.3
Apparent Colour	16/03/2021	mg/l Pt/Co		20.4	35.9	20.9	27.8
Conductivity @ 20 deg.C	12/08/2020	mS/cm	2.5	0.0576	0.057	0.0757	0.0625
Conductivity @ 20 deg.C	26/08/2020	mS/cm	2.5	0.0427	0.0304	0.063	0.0526
Conductivity @ 20 deg.C	24/02/2021	mS/cm	2.5	0.025	0.0377	0.0281	0.0293
Conductivity @ 20 deg.C	16/03/2021	mS/cm	2.5	0.0539	0.0706	0.0588	0.0634
Nitrate as NO3	12/08/2020	mg/l		0.539	<0.3	<0.3	<0.3
Nitrate as NO3	26/08/2020	mg/l		0.374	<0.3	<0.3	0.456
Nitrate as NO3	24/02/2021	mg/l		<0.3	0.384	<0.3	<0.3
Nitrate as NO3	16/03/2021	mg/l		<0.3	<0.3	<0.3	<0.3
Nitrite as NO2	12/08/2020	mg/l	0.05	<0.05	<0.05	<0.05	<0.05
Nitrite as NO2	26/08/2020	mg/l	0.05	<0.05	<0.05	<0.05	<0.05
Nitrite as NO2	24/02/2021	mg/l	0.05	0.273	<0.05	<0.05	<0.05
Nitrite as NO2	16/03/2021	mg/l	0.05	<0.05	<0.05	<0.05	<0.05
pH	12/08/2020	pH Units	>6 & <9	6.88	7.06	7.13	7.13
pH	26/08/2020	pH Units	>6 & <9	5.79	6.59	6.35	6.96
pH	24/02/2021	pH Units	>6 & <9	6.69	6.74	6.47	7.03
pH	16/03/2021	pH Units	>6 & <9	6.75	6.97	7.38	7.25
Phosphate (Ortho as P)	12/08/2020	mg/l		<0.02	<0.02	<0.02	<0.02
Phosphate (Ortho as P)	26/08/2020	mg/l		<0.02	<0.02	<0.02	<0.02
Phosphate (Ortho as P)	24/02/2021	mg/l		<0.02	<0.02	<0.02	<0.02
Phosphate (Ortho as P)	16/03/2021	mg/l		<0.02	<0.02	<0.02	<0.02
Phosphorus (tot.unfilt)	12/08/2020	µg/l		<20	<20	24.1	<20
Phosphorus (tot.unfilt)	26/08/2020	µg/l		<20	<20	23.1	<20
Phosphorus (tot.unfilt)	24/02/2021	µg/l		<20	<20	<20	<20
Phosphorus (tot.unfilt)	16/03/2021	µg/l		<20	<20	<20	<20
Suspended solids, Total	12/08/2020	mg/l	25	<2	<2	<2	<2
Suspended solids, Total	26/08/2020	mg/l	25	<2	<2	<2	<2
Suspended solids, Total	24/02/2021	mg/l	25	<2	2.55	<2	<2
Suspended solids, Total	16/03/2021	mg/l	25	<2	<2	<2	<2
True Colour	12/08/2020	mg/l Pt/Co		24.7	21.1	76.6	48.3
True Colour	26/08/2020	mg/l Pt/Co		84.7	51.9	143	60.3
True Colour	24/02/2021	mg/l Pt/Co		31.4	61.7	44.2	51.4
True Colour	16/03/2021	mg/l Pt/Co		13.8	26.8	14.2	20.2
Turbidity	12/08/2020	ntu		0.54	0.624	1.68	0.905
Turbidity	26/08/2020	ntu		1.28	0.502	1.62	2.22
Turbidity	24/02/2021	ntu		0.561	3.85	1.62	0.452
Turbidity	16/03/2021	ntu		0.805	1.28	0.694	

APPENDIX 9.4:

SW LABORATORY CERTS

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
Dublin
Dublin 14

Attention: Sven Klinkenbergh

CERTIFICATE OF ANALYSIS

Date of report Generation:	20 August 2020
Customer:	Minerex Environmental
Sample Delivery Group (SDG):	200814-71
Your Reference:	3188-A2-COC1
Location:	Inchamore, Co. Cork
Report No:	564014

We received 4 samples on Friday August 14, 2020 and 4 of these samples were scheduled for analysis which was completed on Thursday August 20, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	200814-71	**Client Reference:**	3188-A2-COC1	**Report Number:**	564014
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22656606	3188-SW1		0.00 - 0.00	12/08/2020
22656623	3188-SW2		0.00 - 0.00	12/08/2020
22656636	3188-SW3		0.00 - 0.00	12/08/2020
22656649	3188-SW4		0.00 - 0.00	12/08/2020

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C

17.4
ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	200814-71	**Client Reference:**	3188-A2-COC1	**Report Number:**	564014
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

ults Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
Gas
OTH - Other

Lab Sample No(s)	22656606	22656623	22656636	22656649
Customer Sample Reference	3188-SW1	3188-SW2	3188-SW3	3188-SW4
AGS Reference				
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Container	500ml Plastic (ALE208) / H2SO4 (ALE244) / HNO3 Unfiltered (ALE204) / NaOH (ALE245) / 500ml Plastic (ALE208) / H2SO4 (ALE204) / HNO3 Unfiltered (ALE204) / NaOH (ALE245) / 500ml Plastic (ALE208) / H2SO4 (ALE244) / HNO3 Unfiltered (ALE204) / NaOH (ALE245) / 500ml Plastic (ALE208) / H2SO4 (ALE244) / HNO3 Unfiltered (ALE204) / NaOH (ALE245)			
Sample Type	SW	SW	SW	SW

Alkalinity as CaCO3	All	NDPs: 0 Tests: 4	X				X				X				X				
Ammonium Low	All	NDPs: 0 Tests: 4		X				X				X				X			
Anions by Kone (w)	All	NDPs: 0 Tests: 4	X				X				X				X				
Colour Test	All	NDPs: 0 Tests: 4	X				X				X				X				
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4	X				X				X				X				
Nitrite by Kone (w)	All	NDPs: 0 Tests: 4				X				X				X					X
[illegible]alue	All	NDPs: 0 Tests: 4	X				X				X				X				
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4	X				X				X				X				
Suspended Solids	All	NDPs: 0 Tests: 4	X				X				X				X				
Total Metals by ICP-MS	All	NDPs: 0 Tests: 4			X				X				X					X	
Turbidity in waters	All	NDPs: 0 Tests: 4	X				X				X				X				

Validated

CERTIFICATE OF ANALYSIS

SDG:	200814-71	**Client Reference:**	3188-A2-COC1	**Report Number:**	564014
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3 EC	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	3188-SW1	3188-SW2	3188-SW3	3188-SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	12/08/2020	12/08/2020	12/08/2020	12/08/2020		
			Sample Time	00:00	00:00	00:00	00:00		
			Date Received	14/08/2020	14/08/2020	14/08/2020	14/08/2020		
			SDG Ref	200814-71	200814-71	200814-71	200814-71		
			Lab Sample No.(s)	22656606	22656623	22656636	22656649		
			AGS Reference						
Suspended solids, Total	<2 mg/l	TM022		<2 #	<2 #	<2 #	<2 #		
Alkalinity, Total as CaCO3	<2 mg/l	TM043		9.11 #	22.5 #	18 #	16 #		
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043		9.11	22.5	18	16		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099		0.0245 #	0.0121 #	0.0243 #	0.028 #		
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120		0.0578 #	0.057 #	0.0757 #	0.0625 #		
Phosphorus (tot.unfilt)	<20 µg/l	TM152		<20 #	<20 #	24.1 #	<20 #		
Nitrite as NO2	<0.05 mg/l	TM184		<0.05 #	<0.05 #	<0.05 #	<0.05 #		
Phosphate (Ortho as P)	<0.02 mg/l	TM184		<0.02 #	<0.02 #	<0.02 #	<0.02 #		
Nitrate as NO3	<0.3 mg/l	TM184		0.539	<0.3	<0.3	<0.3		
Turbidity	<0.1 ntu	TM195		0.54 ♦ #	0.674 ♦ #	2.06 ♦ #	1.17 ♦ #		
pH	<1 pH Units	TM256		6.88 #	7.08 #	7.13 #	7.13 #		
Apparent Colour	<1 mg/l Pt/Co	TM261		30.8	31.2	97	65.8		
True Colour	<1 mg/l Pt/Co	TM261		24.7	21.1	76.6	48.3		

CERTIFICATE OF ANALYSIS

SDG:	200814-71	**Client Reference:**	3188-A2-COC1	**Report Number:**	564014
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

ical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Validated

CERTIFICATE OF ANALYSIS

SDG:	200814-71	**Client Reference:**	3188-A2-COC1	**Report Number:**	564014
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	22656606	22656623	22656636	22656649
Customer Sample Ref.	3188-SW1	3188-SW2	3188-SW3	3188-SW4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Ammonium Low	18-Aug-2020	19-Aug-2020	18-Aug-2020	18-Aug-2020
Anions by Kone (w)	17-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Colour Test	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020
Conductivity (at 20 deg.C)	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Nitrite by Kone (w)	17-Aug-2020	19-Aug-2020	19-Aug-2020	17-Aug-2020
pH Value	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Phosphate by Kone (w)	20-Aug-2020	20-Aug-2020	20-Aug-2020	20-Aug-2020
Suspended Solids	20-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Total Metals by ICP-MS	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Turbidity in waters	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**

19. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sample analysed deemed to be clear of asbestos. If any asbestos fibres are found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

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Website: www.alsenvironmental.co.uk

Minerex Environmental
Taney hall
Eglinton Terrace
Dundrum
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Dublin 14

Attention: Sven Klinkenbergh

CERTIFICATE OF ANALYSIS

Date of report Generation:	05 September 2020
Customer:	Minerex Environmental
Sample Delivery Group (SDG):	200828-87
Your Reference:	3188-A2-COC2
Location:	Inchamore, Co. Cork
Report No:	566071

We received 4 samples on Friday August 28, 2020 and 4 of these samples were scheduled for analysis which was completed on Saturday September 05, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

Validated

CERTIFICATE OF ANALYSIS

SDG:	200828-87	Client Reference:	3188-A2-COC2	Report Number:	566071
Location:	Inchamore, Co. Cork	Order Number:		Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22737270	3188-SW1		0.00 - 0.00	27/08/2020
22737286	3188-SW2		0.00 - 0.00	26/08/2020
22737302	3188-SW3		0.00 - 0.00	26/08/2020
22737315	3188-SW4		0.00 - 0.00	26/08/2020

Only received samples which have had analysis scheduled will be shown on the following pages.

![ALS]

Validated

CERTIFICATE OF ANALYSIS

SDG:	200828-87	Client Reference:	3188-A2-COC2	Report Number:	566071
Location:	Inchamore, Co. Cork	Order Number:		Superseded Report:	

Results Legend

- X Test
- N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			22737270				22737286				22737302				22737315			
Customer Sample Reference			3188-SW1				3188-SW2				3188-SW3				3188-SW4			
AGS Reference																		
Depth (m)			0.00 - 0.00				0.00 - 0.00				0.00 - 0.00				0.00 - 0.00			
Container			500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)	1lplastic (ALE221)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)
Sample Type			SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4	X				X				X				X			
Ammonium Low	All	NDPs: 0 Tests: 4		X				X				X				X		
Anions by Kone (w)	All	NDPs: 0 Tests: 4	X				X				X				X			
Colour Test	All	NDPs: 0 Tests: 4	X				X				X				X			
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4	X				X				X				X			
Nitrite by Kone (w)	All	NDPs: 0 Tests: 4				X				X				X				X
pH Value	All	NDPs: 0 Tests: 4	X				X				X				X			
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4	X				X				X				X			
Suspended Solids	All	NDPs: 0 Tests: 4	X				X				X				X			
Total Metals by ICP-MS	All	NDPs: 0 Tests: 4			X				X				X				X	
Turbidity in waters	All	NDPs: 0 Tests: 4	X				X				X				X			

13:52:22 05/09/2020

Validated

CERTIFICATE OF ANALYSIS

SDG:	200828-87	**Client Reference:**	3188-A2-COC2	**Report Number:**	566071
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1.34§C	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref	3188-SW1	3188-SW2	3188-SW3	3188-SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	27/08/2020	26/08/2020	26/08/2020	26/08/2020		
			Sample Time	00:00	00:00	00:00	00:00		
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020		
			SDG Ref	200828-87	200828-87	200828-87	200828-87		
			Lab Sample No.(e) AGS Reference	22737270	22737285	22737302	22737315		
Suspended solids, Total	<2 mg/l	TM022		<2 #	<2 #	<2 #	<2 #		
Alkalinity, Total as CaCO3	<2 mg/l	TM043		4.5 #	7.5 #	9 #	18.6 #		
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043		4.5	7.5	9	18.6		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099		0.0164 #	0.0177 #	0.0321 #	0.018 #		
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120		0.0427 #	0.0304 #	0.063 #	0.0526 #		
Phosphorus (tot.unfilt)	<20 µg/l	TM152		<20 #	<20 #	23.1 #	<20 #		
Nitrite as NO2	<0.05 mg/l	TM184		<0.05 #	<0.05 #	<0.05 #	<0.05 #		
sphate (Ortho as P)	<0.02 mg/l	TM184		<0.02 #	<0.02 #	<0.02 #	<0.02 #		
Nitrate as NO3	<0.3 mg/l	TM184		0.374	<0.3	<0.3	0.456		
Turbidity	<0.1 ntu	TM195		1.28 ♦ #	0.562 ♦ #	1.53 ♦ #	0.885 ♦ #		
pH	<1 pH Units	TM256		5.73 #	6.59 #	6.35 #	6.96 #		
Apparent Colour	<1 mg/l Pt/Co	TM261		96	62.7	165	79.3		
True Colour	<1 mg/l Pt/Co	TM261		84.7	51.9	143	66.3		

CERTIFICATE OF ANALYSIS

SDG:	200828-87	**Client Reference:**	3188-A2-COC2	**Report Number:**	566071
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S)

Validated

CERTIFICATE OF ANALYSIS

SDG:	200828-87	**Client Reference:**	3188-A2-COC2	**Report Number:**	566071
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	22737270	22737286	22737302	22737315
Customer Sample Ref.	3188-SW1	3188-SW2	3188-SW3	3188-SW4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	04-Sep-2020	04-Sep-2020	04-Sep-2020	03-Sep-2020
Ammonium Low	03-Sep-2020	03-Sep-2020	05-Sep-2020	05-Sep-2020
Anions by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Colour Test	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Conductivity (at 20 deg.C)	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
Nitrite by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
pH Value	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
Phosphate by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Suspended Solids	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Total Metals by ICP-MS	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
Turbidity in waters	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020

Appendix

General

1 Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass, it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

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12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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18. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**

19. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

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Website: www.alsenvironmental.co.uk

Minerex Environmental
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Dublin 14

Attention: Sven Klinkenbergh

CERTIFICATE OF ANALYSIS

Date of report Generation:	04 March 2021
Customer:	Minerex Environmental
Sample Delivery Group (SDG):	210301-15
Your Reference:	3188-A2-COC4
Location:	Inchamore, Co. Cork
Report No:	589280

We received 4 samples on Monday March 01, 2021 and 4 of these samples were scheduled for analysis which was completed on Thursday March 04, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23815010	3188-A2-SW1 (Inch. 1)		0.00 - 0.00	24/02/2021
23815030	3188-A2-SW2 (Inch. 2)		0.00 - 0.00	24/02/2021
23815049	3188-A2-SW3 (Inch. 3)		0.00 - 0.00	24/02/2021
23815061	3188-A2-SW4 (Inch. 4)		0.00 - 0.00	24/02/2021

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	210301-15	**Client Reference:**	3188-A2-COC4	**Report Number:**	589280
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

ılts Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
Gas
I - Other

Lab Sample No(s)				23815010			23815030			23815049			23815061			
Customer Sample Reference				3188-A2-SW1 (Inch. 1)			3188-A2-SW2 (Inch. 2)			3188-A2-SW3 (Inch. 3)			3188-A2-SW4 (Inch. 4)			
AGS Reference																
Depth (m)				0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			
Container				500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)
Sample Type				SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4		X			X				X				X			
Ammonium Low	All	NDPs: 0 Tests: 4			X			X				X				X		
Anions by Kone (w)	All	NDPs: 0 Tests: 4		X			X				X				X			
Colour Test	All	NDPs: 0 Tests: 4		X			X				X				X			
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4		X			X				X				X			
Nitrite by Kone (w)	All	NDPs: 0 Tests: 4				X				X				X				X
pH Value	All	NDPs: 0 Tests: 4		X			X				X				X			
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4		X			X				X				X			
Suspended Solids	All	NDPs: 0 Tests: 4		X			X				X				X			
Total Metals by ICP-MS	All	NDPs: 0 Tests: 4		X					X				X				X	
Turbidity in waters	All	NDPs: 0 Tests: 4		X			X				X				X			

Validated

CERTIFICATE OF ANALYSIS

SDG:	210301-15	**Client Reference:**	3188-A2-COC4	**Report Number:**	589280
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery.
(F)	Trigger breach confirmed
1-4 [3]	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	3188-A2-SW1 (Inch. 1)	3188-A2-SW2 (Inch. 2)	3188-A2-SW3 (Inch. 3)	3188-A2-SW4 (Inch. 4)		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	24/02/2021	24/02/2021	24/02/2021	24/02/2021		
			Sample Time	00:00	00:00	00:00	00:00		
			Date Received	01/03/2021	01/03/2021	01/03/2021	01/03/2021		
			SDG Ref	210301-15	210301-15	210301-15	210301-15		
			Lab Sample No.(s)	23815010	23815030	23815049	23815061		
			AGS Reference						
Suspended solids, Total	<2 mg/l	TM022		<2 #	2.55 #	<2 #	<2 #		
Alkalinity, Total as CaCO3	<2 mg/l	TM043		2.5 #	4 #	2 #	3.5 #		
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043		2.5	4	2	3.5		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099		0.037 #	0.036 #	0.024 #	0.032 #		
Conductivity @ 20 deg C	<0.02 mS/cm	TM120		0.025 #	0.0377 #	0.0281 #	0.0293 #		
Phosphorus (tot.unfilt)	<20 µg/l	TM152		<20 2 #	<20 #	<20 #	<20 #		
Nitrite as NO2	<0.05 mg/l	TM184		0.273 #	<0.05 #	<0.05 #	<0.05 #		
Phosphate (Ortho as P)	<0.02 mg/l	TM184		<0.02 #	<0.02 #	<0.02 #	<0.02 #		
Nitrate as NO3	<0.3 mg/l	TM184		<0.3	0.384	<0.3	<0.3		
Turbidity	<0.1 ntu	TM195		0.561 @ #	3.65 @ #	1.62 @ #	2.22 @ #		
pH	<1 pH Units	TM256		6.69 #	6.74 #	6.47 #	7.03 #		
Apparent Colour	<1 mg/l Pt/Co	TM261		37.4	75.2	52	61.3		
True Colour	<1 mg/l Pt/Co	TM261		31.4	61.2	44.2	51.4		

CERTIFICATE OF ANALYSIS

SDG:	210301-15	Client Reference:	3188-A2-COC4	Report Number:	589280
Location:	Inchamore, Co. Cork	Order Number:		Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	210301-15	**Client Reference:**	3188-A2-COC4	**Report Number:**	589280
Location:	Inchamore, Co. Cork	**Order Number:**		**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	23815010	23815030	23815049	23815061
Customer Sample Ref.	3188-A2-SW1 (In ch 1)	3188-A2-SW2 (In ch 2)	3188-A2-SW3 (In ch 3)	3188-A2-SW4 (In ch 4)
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Ammonium Low	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021
Anions by Kone (w)	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021
Colour Test	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021
Conductivity (at 20 deg.C)	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Nitrite by Kone (w)	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
pH Value	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
Phosphate by Kone (w)	02-Mar-2021	02-Mar-2021	02-Mar-2021	03-Mar-2021
Suspended Solids	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
Total Metals by ICP-MS	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Turbidity in waters	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

19. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	
Fibrous Anthophyllite	
Fibrous Tremolite	

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX 9.5:

SAFETY MATERIAL DATASHEET – CLEARBORE

Section 1 - Identification of The Material and Supplier

Clearbore Pty Ltd
62 Mt Tootie Rd
Bilpin, NSW 2758
AUSTRALIA

AUS Freecall 1800 013 210
AUS Fax (02) 4567 0122
NZ Freecall 0800 443 537
NZ Freefax 0800 443 538

Chemical nature:	Organic acid with indicator dye.
Trade Name:	**Clearbore**
Product Use:	Bore water pump cleaner.
Creation Date:	**February, 2009**
This version issued:	**January 2019** and is valid for 5 years from this date.

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Xn, Harmful. Xi, Irritating. Hazardous according to the criteria of SWA.

Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: R36, R21/22. Irritating to eyes. Harmful in contact with skin and if swallowed.
Safety Phrases: S2, S20, S22, S45, S24/25, S36/39. Keep out of reach of children. When using, do not eat or drink. Do not breathe dust. In case of accident or if you feel unwell, contact a doctor or Poisons Information Centre immediately (show this MSDS where possible). Avoid contact with skin and eyes. Wear suitable protective clothing and eye/face protection.
SUSMP Classification: S6
ADG Classification: None allocated. Not a Dangerous Good under the ADG Code.
UN Number: None allocated

GHS Signal word: WARNING.

HAZARD STATEMENT:
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H320: Causes eye irritation.

PREVENTION
P102: Keep out of reach of children.
P264: Wash contacted areas thoroughly after handling.
P280: Wear protective gloves, protective clothing and eye or face protection.
P281: Use personal protective equipment as required.

RESPONSE
P311: If swallowed, call a POISON CENTER or doctor.
P337: If eye irritation persists: seek medical attention.
P353: Rinse skin or shower with water.
P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice.
P370+P378: Not Combustible. Use extinguishing media suited to burning materials.

DISPOSAL
P501: Dispose of contents and containers to landfill.

Emergency Overview

Physical Description & Colour: Blue crystalline solid.
Odour: No odour.
Major Health Hazards: harmful in contact with skin, and if swallowed, eye irritant.

Potential Health Effects

Inhalation:
Short Term Exposure: Available data indicates that this product is not harmful. However product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.
Long Term Exposure: No data for health effects associated with long term inhalation.

Skin Contact:
Short Term Exposure: Available data shows that this product is harmful, but symptoms are not available. In addition product may be irritating, but is unlikely to cause anything more than mild transient discomfort.
Long Term Exposure: No data for health effects associated with long term skin exposure.

Eye Contact:
Short Term Exposure: This product is an eye irritant. Symptoms may include stinging and reddening of eyes and watering which may become copious. Other symptoms may also become evident. If exposure is brief, symptoms should disappear once exposure has ceased. However, lengthy exposure or delayed treatment may cause permanent damage.
Long Term Exposure: No data for health effects associated with long term eye exposure.

Ingestion:
Short Term Exposure: Significant oral exposure is considered to be unlikely. Available data shows that this product is harmful, but symptoms are not available. However, this product is an oral irritant. Symptoms may include burning sensation and reddening of skin in mouth and throat. Other symptoms may also become evident, but all should disappear once exposure has ceased.
Long Term Exposure: No data for health effects associated with long term ingestion.

Carcinogen Status:
SWA: No significant ingredient is classified as carcinogenic by SWA.
NTP: No significant ingredient is classified as carcinogenic by NTP.
IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m^3)	STEL (mg/m^3)
Oxalic acid	144-62-7	>60	1	2
Other non hazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The SWA TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak "is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:
You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this MSDS with you when you call.

Inhalation: No first aid measures normally required. However, if inhalation has occurred, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.
Skin Contact: Quickly and gently brush away excess solids. Wash gently and thoroughly with warm water (use non-abrasive soap if necessary) for 10-20 minutes or until product is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands and belts) and completely decontaminate them before reuse or discard.
Eye Contact: Quickly and gently brush particles from eyes. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the product is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately. Take special care if exposed person is wearing contact lenses.
Ingestion: If swallowed, do NOT induce vomiting. Wash mouth with water and contact a Poisons Information Centre, or call a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. Violent steam generation or eruption may occur upon application of direct water stream on hot liquids.
Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.
Extinguishing Media: Not Combustible. Use extinguishing media suited to burning materials.
Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade.

Flash point:	Combustible solid.
Upper Flammability Limit:	No data.
Lower Flammability Limit:	No data.
Autoignition temperature:	No data.
Flammability Class:	Combustible solid.

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Wear full protective clothing including eye/face protection. All skin areas should be covered. See below under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, Nitrile, butyl rubber, neoprene. Eye/face protective equipment should comprise as a minimum, protective goggles. If there is a significant chance that dusts are likely to build up in cleanup area, we recommend that you use a suitable Dust Mask. Use a P1 mask, designed for use against mechanically generated particles eg silica & asbestos. Otherwise, not normally necessary.
Stop leak if safe to do so, and contain spill. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Consider vacuuming if appropriate. Recycle containers wherever possible after careful cleaning. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. This material may be suitable for approved landfill. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this MSDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.
Storage: This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this schedule of poison. Store packages of this product in a cool place. Make sure that containers of this product are kept tightly closed. Keep containers dry and away from water. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:
Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits	**TWA (mg/m^3)**	**STEL (mg/m^3)**
Oxalic acid	1	2

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.
Ventilation: This product should only be used in a well ventilated area. If natural ventilation is inadequate, use of a fan is suggested.
Eye Protection: Protective glasses or goggles should be worn when this product is being used. Failure to protect your eyes may cause them harm. Emergency eye wash facilities are also recommended in an area close to where this product is being used.
Skin Protection: Prevent skin contact by wearing impervious gloves, clothes and, preferably, apron. Make sure that all skin areas are covered. See below for suitable material types.
Protective Material Types: We suggest that protective clothing be made from the following materials: rubber, nitrile, butyl rubber, neoprene.

Respirator: If there is a significant chance that dusts are likely to build up in the area where this product is being used, we recommend that you use a suitable Dust Mask. Otherwise, not normally necessary.
Eyebaths or eyewash stations and safety deluge showers should be provided near to where this product is being used.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Blue crystalline solid.
Odour:	No odour.
Boiling Point:	No specific data. Expected to decompose before boiling.
Freezing/Melting Point:	187°C
Volatiles:	No specific data. Expected to be low at 100°C.
Vapour Pressure:	Negligible at normal ambient temperatures.
Vapour Density:	No data.
Specific Gravity:	1.65 at 20°C
Water Solubility:	Soluble.
pH:	2 approx (concentration not given)
Volatility:	Negligible at normal ambient temperatures.
Odour Threshold:	No data.
Evaporation Rate:	No data.
Coeff Oil/water Distribution:	No data
Autoignition temp:	No data.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.
Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Keep containers tightly closed. Containers should be kept dry.
Incompatibilities: strong oxidising agents, zinc, tin, aluminium and their alloys.
Fire Decomposition: Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Water. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.
Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Local Effects:
Target Organs: There is no data to hand indicating any particular target organs.

Classification of Hazardous Ingredients

Ingredient	Risk Phrases
Oxalic Acid	Conc>=5%: Xn; R21/22

Section 12 - Ecological Information

This product is biodegradable. It will not accumulate in the soil or water or cause long term problems. This product is unlikely to accumulate in body tissues.

Section 13 - Disposal Considerations

Disposal: This product may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. If neither of these options is suitable, consider controlled incineration, or landfill.

Section 14 - Transport Information

ADG Code: This product is not classified as a Dangerous Good. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: All of the significant ingredients in this formulation are compliant with NICNAS regulations.
The following ingredient: Oxalic acid, is mentioned in the SUSMP.

Section 16 - Other Information

This MSDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS MSDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS MSDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS

OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

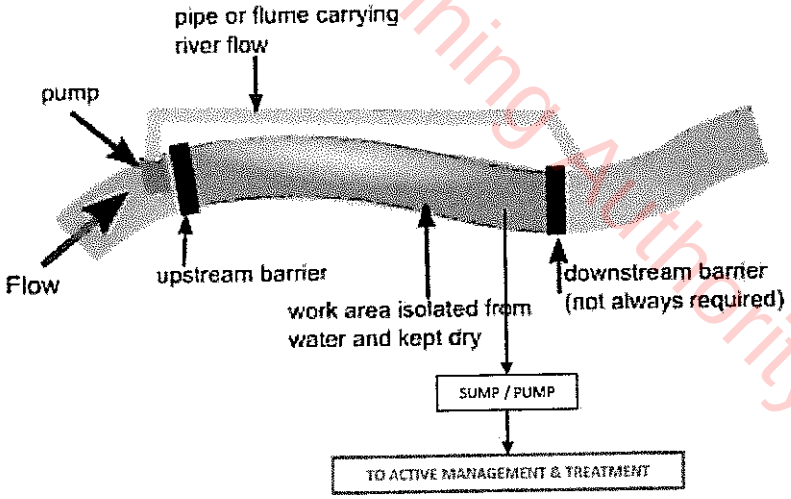
This MSDS is prepared in accord with the SWA document "Preparation of Safety Data Sheets for Hazardous Chemicals - Code of Practice" (December 2011)

http://www.kilford.com.au/ Phone +61 2 9251 4532

APPENDIX 9.6:

CONCEPTUAL AND INFO GRAPHICS

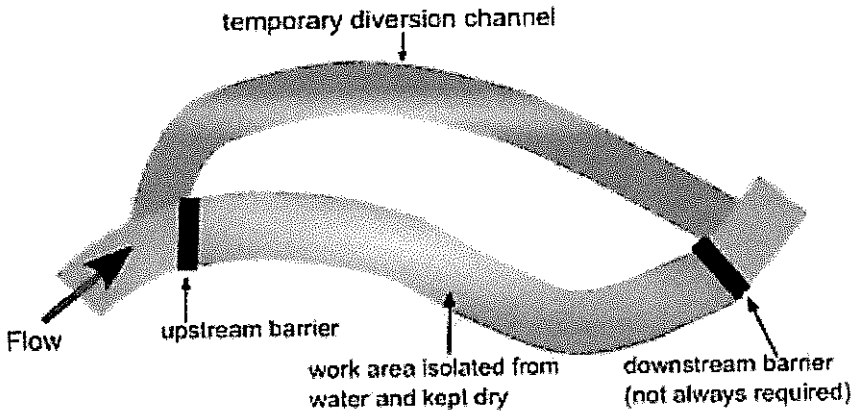
Full Isolation Over Pumping – Plan



NOTES:

- Full isolation over pumping / siphon. A whole section of the channel is isolated using barriers that span the full width of the river. This keeps a stretch of the river dry and the water is transferred downstream of the works area by mechanical assistance (pumping or siphon). The pump and associated pipework need not be located in the isolated area.
- This method is the preferred method for channel diversion during instream works , for example, during watercourse crossing / culvert construction. However, the pumping equipment deployed must be capable of the surface water feature discharge rate, including back up equipment and fail safe protocols.

Full Isolation by Diversion – Plan



NOTES:

- Full isolation temporary diversion channel. A whole section of the channel is isolated and kept dry, and the water is transferred downstream of the works area by excavating a temporary open channel.
- This is the less preferred method due to the destructive nature of constructing temporary diversion channels. However, in some instances where discharge rates are high, this method will negate the requirement for large volume pumping and associated inherent risks.

SEPA (2009) Engineering in the Water Environment Good Practice Guide – Temporary Construction Methods.

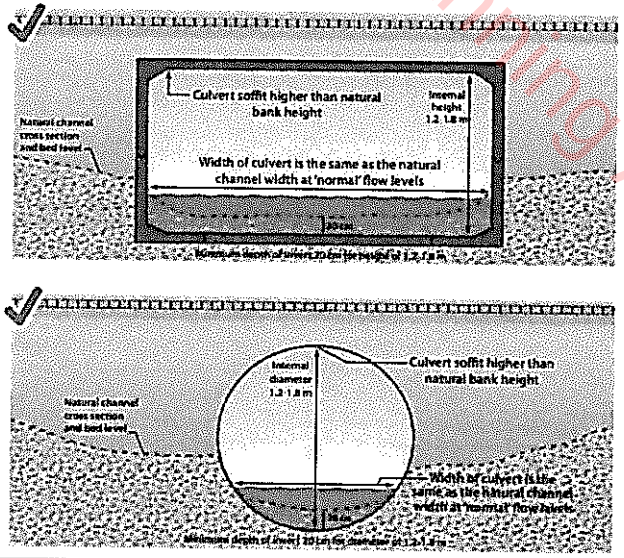
Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Sven Klinkenbergh Principal Environmental Consultant
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 1 Over Pumping – General Considerations**	**Date:**	4/4/2023	**Reviewed By:**	SK
	Revision:	00		

RSK

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

Closed Culvert Good Practice Design Considerations – Section

Figure 40: Good practice, culverts showing invert buried below bed level allowing the natural bed level, slope and material to be maintained. Culvert also maintains natural channel width.



SEPA (2010) Engineering in the Water Environment Good Practice Guide – River Crossings

Closed Culvert Good & Bad Examples – Section

Figure 41: Good practice, use a single large culvert for crossings that maintains the natural channel width.

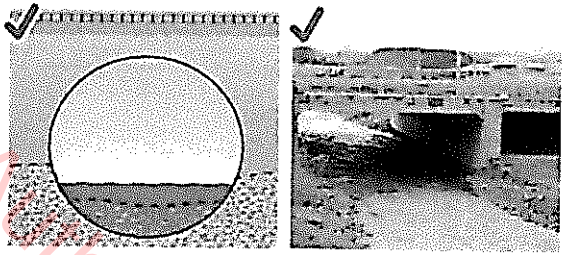


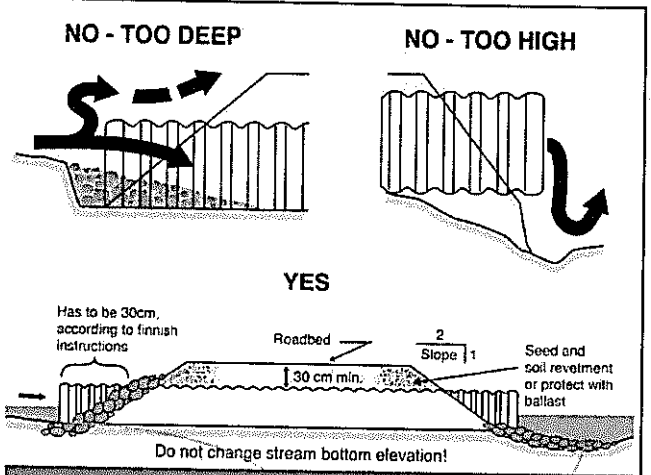
Figure 42: Poor practice, do not use smaller multiple pipes; they can create a barrier to fish passage.

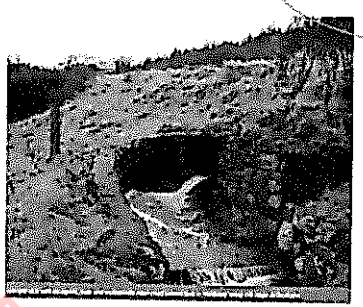
SEPA (2010) Engineering in the Water Environment Good Practice Guide – River Crossings

NOTE: Coarse aggregate has been used for erosion control. Silt fencing has been used to mitigate against the entrainment and mobilisation of solids during the construction process

TrueNorth Steel (2021)

Closed Culvert Erosion Control Good & Bad Examples – Section



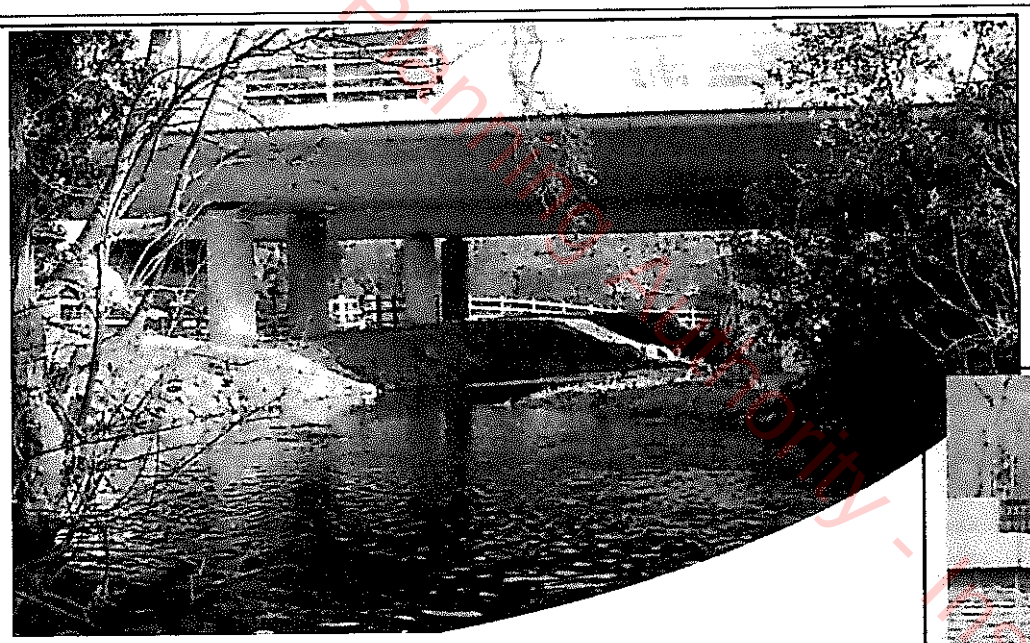


NOTE: Coarse aggregate will be used for erosion control. These areas at the openings of the culvert will also be designed to reduce velocity / discharge rate in turn further controlling erosion and providing additional beneficial impacts such increased attenuation time, increased recharge to ground etc.

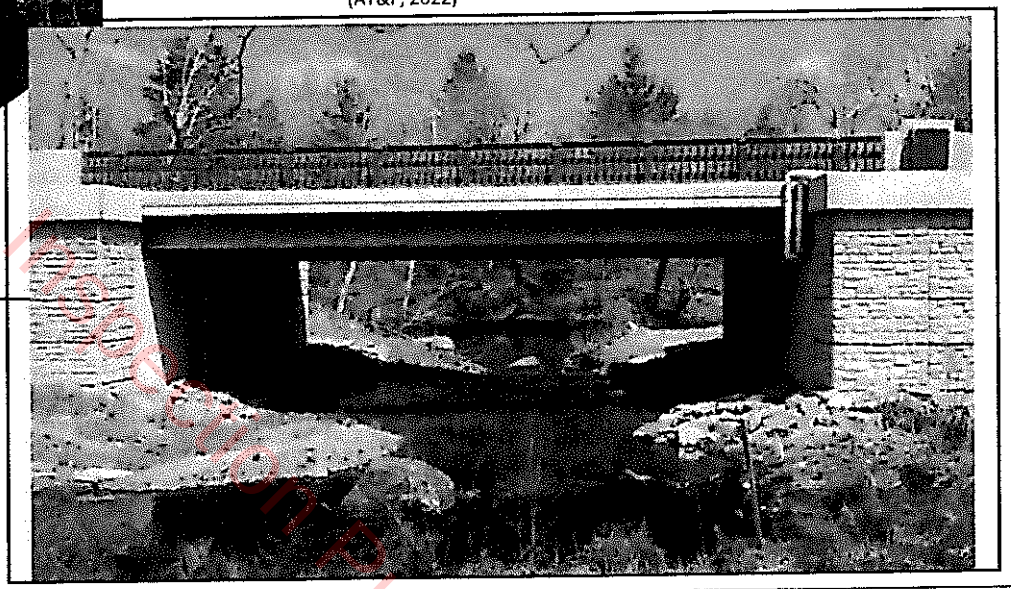
Roadex Network (https://www.roadex.org/e-learning/lessons/drainage-of-low-volume-roads/components-of-road-drainage-system/)

Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By:	Sven Klinkenbergh Principal Environmental Consultant
	Client:	JOD		
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 2 Culverting – General Considerations	Date:	4/4/2023	Reviewed By:	SK
	Revision:	00		

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure Not to scale



Example of a clear-span bridge, which retains the existing river channel and column set back from the river bank
(National Roads Authority, 2008)

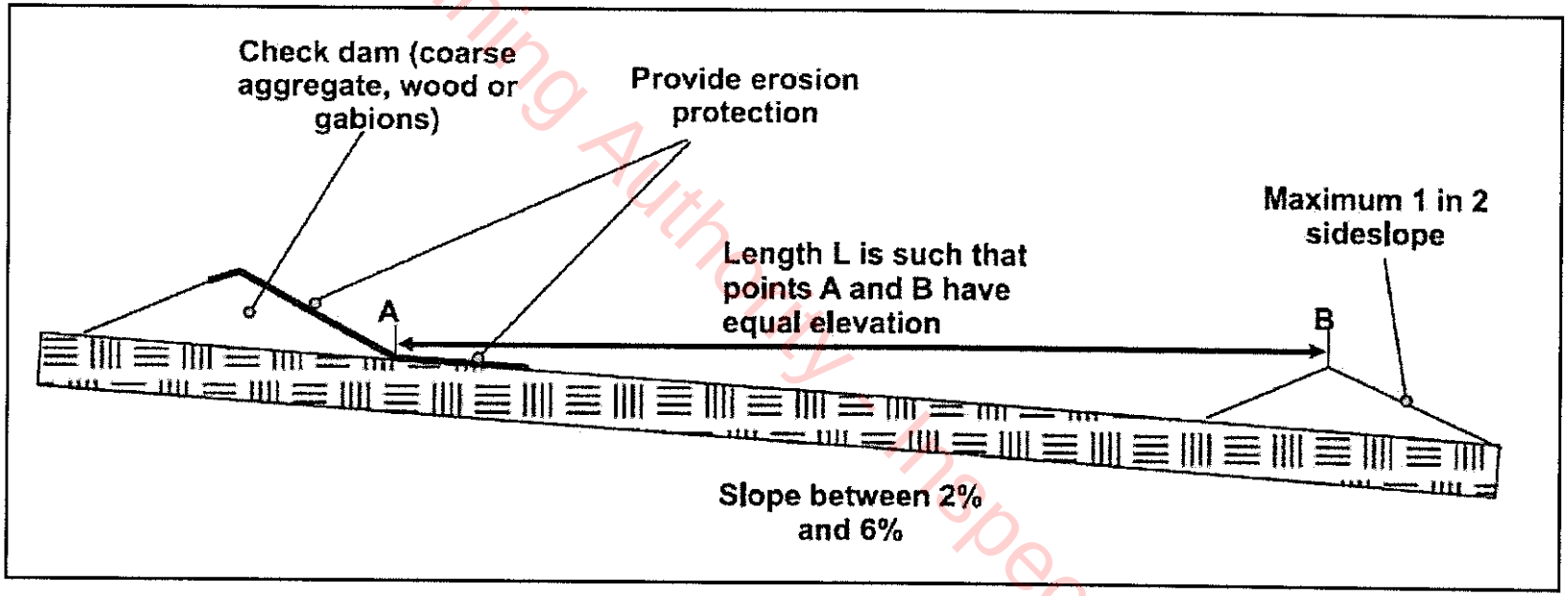


Example of a clear-span bridge which retains the existing river channel, abutments are set back from the river bank
(AT&F, 2022)

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Sven Klinkenbergh Principal Environmental Consultant	RSK
	Client:	JOD			
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 3 Example of Clear Span Bridges**	**Date:**	4/4/2023	**Reviewed By:**	SK	
	Revision:	00			

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

Constructed Drain and Check Dams – Section



Check Dam Design Consideration (CIRIA, 2004)

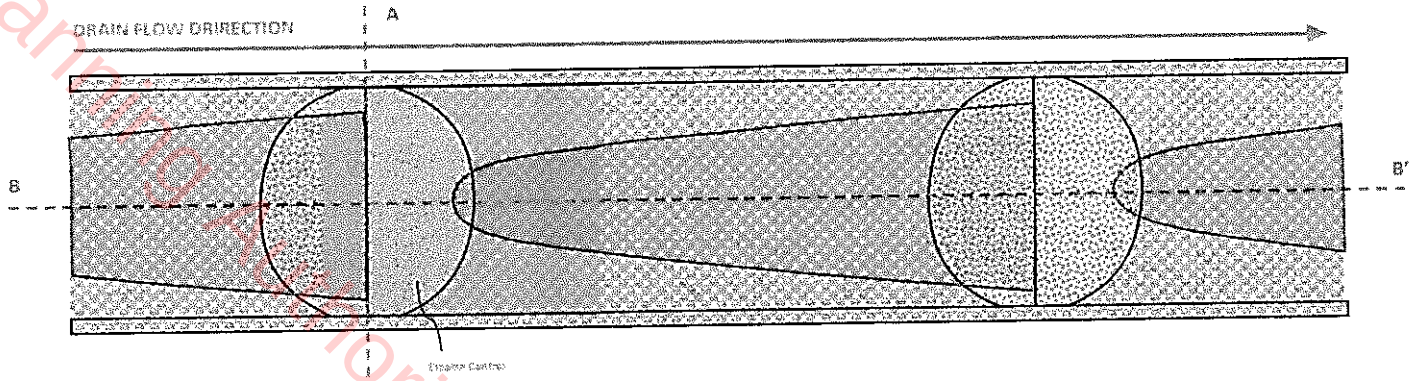
Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By:	Sven Klinkenbergh Principal Environmental Consultant	RSK
	Client:	JOD			
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 4 Check Dams – General Considerations	Date:	4/4/2023	Reviewed By:	SK	
	Revision:	00			

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

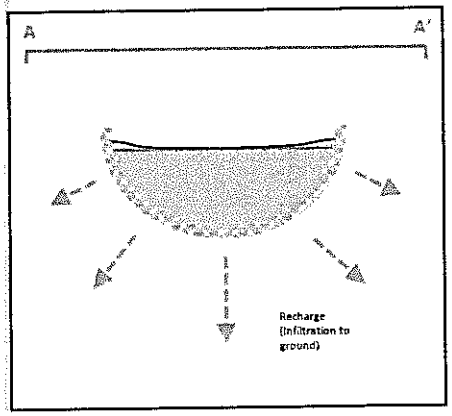
NOTES:

- The extensive use of check dams is recommended for the following reasons:
  - Management of runoff in terms of reducing flow velocity and minimising in channel erosion, or erosion at drainage outfalls.
  - Maximise attenuation of runoff with a view to enhancing runoff quality i.e. settlement of suspended solids.
  - Maximise attenuation of runoff with a view to reducing the hydrological response to rain fall at the site
  - Maintain or improve the site hydrological/ hydrogeological regime with a view to maximising recharge to ground and increasing groundwater levels locally. This is particularly relevant for peatland areas.
- Check dams will be constructed with the following features and specifications:
  - A low flow pipe or small orifice to allow for low flows through the check dam
  - Check dams will be permanent (life of development) and will be constructed with crushed rock with appropriate geo-chemistry (local) for example; coarse aggregate (100-600 mm). Wooden boards, gabions can also be used
  - Erosion protection and energy dissipaters (cobbles / boulder 100-150mm diameter) which will extend approximately 1.2 – 1.8m downgradient of the dam and applied to both the base and side walls of the drain / swale.
  - Erosion control can be enhanced with the in-combination use of geotextile base layers (but consider low flow through).
  - It is recommended that the drainage channels / swales are entirely lined with coarse aggregate / erosion control. This will enhance mitigation in terms of attenuation, erosion control, and recharge to ground. Alternatively, allowing drains / swales to vegetate will achieve similar effects.

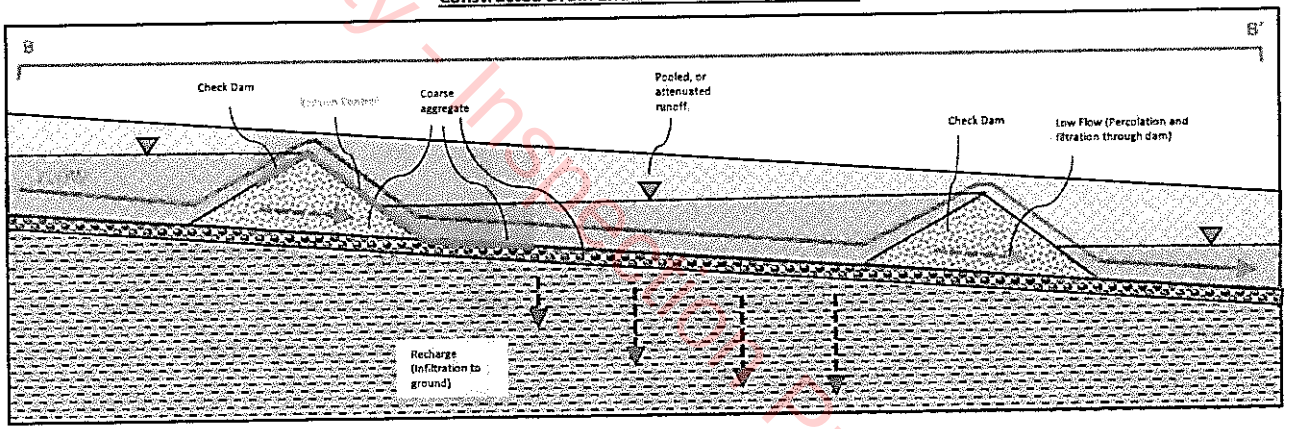
Constructed Drain and Check Dams – Plan View



Constructed Drain and Check Dams – Section A-A'



Constructed Drain and Check Dams – Section B-B'



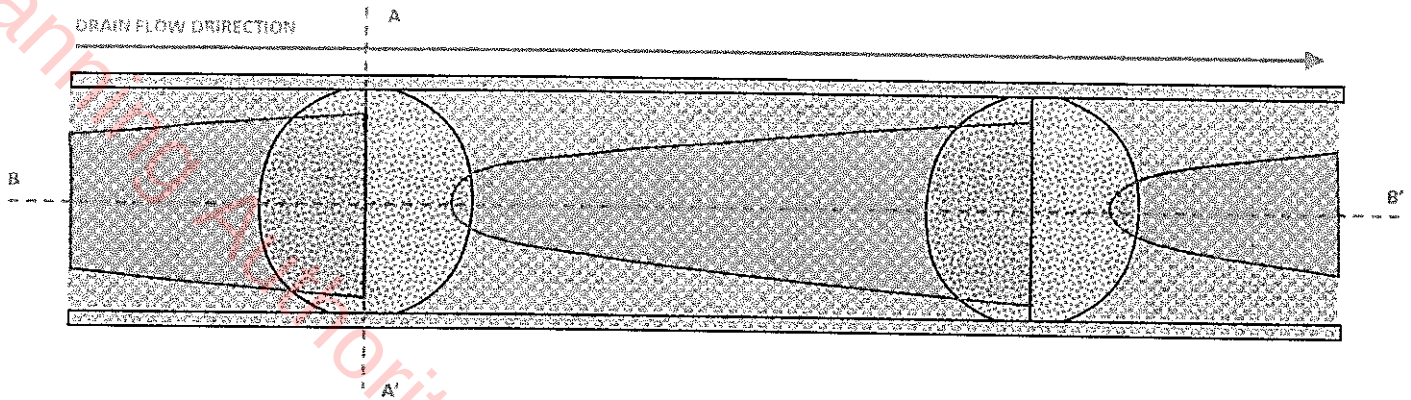
Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By:	Sven Klinkenbergh Principal Environmental Consultant
	Client:	JOD		
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 5 Check Dams – General Considerations	Date:	4/4/2023	Reviewed By:	SK
	Revision:	00		

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

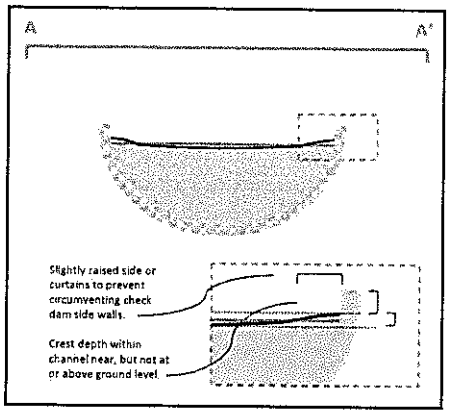
NOTES:

- It is recommended to align the elevation of the upgradient toe and downgradient crest. Therefore the spacing (L) of check dams will be dependent on the on the slope angle of a particular length (L) of drainage, whereby; on shallow slopes check dams will have larger spacing and on steeper slopes (up to 15 degrees *) spacing will be smaller.
- The purpose of aligning the toe and crest of respective check dams is recommended with a view to maximising pooling, or attenuation capacity of the drainage channel. The conceptual section presented here is designed with the downgradient crest (A) higher than the upgradient toe, as opposed to the crest (B) which is aligned with the toe. The purpose of this is to further enhance attenuation capacity at the dam, and to maximise hydraulic head ** and infiltration / percolation of runoff to ground water (recharge). However, this approach has limitations including for the potential to adversely impact undermine the integrity of the upgradient dam through erosion etc. or the downgradient dam through loading / excess weight. Mitigation measures including material selection, erosion control, and variable flow (V-notch) *** will be used where relevant to mitigate such impacts.
- [*] Check dams are recommended for drainage channels with slope angle up to 15 degrees. Drainage and runoff on steeper slopes (>15 degrees) will require different drainage velocity control features, for example; rock ripraps.
- [**] Attenuation of runoff in drainage channels is an opportunity to enhance recharge and reduce the hydrological response to rainfall at the site. However, detailed design will consider environmental and geological constraints, for example; enhanced recharge is not recommended in areas of elevated or high landslide susceptibility or risk.
- [***] V-Notch weirs discussed Conceptual Design – Drainage Infrastructure Check Dams – With Variable Flow Rate / V – Notch Weirs

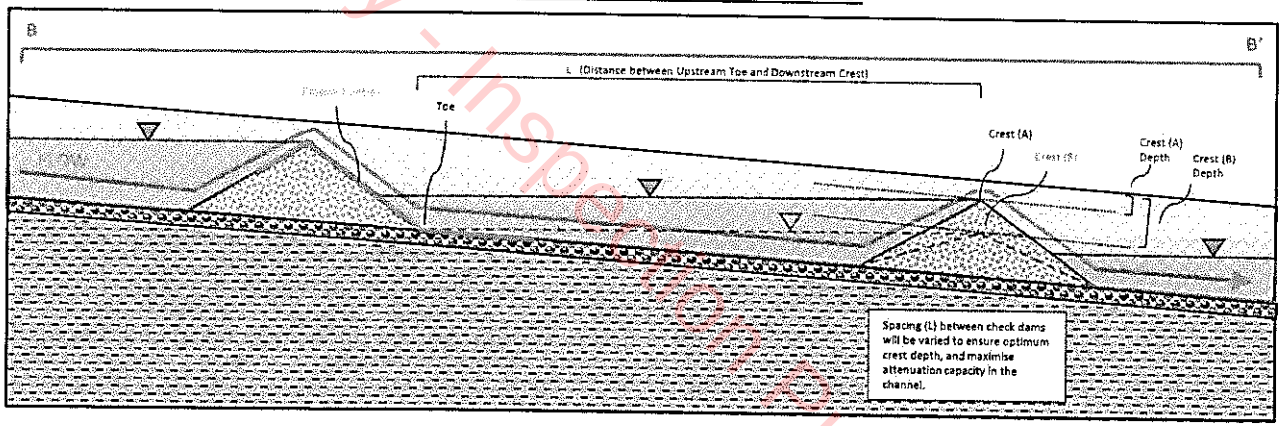
Constructed Drain and Check Dams – Plan View



Constructed Drain and Check Dams – Section A-A'



Constructed Drain and Check Dams – Section B-B'



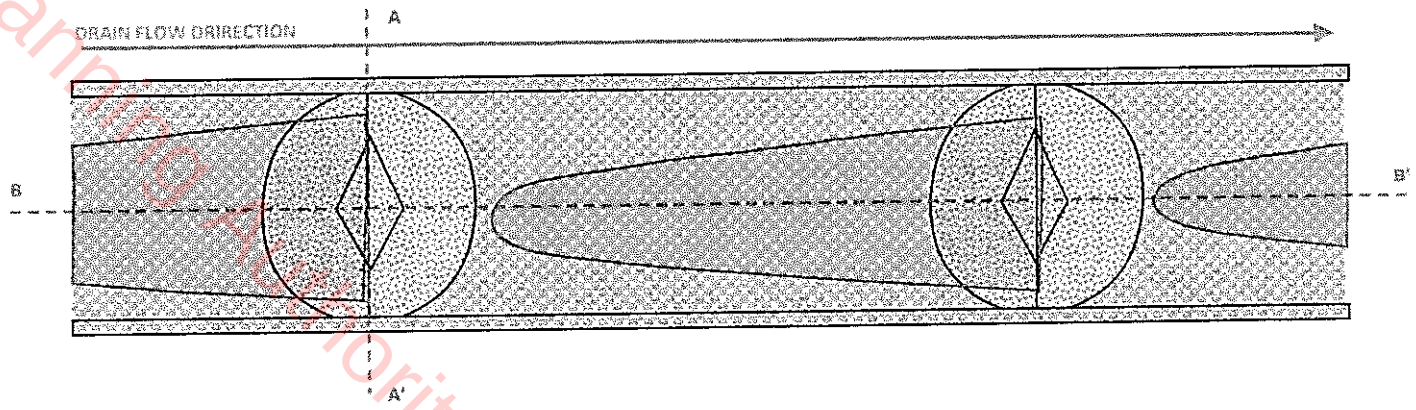
Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Sven Klinkenbergh Principal Environmental Consultant
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 6 Check Dams – Design Specifications and Considerations**	**Date:**	4/4/2023	**Reviewed By:**	SK
	Revision:	00		

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale

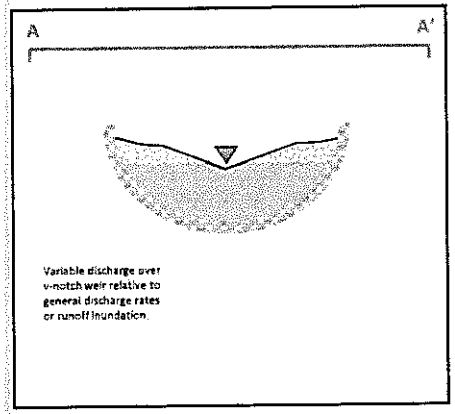
NOTES:

- V-Notch weirs can be included in designs as a control to mitigate against variable or peak flows / drainage discharge rates.
- V-Notch can also be employed to correct the elevation differential (between Toe and Crest) of respective in line check dams

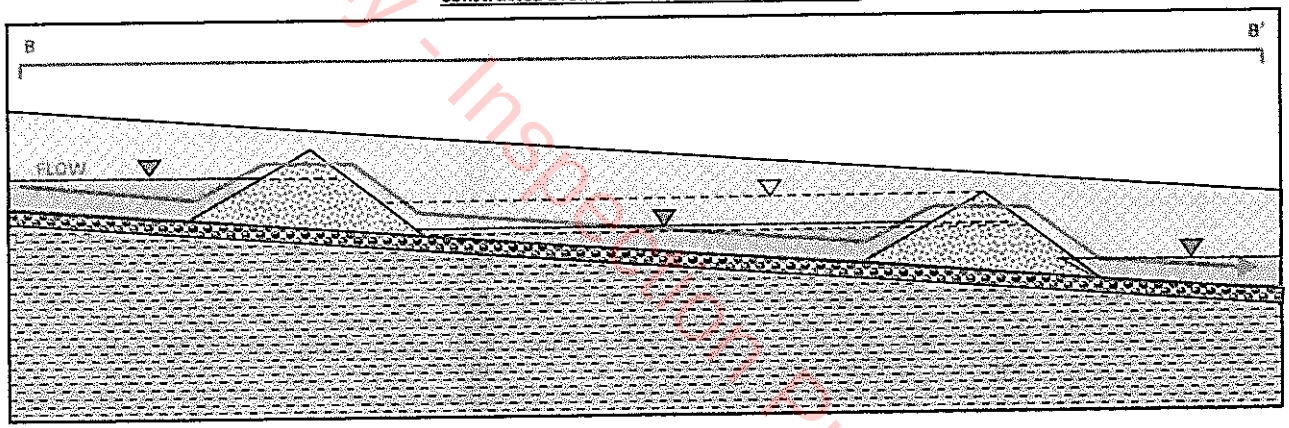
Constructed Drain and Check Dams – Plan View



Constructed Drain and Check Dams – Section A-A'



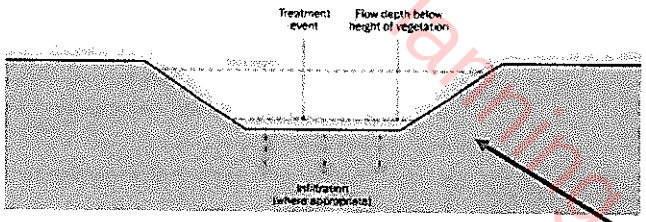
Constructed Drain and Check Dams – Section B-B'



Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By:	Sven Klinkenbergh Principal Environmental Consultant
	Client:	JOD		
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 7 Check Dams – With Variable Flow Rate / V – Notch Weirs	Date:	4/4/2023	Reviewed By:	SK
	Revision:	00		

RSK

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.



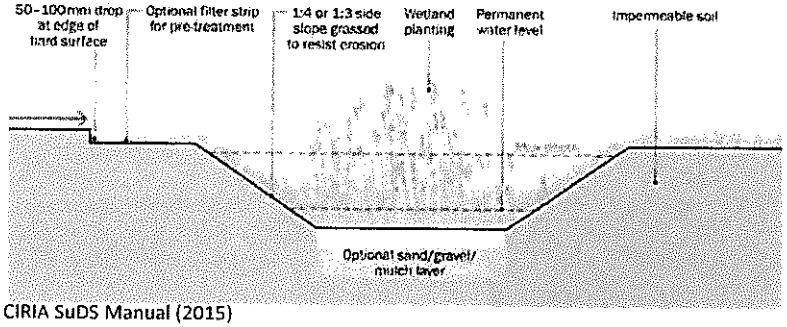
CIRIA SuDS Manual (2015)

A swale can have check dams installed at measured intervals across the flow path, that temporarily pond runoff to increase pollutant retention and infiltration and further decrease flow velocity.

Image Source: Massachusetts Department of Environmental Protection (2023) <https://megamanual.geosyntec.com/npsmanual/checkdams.aspx>

Swale channels are broad and shallow and covered by vegetation, which slows the flow of water and facilitates sedimentation as well as filtration through the roots and soil matrix, evapotranspiration and infiltration into the underlying soil.

Shallow, vegetated, open channel designed to direct, treat and attenuate surface water runoff with a potential for biodiversity benefits.

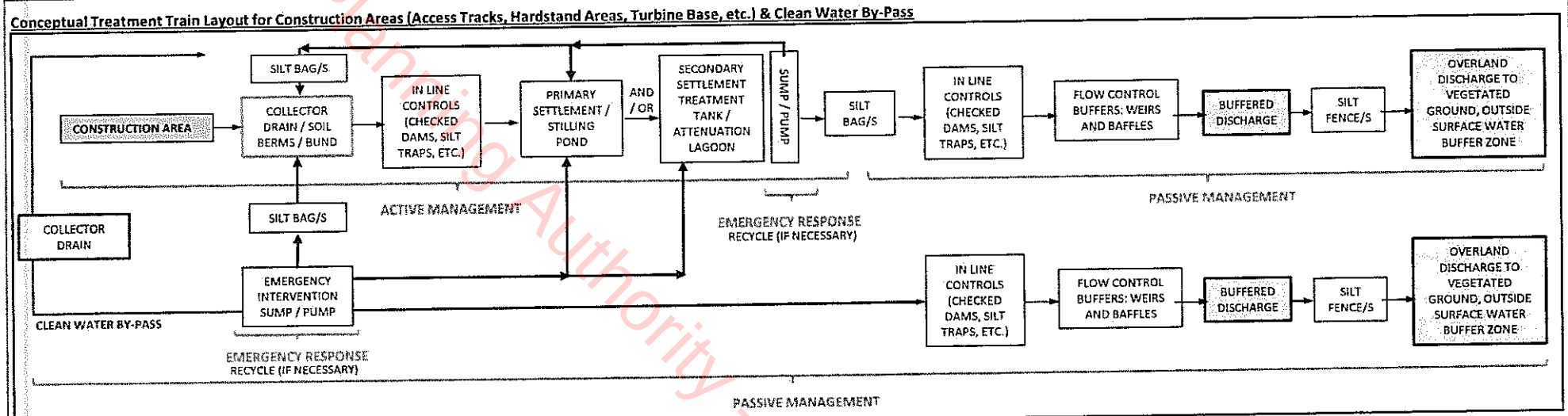


CIRIA SuDS Manual (2015)

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 8 Check Dams – General Considerations**	**Date:**	15/03/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

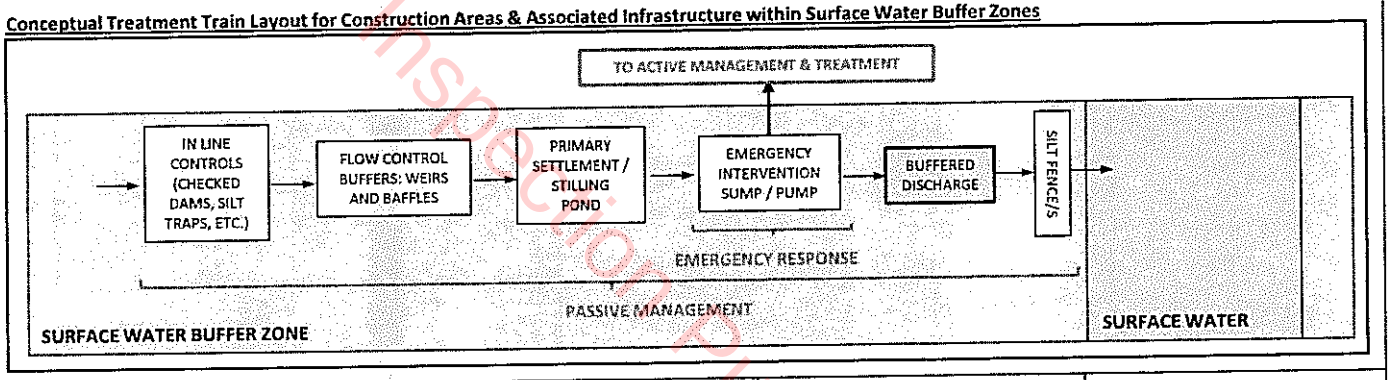
Conceptual Treatment Train Layout for Construction Areas (Access Tracks, Hardstand Areas, Turbine Base, etc.) & Clean Water By-Pass



NOTES:

- Wherever possible, outfalls will be positioned outside of Surface Water Buffer Zones.
- For areas of the development footprint within Surface Water Buffer Zones, in line measures such as silt screens will be over specified e.g. double / triple silt screens, and access to emergency intervention sump / pumps will be facilitated through design and/or emergency response.
- Quality of runoff entering buffer zones will be good i.e. suspended solids <25mg/l. Where runoff quality is poor, emergency response will be to use an intervention sump / pump and pump divert runoff to an area of the drainage network where it will be treated before redistribution and discharge.

Conceptual Treatment Train Layout for Construction Areas & Associated Infrastructure within Surface Water Buffer Zones



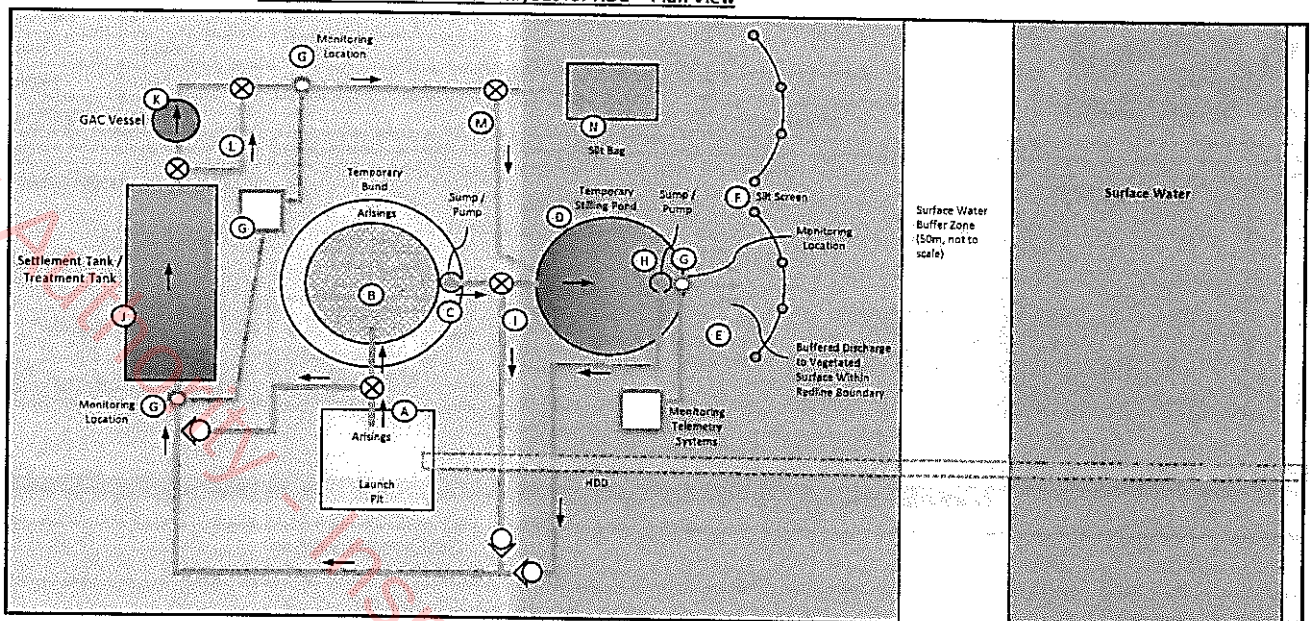
Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By: Sven Klinkenbergh, Principal Environmental Consultant
	Client:	JOD	
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 9 Water Treatment Train Layouts	Date:	4/4/2023	Reviewed By: SK
	Revision:	00	

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale

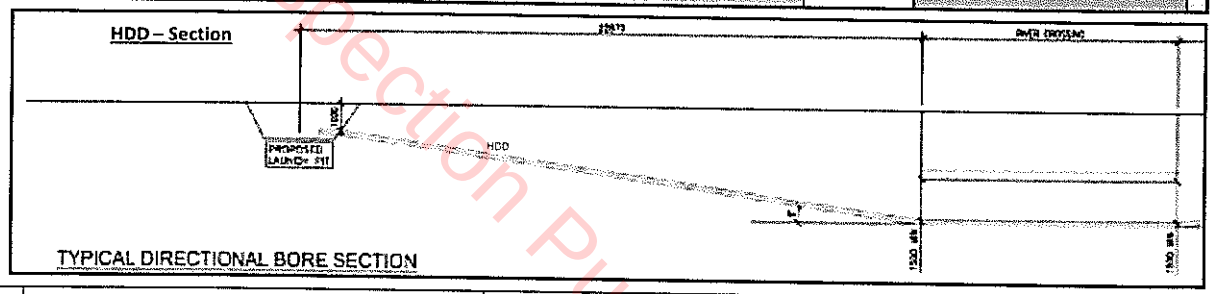
NOTES:

- This methodology and example scenario is designed with a view to managing Horizontal Drilling arisings, but can be applied to all scenarios whereby active dewatering, treatment, or management of construction waters is required.
- Contaminated water arising from construction works, namely; excavations, drilling and temporary stockpiling, will be contained and treated prior to release or discharge. The schematic presented here is a conceptual model of measures implemented to manage arisings and runoff;
  - A. Arisings from the launch / reception pit, or any other significant excavation (e.g., cable joint bays), will be directed the treatment train.
  - B. Arising control area i.e., a temporary bund. Gross solids will be temporarily deposited here. Water arsing with the material will be allowed to drain to sump
  - C. Sump / Pump. Sump will discharge by gravity / pumped to stilling pond.
  - D. Temporary stilling pond. This can be constructed using soils for bunding in combination with an impermeable liner.
  - E. The outfall from the stilling pond will be buffered (coarse aggregate) to dissipate energy and diffuse discharging water.
  - F. Silt Screen. A silt screen will be in place down gradient of the Stilling Pond outfall. This is a precautionary measure to mitigate peak loads or surcharges in the system.
  - G. Monitoring Location/s. Discharge quality will be monitored in real time using telemetry systems. Monitoring of discharge quality will be carried out at the outfall of the stilling pond i.e., before being actually discharged to surface vegetation or surface water (licenced).
  - H. Sump / Pump. Discharge By-Pass. If water discharging from the stilling pond exceeds quality reference limits water will be diverted (pumped) from the stilling pond to the settlement / treatment tank.
  - I. Stilling Pond By-Pass. Similar to Discharge By-Pass, if conditions dictate water can be diverted directly to Settlement / Treatment Tank.
  - J. Settlement / Treatment Tank. A settlement tank will in line and ready to use if required i.e., water quality at stilling pond outfall fails to meet quality reference limits. The tank will be equipped with treatment systems which will be activated as the need arises, for example; very fine particles which are very slow to settle can be treated with a flocculant agent to promote settlement of particles.
  - K. GAC Vessel/s. As a precautionary measure, GAC (Granulated Activated Carbon) vessel/s will be in line and ready to use if required. GAC vessels are used to filter out low concentrations of hydrocarbons. Significant hydrocarbon contamination is only envisaged under accidental circumstances. If a hydrocarbon spill does occur, normal operations will pause and the treatment train will be utilised to remediate captured contaminated runoff.
  - L. GAC Vessel By-Pass. If the quality of the water is acceptable in terms of hydrocarbon contamination.
  - M. Treated water will be discharge by gravity / pump to the stilling pond for additional clarification, monitoring and buffered discharge to vegetated area.
  - N. Silt Bag. A silt bag can be used as alternative to stilling ponds. However, silt bags must only be used as primary method in lower risk areas i.e., outside of buffer zones, etc. Stilling ponds will be the primary method (D, N) is circumstances where risk is elevated, however a gate vale and silt bag can be included in the treatment train and used as an emergency discharge route in the event that the stilling pond needs remediation or maintenance.
- In all instances, stilling ponds (D), Silt Bags (N) and outfalls (E) will be situated outside of surface water buffer zones. At many locations, particularly at HDD locations works will be within buffer zones. In these instances, the treatment train can be positioned upgradient along the road where discharge to vegetated areas / roadside drains can be managed.

Conceptual Treatment Train Layout for HDD – Plan View



HDD – Section



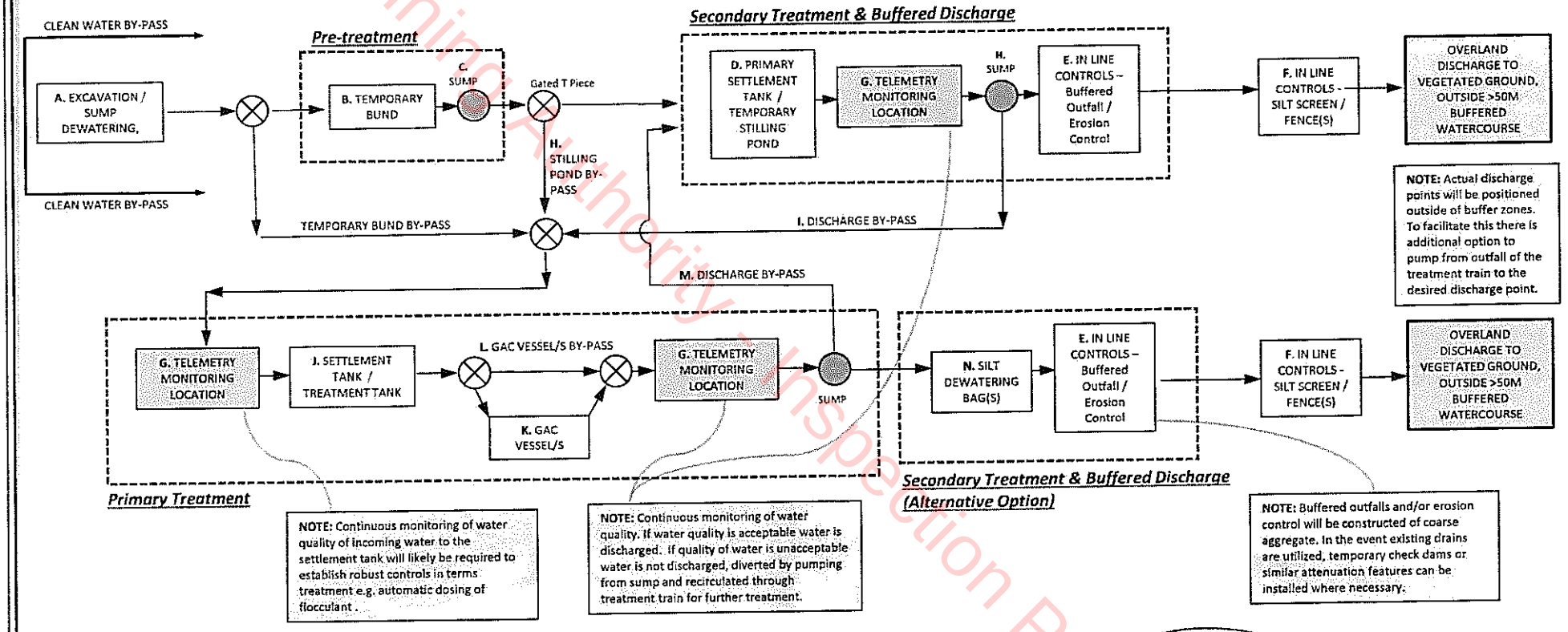
TYPICAL DIRECTIONAL BORE SECTION

Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By:	Sven Klinkenbergh Principal Environmental Consultant	RSK
	Client:	JOD			
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 10 Treatment Train Layout for Active Runoff Management (e.g. HDD)	Date:	4/4/2023	Reviewed By:	SK	
	Revision:	00			

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale

Conceptual Dewatering and Treatment Train Flow Diagram

Contaminated water arising from construction works, namely; excavations and temporary stockpiling, will be contained and treated prior to release or discharge.
The schematic presented here is a conceptual model of measures implemented to manage arisings and runoff.



Site Name: Inchamore Wind Farm, Co. Cork	Project No.	603679	Drawn By: Sven Klinkenbergh, Principal Environmental Consultant
	Client:	JOD	Reviewed By: SK
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 11 Conceptual Dewatering and Treatment Train Flow Diagram	Date:	4/4/2023	
	Revision:	00	

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 646
KERRY COUNTY COUNCIL

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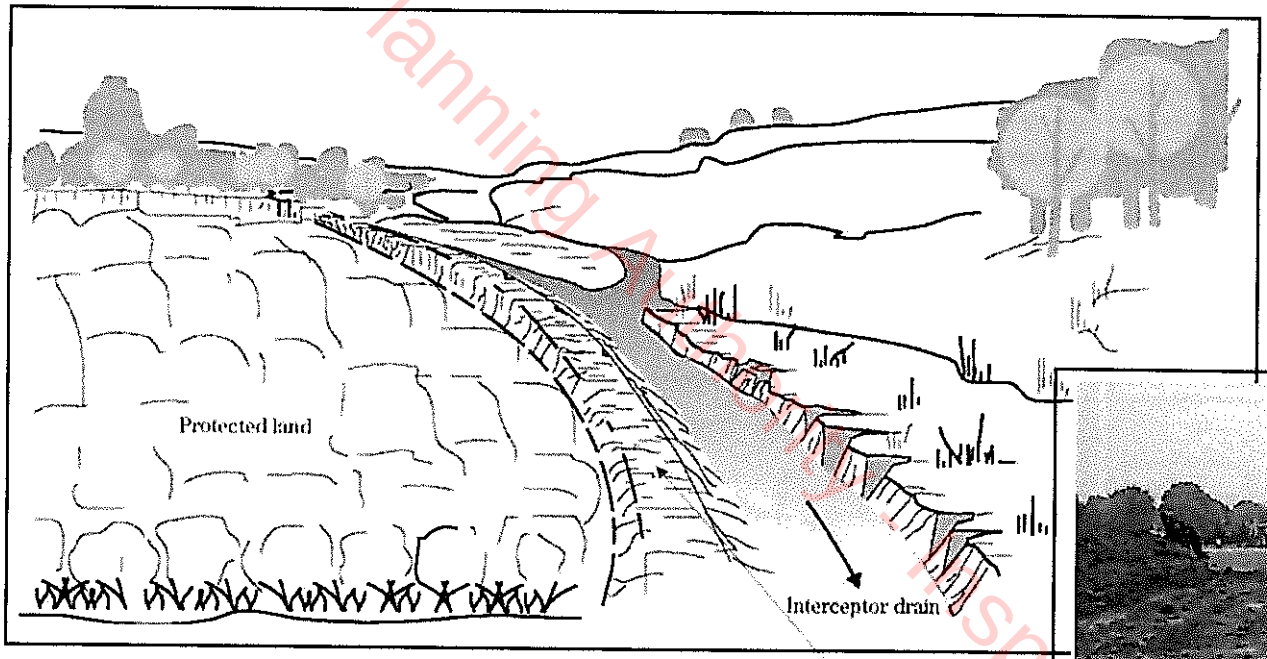
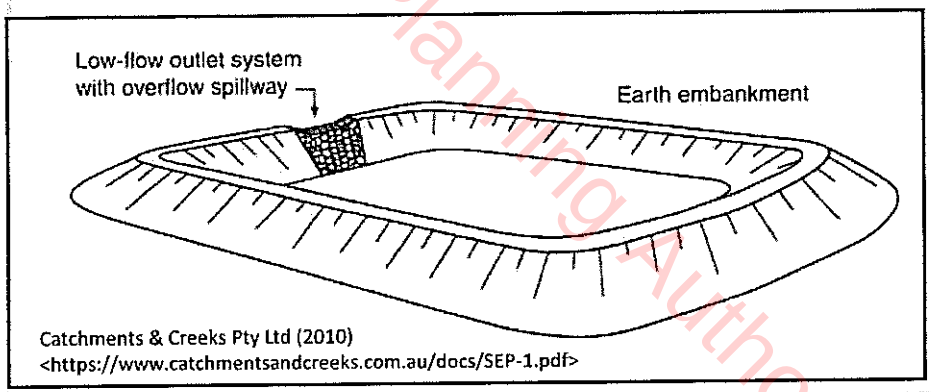


Conceptual graphic of an interceptor drain
(NRCS/USDA.gov, 2007) Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_017651.pdf

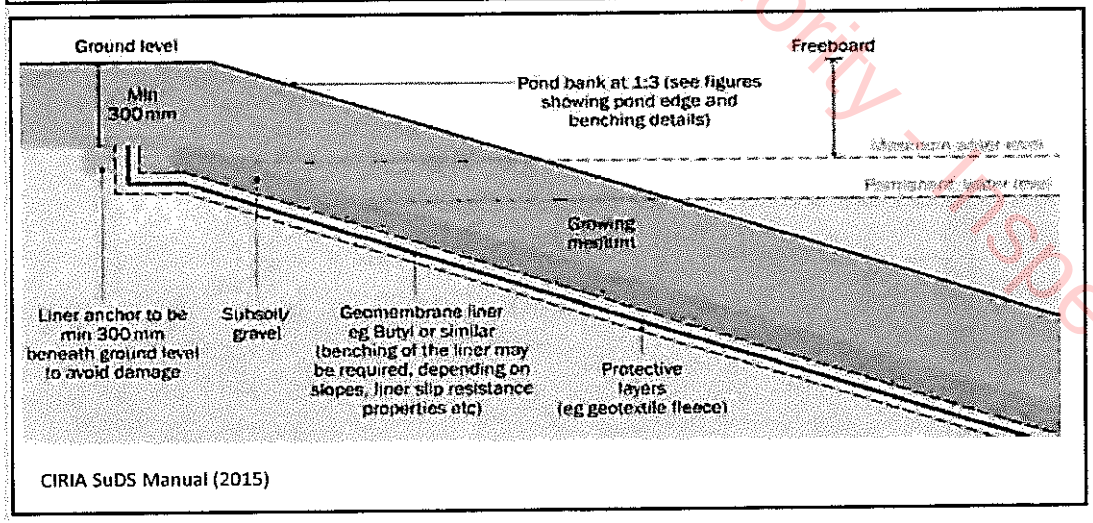
Example of a temporary berm
(Green Infrastructure Ontario, 2012) Available at:
https://greeninfrastructureontario.org/infiltration-trench-swale-construction/

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	6037679	**Drawn By:**	Colleen McClung Graduate Project Scientists
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 12 Interceptor Drain & Spoil berms**	**Date:**	01/09/2022	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

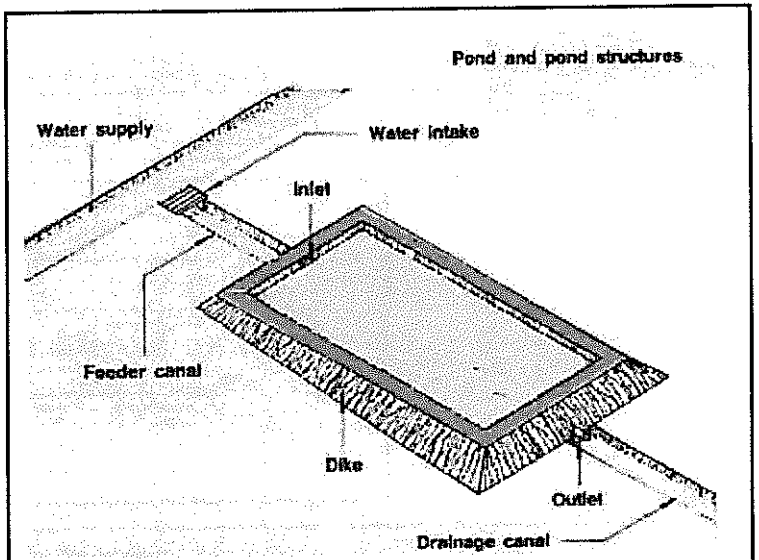
Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale



Catchments & Creeks Pty Ltd (2010)
<https://www.catchmentsandcreeks.com.au/docs/SEP-1.pdf>



CIRIA SuDS Manual (2015)

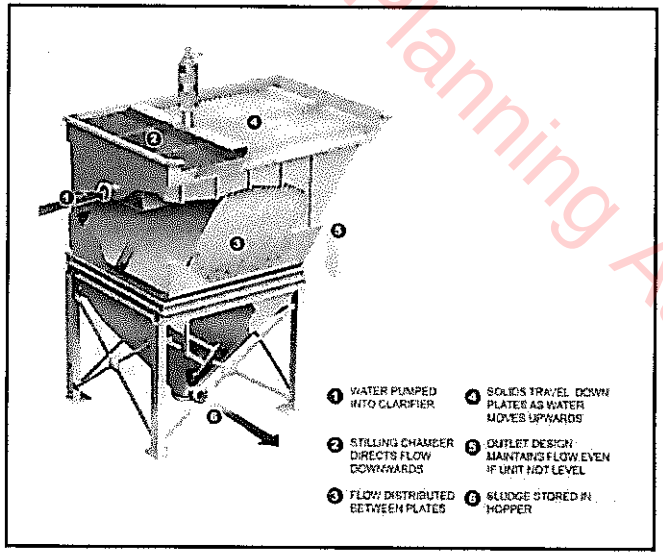


United Nations Food and Agriculture Organization
<https://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x6708e01.htm>

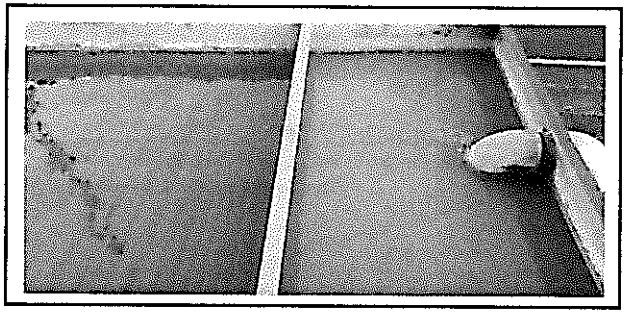
Ponds should be designed to mimic natural forms and have varying depths which can provide a range of different habitats.

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 13 Settlement Ponds**	**Date:**	28/02/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

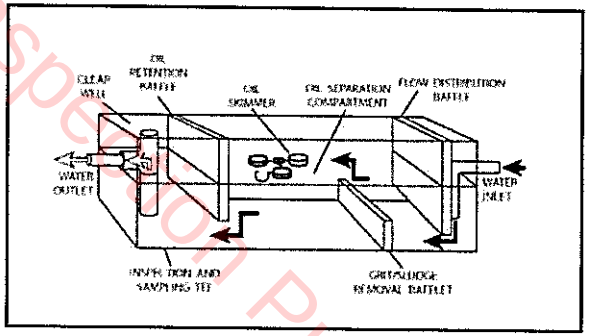
Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale



Example of an oil-water separator
Minerex Environmental Limited, an RSK Group company



Siltbuster ® (2017) "Solutions for Suspended Solids Removal: Hire, Sales & Technical Support" Siltbuster Ltd. Available at: https://www.siltbuster.co.uk/wp-content/uploads/2020/10/Solutions-for-Suspended-Solids-Removal.pdf.

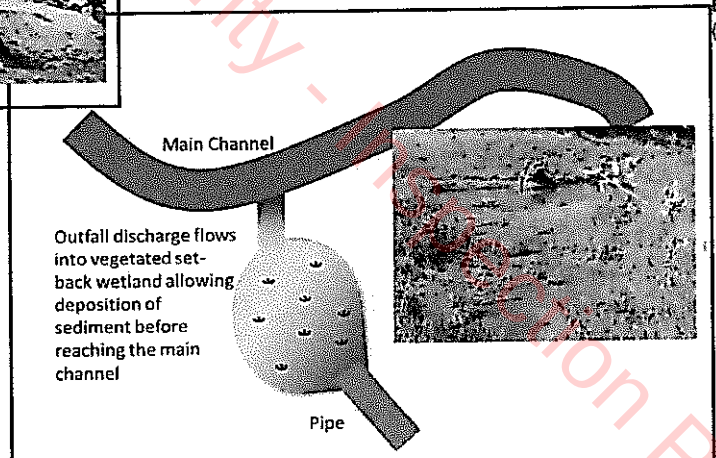


Cross-section of oil-water separator
Mohr, Kirby S. (2014)

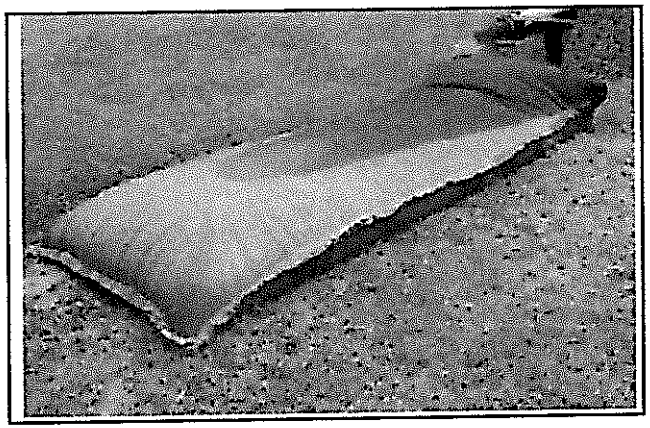
Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientists	RSK
	Client:	JOD			
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 14 Settlement Tank**	**Date:**	28/03/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant	
	Revision:	00			

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale

Example of buffered outfall with coarse aggregate
(Catchments and Creeks Pty Ltd., 2020)



Conceptual graphic of a discharge to vegetated outfall
(Janes-Bassett *et al.*, 2016)



Example of a silt bag
(Cascade Geotechnical Inc., 2022)

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientists	RSK
	Client:	JOD			
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 15 Examples of Mitigation Measures to Reduce Sediment Transport**	**Date:**	28/02/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant	
	Revision:	00			

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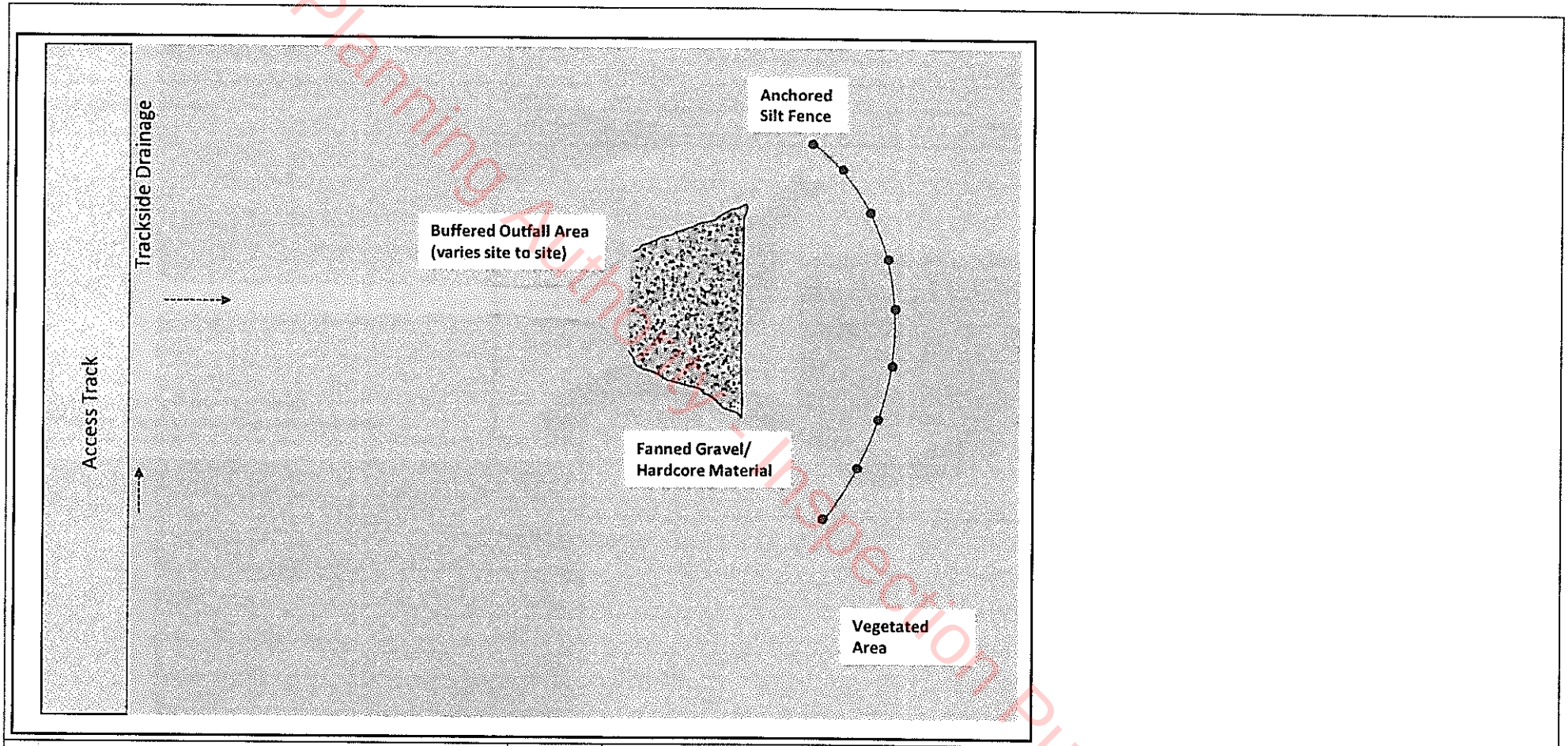

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 16 Collector Drains and Buffered Outfalls**	**Date:**	28/02/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

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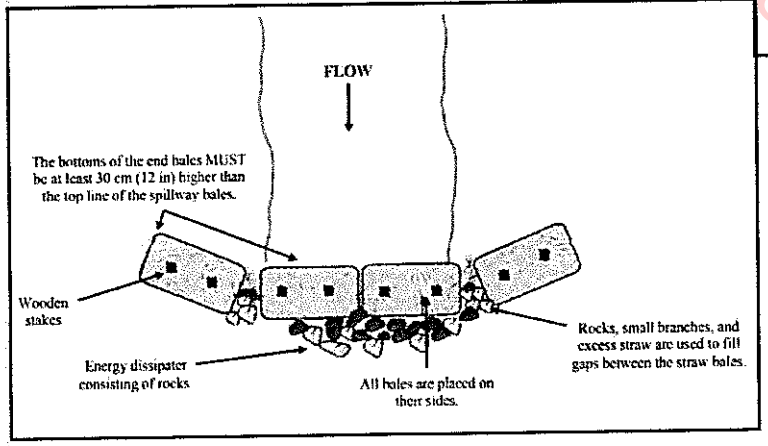
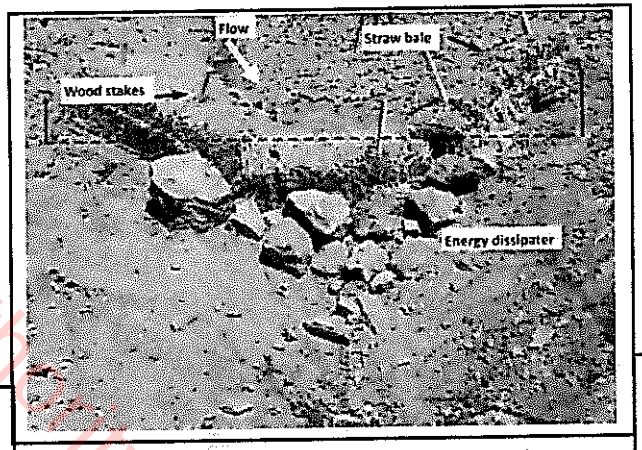
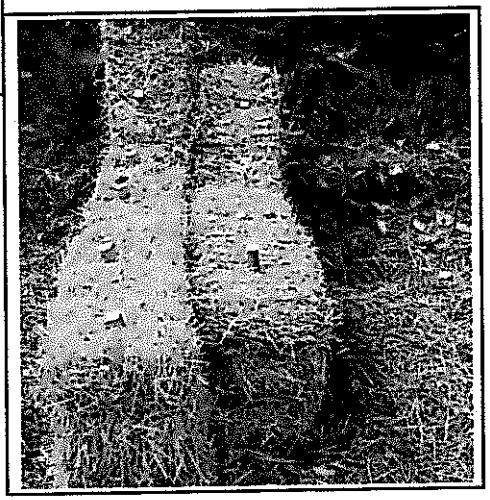


Conceptual graphic of a straw bale checked dam
(Storrar, 2013)



Example of a Strawbale Checked Dam Robichaud, et al. (2019)



Example of a Strawbale Checked Dam
(Kawartha Conservation, 2020)

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 17 Examples of Mitigation Measures to Reduce Sediment Transport – Straw Bales**	**Date:**	28/02/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

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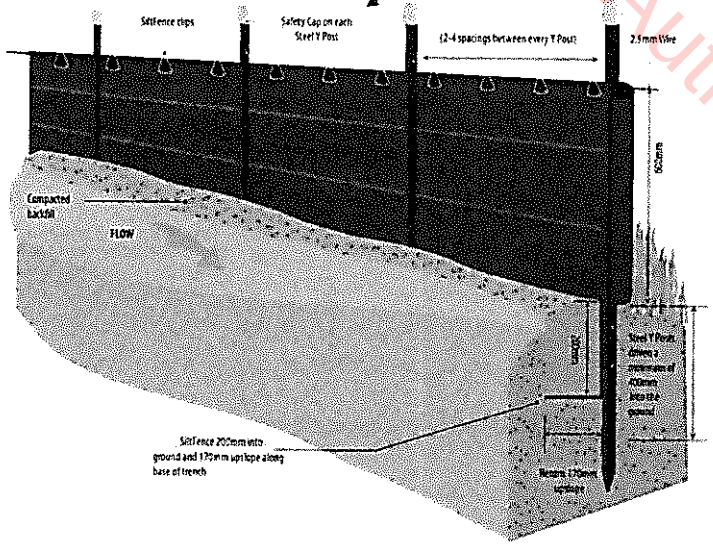
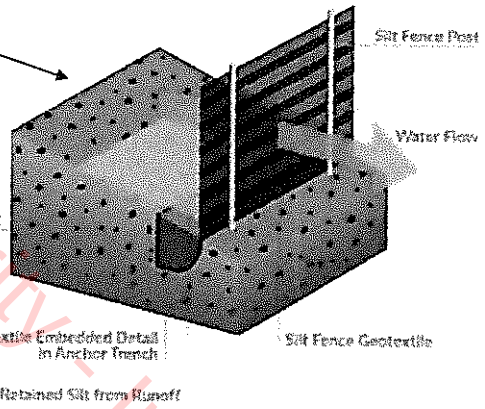
Temporary barrier fabric used to retain erosion of sand, silt, and clay. Geotextile silt fencing acts as a vertical, permeable, interceptor to sediment-laden waters from construction.

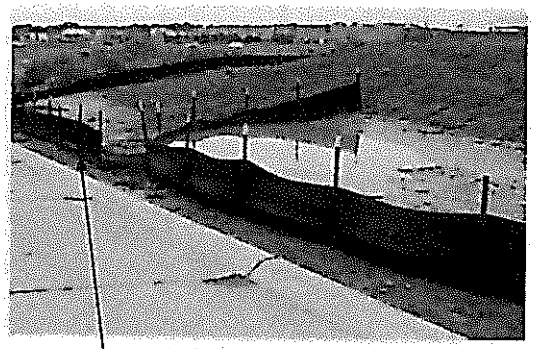


Conceptual graphic of a silt fence
Tech Weave (2020) Available at:<https://techweave.com/silt-fences/>



Conceptual graphic of a silt fence
Available at: https://www.pub.gov.sg/Documents/SiltFences.pdf

Example of Silt fencing in use
(EnviroPro, 2022) Available at:
<https://www.enviropro.co.uk/entry/153977/Siltbuster/Terrastop-silt-fences-for-erosion-and-runoff-control/>



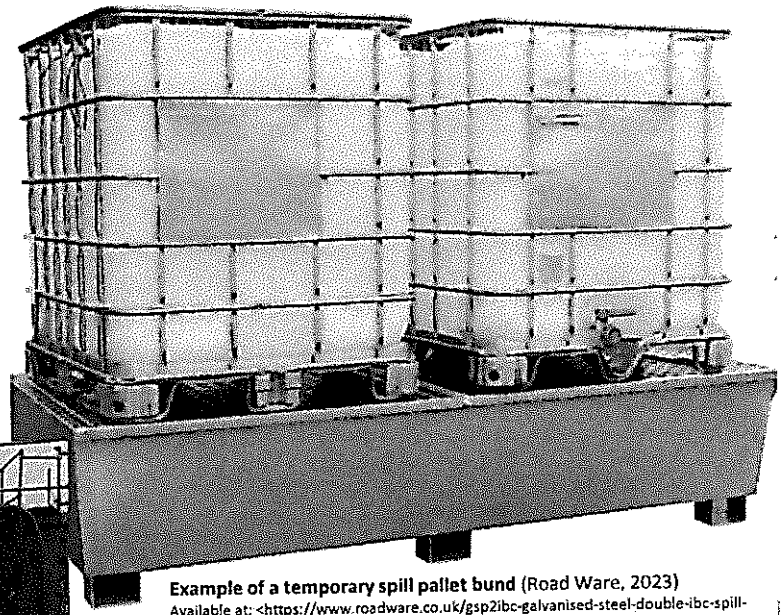
Example of Silt fencing in use
Bowman Construction Supply (2023) Available at:<https://www.bowmanconstructionsupply.com/products/silt-fence/>

Silt fences control runoff by allowing water to pass through the fabric while collecting leftover sediment.

Site Name: **Firlough Green Energy – Wind Farm**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD / Mercury Renewables		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 18 Silt Fencing**	**Date:**	21/12/2022	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

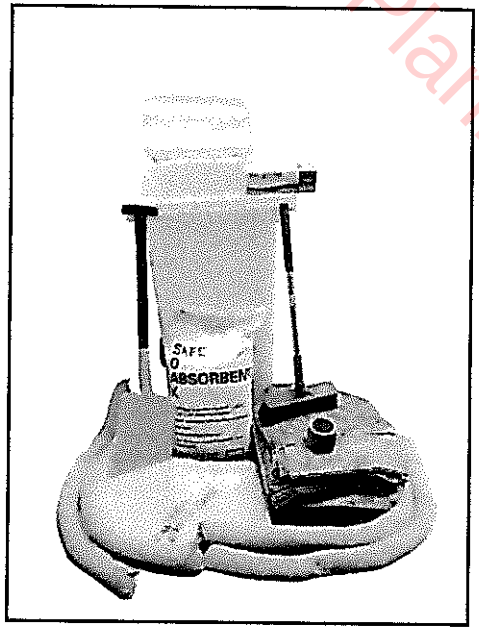
Example of a temporary spill pallet bund (Road Ware, 2023)
Available at: <https://www.roadware.co.uk/ibc-storage-tank-pallet-spill-containment-bund-stand/?sku=IBCSP&gclid=Cj0KCQiA8aOeBhCWARIsANRFrQFTsDlSEUrk4rdov4TcTBQOwNZguishep9-yj6_qx9NexUXnAv6ONkaAq8ZEALw_wcB>

Example of a temporary spill pallet bund (Road Ware, 2023)
Available at: <https://www.roadware.co.uk/bp4c-covered-4-drum-spill-pallet-bund-sump/?gclid=Cj0KCQiA8aOeBhCWARIsANRFrQFNE1gbC8i9OUP2HLpHeKcFDNjrurp_ui5Nz6rmRa1WblNXRH17diBaAn-kEALw_wcB>

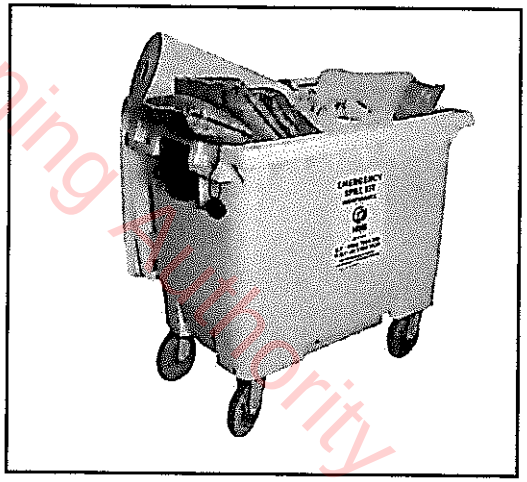


Example of a temporary spill pallet bund (Road Ware, 2023)
Available at: <https://www.roadware.co.uk/gsp2ibc-galvanised-steel-double-ibc-spill-pallet-bund/?gclid=Cj0KCQiA8aOeBhCWARIsANRFrQGfh5e3lUi9TcfRIXMAcEnilLo5gFmKlb0_dHBi7MRkIwiM0cU7F2oaAkDSEALw_wcB>

Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist	RSK
	Client:	JOD			
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 19** **Examples of Mitigation Measures During Construction Phase- Environmental 'Good Practice' of Bunded Materials**	**Date:**	21/12/2022	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant	
	Revision:	00			



Polymer Spill Kit
(Yellow Shield Ltd., 2023) Available at:
https://www.yellowshield.co.uk/polymer-spill-kit



Maintenance Spill Kit
(Hyde Park Environmental, 2023) Available at: https://hydepark-environmental.com/1100-litre-maintenance-emergency-spill-kit?utm_source=email&utm_medium=email&utm_campaign=HMK234%2FD3.23

Example of a spill kit deployed in surface water
(Oracle Environmental Experts Ltd., 2022)
Available at: https://www.oracle-environmental.com/spill-kits

Site Name: **Inchamore Wind Farm Co., Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientists
	Client:	JOD		
Figure Name: **Appendix 9.6 – Conceptual & Information Graphics – Tile 20 Emergency Spill Kits**	**Date:**	07/03/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant
	Revision:	00		

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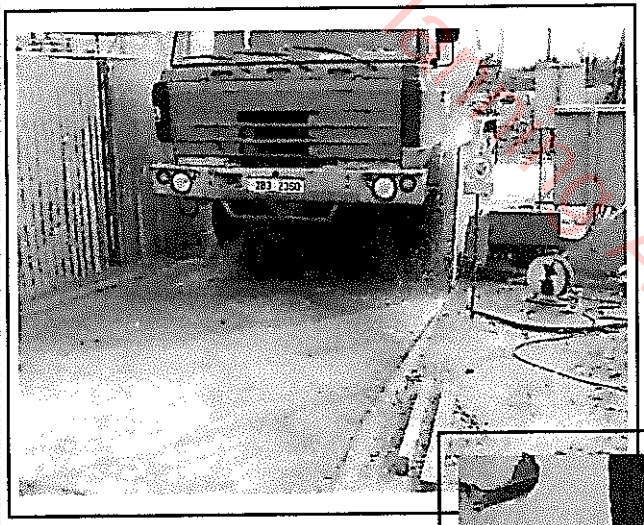

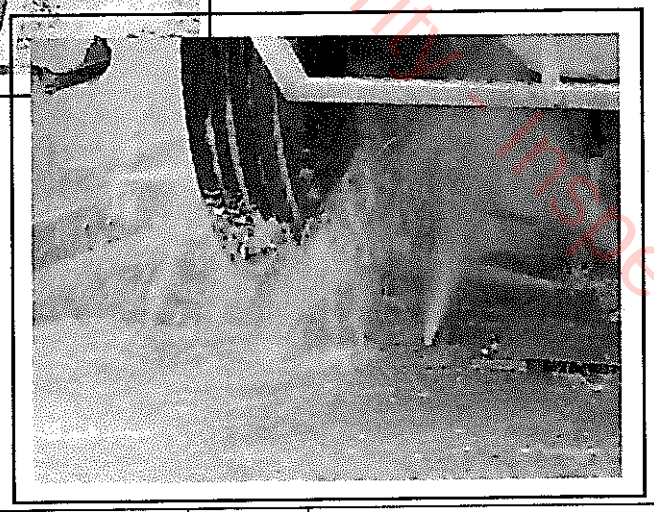

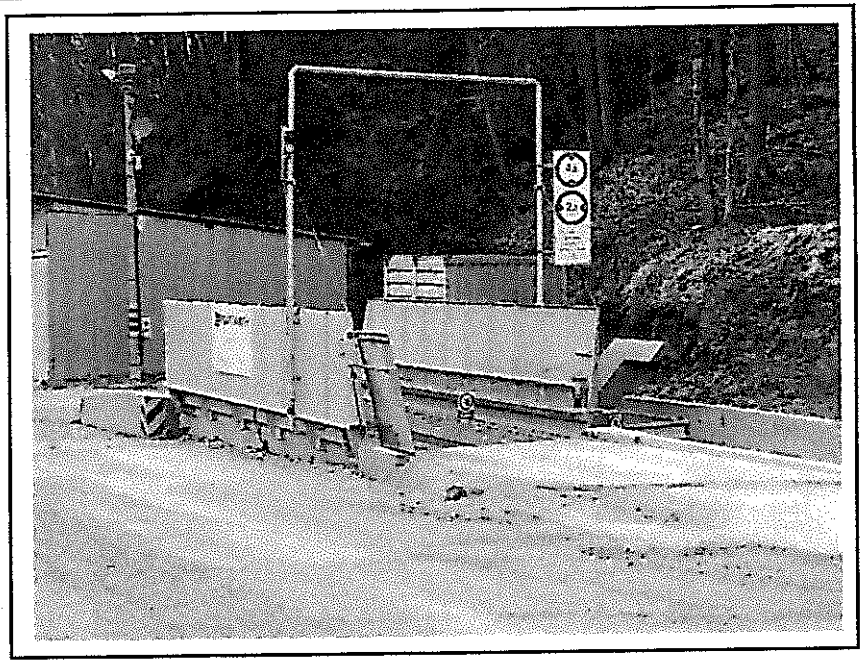

Site Name: Inchamore Wind Farm Co., Cork	Project No.	603679	Drawn By:	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: Appendix 9.6 – Conceptual & Information Graphics – Tile 21 Wheel Washout Station	Date:	01/09/2022	Reviewed By:	Esveri Kuiken-Pego Principal Environmental Consultant
	Revision:	00		

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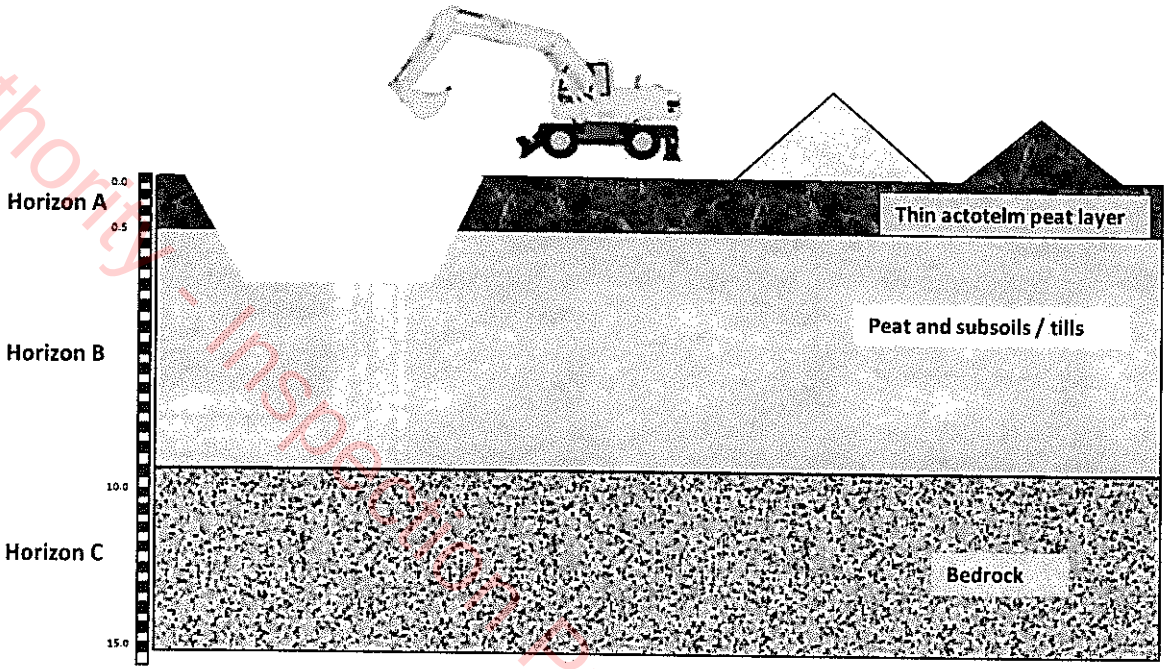
Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale.

- The three principal materials excavated in order of depth will include topsoil at the surface, subsoils, and weathered and broken bedrock (Horizons A-C, respectfully).
- A suitably qualified geotechnical / soil scientist will supervise all excavation and the principal material types (topsoil, subsoil and bedrock) will be segregated as they arise.
- Temporary storage locations and stockpiled arisings will be managed in such a way that as to not mix induvial soils types which will, in turn will facilitate reuse on Site. Some measures which will be taken include;
    - Designated areas for each type of material which will be adequately sized based on Material Balance Assessment calculations and planned storage height.
    - Incorporating the planned movement of materials for example; actotelm peat will be the first material to be excavated and the last to be used in reinstatement.
    - Adequate space between stockpiles to reduce the potential of mixing when material is being deposited or removed, or if localized stability issues arise for example; stockpile collapse.
    - It is also important to mitigate against the entrainment of solids in runoff (EIAR Chapter 9 – Hydrology & hydrogeology).
- In order to reduce the amount of arisings to be managed or stored at any one time during the construction phase, a Materials Balance Assessment and Materials Management Plan will be developed with a view to identifying suitable locations for permanent reinstatement as early as possible, for example; as the construction phase progresses, opportunities to move arisings to a permanent reinstatement area in one movement will be taken as often as possible.
- Backfilling in layers will be carried out at the designated reinstatement locations, this will include; use of material as fill under infrastructure, backfill around newly installed infrastructure e.g. foundations, and potentially in improvement areas.
- Infilling with material in identified soil horizons to revert these areas to baseline levels.



Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist	RSK
	Client:	JOD			
Figure Name: **Appendix 9.6 - Conceptuel & Information Graphics – Tile 22 Conceptual Soil Horizon Graphic**	**Date:**	07/03/2023	**Reviewed By:**	Sven Klinkenbergh Principal Environmental Consultant	
	Revision:	00			

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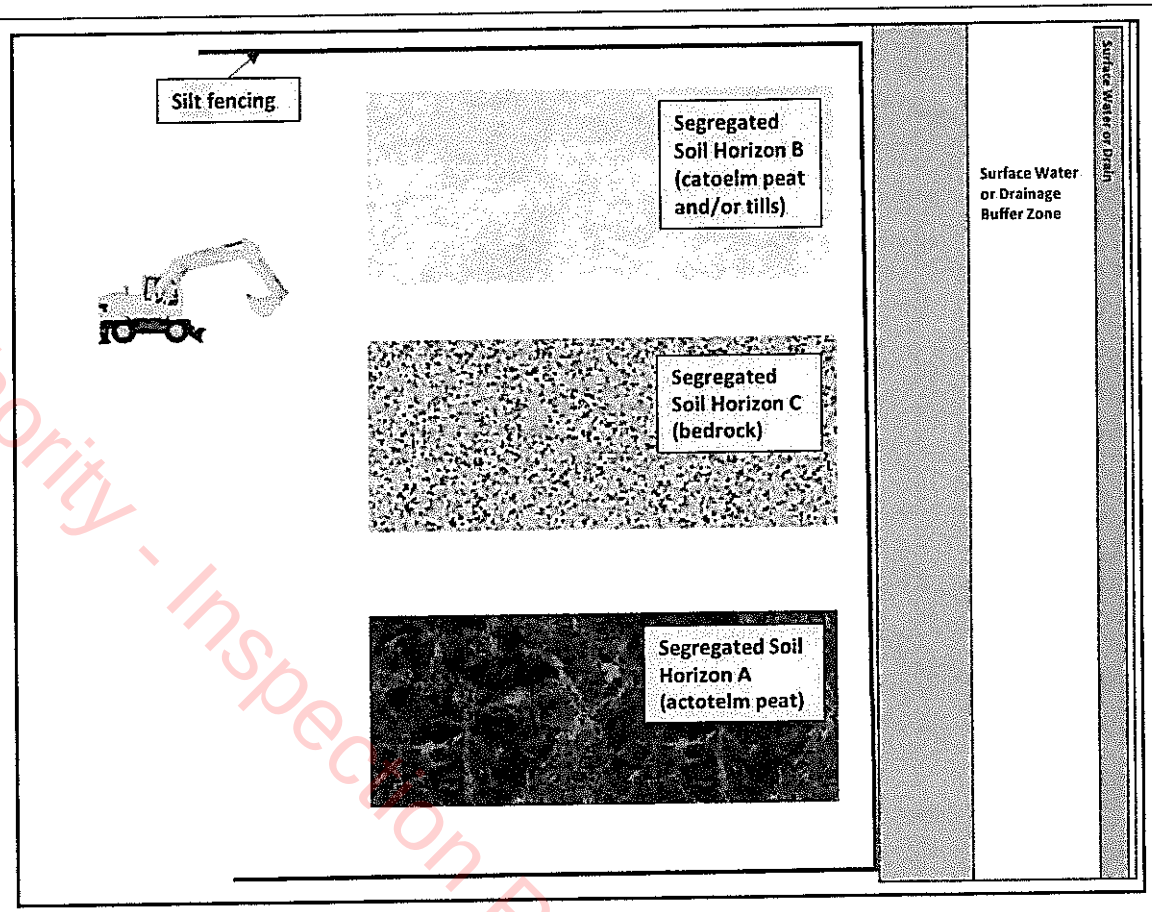
- All stockpiles will be covered with high-grade polythene sheeting to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust.
- Recovered material destined for reuse off site will comply with Article 27 or Article 28 of the EPA to be classified as a by-product or as end-of-life waste, or Certificate of Registration for soils.
- Excess soils which cannot be reused will be tested and classified as a waste and disposed of appropriately.
- Temporary stockpiles will avoid areas on Site near artificial drainage channels (outside designated surface water buffer zones and will adhere to mitigation measures outline in **EIAR Chapter 9 Hydrology and Hydrogeology,** in dealing with entrainment of soils in surface water runoff.



Site Name: **Inchamore Wind Farm, Co. Cork**	**Project No.**	603679	**Drawn By:**	Colleen McClung Graduate Project Scientist
	Client:	JOD		
Figure Name: **Appendix 9.6 - Conceptuel & Information Graphics – Tile 23** **Conceptual Management of Stockpiles Graphic**	**Date:**	07/03/2023	**Reviewed By:**	Sven Klinkenbergh Principal Consultant
	Revision:	00		

Conceptual Graphics & Design for consideration at detailed design phase and engineered specification of required infrastructure. Not to scale

PLANNING & DEVELOPMENT SECTION
6 JUN 2023 646
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