APPENDIX 7-5

WATER FRAMEWORK DIRECTIVE ASSESSMENT

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PROPOSED QUARRY EXTENSION AND RESTORATION, BALLYQUIN CO. CLARE

WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

FINAL REPORT

Prepared for:

ROADSTONE LIMITED

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) was engaged by MKO, on behalf of Roadstone Ltd to undertake a Water Framework Directive (WFD) Compliance Assessment for proposed continuation of sand and gravel extraction as well as the infilling/restoration of the existing and proposed extraction areas including all related ancillary works at Roadstone Ballyquin, Co. Clare.

The Proposed Development being applied for under this planning application also includes for the construction of a soil inspection shed, refuelling area, settlement ponds, road improvements, drainage network and environmental berms.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the Proposed Development will compromise WFD objectives or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status.

This assessment will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures if such water bodies are identified at risk and define any residual potential impacts if required.

This WFD Assessment is intended to supplement the EIAR submitted as part of the Proposed Development planning application.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types including quarries.

This WFD assessment was prepared by Michael Gill and David Broderick.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions.

David Broderick P.Geo (BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with 17 years environmental consultancy experience in Ireland. David has completed numerous hydrological and hydrogeological assessments for various developments across Ireland. David has significant experience in surface water drainage issues, SUDs design, flood risk assessment and modelling.

1.3 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("**WFD**"), was established to ensure the protection of the water

environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised.

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021.

The River Basin Management Plan (2018 - 2021) objectives, which have been integrated into the design of the proposed development, include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2027; and,
- Ensure waters in protected areas meet requirements;
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Furthermore, the Department of Housing, Local Government and Heritage are currently reviewing the submissions made on the Draft River Basin Management Plan (2022 - 2027) which was out for public consultation in Q4 of 2021 and Q1 of 2022. The draft plan will be updated with a view to finalisation and publication in Q3/Q4 of 2022. As of yet, no final publications have been made.

Our understanding of these objectives is that water bodies, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed.

2. WATERBODY IDENTIFICATION CLASSIFICATION

2.1 INTRODUCTION

This section identifies those River Waterbodies, Groundwater Bodies and protected areas with the potential to be affected by the Proposed Development and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

On a regional scale, the Proposed Development site is located in the River Shannon catchment with the northern portion mapped in the Shannon Estuary North (Catchment ID 27) within the Owenogarney_SC_010 sub-catchment.

The southern portion of the Proposed Development site is located in the Lower Shannon (Catchment ID 25A) within the Shannon[Lower]_SC_080 sub-catchment.

The proposed extraction area is located in the Lower Shannon Catchment while the proposed restoration/infill area is located in both.

In the Owenogarney_SC_010 sub-catchment, the Proposed Development site drains locally to the Broadford River (Broadford_010 river waterbody). The Broadford River flows through Loch an Dúin (Duin CE), approximately 10km downstream of the site, prior to entering the Owenogarney River. Only infilling/restoration is proposed in the Owenogarney_SC_010 sub-catchment.

In the Shannon[Lower]_SC_080 sub-catchment, the Proposed Development site drains locally to the Bridgetown(Clare)_010 river waterbody (referred to as the Black River on OSI mapping). The Bridgetown River flows into the River Shannon approximately 6km downstream of the Proposed Development site. Aggregate extraction and infilling/restoration are proposed in the Shannon[Lower]_SC_080 sub-catchment.

The River Shannon within the Shannon (Lower)_050 flows for 5.8km southwest into the Shannon (Lower)_060. The River Shannon then flows for 12.81km southwest through the Shannon (Lower)_060 and through Limerick City until it reaches the Limerick Dock transitional waterbody (IE_SH_060_0900). The Limerick Dock transitional waterbody flows for 9.6km to the west before flowing into the Upper Shannon Estuary (IE_SH_060_0800). Maigue Estuary (IE_SH_060_0700) is located 9km downstream of the Limerick Dock transitional waterbody, within the Upper Shannon Estuary.

The Lower Shannon Estuary (IE_SH_060_0300) and the Fergus Estuary (IE_SH_060_1100) is located downstream of the Upper Shannon Estuary. The Lower Shannon Estuary then continues in a westerly direction for ~39km before entering into the Mouth of the Shannon coastal waterbody (HAs 23;27) (IE_SH_060_0000). The Southwestern Atlantic Seaboard (HA 23) (IE_SH_010_0000) is located downstream of the Mouth of the Shannon coastal waterbody.

A local hydrology map is shown below as **Figure A.**

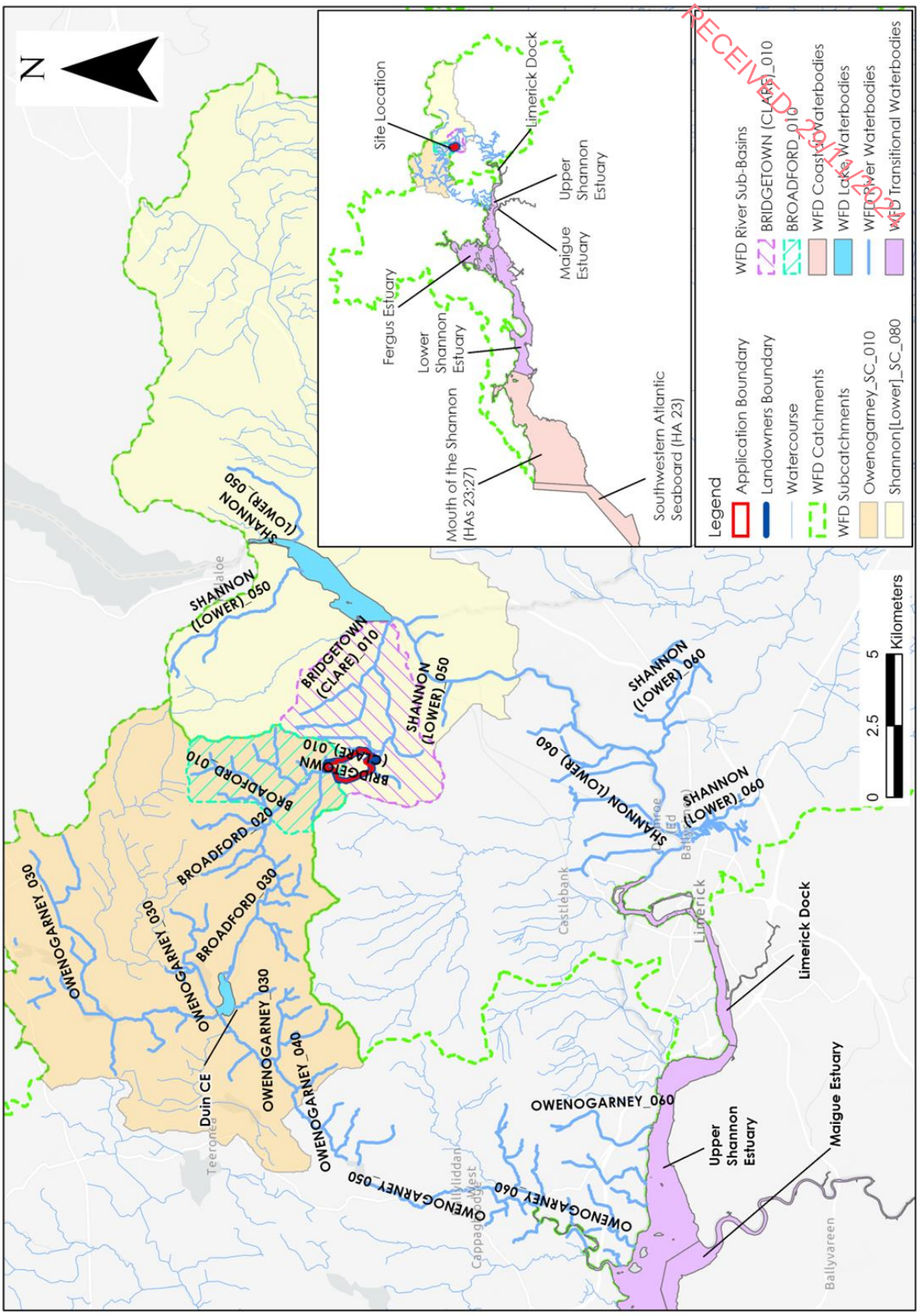

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for river waterbodies downstream of the Proposed Development are shown in **Table A**. The overall status of SWBs is based on the ecological, chemical and quantitative status of each river waterbody.

Local Groundwater Body (GWB) and river waterbody (RWB) status information is available from (www.catchments.ie).

To the north of the Proposed Development, the Broadford River flows along the northern boundary of the Proposed Development site. The Broadford_010 has a current WFD status of "Moderate" according to the latest cycle (2016-2021) and is deemed to be "at risk" of missing out on its WFD objectives by 2027, according to the WFD Risk 3rd Cycle. Downstream of this, the Broadford_020 has a "Good" status according to the WFD 2016-2021 Status and is deemed to be "at risk" according to the Risk 3rd Cycle, of missing out on the WFD objectives by 2027.

To the south of the Proposed Development Site, the Bridgetown (Clare) SWB has a WFD 2016-2021 Status of "Good" and is deemed by the Risk 3rd Cycle to be "Not at risk" of missing out on the WFD's 2027 objectives. This SWB flows into the Shannon Lower_050, which has a WFD 2016-2021 Status of "Poor" and is currently "At risk" of missing out on the 2027 WFD objectives, according to the Risk 3rd Cycle.

Downstream of the Shannon Lower_050, the Shannon Lower_060 has a Status of "Moderate" and is currently "Under Review" for the Risk 3rd Cycle. The Limerick Dock transitional waterbody has a Status of "Poor" and is deemed to be "At risk" according to the Risk 3rd Cycle. The Upper Shannon Estuary lies downstream of the Limerick Dock, and it has a Status of "Poor" and is deemed to be "At risk". The Maigue Estuary, within the Upper Shannon Estuary, has a Status of "Moderate" and is deemed to be "At risk" according to the Risk 3rd Cycle. The Lower Shannon Estaury has a Status of "Good" and is deemed to be "Not at risk" according to the Risk 3rd Cycle. The Fergus Estuary, located downstream of the Upper Shannon Estuary and adjacent to the Lower Shannon Estuary, has a Status of "Moderate" and is deemed to be "At risk" according to the Risk 3rd Cycle.

The Mouth of the Shannon (HAs 23;27) has a Status of "Good" and is deemed to be "Not at risk" according to the Risk 3rd Cycle. Downstream, the Southwestern Atlantic Seaboard (HA 23) has a Status of "High" and is also deemed to be "Not at risk" by the Risk 3rd Cycle.

The RWB status for the 2016-2021 WFD cycle are shown on **Figure B** below.

Table A: Summary WFD Information for River Waterbodies

SWB	Overall Status (2010-2015)	Risk Status (2nd Cycle)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status (3rd Cycle)	3rd Cycle Pressures
Broadford_010	Poor	At risk	Poor	Moderate	At risk	Hydromorphology
Broadford_020	High	Not at risk	Good	Good	At risk	Agriculture, Hydromorphology
Broadford_030	Good	Not at risk	Good	Moderate	At risk	-
Owneogarney_030	Good	Not at risk	Good	Good	Not at risk	-
Duin CE	Unassigned	Under Review	Unassigned	Moderate	Review	-
Bridgetown (Clare)_010	Good	Not at risk	Good	Good	Not at risk	-
Shannon (Lower)_050	Moderate	At risk	Moderate	Poor	At risk	Hydromorphology
Shannon (Lower)_060	Unassigned	Not at risk	Moderate	Moderate	Review	-
Limerick Dock	Moderate	At risk	Good	Poor	At risk	-
Upper Shannon Estuary	Poor	At risk	Poor	Poor	At risk	Agriculture
Maigue Estuary	Moderate	At risk	Moderate	Moderate	At risk	Agriculture
Lower Shannon Estuary	Moderate	At risk	Good	Good	Not at risk	-
Fergus Estuary	Moderate	At risk	Moderate	Moderate	At risk	-
Mouth of the Shannon (HAs 23;27)	Moderate	Review	Good	Good	Not at risk	-
Western Atlantic Seaboard (HA 23)	Unassigned	Not at risk	High	High	Not at risk	-

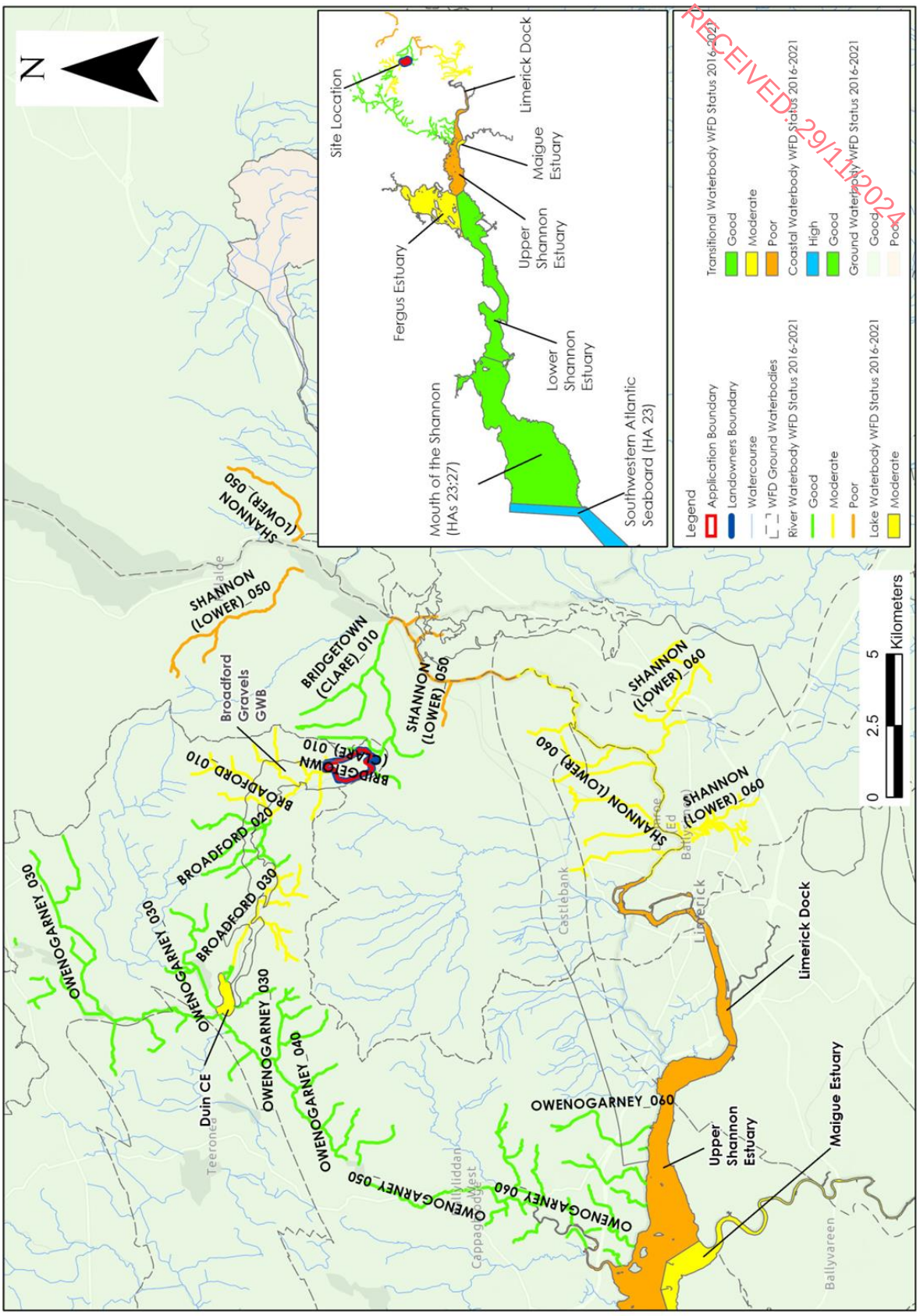

Figure B: WFD River Waterbody Status and Groundwater Body Status (2016-2021)

2.4 GROUNDWATER BODY IDENTIFICATION

According to WFD mapping, the Proposed Development site is located within 3 no. groundwater bodies (GWBs).

The Proposed Development site sits within the Broadford Gravels GWB (EU_CD: IE_SH_G_095) which in turn is underlain by 2 no. bedrock GWBs, namely the Tulla-Newmarket on Fergus GWB (E_SH_G_229) and Lough Graney GWB (IE_SH_G_157).

2.5 GROUNDWATER BODY CLASSIFICATION

All GWBs achieved "Good" status in all 3 no. WFD cycles (2010-2015, 2013-2018 and 2016-2021) and are currently "not at risk" of missing its WFD target objective by 2027. (refer to **Table B**).

The GWB status for the 2016-2021 WFD cycle are shown on **Figure** B.

Table B: Summary WFD Information for Groundwater Bodies

GWB	Overall Status (2010-2015)	Risk Status (2nd cycle)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status (3rd cycle)	Pressures
Broadford Gravels	Good	Under review	Good	Good	Not at risk	N/A
Tulla-Newmarket on Fergus	Good	Under review	Good	Good	Not at risk	N/A
Lough Graney	Good	Not at Risk	Good	Good	Not at risk	N/A

2.6 PROTECTED AREA IDENTIFICATION

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. Nature conservation designations, bathing waters, Nutrient Sensitive Areas (NSA's), shellfish protected areas and Drinking Water Protected Area's (DWPA) within the vicinity of the Site are considered at as part of the assessment.

2.6.1 Nature Conservation Designations

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

The closest designated site to the Proposed Development site is Glenomra Woods SAC and pNHA (Site Code: 001013) and is located ~1.5km to the southwest and is not hydrologically connected to the site.

The Lower River Shannon SAC is located 6km downstream to the southeast of the Proposed Development site also. These are the only designated sites within the surroundings of the Proposed Development site.

Slieve Bernagh Bog SAC (002312) is situated 3km north, upgradient and remote of the Proposed Development site.

2.6.2 Bathing Waters

Bathing waters are those designated under the Bathing Water Directive (76/160/EEC) or the later revised Bathing Water Directive (2006/7/EC).

There are no bathing water sites located in the vicinity of the Proposed Development site.

2.6.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC). Sensitive areas under the UWWTD are water bodies affected by eutrophication associated with elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

The closest nutrient sensitive area to the Proposed Development site is Lough Derg on the River Shannon (IE_SH_25_191a), upstream of where the Bridgewater (Clare) enters into the River Shannon. This is deemed as an Urban Waste Water Treatment Directive Sensitive Area. The majority of Lough Derg (Derg TN) has WFD Status rating of "Moderate" and is "at risk" of missing out on the objectives set out by the WFD by 2027. The southernmost part of Lough Derg (Derg HMWB) currently has a status of "Good" is "under review" for its Risk 3rd Cycle.

Duin CE (IE_SH_27_12) lies downstream of the Proposed Development site. This is a nutrient sensitive area that currently has a WFD Status of "Moderate" and is "Under Review" for its Risk 3rd Cycle.

2.6.4 Shellfish Waters

The Shellfish Waters Directive (2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth.

There are no Shellfish protected area sites within the vicinity of the Proposed Development. The closest Shellfish waters are 65km to the southwest of the site in West Shannon Ballylongford.

2.6.5 Drinking Water

According to the EPA, there are DWPAs in the vicinity and downstream of the Proposed Development site.

The Shannon (Lower)_060 (IE_SH_25S012600) is situated 6km to the southeast of the Proposed Development site and is a surface water DWPA. The DWPA is defined as the section of the River Shannon that is ~4.8km downstream of where the Bridgetown (Clare)_010 flows into the River Shannon.

Lough Derg (Derg TN - IE_SH_25_191a) is located 7.8km to the northeast of the Proposed Development site and is also a surface water DWPA.

Meanwhile, all GWBs within the catchment are listed as DWPAs.

3. WFD SCREENING

As discussed in **Section 2**, there is a total of 7 no. river waterbodies, 1 no. lake bodies, 5 no. transitional waterbodies and 2 no. coastal waterbodies located downstream of the Proposed Development site. Furthermore, the Proposed Development site is underlain by 3 no. groundwater bodies. In addition, there are protected areas in the vicinity and downstream of the Proposed Development.

3.1 SURFACE WATER BODIES

As shown in **Figure A** above, there are 7 no. RWBs located in the vicinity or downstream of the Site.

With consideration for the Proposed Development at the site, it is considered that the Broadford_010, _020 and _030 be brought through to the WFD Impact Assessment due to their proximity to the Proposed Development site and the fact that they are hydrologically connected to the Site.

The Owenogarney_030 will also be screened in as this SWB lies downstream of the Broadford_030. Lough Doon (Duin CE) will not be screened in due to the large amount of water within the lake waterbody that has the ability to dilute possible contaminants that may come downstream from the Proposed Development site. This lake body will not undergo any deterioration in Status or quality due to the Site.

The Bridgetown (Clare)_010 will be brought through to the WFD Impact Assessment due to the proximity of the SWB to the Proposed Development site as it flows close to the southern part of the Proposed Development site and flows downstream into the River Shannon (Shannon [Lower]_050 and Shannon [Lower]_060).

The Shannon (Lower)_050 and Shannon [Lower]_060) will not be screened in due to the large volume of water that it holds and the high velocities of the river. There will be no deterioration in the SWB status or the quality of it due to the Proposed Development site.

3.2 GROUNDWATER BODIES

With respect to groundwater bodies, the Broadford Gravels GWB, Tulla-Newmarket GWB and Lough Graney GWB have been screened in due to their location directly underlying the Site. The Proposed Development works must not in any way result in a deterioration in the status of these GWBs and/or prevent it from meeting the characteristics required for good status in the future.

3.3 PROTECTED AREAS

The closest designated site is Glenomra Wood SAC which is located ~1.5km to the southwest of the Proposed Development site. However, it is not in the same WFD river sub basin as the Proposed Development site and therefore Glenomra Wood SAC is not hydrologically connected to the Site. As such, the SAC will not be brought into the WFD Impact Assessment.

Doon Lough (Duin CE) NSA will not be brought through to the WFD Impact Assessment due to its distal location from the Proposed Development site and the large amount of water that the lake holds, with the capability of the lake to dilute possible contaminants that flow downstream. Therefore, there will be no deterioration of the status or quality of the lake.

The Lower River Shannon SAC is located 6km downstream to the southeast of the Proposed Development site. However, due to the volume of water in the River Shannon and the high velocity of the river, the SAC will not be brought through to the WFD Impact Assessment.

The Slieve Bernagh Bog is situated 3km to the north of the Proposed Development site and topographically upgradient. There will be no possible contaminants from the site in contact with the bog and as such, it will not be brought through to the WFD Impact Assessment.

3.4 WFD SCREENING SUMMARY

A summary of WFD Screening discussed above is shown in **Table C**.

Table C: Screening of WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	River	Broadford_010	**Yes**	The Broadford_010 SWB flows along the northern border of the Proposed Development Site and therefore is hydrologically connected to the Site and as so will be brought through to the WFD Impact Assessment.
	River	Broadford_020	**Yes**	The Broadford_020 lies downstream of the Broadford_010 and is located proximally to the Site while also being hydrologically connected to it. Therefore, it will be brought through to the WFD Impact Assessment.
	River	Broadford_030	**Yes**	The Broadford_030 lies downstream of the Broadford_020 and is hydrologically connected to it the Proposed Development Site. Therefore, it will be brought through to the WFD Impact Assessment.
	River	Owenogarney_030	**Yes**	The Owenogarney_030 lies downstream of the Broadford_030 and therefore is linked hydrologically to the Proposed Development Site, therefore it will be brought through to the WFD Impact Assessment.
	Lake	Lough Doon (Duin CE)	No	Lough Doon will not be brought through to the WFD Impact Assessment due to the large amount of water in the lake body that have the capacity to dilute potential contaminants. Therefore there is no potential for the deterioration in the Status or quality of the lake body.
	River	Bridgetown (Clare)_010	**Yes**	The Bridgetown (Clare)_010 SWB can be seen in close proximity to the Proposed Development Site and hydrologically connected to the Site, therefore it will be brought through to the WFD Impact Assessment.
	River	Shannon [Lower]_050	No	The Shannon (Lower)_050 will not be brought through to the WFD Impact Assessment due to the large volume of water in the river and the high velocities of flow within it.
	River	Shannon (Lower)_060	No	The Shannon (Lower)_060 will not be brought through to the WFD Impact Assessment due to the large volume of water in the river and the high velocities of flow within it.
	Transitional	Limerick Dock	No	The Limerick Dock transitional waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
	Transitional	Upper Shannon Estuary	No	The Upper Shannon Estuary transitional waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
	Transitional	Maigue Estuary	No	The Maigue Estuary transitional waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
	Transitional	Lower Shannon Estuary	No	The Lower Shannon Estuary transitional waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
	Transitional	Fergus Estuary	No	The Fergus Estuary transitional waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
	Coastal	Mouth of the Shannon (HAs 23;27)	No	The Mouth of the Shannon (HAs 23;27) coastal waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
	Coastal	Western Atlantic Seaboard (HA 23)	No	The Western Atlantic Seaboard (HA 23) coastal waterbody will not be brought through to the WFD Impact Assessments due to the distal location of the SWB and the fact that it has large volumes of saline water and tidal currents which will dilute potential contaminants that may come downstream. As such, the status and quality of this SWB will not deteriorate due to the Proposed Development Site.
Ground water Body	Groundwater	Broadford Gravels GWB	**Yes**	The Proposed Development Site overlies the GWB. An assessment is required to consider potential impacts of the Proposed Development on this GWB. Therefore, this GWB will be brought through to the WFD Impact Assessment.
		Tulla-Newmarket GWB	**Yes**	The Proposed Development Site overlies the GWB. An assessment is required to consider potential impacts of the Proposed Development on this GWB. Therefore, this GWB will be brought through to the WFD Impact Assessment.
		Lough Graney GWB	**Yes**	The Proposed Development Site overlies the GWB. An assessment is required to consider potential impacts of the Proposed Development on this GWB. Therefore, this GWB will be brought through to the WFD Impact Assessment.
Protected Areas	Nature Conservation Designations	Glenomra Wood SAC	No	The Glenomra Wood SAC is located in a different WFD river sub basin to the Proposed Development Site and as such, is no hydrologically connected to the Site. Therefore, it will not be included into the WFD Impact Assessment.

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
		Lower River Shannon SAC	No	The River Shannon has a large volume of water that is fast flowing and therefore its SAC will not be included due to the dilution factors.
		Slieve Bernagh Bog	No	Slieve Bernagh Bog is situated topographically upgradient of the Proposed Development Site and therefore any possible contaminants from the site will not come in contact with it. As such, it is screened out.
	Nutrient Sensitive Areas	Lough Derg	No	As Lough Derg, and the part of the River Shannon within this NSA, are situated upstream of where the Bridgetown (Clare)_020 enters into the River Shannon, there will be no effect on it and as such is screened out.
		Lough Doon (Duin CE)	No	Lough Doon will not be brought through to the WFD Impact Assessment due to the large amount of water in the lake body that have the capacity to dilute potential contaminants. Therefore there is no potential for the deterioration in the Status or quality of the lake body.
	Drinking Waters	Shannon (Lower)_060	No	The Shannon (Lower)_060 DWPA will not be brought through to the WFD Impact Assessment due to the large amount of water within the river and the high velocity flow of it. There will be no deterioration in the Status and quality of this SWB due to these factors.
		Lough Doon (Duin CE)	No	Lough Doon will not be brought through to the WFD Impact Assessment due to the large amount of water in the lake body that have the capacity to dilute potential contaminants. Therefore there is no potential for the deterioration in the Status or quality of the lake body.

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

The construction phase will require minor excavation of soil and subsoil for site levelling and for the installation of infrastructure and new concrete hardstands for the refuelling area and quarantine building, settlement ponds and road improvements. These works will occur over a ~1 month period.

Initial preparation/construction work requirements at the site will also include stockpiling of topsoil removed from proposed extraction areas that will be used for future implementation of a final restoration plan.

The operational phase proposal includes the concurrent extraction of sand and gravel and the importing of inert material for restoration.

The proposed continued extraction of sand and gravel will occur over a 16.3ha area. The majority of this area has previously been extracted with the exception of 1.8ha of agricultural located at the southeastern end of the Proposed Development site.

The depth of sand varies across the extraction area, as a result levels of excavation will vary from ~76m OD in the north of the site to ~57.5m OD in the south of the site. The layer of sand and gravel ranges from 7 to 14m in thickness. Extraction of sand will stop when rock is met.

It has been calculated that approximately (1,428,571 tonnes) of material will be extracted. The aggregate that will be extracted will be washed and processed on-site. The spoil/fines from the processing will be stored in cells constructed in in-situ sand and gravel deposits.

The proposed infilling/restoration of the existing and future pit voids covers an area of approximately 38 hectares. It is proposed to import approximately 4,471,200 tonnes of inert soil and stone material for the infilling purposes.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Impacts on Surface Water Quality (Construction Phase)

Construction phase activities including removal of soil and overburden from the proposed extraction areas as well as installation of infrastructure and foundations for the inspection shed and refuelling area, settlement ponds, road improvements, drainage network and environmental berm. The main risk will be from surface water runoff from bare soil and stockpiles during construction works.

Hydrocarbons will also be used during the construction phase. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to surface waters at all construction sites. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in the death of aquatic organisms.

Construction phase activities can result in the release of suspended solids and pollutants in runoff water and could result in an increase in the suspended sediment load, resulting in

increased turbidity and contamination which in turn could affect the water quality and fish stocks of downstream watercourses.

However, there is no existing or proposed direct surface water connections between the Proposed Development site and nearby surface watercourses. The main possible hydraulic connections are via small rates of surface water runoff and via vertical migration through the unsaturated zone in the gravel aquifer followed by lateral migration and discharge into nearby surface watercourses.

The potential for surface water quality effects is therefore very low due to the local hydrogeological regime (high rates of groundwater recharge) and the short term-nature of the work during the construction phase.

A summary of potential status change to RWBs arising from surface water quality impacts from works during the construction phase of the Proposed Development in the unmitigated scenario are outlined in **Table D**.

There is the potential for deterioration in RWB quality due to the construction works occurring at the Site.

Table D: Potential Impacts on receiving river water quality during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford_010	IE_SH_27B020300	Moderate	Moderate
Broadford_020	IE_SH_27B020600	Good	Good
Broadford_030	IE_SH_27B020800	Moderate	Moderate
Bridgetown (Clare)_010	IE_SH_25B230100	Good	Good

4.2.1.2 Potential Impacts on Groundwater Quality (Construction Phase)

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk to groundwater. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk and have the potential to impact on groundwater quality in the underlying groundwater bodies.

A summary of potential status change to GWBs arising from potential groundwater quality impacts during the construction phase of the proposed development in the unmitigated scenario are outlined in **Table E**.

There is no potential for GWB quality to significantly deteriorate as a result of construction works at the Site.

Table E: Potential Impacts on Groundwater Quality / Quantity during the Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford Gravels	IE_SH_G_095	Good	Good
Tulla-Newmarket	IE_SH_G_229	Good	Good

GWB	WFD Code	Current Status	Assessed Potential Status Change
Lough Graney	IE_SH_G_157	Good	Good

4.2.1.3 Water Quality Impacts on Protected Areas (Construction Phase)

The protected areas that are in close proximity to the Proposed Development site include: Glenomra Wood SAC, Lower Shannon River SAC and the Slieve Bernagh Bog SAC.

Glenomra Wood SAC

Glenomra Wood SAC is located in a different WFD river sub basin to the Proposed Development site and as such is not hydrologically connected to the Site. There will, therefore, be no deterioration of the SAC due to the works at the Proposed Development site.

Lower Shannon River SAC

The Lower Shannon River SAC is located 6km downstream from the Proposed Development site. The River Shannon has a large volume of water with high velocity flows that have the ability to dilute potential contaminants that flow downstream from the Site. Therefore, there is no possibility of the Status or quality of the River Shannon deteriorating due to the works at the Proposed Development Site.

Slieve Bernagh Bog SAC

The Slieve Bernagh Bog SAC is located 3km to the north of the Proposed Development site and at a higher elevation than the Site. It is not hydrologically linked to the Site and therefore will not have any impact on the SAC.

4.2.2 Operational Phase (Unmitigated)

4.2.2.1 Potential Impacts on Groundwater Quantity / Quality

During the extraction phase, no groundwater dewatering will be required and therefore there is no potential for groundwater quantity effects

The Proposed Development comprises importing approximately 4,471,200 tonnes of material to restore the Proposed Development Site.

A certain volume of rainfall falling on the imported material will percolate down through the inert material (leachate) before recharging into the underlying regionally important bedrock aquifer. Recharge is a potential pathway for contaminants to enter the groundwater system.

However, Infilling of the Site with inert soil and stone will pose a very low contamination risk as no harmful contaminants will be present. In addition, inert soil and stone will not contain either organic matter or liquids that will form a source of organic contamination.

Infilling of the Site with Article 27 by-product material will pose a very low contamination risk as no harmful contaminants will be present.

A summary of potential status change to GWBs arising from potential groundwater quality impacts during the operational phase of the Proposed Development in the unmitigated scenario are outlined in **Table F**.

There is limited potential for GWB quality deterioration as a result of ongoing operational works within the quarry site.

Table F: Potential Impacts on Groundwater Quality / Quantity during the Operational/Restoration Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford Gravels	IE_SH_G_095	Good	Good
Tulla-Newmarket	IE_SH_G_229	Good	Good
Lough Graney	IE_SH_G_157	Good	Good

4.2.2.2 Potential Impacts on Surface Water Quality

There are no direct surface water drainage pathways between the Site and the surrounding SWBs and the Site does not pump water to SWBs surrounding the Site either.

There are no direct surface water drainage pathways (i.e. drains, culverts, channels etc) between the proposed infill/restoration area and local watercourses. Also due to the setback distance, stormwater runoff from the proposed infill/restoration area will not reach local watercourses due to high recharge characteristics.

A summary of potential status change to SWBs arising from surface water quality during the operational/restoration phase of the Proposed Development in the unmitigated scenario are outlined in **Table G.**

Table G: Potential Impacts on receiving surface water quality during Operational/Restoration Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford_010	IE_SH_27B020300	Moderate	Moderate
Broadford_020	IE_SH_27B020600	Good	Good
Broadford_030	IE_SH_27B020800	Moderate	Moderate
Bridgetown (Clare)_010	IE_SH_25B230100	Good	Good

4.2.2.3 Water Quality Impacts on Protected Areas (Operational and Restoration Phase)

There are no direct discharges to any natural surface water or groundwater body and therefore no significant effects on downstream protected areas will occur.

4.3 WATER QUALITY PROTECTION MEASURES

In order to ensure the protection of surface and groundwater quality, quantity and flow patterns, the following water quality protection measures will be implemented during the Proposed Development. These are outlined below.

4.3.1 Earthworks (removal of Vegetation Cover) Resulting in Suspended Solids Entrainment in Surface Water Bodies (Construction Phase)

- Drainage from the development reception area will be directed towards the existing lagoons on the west of the Proposed Development site;
- Prior to the commencement of earthworks, silt fencing will be placed down-gradient of the construction areas where surface water may drain towards local watercourses. These will be embedded into the local soils to ensure all site water is captured and filtered;
- Daily monitoring and inspections of any constructed site drainage channels during the construction phase will be completed; and
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses.

4.3.2 Hydrocarbons and Cement Based Compounds (Construction and Operational Phase)

- On site re-fuelling of machinery will be carried out in a dedicated refuelling area, or using a mobile double skinned fuel bowser outside the refuelling area. A dedicated refuelling area will be constructed as part of the Proposed Development.
- No plant maintenance will be completed on site. Any broken down plant will be removed from the site to be fixed;
- Mobile double skinned bowser will be stored in the refuelling area;
- Drainage from the refuelling areas will be routed through a full hydrocarbon interceptor prior to final discharge to ground within the existing lagoons on the west of the site. There will be an inspection chamber between the oil interceptor and the lagoon for inspection/sampling.
- Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Onsite refuelling will be carried out by trained personnel only;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose;

4.3.3 Drainage Control (Operational)

Drainage control around the infill/restoration area is proposed and this includes the following:

- Construction of new silt lagoons (3 no.) and 1 no. settlement pond at the proposed washing plant location for management of fines/sediments and dirty water from washing process (refer to Drawing P1623-1-0524-A3-Figure1-00A);
- Water consumption rate for washing is estimated to be 320m^3/day (9hr working day) and the proposed settlement pond is sized accordingly for those flow rates;
- The majority of the clean water from the proposed settlement pond will be pumped back to the washing plant;
- Over flow from the proposed settlement pond at the washing plant will be diverted to the existing lagoons on the west of the site for discharge to ground as permitted by the existing discharge licence WP170;
- Water for topping up the washing plant will be sourced, as previously done, from the existing manmade pond on the west of the site where the pumps and pipework are still in place (i.e. this manmade pond intercepts the groundwater table);
- The pumped water from the pond will essentially be recycled water from the washing plant that will be discharged to ground at the nearby discharge lagoon;
- Management of surface water from the inspection area, the wheelwash area and ancillary buildings will be directed through the existing lagoons on the west of the site;

- Drainage from the refuelling area will be routed through a proposed full hydrocarbon interceptor before discharging to the existing lagoons on the west of the site for final discharge to ground as permitted under WP170. There will be an inspection chamber between the oil interceptor and lagoons for inspection/sampling;
- Runoff from the infill areas will be directed into newly constructed drains/swales situated along the perimeter of the infill areas;
- These swales will be unlined and the high permeability subsoils will allow any surface water runoff to recharge to groundwater (as is currently the case);
- Any sediment which settles at the base of the swales will be removed at regular intervals to maintain the permeability of the swales; and,
- Sanitary wastewater from the Proposed Development will be collected in sealed tanks and taken off-site for disposal at a wastewater treatment plant.

4.3.4 Imported Material Quality Checks (Operational and Restoration Phase)

The following proposed measures are applicable to the Site under both forms of operation (Inert soil and stone importation and Article 27 by-product material importation).
Proposed mitigation measures include:

- Sourcing material that is proven to be inert prior to transport to the Site;
- Pre-agreed source sites for inert material ensuring; no pollutants, unauthorised material, invasive species;
- Regular checks of incoming loads to ensure suitability of imported material;
- The Site will be operated under an Environmental Management System;
- All required pollution prevention measures will be implemented at the Site;
- The operator will prepare and implement an emergency response procedure;
- The operator will complete environmental monitoring, including local groundwater and surface water monitoring;
- A phased restoration of the Site will be implemented, with species rich grassland restored;
- The operator will have a documented waste recording procedure for all material entering the Site; and,
- No unauthorised dumping of waste will be allowed at the Site.

Table H: Summary of WFD Status for Unmitigated and Mitigated Scenarios

SWB	WFD Code	Current Status	Assessed Potential Status Change - Unmitigated	Assessed Status with Mitigation Measures
SWB				
Broadford_010	IE_SH_27B020300	Moderate	Moderate	Moderate
Broadford_020	IE_SH_27B020600	Good	Good	Good
Broadford_030	IE_SH_27B020800	Moderate	Moderate	Moderate
Bridgetown (Clare)_010	IE_SH_25B230100	Good	Good	Good
GWB				
Broadford Gravels	IE_SH_G_095	Good	Good	Good
Tulla-Newmarket	IE_SH_G_229	Good	Good	Good

SWB	WFD Code	Current Status	Assessed Potential Status Change - Unmitigated	Assessed Status with Mitigation Measures
Lough Graney	IE_SH_G_157	Good	Good	Good

5. WFD ASSESSMENT CONCLUSION

WFD status for RWBs (River Waterbodies), GWBs (Groundwater Bodies) and protected areas hydraulically linked to the Proposed Development site are defined in **Section 2** above.

Design control measures for the protection of surface water during the construction, operation and restoration phases of the development will ensure the qualitative status of the receiving waters will not be altered by the Proposed Development.

There will be no change in GWB or RWB status in the underlying GWB or downstream RWBs resulting from the Proposed Development. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream RWBs are protected from any potential deterioration.

As such, the Proposed Development will not impact upon any surface water or groundwater body as it will not cause a deterioration of the status of the body and/or it will not jeopardise the attainment of good status.

As such, the Proposed Development:

- will not cause a deterioration in the status of all river and groundwater bodies assessed;
- will not jeopardise the objectives to achieve 'Good' river water/groundwater status;
- does not jeopardise the attainment of 'Good' river water/groundwater chemical status;
- does not jeopardise the attainment of 'Good' river water/groundwater quantity status;
- does not permanently exclude or compromise the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- is compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- is consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive(2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 7.2.1 of EIAR Chapter 7).

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