

Laois - Kilkenny Reinforcement Project Environmental Reports

Study Area Constraints Report – Hydrology and Hydrogeology

Submission to: ESB International

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1. Introduction

This section identifies the water (hydrology and hydrogeology) constraints that exist in the study area as defined for the Laois-Kilkenny Reinforcement Project. This report was prepared by Mr. Brian Tiernan, Environmental Consultant – AWN Consulting.

The purpose of this report is to provide an assessment for the lead consultant ESBI, of the constraints found within the overall project study area.

2. Methodology and Information Sources

The following list of maps and publications, together with the databases noted, were reviewed as part of the desk study:

- The Geological Survey of Ireland (GSI) well and groundwater records, with reference to hydrology and hydrogeology
- Ordnance Survey of Ireland Discovery Series 1:50,000 Map Series, Nos. 54, 55, 60 and 61
- GSI, Geology of Kildare-Wicklow, Sheet 16
- GSI, Geology of Carlow - Wexford, Sheet 19
- GSI, Geology of Tipperary, Sheet 18
- Department of Environment, Environmental Protection Agency (EPA) & GSI, Groundwater Protection Scheme Guidelines, 1999
- Water Framework Directive Monitoring Programme, EPA 2006
- South Eastern River Basin District Management Plan, SERBD 2009
- Office of Public Works flood mapping data (www.floodmaps.ie)
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes, Natura and the NRA, 2005
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, NRA 2008

3. Hydrology

The study area is located within the South Eastern River Basin District, as defined by European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy, (commonly known as the Water Framework Directive [WFD]). There are a number of rivers within the study area. A river is defined in the Water Framework Directive as "a body of inland water flowing for the most part on the surface of the land but which may flow underground for part of its course".

3.1 Surface Water Features

For the purpose of the constraints study the following rivers were assessed:

- River Nore (Upper) and the following tributaries located in the River Nore catchment:
 - Erkina and the following tributary:
 - Goul
 - Gully
 - Owenbeg (Ovbeg) and the following tributary:

- Ironmills
- Glashagal
- Dinin and the following tributaries:
 - Glosia
 - Kileen
 - Clogh
 - Moyadd Stream
 - Monavea
 - Mayo

The following rivers and streams are located within the River Barrow catchment in the north eastern section of the study area.

- Cush
- Foyle
- Timahoe
- Timogue
- Bauteogue River
- Crooked River
- Douglas River

Baseline data has been collected from the aforementioned information sources in order to form a comprehensive database of the water quality in the study area. This will assist in the assessment of any potential impact(s) on the hydrological and hydrogeological environment from the route option when chosen.

3.2 Water Framework Directive Surface Water Quality Status

The European Water Framework Directive (2000/60/EC) (WFD) was implemented in Ireland by S.I. 722 of 2003, European Communities (Water Policy) Regulations 2003. These regulations established in Irish law a framework for community action in the field of water policy. The Water Framework Directive requires 'good water status' for all European waters by 2015, to be achieved through a system of river basin management planning and extensive monitoring. The study area is located within the South Eastern River Basin District (SERBD). Significant water management issues are included in the SERBD within the water management action plans compiled as part of the SERBD Management Plan 2009 - 2015. *Table 3.1* shows the current status of the rivers monitored in the study area as part of the plan.

River	WFD Status
River Nore (Upper)	Moderate
Erkina	Moderate
Goul	Poor
Gully	Good
Owenbeg (Ovbeg)	Moderate
Ironmills	High
Glashagal	Moderate

River	WFD Status
Dinin	Moderate
Gloshia	Moderate
Kileen	Moderate
Clogh	Good
Moyadd Stream	Moderate
Monavea	Moderate
Mayo	Moderate
Cush	Poor
Timahoe	Moderate
Timogue	Poor
Bauteogue River	Moderate
Crooked River	Moderate

Table 3.1 *WFD Status of rivers within the Study Area*

3.3 *Water Supply*

Water usage in the study area is primarily supplied by Laois and Kilkenny County Councils from their surface water abstractions of water courses and supplemented by groundwater abstraction boreholes. There are also a number of private wells used by landowners individually or part of group water schemes. A search of the GSI well database shows there are a number of wells in the area with uses varying from private to agricultural use. See Appendix for details.

3.4 *Flooding Events*

The Office of Public Works (OPW) Flood Hazard Database was used in order to obtain information on historical flooding events within the study area. This information was used to establish the current baseline conditions in terms of sections of the study area that are liable to flood.

A number of historical flood events were recorded within the study area. The Dinin River at Ballyhimmin N78 near Castlecomer overflowed its banks in November 2000. An Engineer's Report in 2005 obtained from the OPW database noted that there have been recurring floods on the River Nore at several locations within the study area. These have been recorded at Tallyho Bridge Durrow, Water Castle Bridge and Abbeyleix, Co. Laois.

4. Hydrogeology

4.1 *Aquifer Classification*

The GSI Online maps were consulted in relation to the occurrence of bedrock and quaternary aquifers in the study area. Regionally Important Karstified (diffuse) bedrock aquifers are located at Timahoe, Co. Laois and north of Timahoe; they are also located north of Ballyroan, Co. Laois and extend southwards along the River Nore catchment to Ballyragget, Co. Kilkenny and past. The remaining sections of the study area consist of poor bedrock aquifers, which are described as generally unproductive except in local zones.

Regionally Important extensive sand and gravel aquifers are present at Timahoe, Co. Laois and north of Timahoe and at Abbeyleix, Co. Laois where the aquifer extends southwards along the River Nore catchment to Ballinakill and Ballyragget, Co. Kilkenny.

The GSI Well Card Index is a record of wells drilled in Ireland. This Index shows a number of wells within the study area. While much useful information can be obtained from this Index, it is important to note that it is by no means exhaustive, as it requires individual drillers to submit details of wells in each area. The well card data presented in the Appendix shows the occurrence of recorded wells within the study area, information regarding the depth of each well, the groundwater yield (m³) and the yield class. Due to the extensive study area the yield class is varied ranging from poor to moderate and excellent.

4.2 *Groundwater Vulnerability*

The GSI, EPA and DoEHLG have developed a programme of Groundwater Protection Schemes, with the aim of maintaining the quantity and quality of groundwater in Ireland; in addition the programme aims, in some cases to improve groundwater quality by applying a risk assessment approach to groundwater protection and sustainable development. The vulnerability mapping guidelines allow for the assignment of vulnerability ratings from "extreme" to "low", depending upon the subsoil type and thickness. Aquifer vulnerability was varied throughout the study area but was largely classed by the GSI as high-extreme.

5. **Constraints of Study Area – Water**

The key constraints in relation to water are the following:

- **Physical constraints** – Water courses are located within the study area. The requirements for the crossing of water bodies would be the main constraint. Some construction works on site may take place in the vicinity of watercourses in the riparian zone. A buffer area should be established to protect the riparian and aquatic zones from disturbance. All watercourse crossings should be planned in consultation with Laois and Kilkenny County Councils, the Fisheries Board and in accordance with the necessary guidelines.
- **Historical flooding**- there is a history of flooding in some locations within the study area e.g. the Nore River at Abbeyleix and Durrow, Co. Laois and the Dinin River at Castlecomer, Co. Kilkenny. Cognisance should be made to the locations of these previous flood events when locating structures, particularly in the vicinity of watercourses and floodplains and other surface water features.
- **Groundwater Supplies** – a number of groundwater supplies have been identified from the GSI well database. Additional public or private water supplies may be present in the area. A comprehensive database of supplies should be completed as part of the EIA (Environmental Impact Assessment) process.
- **Groundwater Vulnerability** - Regionally important bedrock and gravel aquifers are located within the study area at locations noted in the previous sections. Also the GSI vulnerability rating in some sections of the study area

is classified as extreme. Cognisance of these locations should be made during the EIA process.

6. Conclusions

The constraints in relation to water are highlighted in the previous section, the potential impact of the proposed development, in relation to water, will be identified in the EIS. Cognisance will be taken of the highlighted constraints during the preparation of the EIS. The implementation of appropriate mitigation measures in the EIS will ensure there will be no significant residual impact on the environment from the proposed development in respect to water.

Appendix
GSI Well Data for Study Area

GSI Code	Depth (m)	Easting	Northing	Townland	County	Well Use	Yield Class	Yield m3d
2317NEW209	43.3	254650	182530	CHATSWORTH	Kilkenny	Domestic use only	Moderate	54.6
2317SEW123	-	254640	178760	CRUTT	Kilkenny	Agri & domestic use	Good	268
2317SEW129	233	257210	179060	TOORTANE	Kilkenny	Domestic use only	Poor	5.2
2317SEW156	4.3	249270	172190	RATHKYLE	Kilkenny	Unknown	Failure	1.4
2317SEW161	25	252170	172280	DONAGUILE	Kilkenny	Agri & domestic use	Poor	16.4
2317SEW163	5	252010	171850	CLASHDUFF UPPER	Kilkenny	Agri & domestic use	Poor	3.8
2317SEW169	52	250670	176150	SKEHANA	Kilkenny	Agri & domestic use	Poor	32.7
2317SEW175	22	252440	177110	MOYHORA	Kilkenny	Agri & domestic use	Moderate	43.6
2317SEW182	129.4	253280	173010	CASTLECOMER	Kilkenny	Industrial use	Good	206
2317SEW206	-	259220	174070	CROGHTENCLOGH	Kilkenny	Unknown	Poor	17
2317SEW234	0	256990	175180	COOLBAUN	Kilkenny	Agri & domestic use	Low Spring	22
2317SEW235	0	256790	175020	COOLBAUN	Kilkenny	Unknown	Low Spring	9
2317SEW239	0	257090	175600	MONEENROE	Kilkenny	Unknown	Low Spring	3.3
2317SEW240	0	257590	175730	GORTEEN	Kilkenny	Agri use only	Low Spring	22
2317SEW251	-	259670	170980	COAN EAST	Kilkenny	Industrial use	Good	108
2317SWW415	63.7	242620	174820	BALLYNASLEE	Kilkenny	Agri & domestic use	Poor	20.1
2317SWW416	63.7	242640	174750	BALLYNASLEE	Kilkenny	Other	Poor	5.5
2317SWW420	33.5	243500	171730	BALLYCONRA	Kilkenny	Industrial use	Excellent	4500
2317SWW443	61	243420	171760	BALLYCONRA	Kilkenny	Industrial use	Poor	5
2317SWW444	30.5	243360	171900	BALLYCONRA	Kilkenny	Industrial use	Poor	5
2317SWW445	30.5	243620	171970	BALLYCONRA	Kilkenny	Industrial use	Poor	5
2317SWW446	27.5	243280	172240	BALLYCONRA	Kilkenny	Industrial use	Poor	19.5
2317SWW447	18	243910	172310	BALLYCONRA	Kilkenny	Industrial use	Good	196
2317SWW449	9.8	244000	172250	BALLYCONRA	Kilkenny	Industrial use	Excellent	1190
2317SWW450	68.6	243970	172240	BALLYCONRA	Kilkenny	Industrial use	Excellent	842
2317SWW451	45.7	243980	172180	BALLYCONRA	Kilkenny	Industrial use	Poor	30
2317SWW454	18.8	243670	171710	BALLYCONRA	Kilkenny	Industrial use	Moderate	66
2317SWW455	61	243960	171600	BALLYCONRA	Kilkenny	Industrial use	Good	327
2317SWW456	30	243730	171660	BALLYCONRA	Kilkenny	Industrial use	Moderate	50
2317SWW468	42.1	244800	176210	EARLSGARDEN	Kilkenny	Domestic use only	Good	327.3
2317NEW049	-	245220	186760	TULLORE	Laois	Public supply (Co Co)	Spring	818
2317NWW117	6.4	243290	189170	RAHEEN	Laois	Industrial use	Moderate	90.9
2317NWW118	18.3	244030	188980	CORBALLY	Laois	Agri use only	Moderate	43.6
2317NWW128	8.8	240970	187250	CAPPANACLOGHY	Laois	Agri & domestic use	Poor	5
2317NWW129	3.7	241270	186800	DERRYKEARN	Laois	Agri & domestic use	Poor	5
2317NWW130	8.4	240900	186540	CAPPANACLOGHY	Laois	Agri & domestic use	Poor	5
2317NWW132	29.3	240690	189580	FOXBURROW	Laois	Agri & domestic use	Moderate	54.5
2317NWW136	29.3	241620	188360	DERRYKEARN	Laois	Agri & domestic use	Poor	22.7

GSI Code	Depth (m)	Easting	Northing	Townland	County	Well Use	Yield Class	Yield m3d
2317NWW137	18.6	242010	188140	DERRYKEARN	Laois	Agri & domestic use	Poor	13.6
2317NWW169	3.5	241700	184280	TULLYROE	Laois	Domestic use only	Excellent	1091
2317NWW192	122	243350	189150	CORBALLY	Laois	Industrial use	Poor	20
2317NWW193	15	243360	189100	CORBALLY	Laois	Industrial use	Moderate	150
2317NWW237	28.7	241040	180820	DUNMORE	Laois	Agri & domestic use	Excellent	1964
2317NWW250	4.6	241330	181630	GRACESWOOD	Laois	Agri & domestic use	Poor	19.6
2317SEW017	44.2	250000	179700	KILRUSH	Laois	-	Good	152.4
2317SWW058	29.3	240220	177510	CASTLEDURROW DEMESNE	Laois	Public supply (Co Co)	Excellent	545
2317SWW104	26.7	242850	179100	FERMOYLE	Laois	Public supply (Co Co)	Excellent	1506
2317SWW106	24.4	242810	179100	FERMOYLE	Laois	Public supply (Co Co)	Good	168
2317SWW171	58	239900	172630	AHARNEY	Laois	-	Moderate	43.6
2317SWW173	23	240700	174410	ARCHERSTOWN	Laois	-	Poor	32.7
2317SWW209	3	244000	176270	GRENAN	Laois	-	Good	218.2
2317SWW212	61	240150	172300	AHARNEY	Laois	Agri use only	Moderate	65.5
2317SWW213	63.1	239810	172870	AHARNEY	Laois	Agri use only	Moderate	53.5
2317SWW214	64	240000	172820	AHARNEY	Laois	Agri use only	Poor	38.2
2319SEW116	22.6	256700	194610	TIMOGUE	Laois	Agri use only	Moderate	68.2
2319SEW117	32.3	255970	193950	TIMOGUE	Laois	Agri & domestic use	Moderate	90.5
2319SEW146	-	255450	192230	KYLE	Laois	Public supply (Co Co)	Spring	1337
2319SWW200	25	242700	194680	OLDTOWN	Laois	-	Poor	36