



**ENVIRONMENTAL  
SOLUTIONS LTD**

Panther Environmental Solutions Ltd  
Units 3 & 4, Innovation Centre  
Institute of Technology  
Green Road, Carlow, Ireland  
R93 W248

Telephone: 059-9134222

Email: [info@pantherwms.com](mailto:info@pantherwms.com)  
Website: [www.pantherwms.com](http://www.pantherwms.com)

## **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**FOR**

### **BROILER FARM AND ALL ANCILLARY SITE WORKS AND SERVICES**

**WESTERN BRAND GROUP,  
BERNIE'S FARM,  
BEKAN,  
CO. MAYO**

<b>REPORT NO:</b>	EIAR_18_8967	<b>DATE:</b>	29 <sup>th</sup> June 2018
<b>AUTHOR:</b>	Lorraine Wyse, BSc. Nial Ryan, MSc.	<b>REVIEWED:</b>	Martin O'Looney, BSc. Mike Fraher, BSc.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>SUBJECT</b>	<b>PAGE</b>
	<b>NON-TECHNICAL SUMMARY</b>	<b>11</b>
<b>1.</b>	<b>LEGISLATION REQUIREMENTS</b>	<b>25</b>
1.1	INTRODUCTION	25
1.2	ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION	25
1.3	SCOPE OF THE EIAR	27
1.4	IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS	28
1.5	COMPETENT EXPERTISE	30
	<b><u>PART I PROPOSED DEVELOPMENT</u></b>	<b>32</b>
<b>2.</b>	<b>DESCRIPTION OF PROPOSED DEVELOPMENT</b>	<b>32</b>
2.1	RECENT PLANNING HISTORY OF THE SITE	33
2.2	SITE LAYOUT AND CONSTRUCTION	33
2.3	PRODUCTION PROCESSES AND MANAGEMENT	42
<b>3.</b>	<b>ALTERNATIVES</b>	<b>48</b>
3.1	EXAMINATION OF POSSIBLE ALTERNATIVES	48
3.2	ALTERNATIVE SITES	48
3.3	ALTERNATIVE LAYOUTS	49
3.4	ALTERNATIVE PROCESSES CONSIDERED	49
3.5	ALTERNATIVE MANAGEMENT OF LITTER/MANURE BY-PRODUCT	49
3.6	"DO NOTHING" ALTERNATIVE	50
	<b><u>PART II ENVIRONMENTAL IMPACTS</u></b>	<b>52</b>
	<b>SECTION A – HUMAN ENVIRONMENT</b>	<b>53</b>
<b>4.</b>	<b>POPULATION AND HUMAN HEALTH</b>	<b>54</b>
4.1	INTRODUCTION	54
4.2	METHODOLOGY	54
4.3	RECEIVING ENVIRONMENT	54
4.4	IMPACTS	57
4.5	MAJOR ACCIDENTS AND NATURAL DISASTERS	60
4.6	MITIGATING MEASURES	60
4.7	REFERENCES	61
<b>5.</b>	<b>AIR QUALITY</b>	<b>62</b>
5.1	INTRODUCTION	62
5.2	LEGISLATIVE CONTEXT	63
5.3	METHODOLOGY	63
5.4	DESCRIPTION OF BASELINE AIR QUALITY	63
5.5	IMPACTS	65

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>SUBJECT</b>	<b>PAGE</b>
5.6	MITIGATION MEASURES	66
5.7	CONSTRUCTION IMPACTS & MITIGATION	67
5.8	REFERENCES	68
<b>6.</b>	<b>ODOUR</b>	<b>70</b>
6.1	INTRODUCTION	70
6.2	EXISTING ODOUR CLIMATE	70
6.3	PREDICTIVE ODOUR MODEL	70
6.4	IMPACTS	71
6.5	MITIGATING MEASURES	73
6.6	REFERENCES	74
<b>7.</b>	<b>NOISE</b>	<b>75</b>
7.1	INTRODUCTION	75
7.2	LEGISLATIVE CONTEXT	75
7.3	REGIONAL ENVIRONMENTAL SETTINGS	77
7.4	EXISTING NOISE CLIMATE	77
7.5	SURVEY PROTOCOLS	78
7.6	SURVEY RESULTS	79
7.7	EVALUATION OF THE RESULTS	81
7.8	CONCLUSIONS	85
7.9	MITIGATION MEASURES	86
7.10	CONSTRUCTION IMPACTS & MITIGATION	86
7.11	REFERENCES	87
<b>8.</b>	<b>LANDSCAPING AND VISUAL</b>	<b>89</b>
8.1	INTRODUCTION	89
8.2	METHODOLOGY	89
8.3	EXISTING ENVIRONMENT	91
8.4	CHARACTERISTICS OF THE PROPOSAL	93
8.5	IMPACTS	94
8.6	MITIGATION MEASURES	112
8.7	RESIDUAL IMPACTS	112
8.8	REFERENCES	112
<b>SECTION B – THE NATURAL ENVIRONMENT</b>		<b>114</b>
<b>9.</b>	<b>BIODIVERSITY – TERRESTRIAL ENVIRONMENT</b>	<b>115</b>
9.1	INTRODUCTION	115
9.2	LEGISLATIVE FRAMEWORK AND PLANNING POLICY	115
9.3	METHODOLOGY	118
9.4	DESCRIPTION OF EXISTING ENVIRONMENT	119
9.5	IMPACTS	128
9.6	MITIGATION MEASURES	131
9.7	CONSTRUCTION IMPACTS AND MITIGATION	132

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>SUBJECT</b>	<b>PAGE</b>
9.8	RESIDUAL IMPACTS	134
9.9	REFERENCES	134
<b>10.</b>	<b>BIODIVERSITY – AQUATIC ENVIRONMENT</b>	<b>137</b>
10.1	INTRODUCTION	137
10.2	LEGISLATIVE FRAMEWORK AND PLANNING POLICY	137
10.3	METHODOLOGY	142
10.4	DESCRIPTION OF EXISTING ENVIRONMENT	142
10.5	IMPACTS	143
10.6	MITIGATION MEASURES	145
10.7	CONSTRUCTION IMPACTS AND MITIGATION	146
10.8	RESIDUAL IMPACTS	148
10.9	REFERENCES	148
<b>11.</b>	<b>LAND – SOILS, GEOLOGY AND HYDROLOGY</b>	<b>150</b>
11.1	INTRODUCTION	150
11.2	METHODOLOGY	150
11.3	DESCRIPTION OF EXISTING ENVIRONMENT	151
11.4	IMPACTS	173
11.5	MITIGATION MEASURES	178
11.6	RESIDUAL IMPACTS	181
11.7	REFERENCES	187
<b>12.</b>	<b>CLIMATE</b>	<b>188</b>
12.1	INTRODUCTION	188
12.2	METHODOLOGY	188
12.3	DESCRIPTION OF EXISTING ENVIRONMENT	189
12.4	IMPACTS	190
12.5	MITIGATION	191
12.6	REFERENCES	191
<b>SECTION C – MATERIAL ASSETS</b>		<b>192</b>
<b>13.</b>	<b>MATERIAL ASSETS - AGRICULTURE</b>	<b>193</b>
13.1	INTRODUCTION	193
13.2	METHODOLOGY	193
13.3	DESCRIPTION OF EXISTING ENVIRONMENT	193
13.4	IMPACTS	194
13.5	MITIGATION MEASURES	195
13.6	CONSTRUCTION IMPACTS AND MITIGATION	195
13.7	RESIDUAL IMPACTS	196
13.8	REFERENCES	196
<b>14.</b>	<b>MATERIAL ASSETS – NON-AGRICULTURAL PROPERTIES</b>	<b>197</b>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>SUBJECT</b>	<b>PAGE</b>
14.1	INTRODUCTION	197
14.2	METHODOLOGY	197
14.3	DESCRIPTION OF EXISTING ENVIRONMENT	197
14.4	IMPACTS	200
14.5	MITIGATION MEASURES	201
14.6	CONSTRUCTION IMPACTS AND MITIGATION	201
14.7	RESIDUAL IMPACTS	202
14.8	REFERENCES	202
<b>15.</b>	<b>MATERIAL ASSETS – NATURAL AND OTHER RESOURCES</b>	<b>203</b>
15.1	INTRODUCTION	203
15.2	DESCRIPTION OF EXISTING RESOURCES	203
15.3	IMPACT AND MITIGATION	204
15.4	RESIDUAL IMPACTS	205
15.5	REFERENCES	205
<b>SECTION D –</b>	<b>ARCHITECTURAL, ARCHAEOLOGICAL AND</b>	
	<b>CULTURAL HERITAGE</b>	<b>206</b>
<b>16.</b>	<b>ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL</b>	<b>207</b>
	<b>HERITAGE</b>	
16.1	INTRODUCTION	207
16.2	LEGISLATION AND POLICY CONTEXT	207
16.3	METHODOLOGY	208
16.4	EXISTING ENVIRONMENT	208
16.5	POTENTIAL IMPACTS	215
16.6	MITIGATION MEASURES	216
16.7	CONSTRUCTION IMPACTS AND MITIGATION	216
16.8	CONCLUSION	216
<b>17.</b>	<b>INTERACTIONS AND INTER-RELATIONSHIPS</b>	<b>218</b>
17.1	AIR AND SOILS	220
17.2	AIR AND CLIMATE	220
17.3	AIR, HUMAN BEINGS AND ECOLOGY	220
17.4	NOISE, HUMAN BEINGS AND ECOLOGY	221
17.5	MATERIAL ASSETS AND HUMAN BEINGS	222
17.6	MATERIAL ASSETS AND ECOLOGY	222
17.7	MATERIAL ASSETS AND NOISE	222
17.8	MATERIAL ASSETS AND AIR	222
17.9	WATER QUALITY AND SOILS	223
17.10	WATER QUALITY AND HUMAN BEINGS	223
17.11	WATER QUALITY AND ECOLOGY	224
17.12	LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS	224
17.13	CULTURAL HERITAGE, SOILS AND HUMAN BEINGS	225

## **LIST OF TABLES**

Table 1.1	General Criteria used to quantify the Potential Impacts of the Proposed Scheme
Table 2.1:	Examples of Required Temperature for Broiler Rearing
Table 2.2:	Estimated Mass Emission per Batch from Natural Gas Usage
Table 2.3:	Estimated Traffic Journeys per 8-Week Batch
Table 2.4:	Expected Waste Generation and Disposal
Table 4.1:	Population Change between 2011 Census and 2016 Census per Age Group
Table 4.2:	Summary of Working Population in Co. Mayo, 2016
Table 5.1:	Annual Mean for Air Monitoring undertaken at Castlebar Monitoring Station for the 2013-2015 period.
Table 5.2:	Estimated Annual Emissions of Ammonia, Methane and Nitrous Oxide
Table 6.1:	Predicted Mass Emission Value Results for Odour
Table 7.1:	Baseline Noise Survey Results Summary
Table 7.2:	Predicted Noise Results Summary (dBA)
Table 7.3:	BS4142 Construction Noise Assessment
Table 7.4:	BS4142 Max Operational Noise Assessment (Vehicles & Ventilation)
Table 7.5:	BS4142 Operational Noise Assessment (Normal Ventilation)
Table 7.6:	Examples of Required Temperature for Broiler Rearing
Table 7.7:	Claremorris Station-Average Days per Month where Maximum Temperature @ $\geq 21^{\circ}\text{C}$
Table 8.1:	Visual Amenity Planning Policies, Objectives and Recommendations
Table 9.1:	Regional Policies Relevant to Biodiversity and the Proposed Development
Table 9.2:	Local Policies and Objectives Relevant to Biodiversity and the Proposed Development
Table 9.3:	Designated Sites within 15km of the Proposed Development
Table 9.4:	Proposed Designated Sites within 15km of the Proposed Development

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Table 9.5:	Summary of Habitats Identified at the Proposed Development Site
Table 9.6:	Protection and Conservation Concern Statuses for Recorded Birds
Table 9.7:	Ecological Value of Identified Habitats
Table 10.1:	Regional Policies Relevant to Aquatic Biodiversity and the Proposed Development
Table 10.2:	Local Policies and Objectives Relevant to Aquatic Ecology and the Proposed Development
Table 10.3:	EPA monitoring points on the Robe Hydrometric Area
Table 11.1:	Summary of Trial Hole Information
Table 11.2:	Status & Risk of Nearby WFD Surface Water Bodies
Table 11.3:	Vulnerability Mapping Guidelines
Table 11.4:	Groundwater Sample Results
Table 11.5:	Summary of Predicted Construction Phase Impacts
Table 11.6:	Summary of Predicted Operational Phase Impacts
Table 12.1:	2017 and 30-year average meteorological conditions from Claremorris synoptic station
Table 13.1:	EPA Licenced Agricultural Enterprises within 15km of the Proposed Development
Table 14.1:	NACE Activity per Assigned Colour
Table 14.2:	EPA Licenced Facilities within 15km of the Proposed Development
Table 16.1:	List of Recorded Monuments within 1km of development
Table 17.1:	Summary of Potential Interactions/Inter-Relationships

## **LIST OF FIGURES**

- Figure 2.1: Overall Energy Use Breakdown for Poultry Farms
- Figure 2.2: Overall Electrical Use Breakdown for Poultry Farms
- Figure 2.3: SKOV Conventional Ridge Ventilation System
- Figure 2.4: SKOV Low Power Ventilation System
- Figure 4.1: Address Points by Buildings for Properties within the vicinity of the Proposed Development (Source: myplan.ie)
- Figure 7.1: Predicted BS4142 Noise Rating vs. Existing Baseline Noise (L<sub>90</sub>)
- Figure 8.1: East Central Drumlin Spine (K) (Source: Landscape Appraisal of County Mayo)
- Figure 9.1: Habitat Map of Encountered Habitats at the Proposed Development Site, Bekan, Co. Mayo.
- Figure 10.1: EPA Ecological Monitoring of the Robe from 1989-2015
- Figure 11.1: Soils Map
- Figure 11.2: Subsoils Map
- Figure 11.3: Trial Hole Locations
- Figure 11.4: Bedrock Related Features
- Figure 11.5: PFRA Fluvial Mapping
- Figure 11.6: OPW Flood Maps
- Figure 11.7: GSI Subsoil Mapping
- Figure 11.8: Aquifer Designations
- Figure 11.9: Groundwater Vulnerability
- Figure 11.10: Karst Features
- Figure 11.11: Cross-Section
- Figure 11.12: Proposed Site Layout
- Figure 14.1: Address Points by Buildings for Properties within the vicinity of the Proposed Development (Source: myplan.ie)

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Figure 14.2: Commercial Activities per NACE Code within the vicinity of the Proposed Development (Source: myplan.ie)

Figure 16.1: Extract from Mayo RMP, Sheet No. 92, showing recorded monuments

Figure 16.2: Extract from OS 6-inch map showing recorded monuments

Figure 16.3: Extract from 1<sup>st</sup> edition OS 6-inch map (1838)

Figure 16.4: Extract from historical OS 25-inch map

Figure 16.5: Existing Site Layout

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**LIST OF ATTACHMENTS**

Attachment	A	Proposed Development Maps
	A.1	Site Location Map
	A.2	Proposed Site Layout Maps
	A.3	Proposed Buildings Layout
	A.4	Proposed Wash-Water Tank Specifications
	A.5	Proposed Wash-Water Spreadlands
	A.6	Existing Site Layout Map
Attachment	B.1	Odour Impact Assessment Report
	B.2	Odour Management Plan
Attachment	C.1	Noise Impact Assessment Report
	C.2	Noise Management Plan
Attachment	D.1	Appropriate Assessment Screening Report
	D.2	Photo Log
	D.3	Full List of Recorded Flora
Attachment	E	Land and Visual Maps
	E.1	Catchments in the Bekan Region
	E.2	Townland Boundary 2018
	E.3	Visual Assessment – Contour
	E.4	Visual Assessment – Aerial
Attachment	F	List of Abbreviations – Architectural, Archaeological and Cultural Heritage
Attachment	G	Traffic Assessment Report

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**NON-TECHNICAL SUMMARY**

**General**

This Environmental Impact Assessment Report (EIAR) document has been prepared on behalf of and for the exclusive use of the Western Brand Group by Panther Environmental Solutions Ltd., with respect to an application for planning permission to Mayo County Council (Ref. No. 17825) for the demolition of existing broiler houses and the construction of four new broiler houses with a total capacity of 100,000 places for broilers, feed silos and all associated site development works at Bekan, Ballyhaunis, Co. Mayo.

The poultry farm currently in operation at the proposed development site, operated by the applicant, originally comprised of five broiler houses with a total capacity for 97,000 birds. However, due to storm damage in recent years, two of the broiler houses were demolished. The applicant is proposing to demolish the remaining broiler houses and construct four new broiler houses in its place.

The current poultry operation, when operating at full capacity of 97,000 birds, is above the threshold of 40,000 bird capacity outlined in Section 6.1(a) of the First Schedule of the EPA Acts 1992 to 2013. Therefore, the facility was issued with Industrial Emissions Licence for the farm from the EPA, Registration No. P0911-01. The proposed development would be operated under this IE licence. The EPA would be consulted with regards the proposed development at the site.

The proposed development would have a footprint of approximately 2.5 acres on a hard-standing site of approximately 2.72 acres. The site would be accessed via the existing poultry farm entrance. The site location map and proposed site layout are included in Attachment A.

The site is located in a rural area. Residential development in the area is predominantly aligned along the existing road network. The closest dwelling to the proposed broiler farm is located approximately 120m to the south-east of the proposed site. The activity on the site would be farming activities appropriate to the rural area.

The site is located approximately 150m from the village of Bekan, 5.3km from Knock town, 5.7km from Ballyhaunis and 10.7km from Claremorris. The site is accessed by a local road which links to the R323 some 1.8km to the north-east of the site. The R323 road connects to the N60 and N86 roads some 4.4km to the east at Ballyhaunis town.

The main activities on the proposed site are summarised as follows:

- Bedding of house with straw/wood shavings;
- Placing of day-old chicks in the broiler houses;
- Feeding and rearing of birds for 6 weeks;
- Delivery of feed to farm approximately five times per batch;
- Medication of broilers via automated feed and drinking water systems;
- Removal of broilers for slaughter;
- Removal of litter (mixture of bedding material, feathers and manure) to a covered trailer for immediate removal by licenced haulier (M.J. Kehoe) and transported to the Walsh Mushrooms composting facility in Co. Wexford;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- Washing of houses between batches and collection of wash-water in an underground tank;
- Collection and spreading of wash-water on land owned by the applicant, subject to set back distances outlined in the Nitrates Regulations (S.I No. 31 of 2014);
- Disinfecting and drying of broiler houses in preparation for next batch (1-2 weeks).

The construction phase is proposed to take place over 3-4 months, with landscaping activities concluding shortly thereafter.

The principal inputs would be day-old hatchlings, feed (e.g. cereals, soya protein), water, veterinary medicines and a modest amount of energy (electricity and natural gas) for the automated feed system, lighting and heating. The outputs would be broiler chickens (primary product) and animal manure (by-product). The waste products would be domestic refuse, recyclable packaging waste and broiler carcasses (typical mortality 1.5%).

Each house would have a capacity for 25,000 birds, with the rearing period lasting approximately six weeks, followed by a downtime period of two weeks. There would be approximately 6.2 batches of 100,000 birds per year.

Upon completion of the construction phase, per batch of 100,000 birds, there would be approximately 1 truck journey for chick delivery, 1 truck journey for the delivery of wood shavings, 56 operator visits, 3 truck journeys for waste/carcass collection, 5 truck journeys for feed deliveries, 2 fuel deliveries, 8 truck movements for broiler collection, 3 truck collections for litter removal, one half load collection of wash-water (one collection every two batches), one visit by Veterinary / Dept. of Ag. personnel and 2 visits by customers. This would result in approximately 23.5 articulated truck and 59 car journeys per 8-week batch, equating to 146 truck and 366 car journeys per year. However, it should be noted that these figures are likely to be overestimates, given that many of the delivery services provided would occur in tandem with deliveries to other poultry units in the area and would not significantly add to existing traffic in the wider area. Furthermore, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity.

### **Human Beings**

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads and agricultural facilities are located in the surrounding area of the proposed site. The area also supports a number of commercial developments.

The proposed development would have a positive impact upon the local economy by providing temporary employment during the construction phase and permanent, full-time employment for 1-2 operators. The development would also provide employment for contract workers including hauliers delivering feed and removing products and wastes, in addition to pest control contractors. The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the Bekan area and surrounds.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The proposed development would have a potential nuisance upon human beings during the construction phase due to increased dust and noise emissions. However, the potential impact would be temporary given the transient nature of construction works. Noise and dust control measures would be implemented throughout the construction phase to reduce the potential impact. Therefore, noise and dust would not be considered to pose a significant impact.

During the operational phase, there would be potential for odour generation from the broiler rearing process. Odour dispersion modelling, undertaken as part of this EIAR and included as Attachment B, concluded that all identified receptors in the vicinity of the proposed development would perceive an odour level less than the Irish EPA and UK EA guidance guideline odour limit of less than 3.0  $\text{Ou}_E/\text{m}^3$  for the 98<sup>th</sup> percentile of hourly averages for the worst-case 2013 meteorological year. It is therefore considered that the siting of the new poultry development would not impact significantly upon nearby sensitive receptors with respect to odour.

No significant additional noise impact on local residences would be anticipated during the operational phase of the proposed development. It is recommended that all collections and deliveries from the site are conducted during normal working hours. During the normal operation of the ventilation system, noise is predicted to be inaudible at the nearest noise sensitive locations. During warmer days, it is predicted that ventilation noise would be lowly audible at the closest sensitive location, and maximum ventilation noise would cause a slight additional noise impact while atmospheric temperatures  $>21^\circ\text{C}$  persist during the day. Given the transient nature of construction works and provided the recommended control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact upon the generation of noise and dust emissions. While there would be increased vehicle movements during the construction phase, this would be for a limited period of time only. There is predicted to be no significant increase in traffic volumes during the operation of the proposed development. The estimated traffic movements for the proposed development would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity, with approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch, with these figures likely to be overestimates.

The traffic assessment undertaken by RoadPlan Consulting (Attachment G) concluded that the L1501 road, along which the proposed development site is located, would operate within capacity when the proposed development is fully operational for the future assessment years 2019, 2024 and 2034. The report noted that there would be no queues and minimal delays to the existing L1501 / development access priority junction as a result of the proposed development for the future assessment years 2019, 2024 and 2034.

The proposed development would not be anticipated to have any significant impact upon the land use of the area. The proposed poultry farm would replace an existing poultry farm (operated by the applicant) at the site. Therefore, there would be no land use change at the proposed development site.

There would be a slight to no significant impact upon the visual landscape due to the proposed development, the visibility of the development would be limited to the uppermost

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

sections of the feed silos and small sections of the poultry house roof apex, this would be limited in extent and would be in conformance with the character of the existing agricultural environment. The structures would be of a similar visual character to existing poultry farm at the site.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.

There would be no adverse impacts to human beings due to a deterioration in water quality. During the construction phase, water quality would be protected by the implementation of mitigation measures as outlined in Section 11.5, such as the appropriate storage of excavated topsoil and the appropriate handling and storage of potentially polluting substances.

It is not anticipated that the proposed development has the potential to adversely impact upon water quality during the operational phase, as there would be no process effluent emissions from the site, storm-water would be directed through a SuDS designed system (including silt trap, interceptor, and soak pits) before discharging to ground and wash-waters would be landspread in accordance with the Nitrates Regulations as a matter of good environmental practice.

**Air / Climate**

The main potential sources of air pollutants from the operation of the proposed development would be the livestock digestive processes, litter of the broilers and the burning of fuel for heating. Emissions from digestive processes and manure of pullets include primarily ammonia, nitrogen oxides and methane. Airborne dust and particulate matter can arise from pullets, litter and feed.

Air emissions generated at the proposed development would be typical of the industry and would be anticipated to have no significant to slight air quality impacts in the regional context. Air quality in the vicinity of the development would be expected to continue to be good and would remain dominated by external traffic and agricultural sources within the region.

Dust levels generated by the development during the operational phase would be expected to be negligible. Dust within the broiler houses would be controlled primarily through feed and litter selection as a matter of animal husbandry to promote an optimal growing environment.

A number of measures would be taken to mitigate the potential emissions associated with the proposed development, which include the implementation of good housekeeping practices, appropriate management and storage of litter, appropriate bird stocking densities and the provision of high quality feed with lower "fines".

Maximum efficiency of fuel input is required to ensure profitability of the operation. The applicant intends to use natural gas as the fuel source. Natural gas generates 60-90% less greenhouse gases than other fossil fuel sources.

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO

The main potential source of air pollution during the construction phase of the development would be the generation of dust.

Earthworks during construction are a potential source of dust pollution. Minimal levels of dust would be expected to be generated during the construction phase given the confined area of earth-works and the short term of the construction phase. The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravels/concrete/etc. to and from the site, having the potential to cause an environmental nuisance to use of the local road.

Construction dust control is a common part of construction management practices. The effect of construction activities on air quality, in particular construction dust, would not be significant following the implementation of the proposed mitigation measures such as good working practices, dust suppression measures, sweeping of roads and hardstand areas where required and undertaking reinstatement works as soon as practicable.

Therefore, the effects of the proposed development on air quality and climate are anticipated to be insignificant outside of the site boundary.

### Odour

While EPA BATNEEC Guidance recommends a set-back distance of 400m from third party residences, this set back distance cannot always be achieved in the real world, particularly given the proliferation of one off housing developments in rural Ireland in recent years. Therefore, it is considered that site specific assessments carried out to determine the likely impact of the proposed development in the context of the proposed site location would take precedence.

Odour dispersion modelling has been undertaken in support of this EIAR and is presented in Attachment B.1.

Within a 1.5km proximity of the site there are three operational poultry farms: Greenwood Farm located 650m north-east; Hunts Farm located 845m south; and Ballyhaunis Farm located 1.5km north-east. These three existing farms were included in the odour dispersion model. Significant odours would generally be present during the slurry-spreading season associated with the agricultural industry in the area.

Emissions to the atmosphere from the proposed development would consist of warm air from the ventilation system in the buildings and odour from the organic manure. Emissions of odour would occur from the digestive processes and litter of the broilers.

While increased odour emissions may be associated with the loading of broilers or litter, the potential impact would be considered minor given that this occurs once per 8-week batch. Furthermore, the emptying of litter from each house would take no more than 3 hours in duration, therefore potential odours would be short-lived.

The odour dispersion modelling concluded that the odour plume spread from the facility would be considered small, with the plume generally remaining inside the site boundary.

The modelling also concluded that all identified receptors in the vicinity of the proposed development would perceive an odour level less than the Irish EPA and UK EA guidance

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

guideline odour limit of less than 3.0 Ou<sub>E</sub>/m<sup>3</sup> for the 98<sup>th</sup>ile of worst-case hourly averages for the 2013 - 2017 meteorological years.

Mitigation measures for odour control are outlined in Section 6.5, and include the adequate use of litter bedding, appropriate stocking density, appropriate timing / weather for litter removal, quality ventilation and high quality house design. It is also recommended that an Odour Management Plan, included as Attachment B.2, is implemented at the facility to ensure that high standards are maintained with regards odour.

It is therefore considered that the proposed development would not have a significant impact upon human beings with respect to odour.

### Noise

A Noise Assessment Report has been prepared in support of this EIAR and is presented in Attachment C. The Noise Assessment Report identified the main noise sensitive locations (NSLs) and assessed the potential impact of the proposed development at these locations, in accordance with the methodologies prescribed in ISO 9613-2:1996 "*Attenuation of Sound during Propagation Outdoors,*" and in BS 4142:2014 "*Methods for Rating and Assessing Industrial and Commercial Sound*".

The closest noise sensitive location is 120m to the south-east of the proposed operation.

The baseline noise assessment conducted for the proposed development provides a predictive analysis of the impact of the construction and operation of the proposed development on noise sensitive locations (NSL) to determine the need for any mitigation measures.

Peak source noise levels would occur during short periods during the initial construction phase, such as excavation/site clearance activities. It is anticipated that the proposed development would have a significant but short-term impact on the closest noise sensitive locations during the construction phase. The overall construction phase would be temporary (approx. 3-4 months) and works would be conducted during normal working hours, reducing the risk of negative impacts. Therefore, the subjective impact of noise from construction activities would be mitigated. Predicted construction noise levels would be in compliance with NRA guidance for noise during construction.

There would be a slight to moderate impact on the closest noise sensitive locations due to noise from agricultural/delivery vehicles.

It has been recommended that all collections and deliveries from the site be conducted during normal working hours. Following the implementation of proposed mitigation measures, it is predicted that there would be no significant noise impact upon noise sensitive locations.

The maximum noise from climate controlled ventilation fans onsite would be predicted to occur predominantly during the daytime periods of the warmest summer days. It is likely that ventilation fans would only be operating at maximum from May to September, for a number of days during these months and only for short periods of these days. The maximum potential impact of noise from ventilation has been based upon fans working at maximum power and includes a correction for potential tonal noise from malfunctioning fans. Therefore, the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

predicted noise levels may be seen as a worst-case scenario for ventilation noise during the operation of the site.

At the closest noise monitoring location, NSL (140 metres), maximum worst-case scenario ventilation fan noise has been predicted to be below the existing L<sub>90</sub> background noise levels. Due to the low predicted resultant noise levels and the infrequency of occurrence it is predicted that maximum ventilation noise would have a no significant impact upon noise sensitive locations.

During normal operations, low fan noise would be the dominant noise source onsite. The mid-range operation of the ventilation system is not predicted to be audible at the nearest noise sensitive locations.

It is the conclusion of the Noise Assessment Report that there would be no significant impact on noise sensitive locations as a result of the operational phase of the proposed development at Bekan, Co. Mayo.

It has been recommended that all onsite workers, hauliers and contractors be informed of noise considerations, both onsite and on local access roads, during the operational and construction phases of the proposed development.

In order to facilitate and promote good practice at the site, it is recommended that the applicant implement a noise management plan. An outline of this plan is included in Attachment C.

**Visual Impact**

The proposed development is located within a rural agricultural landscape, dominated by fields of varying sizes, bordered by mature hedgerows, banks, dry stone walls, drainage ditches and fences. Medium to large loughs and areas of conifer forestry plantation are also found within the vicinity of the proposed site. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Large farmyard complexes are common in the area and are generally composed of barrel or A-shaped sheds with green or dark finish, many including feed type silos either of unfinished stainless steel or green/dark finish.

The proposed site is located at an approximate elevation of 100-110m above sea level. Topography is characterised by low-lying small to medium sized drumlins. The proposed development site is located within the "Drumlins and Inland Lowlands" Principle Policy Area and within the Landscape Character Unit K, "East Central Drumlin Spine".

There would be a slight to no significant impact upon the visual landscape due to the proposed development, the visibility of the development would be limited to the uppermost sections of the feed silos and small sections of the poultry house roof apex, this would be limited in extent and would be in conformance with the character of the existing agricultural environment. The structures would be of a similar visual character to existing poultry farm at the site.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

As the proposed development would be located within the footprint of the existing poultry farm, and would use the existing site entrance, no removal or alteration of hedgerows would be required as part of the proposed development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would add ecological value to the site.

There would be a slight to no significant impact upon the visual landscape due to the proposed development, the visibility of the development would be limited to the uppermost sections of the feed silos and small sections of the poultry house roof apex, this would be limited in extent and would be in conformance with the character of the existing agricultural environment. The structures would be of a similar visual character to existing poultry farm at the site.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.

As a result, it is considered that the proposal may be viewed as having an acceptable level of landscape and visual impact.

**Litter and Wash-Water Management**

Poultry litter is composed of a mixture of bedding material, feathers and manure. It is estimated that the quantity of litter generated at the farm with a capacity of 100,000 birds would be 558 tonnes per annum (based upon 90 tonne of litter produced per batch).

Litter arising from the development would be collected by the contractors M. J. Kehoe, for supply to the Walsh Mushrooms facility in Co. Wexford, for use as a fertiliser. M. J. Kehoe is a registered contractor on the Department of Agriculture, Food and Marine ABP Transport Register, Registration No. HAC2340.

All manure collections from the site would be recorded in a log by the applicant, as per Nitrates Regulations (S.I. No. 31 of 2014).

All wash-water generated during the cleaning of the broiler houses would be removed after each batch, for application to lands owned by the applicant (as outlined in the wash-water spreadlands map provided in Attachment A.5). Removal of wash-water would be documented as appropriate under the Nitrates Regulations (S.I. No. 31 of 2014).

**Waste Material**

All waste material would be stored as per the BREF Document on Emissions from Storage (July, 2006) and removed from site by a licensed waste contractor as necessary. Removal of waste materials would be documented as appropriate.

**Water Supply**

Water for stock and for poultry house washing would be acquired from the existing mains connection.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

It is estimated that the proposed development would use 4,482.6 M<sup>3</sup> of water per year (based upon 6.2 batches per year). This would include drinking water for stock (approximately 7M<sup>3</sup> water per 1,000 birds per batch) and cleaning of the houses (approximately 0.23 M<sup>3</sup> per 1,000 birds per batch).

**Biodiversity**

An Appropriate Assessment Screening Report has been prepared in support of this EIAR and is presented in Attachment D.1.

The closest Natura 2000 sites to the proposed development are the River Moy SAC (Site Code: 002298) and Lough Corrib SAC (Site Code: 000297), located 3.8km north-east and 8.5km south-east from the site respectively. There are no NHA sites within 15km of the proposed development.

It is not anticipated that the proposed development, by itself or in combination with other developments, would impact negatively upon the Natura 2000 network during the construction or operational phases of the project.

The site is not anticipated to have a significant negative ecological impact upon the biodiversity of the area, given the relatively small footprint of the development and given that habitats within the proposed development area are of low ecological value or common to the area.

The proposed development would be located within the same footprint as the existing poultry farm, and would use the existing site entrance. Therefore, no existing hedgerows would be removed or altered as part of the proposed development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would add ecological value to the site.

No rare or protected flora were recorded within the proposed development site during the field assessment. No invasive flora species of concern were noted as present for the proposed development area during the site assessment. Given the nature of the proposed development, it is considered that there would be no risk of introducing invasive species during the operational phase. The potential risk of introducing invasive species during the construction phase would be considered low.

Where protected species, such as bats, badgers or the common frog are found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of activities.

No significant impacts on fauna would be envisaged due to noise emissions from the proposed development. The applicant would implement a noise management plan to ensure minimal noise pollution outside the site boundary. While there would be increased noise emissions during the construction phase of the development, these would not be considered to pose a significant risk owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

During the construction phase of the development, there would be potential for dust emissions. However, dust emissions would not be considered to have a significant potential impact on fauna due to the transient nature of construction works and the implementation of dust control measures.

There would be no significant impact upon biodiversity due to the generation of litter and wash-water onsite. Litter arising from the development would be collected by the contractor M. J. Kehoe for supply to Walsh Mushrooms in Co. Wexford, for use as a fertiliser. The collection and spreading of wash-waters would be undertaken on lands owned by the applicant, in compliance with the requirements of the Nitrates Regulations, SI 31 of 2014.

**Surface Water**

It is not anticipated that there would be any potential significant impacts upon water quality during the operational phase of the proposed development, as only clean, surface water run-off would be discharged from the proposed development site.

There would be no process effluent associated with the operation of the facility. Therefore, there would be no effluent emissions to surface or groundwaters.

All storm-water from roofs and hardstanding areas of the proposed development would be collected and discharged to ground via a system designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground. The stormwater system would include a silt trap, interceptor and soak pits which would discharge to ground. The proposed silt trap and interceptor would remove solids and any hydrocarbons, ensuring there would be no potential contamination of surface water.

According to the Preliminary Flood Risk Assessment (PFRA) indicative flood mapping website, the site is not located within fluvial, pluvial or groundwater flood zones.

The site does not propose to store significant volumes of any chemicals or materials which could pose a significant spill risk to the aquatic environment. The fuel for heating of the houses would be natural gas.

The only potential contaminant to be stored on site in significant volume would be wash-water, or 'soiled water'. This would be stored in a designated leak-proof tank, which would be regularly visually inspected for integrity, cleaned as necessary and subject to hydrostatic integrity tests every three years. Therefore, the risk of a spillage of a potential contaminant is deemed to be low. This soiled water would be spread on lands owned by the applicant, subject to set back distances outlined in the Nitrates Regulations. An assessment of the suitability of lands for landspreading of wash-water has determined that 1.5 hectares of the total 1.66 hectares are suitable for landspreading (as outlined in the wash-water lands map provided in Attachment A.5). The available landspreading area is more than sufficient for the volume of wash-water generated by the proposed activity, with the proposed maximum application rate of c. 15 M3/hectare being in compliance with the 25 M3/hectare limit for karst areas, as required under the Nitrates Regulations.

During the construction phase, there would be potential for a deterioration in surface water quality through the release of suspended solids during soil disturbance works, the release of

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

hydrocarbons from construction plant and the release of uncured concrete. Surface water quality would be protected during the construction phase through the implementation of standard construction control measures and mitigation measures, which include the appropriate storage of potentially polluting substances, the regular maintenance and inspection of construction plant, supervised concrete works and the use of silt control features where necessary.

**Soils, Geology and Hydrology**

Soils underlying the proposed development site are primarily composed of "Poorly drained basic mineral soils" (gleys) BminPD, with the remainder of the site composed of "Deep well drained basic mineral soil" (BminDW). The subsoil at the site is classed as Limestone Till. Trial pit excavations indicate that the subsoils of the site comprised of fill to depths of 0.2-0.7m, underlain by natural subsoils ranging from gravelly/sandy clay and clayey gravel. The bedrock underlying the site is classed as Dinantian Pure Bedded Limestones.

Groundwater vulnerability at the proposed site is classed as moderate. According to the GSI, there are no wells on the proposed development site itself, or within the vicinity of the site. The nearest record is for a dug well located approximately 9km from the site. As part of the work undertaken for this assessment, one bored well was identified in the village of Bekan, which is used periodically.

There are no Groundwater Source Protection Areas (SPAs) mapped by the GSI in the vicinity of the site. The nearest SPA is for the Ballinlough / Ballybane Public Water Scheme located approximately 13km to the southeast of the site.

During the construction phase, the main potential impacts upon soils would be through soil removal as part of excavation works, soil compaction arising from the use of construction plant and hydrocarbon contamination from leaks and spills. Mitigation measures would include the re-use of excavated soils for reinstatement and landscaping works where possible, the use of specialised machinery to minimise soil compaction and the appropriate storage of potentially polluting materials.

During the construction phase, the main potential impacts to surface and ground water would be the potential for sediment laden run-off, hydrocarbon spillage and uncured concrete spillage. Mitigation measures would include the appropriate storage of excavated soils, the appropriate handling and storage of hydrocarbons, daily inspections of construction plant, good housekeeping practices and the provision of spill kits.

During the operational phase of the development, the main potential impacts to soils, geology and water would include the storage and recovery of litter, the storage and spreading of soiled wash-water and accidental leakage or spillage of hydrocarbons. Mitigation measures would include the controlled removal of litter, the storage of wash-water within an appropriate wash-water storage tank, the spreading of wash-water in accordance with the E.U. (Good Agricultural Practice for the Protection of Waters) Regulations 2017 and the appropriate storage of potentially polluting materials.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Material Assets**

There would be no significant impacts upon agricultural properties or non-agricultural properties (including residential, commercial, recreational and non-agricultural land) due to the proposed development.

There would be no loss of residential, commercial, recreational or non-agricultural due to the proposed development. As the proposed development would replace an existing poultry farm (operated by the applicant), the site would continue to be used for agricultural activities. Therefore, there would be no land use change at the proposed site.

During the construction phase, there is potential for noise and dust to impact upon agricultural and non-agricultural material assets. However, the potential impact would not be considered significant, given the transient nature of construction works and given that noise and dust control measures would be implemented throughout the construction phase, as discussed in Sections 5 and 6.

There would be construction-related traffic during the construction phase of the proposed development. As construction works would be located on agricultural land, there would be no potential impacts on non-agricultural material assets. For agricultural material assets, discussions would take place with local landowners to ensure that construction traffic causes minimum interference with movements of stock and does not hinder farm operations.

The potential for operational noise associated with the proposed development to cause disturbance to livestock within grassland surrounding the proposed development would be considered low. Animals would quickly become acclimatised to the new noise environment adjacent to the development, as with similar projects such as new roads and motorways.

The potential for noise to impact upon residential, commercial and other non-agricultural facilities would be considered low, given the nature of the proposed development, the existing noise climate of the area and the distance from other facilities.

There is predicted to be no significant increase in traffic volumes using the local road infrastructure as a result of the operation of the proposed development. Upon completion of the construction phase, there would be approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch, equating to approximately 146 truck and 366 car journeys per year, with these figures likely to be overestimates. It is considered that the estimated traffic movements from the proposed development would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity.

The traffic assessment undertaken by RoadPlan Consulting (Attachment G) concluded that the L1501 road, along which the proposed development site is located, would operate within capacity when the proposed development is fully operational for the future assessment years 2019, 2024 and 2034. The report noted that there would be no queues and minimal delays to the existing L1501 / development access priority junction as a result of the proposed development for the future assessment years 2019, 2024 and 2034.

**The Use of Natural Resources**

There are no significant negative effects expected in relation to the use of natural resources.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Operations carried out on-site would lead to the consumption of water, feed, natural gas, electricity and medication during the operational phase of the proposed development. The main resource to be consumed would be feed, which is classifiable as a natural resource that is a renewable resource.

It is estimated that 723 M<sup>3</sup> of water would be used per batch of 100,000 birds, for drinking and cleaning of houses. At a maximum of 6.2 batches per year, this would result in approximately 4,482.6 M<sup>3</sup> of water per year.

Fuel requirement would be a maximum 6,440 M<sup>3</sup> (6,440,000 L) of natural gas per batch. Fuel requirements have been calculated using a conservative (i.e. likely an overstated) estimate based on a small-scale study conducted by Teagasc in 2011.

It is proposed to install a hot water heating system in the broiler houses, with water circulated through Spiraflex radiators situated along the side-walls of the broiler houses, heating the air. The heating system would be used primarily during the winter, nights and for new chicks.

There would be a modest input of electricity for the feed and watering system.

**Archaeological, Architectural and Cultural Heritage**

Following a desk study and site inspection, it was concluded that there are no protected archaeological, architectural or cultural heritage sites within the proposed development site or within its immediate environs. Therefore, it is not anticipated that the proposed development would have any impacts on any elements of the protected resource.

There are fifteen known archaeological sites within 1km of the proposed development site, the nearest of which are located approximately 200m from the site. The known archaeological sites within 1km of the proposed site are as follows:

- Enclosure (MA092-070)
- Enclosure (MA092-071)
- Enclosure (MA092-072)
- Wedge Tomb (MA092-074)
- Enclosure (MA092-075)
- Possible Enclosure (MA092-076)
- Possible Crannog (MA092-077)
- Church (MA092-078001)
- Graveyard (MA092-078002)
- Enclosure (MA092-094)
- Enclosure (MA092-095)
- Burnt Mound (MA092-114)
- Burnt Mound (MA092-115)
- Burnt Mound (MA092-116)
- Enclosure (MA092-122)

There are no entries for Brackloon West in the Topographical Files of the National Museum of Ireland, however, a dug-out canoe is recoded along the southern shore of Bekan Lough, approximately 700m from the proposed development site.

There are no protected structures within or in the immediate vicinity of the proposed development site. There is one building in the area which is included in the National Inventory of Architectural Heritage, the Church of St. Margaret Mary Alacoque in Bekan, which was built in 1934-5, located approximately 350m from the proposed development.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

No adverse physical or visual impacts on the known Cultural Heritage of the area have been identified as a result of the proposed development, given the distance between the nearest recorded monument, the absence of any protected structures within 1km of the site and given that the site has been completely disturbed during its initial development in 1979-1980.

**Traffic**

A Traffic Assessment Report (TAR) was prepared by RoadPlan Consulting for the proposed development at Bekan and is included as Attachment G. The report assesses the potential impact of the proposed development upon the L1501 road, along which the development site is located, in addition to the existing N60/L1501 priority junction.

The report concluded that the existing L1501 / Development Access priority junction would operate within capacity with no queues and minimal delays when the poultry farm is operational in 2019, year of opening, 2024, five years after completion and in 2034, fifteen years after completion. The existing L1501 operates within capacity for a Level of Service D with an existing AADT level of 1,087. The L1501 would operate within capacity for a Level of Service D in when the poultry farm is fully operational with a proposed AADT of 1,194 in 2019, year of opening, an AADT of 1,209 in 2024, five years after completion and an AADT of 1,390 in 2034, fifteen years after completion.

**Summary**

The potential for the proposed development to cause adverse environmental impacts during the construction and operational phases, considering the proposed mitigation measures, is anticipated to be negligible.

This is due to the nature, scale, high specification, management and location of the proposed development, due to all litter going to a composting facility and due to the proposed removal of all wastes from the site in a timely fashion by a licenced contractor for disposal or recovery.

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **1. LEGISLATIVE REQUIREMENTS**

### **1.1 INTRODUCTION**

This chapter broadly describes the legislative context in which the Western Brand Group's proposal to replace an existing poultry operation with four new broiler houses is presented.

This Environmental Impact Assessment Report has been compiled following an Environmental Impact Assessment with regard to the demolition of existing broiler houses and the construction of four new broiler houses with a total capacity of 100,000 places for broilers, feed silos and all associated site development works at Bekan, Ballyhaunis, Co. Mayo.

This EIAR is to be submitted to Mayo County Council in support of an application for Planning Permission under the Planning and Development Regulations 2001 (S.I.No 600 of 2001).

### **1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION**

This EIAR has been prepared in accordance with the requirements of the European Communities (Environmental Impact Assessment) Regulation, 1989 to 2001, the Planning and Development Act 2000 and the Planning and Development Regulations 2001. This legislation requires the assessment of the effects of certain public and private projects on the environment.

The proposed development would fall above the threshold prescribed in Schedule 5, Part 17 (a) of the Planning and Development Regulations, 2001 as amended: "*Installations for the intensive rearing of poultry or pigs with more than 85,000 places for broilers, 60,000 places for hens,*" which would render the submission of an Environmental Impact Statement (EIS) (now referred to as an EIAR) a mandatory requirement.

This report is drafted with particular regard to Article 94 and Schedule 6 in the 2001 regulations, and is submitted to provide information that may be helpful to the planning authority in making its decision on this application for planning permission.

It should be noted that the EIA Directive, 2014/52/EU, was due to be transposed into Irish law by the 16<sup>th</sup> of May 2017. A circular letter was issued by the Department of Housing, Planning, Community and Local Government on the 15<sup>th</sup> of May 2017 (Ref. PL 1/2017), advising planning authorities and An Bord Pleanála of the procedures to follow until the laws, regulations and administrative provisions necessary to comply with the EIA Directive have been brought into force:

*"In respect of applications for planning permission or other development consent received on or after 16 May 2017 falling within the scope of Directive 2011/92/EU, or within the scope of Directive 2014/52/EU, competent authorities are advised to consider applying the requirements of Directive 2014/52/EU by way of administrative provisions in advance of the transposition of Directive 2014/52/EU into Irish law."*

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO

This document has therefore been prepared taking cognisance of the amendments to the 2011 Directive.

The documents “Guidelines on the information to be contained in Environmental Impact Statements” 2002, “Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)” 2003 and the draft “Guidelines on the information to be contained in Environmental Impact Assessment Reports” 2017 as prepared by the EPA were followed in the preparation of this report.

The guidelines state that in preparing an EIAR, the Developer will carry out an analysis of the likely effects of the project (positive or negative) on the environment. The Environmental Impact Assessment procedure commences at the project design stage when the scope of the study is determined. Studies are then carried out to investigate in detail, any potential environmental impacts. Where significant adverse impacts are identified, measures are recommended to mitigate or avoid the impact of the proposed development.

This Environmental Impact Assessment Report examines the potential significant impacts of the proposed construction of four new poultry houses with a total capacity of 100,000 places for broiler chickens, feed silos and all ancillary site works and services at Bekan, Co. Mayo.

The extent of the proposed scheme is described in detail in Section 2 – Description of Development. The potential environmental impacts of the proposed scheme are addressed in Sections 5 – 17 of this volume of the report under the headings Human Environment, Natural Environment, Material Assets and Architecture, Archaeology and Cultural Heritage.

### 1.2.1 INFORMATION TO BE CONTAINED IN AN EIAR

Schedule 6 of the Planning and Development Regulations 2001 specifies the information to be contained within an EIS, including:

1. (a) A description of the proposed development, comprising information on the site, design and size of the proposed development.
  - (b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.
  - (c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.
  - (d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.
2. Further information, by way of explanation of the information referred to in paragraph 1, on the following matters:-
    - (a) (i) a description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operation phases.
    - (ii) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- (iii) an estimate, by type and quantity, of expected residues and emissions (including water, air, and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development:
- (b) A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular
- human beings, fauna and flora,
  - soil, water, air, climate factors and the landscape
  - material assets, including the architectural and archaeological heritage,
  - the cultural heritage,
  - the inter-relationship between the above factors
- (c) A description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from :
- the existence of the proposed road development
  - the use of natural resources
  - the emission of pollutants, the creation of nuisance and the elimination of waste and
  - a description of the forecasting methods used to assess the effects on the environment:
- (d) An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

### **1.3 SCOPE OF THE EIAR**

Scoping is an essential part of the preparation of an EIAR as it ensures that all potential and important significant impacts on the receiving environment are taken into account at the earliest possible time.

Scoping provides relevant information on the most important potential impacts of the project, which will have to be addressed in the EIAR.

With regard to EPA criteria for scoping, the environmental areas that may be impacted by the proposed scheme were identified and are as follows:

#### *Human Beings*

During scoping, particular regard was given to the potential impact of the proposed broiler facility and associated structures and operations on human beings.

In particular, potential impacts which may occur due to noise during the construction phase and noise and odour during the operational phase were considered.

#### *Natural Environment*

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The site of the proposed development is not located in an area of significant ecological value. The nearest SACs to the proposed site are the River Moy SAC (Site Code: 002298) and Lough Corrib SAC (Site Code: 000297), located 3.8km north-east and 8.5km south-east from the site respectively. There are no SPAs, NHAs or Ramsar sites within 15km of the proposed site.

The site is located on an aquifer categorised as a regionally important karst aquifer and is classified as being of moderate vulnerability.

The potential impacts on land, waters and biodiversity must be assessed with care to ensure that all impacts are clearly identified and where possible removed, reduced or minimised to a satisfactory level.

*Material Assets*

This involves assessing impact of the land proposed to be taken on the availability of resources such as soils, utilities etc. for activities such as agriculture. The development would replace an existing broiler facility at the proposed site, operated by the applicant.

*Architecture, Archaeology & Culture Heritage*

The site is comprised primarily of hardstanding, and has been completely disturbed during construction of the existing poultry farm at the site. The site is therefore of low potential with regard to archaeological and other cultural heritage finds.

**1.3.1 SCENARIOS INVESTIGATED**

A number of different scenarios have been examined when determining likely significant impacts.

The “do nothing” scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme not be built.

The “do something” scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme be built.

**1.4 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS**

Schedule 6 of the Planning and Development Regulations requires that an EIS describes likely, direct and indirect significant impacts of a proposed scheme. The EPA’s draft “Guidelines on the information to be contained in Environmental Impact Assessment Report, 2017” defines an impact as the “change resulting from the implementation of project” and goes on to elaborate on impacts in terms of:

- Quality (positive, neutral or negative);
- Significance (imperceptible, not significant, slight, moderate, significant, very significant or profound);
- Extent and context;
- Probability of effects (likely, unlikely);

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- Duration (momentary, brief, temporary, short-term, medium-term, long-term, permanent, reversible);
- Type (indirect, cumulative, Do-Nothing, worst-case, indeterminable, irreversible, residual, synergistic)

The following factors have been considered for this EIAR when determining the significance of the impacts, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment.
- The relative importance of the environment in terms of national, regional, or local importance.
- The degree to which the quality of the environment is enhanced or impaired.
- The scale of change in terms of land are, number of people impacted, number and population of species affected including the scale of change resulting from all types of impacts.
- The consequence of that impact/change occurring.
- The certainty/risk of the impact/change occurring.
- Whether the impact is temporary or permanent.
- The degree of mitigation that can be achieved.

The magnitude of the impacts outlined in the chapters which follow, take into account the guidelines given by the EPA and those scales used in other EIS / EIAR documents for significant developments in this country. A broad outline of the scale of impacts is given in Table 1.1.

Where mitigation in the form of design measures have been suggested throughout the evolution of the EIAR, these have been incorporated into the scheme design as far as is possible from an engineering perspective.

**Table 1.1:** General Criteria used to quantify the Potential Impacts of the Proposed Scheme

SIGNIFICANCE LEVEL	DEFINITION OF IMPACT
<b>Profound</b>	Significant Impact An impact, which obliterates sensitive characterisation
<b>Major</b>	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
<b>Moderate</b>	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends
<b>Slight</b>	An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities
<b>Not significant</b>	Neutral or imperceptible impact An impact which does not change the quality of the environment is capable of being measured but without noticeable consequences and causes changes in the character of the environment which are not significant or profound

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **1.5 COMPETENT EXPERTISE**

Directive 2014/52/EU states that the preparation of EIAR documents should be undertaken by “competent experts”, ensuring that the information provided is of high quality.

Panther Environmental Solutions Ltd (PES Ltd) is a leading Environmental Consulting Firm based in Carlow, Ireland. PES Ltd was formed in 2005 by Environmental Consultant Mike Fraher who has over two decades of experience working in the Environmental Consultancy Industry, both in Ireland and in the UK. The PES Ltd. team are experienced in preparing EIS / EIAR documents, having completed a number of these reports for a range of industries including the intensive agriculture sector.

This EIAR has been prepared by experienced environmental consultants with PES Ltd. Mr. Mike Fraher has over 25 years' of consultancy experience and has a B.Sc Degree in Environmental Sciences from the University of Glamorgan, Cardiff in Wales and a Diploma in Food Sciences from Cork Institute of Technology. Mr. Martin O'Looney has over five years' consultancy experience and has a B.Sc Degree in Environmental Science and Technology from Sligo Institute of Technology. Ms. Lorraine Wyse has over three years' consultancy experience and has a B.Sc Degree in Environmental Science and Health from Dublin City University and a Diploma in Field Ecology from University College Cork. Mr. Nial Ryan has over two years' consultancy experience and has a B.Sc in Applied Physics from Dublin City University and an M.Sc in Medical Device Regulatory Affairs from Institute of Technology Carlow.

Additional expertise was obtained for the preparation of the land (soils, geology and hydrology), traffic and architectural, archaeological and cultural heritage assessments of this EIAR.

The land – soils, geology and hydrology section has been prepared by IE Consulting Ltd, a water, environmental and civil engineering consultancy established in 2001. IE Consulting provide specialist services in hydrogeology and environmental geology. The section has been prepared by Ms. Aisling Whelan, who has over 11 years' experience as a consultant hydrogeologist and has a B.Sc (Hons) in Environmental Science and a Postgraduate Diploma in Environmental Hydrogeology. The soils, geology and hydrology section has been reviewed by Mr. Jer Keohane, a director with IE Consulting, who has over 33 years' experience in consulting and whose qualifications include a B.Sc Degree in Geology, Masters and CGeol FCIWEM MIEI.

The architectural, archaeological and cultural heritage section has been prepared by Mr. Richard Crumlish. Mr. Crumlish has over 25 years' experience as an archaeologist, has a B.A. in Archaeology and Geography from University College Galway (now National University of Ireland Galway), and is a member of the Institute of Archaeologists of Ireland (M.I.A.I.). Mr. Crumlish has directed over 300 excavations, has compiled numerous impact assessments and has published a number of articles in historical/archaeological journals over the years.

A Traffic Impact Assessment has been prepared by RoadPlan Consulting Ltd., established in 2003, specialising in road design, road safety and transportation assessment. RoadPlan's staff has a wealth of experience in all areas of the roads and traffic industry: design standards, statutory procedures, contract documentation, construction standards, traffic assessment,

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

temporary traffic management and road safety assessment, offering high-quality advice, guidance and services. Since 2004, RoadPlan has carried out in excess of 600 Traffic Impact Assessments for residential, commercial and industrial developments ranging from large regional size developments to single housing schemes, principally for private clients to support planning applications.

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**PART I – PROPOSED DEVELOPMENT**

This section of the EIAR describes the proposed construction of the new poultry farm with a total capacity of 100,000 places for broilers, new feed silos and all ancillary site works and services at Bekan, Co. Mayo.

**2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT**

The proposed development at Bekan, Co. Mayo, would replace an existing poultry farm at the site, operated by the applicant Western Brand Group.

The existing poultry farm originally comprised of five broiler houses with a total capacity for 97,000 birds. However, due to storm damage in recent years, two of the broiler houses were demolished. The applicant is proposing to demolish the remaining broiler houses at his site and to construct four new broiler houses in their place with a total capacity of 100,000 places for broilers along with new feed silos and all ancillary site works and services at Bekan, Co. Mayo.

In addition to the poultry houses and feed silos, the proposed development would include a wash-water tank, a surface water system comprising of a silt trap, interceptor and soak pits. A schematic of the site layout is provided in Attachment A.2.

The First Schedule of the EPA Act, 1992, as amended provides that an Industrial Emissions Licence would be required for:

- 6.1 (a) The rearing of poultry in installations where the capacity exceeds 40,000 places.
- (b) In clause (a) 'poultry' shall be construed in accordance with Regulation 2(2) of the European Communities (Poultry and Hatching Eggs) Regulations 2010 (S.I. No. 564 of 2010).

Under the EPA Act 1992, as amended, an 'installation' is defined as "*a stationary technical unit or plant where the activity concerned referred to in the First Schedule is or will be carried on, and shall be deemed to include any directly associated activity, whether licensable under this Part or not, which has a technical connection with the first-mentioned activity and is carried out on the site of that activity*".

An 'activity' is defined as "*any process, development or operation specified in the First Schedule and carried out in an installation*".

The current poultry operation, when operating at full capacity of 97,000 birds, was above the threshold of 40,000 bird capacity outlined in Section 6.1(a) of the First Schedule of the EPA Acts 1992 to 2013. Therefore, the facility was issued with Industrial Emissions Licence for the farm from the EPA, Registration No. P0911-01. The proposed development would be operated under this IE licence. The EPA would be consulted with regards the proposed development at the site.

The proposed development would provide employment during the construction phase over a period of approximately 3-4 months. When operational, it would provide employment for 1-2

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

operators, along with contract work for pest control contractors and hauliers delivering chicks and feed, and removing chickens, litter, carcasses and general waste.

## 2.1 RECENT PLANNING HISTORY OF THE SITE

There are four previous planning applications relating to this site;

MAYO CO. CO. PLANNING REF	APPLICANT	DEVELOPMENT DESCRIPTION	STATUS
P79/58	Mr. Philip Cunnane	Erection of two chicken houses at Brackloon West, Bekan	Granted
P88/599	Mr. John Lannon	Retention of existing 2 poultry houses and erection of new poultry house at Brackloon West, Bekan, Claremorris	Granted
P90/79	Mr. John Lannon	Erection of 2no. chicken houses at Brackloon West, Bekan, Claremorris	Granted
17825	Western Brand Group	Demolish existing broiler chicken house and construct 4 replacement broiler chicken houses, to those	Withdrawn

There are no other previous planning applications for the proposed development site. Planning information was sourced from the Mayo County Council Planning Enquire System, available at <http://www.mayococo.ie/PlanSearch/mcc4/PlanningViewer/SelectPlan.asp>, in addition to visiting the offices of Mayo County Council.

## 2.2 SITE LAYOUT AND CONSTRUCTION

### 2.2.1 OVERVIEW

The location of the proposed development is in a rural, farming area at Bekan, in the townland of Brackloon West, Co. Mayo (Grid Reference E143797 N279825).

The site is located 5.3km south-east of Knock town centre, 5.7km west of Ballyhaunis town centre and 10.7km north-east of Claremorris. The site is accessed by a local road which links to the R323 some 1.8km to the north-east of the site. The R323 road connects to the N60 and N86 roads some 4.4km to the east at Ballyhaunis town.

A poultry farm is currently in operation at the proposed development site, operated by the applicant. The existing layout of this poultry farm is included as Attachment A.6. This poultry farm originally comprised of five broiler houses with a total capacity for 97,000 birds. However, due to storm damage in recent years, two of the broiler houses were demolished. The applicant is proposing to demolish the remaining broiler houses and construct four new broiler houses in its place. The applicant is also proposing to decommission and remove the existing wash-water tanks at the site, and proposes to excavate and back-fill with appropriate fill the old underground tanks.

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO

The site is comprised mainly of hardstanding, upon which three poultry houses are currently located. The site is surrounded by a mixture of boundary hedgerows and stone walls. The area of the proposed development site measures approximately 2.72 acres. Access to the proposed broiler farm would be via the existing poultry farm entrance.

The site boundaries are currently marked by a combination of hedgerows and stone walls. As the proposed development would be located within the same footprint as the existing poultry farm, no existing hedgerows would be removed or altered as part of the development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would add ecological value to the site.

The proposed development would include the construction of four high specification poultry housing units with a capacity of 100,000 birds. Within the housing units, broiler chickens would be accommodated on bedding made from straw / wood chippings and would be fed and medicated via automated and optimised feed and watering systems. Feed would be stored in a silo, which would be located on a concrete apron external to each house.

Poultry litter (mixture of bedding material, feathers and manure) would be collected after each batch of broilers by licenced haulier (M.J. Kehoe) and transported to a mushroom composting facility in County Wexford. Wash-waters generated during the cleaning process between batches would be collected and applied to lands which would be owned by the applicant (as shown in Attachment A.5).

The proposed development would produce approximately six batches of broiler chickens (each with 100,000 broilers) per year for supply to the market. There would be a minimum of two weeks downtime between batches, to allow for cleaning, disinfection and preparation for incoming chicks.

The construction phase would extend over a period of about 3-4 months. All of the construction materials and equipment required would be acquired from local sources, where possible, and transported in to the site by road.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reducing the visual impact.

The proposed development would use natural gas as the fuel source.

The following sections describe the specifications of the proposed structures and systems to be implemented.

### 2.2.2 DESCRIPTION OF THE PROPOSED STRUCTURES AND SYSTEMS

#### **Broiler House**

The proposed broiler house design is state of the art for the industry. Structures of this type are common in Ireland and the best available techniques to minimise emissions and to maximise welfare conditions for animals and staff alike are standard.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

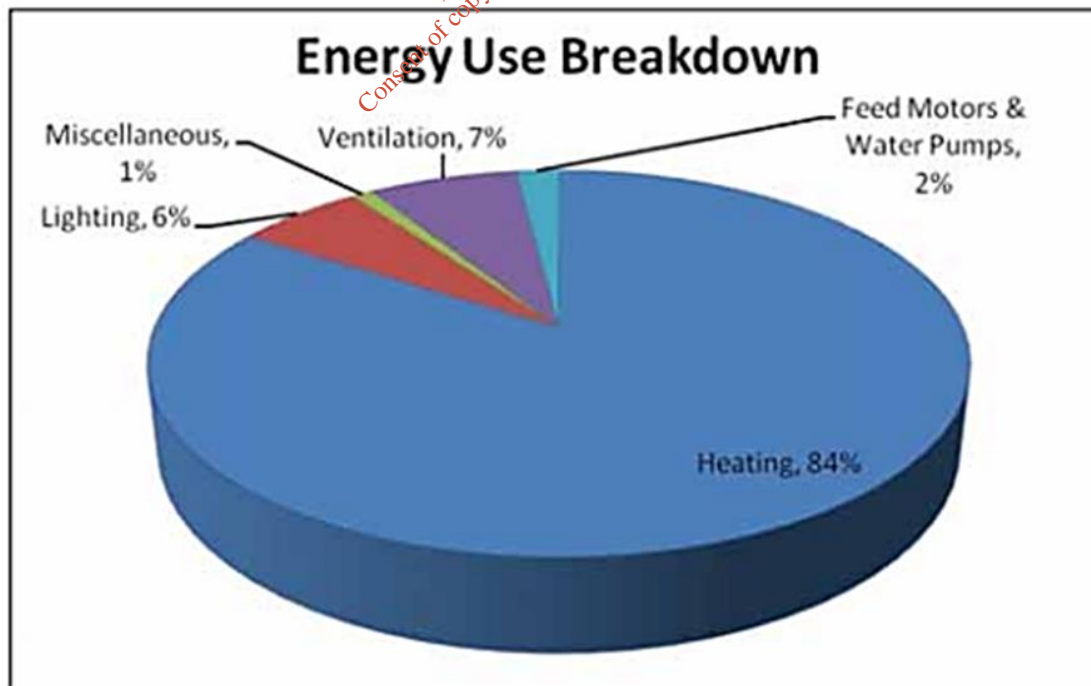
Each proposed house would be insulated and would each measure 67.8m x 21.1m, covering a total area of 1,430.6m<sup>2</sup>. Each house would measure approximately 5.8m high to ridge level, with ridge vents approximately 1m above the house apex. The floor would be built as a solid concrete slab. The walls would be constructed of concrete up to a height of 1m, with the upper section constructed of selected green metal cladding. The roof would be constructed of selected profiled metal roof cladding. Seven ridge vents would be located along the apex of the roof and one per cable end, allowing optimal ventilation. Access to each house would be via a 3m wide opening along with a smaller 1m opening to the store to the front elevation of the houses, and a single 1m opening to the rear elevation. Each broiler house would be serviced by a boiler, which would be located within the food store contained within the broiler house.

The design of the proposed poultry houses complies with BAT housing systems for broiler chickens as identified in the BREF Document for Intensive Rearing of Poultry or Pigs (2017), i.e. broilers would be kept on “*litter spread over the entire floor area*”, bedding would comprise of “*straw or wood shavings*”, houses would be equipped with “*controlled ventilation systems that allow climate control for animals, litter drying*”, and “*automatic, height-adjustable feeding and drinking systems*” would be provided.

Drawings of the proposed broiler houses are included as Attachment A.3.

**Energy Usage**

Optimising energy input in intensive poultry production is vital in order to reduce production costs, maintain financial viability and gain a marketing edge on competitors. Figure 2.1 provides a breakdown of the overall energy consumption in broiler poultry farms. As can be seen, an efficient heating system can greatly reduce overall energy input.



**Figure 2.1** Overall Energy Use Breakdown for Poultry Farms (source: *Energy Use in Agriculture*, Teagasc 2011)

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Broiler house energy usage in Ireland is estimated at 0.71kWh per bird. This is detailed in *Energy Use in Agriculture*, Teagasc 2011. Using this figure, total energy use per batch from the proposed development is estimated at 71,000 kWh.

Using the figures specified in Teagasc's 2011 report and the SEAI's gross calorific value coefficient for natural gas, the estimated fuel input requirements for the proposed development have been calculated.

The required heating energy input would be 59,640 kWh per batch. This equates to 6,440 M<sup>3</sup> (6,440,000L) of natural gas per batch. An estimated mass emission balance is shown in Table 2.2.

It should be noted that the fuel requirement estimates used in this EIAR are likely to be conservative (i.e. overestimates) as the figures stated in the Teagasc study were taken from a small-scale study conducted before 2011. No indication is given of the heating systems employed by the farms in question. As the proposed heating system would be designed for maximum efficiency of fuel input, it would likely require less fuel than the average determined by this study.

An example of the efficiency that could be attainable is from a larger survey conducted in the UK which estimated energy usage at 0.39kWh / bird over the 8-week rearing period. As the UK has a comparable climate, it is clear that there is scope to reduce energy usage per bird below 0.71kWh per bird in Irish poultry house.

This can be achieved by high building and system design specifications - including whole-building insulation and optimal heating and ventilation systems. Optimal management practices are also necessary, these include on-going monitoring of bird health as well as feed, water, fuel and electricity input - all of which would be employed by the proposed development.

In addition, poorly maintained ventilation ducts and vents can increase running costs by 60%. Therefore, all ducts and vents would be included in the end-of-batch clean and filters would be replaced where necessary.

Winter ventilation would be monitored and controlled accurately where heating is used in the buildings. If the level is too high, heating costs increase significantly. Too low a level produces foul air conditions.

Energy saving LED lights would be used to light the broiler houses. LED lights are the most energy efficient and practical lighting source. They are longer lasting than compact fluorescents (CFL) and incandescents - up to 10 times as long as compact fluorescents, and far longer than typical incandescents. They are less hazardous as they do not contain mercury. They give better quality light. They are more efficient - using only 2-17 watts of electricity (1/3rd to 1/30th of Incandescent or CFL).

### **Heating**

The proposed houses would primarily require heating during the winter and during most nights. It is proposed to install a convector type hot water radiator system in each house.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

As new chicks are particularly sensitive to cold and their most rapid growth phase is in their first week, it is important to adequately heat the broiler houses (see Table 2.1). Where chicks are raised in temperatures that are too cold, mortality is increased, surviving chicks eat more feed in order to maintain body heat, and suffer stunted development. Heating can be adjusted as necessary using the hot water system. New chicks, particularly in winter months, require the highest input of heat energy.

**Table 2.1:** Examples of Required Temperature for Broiler Rearing<sup>1</sup>

Ages (days)	Indoor environment Temperature (°C)		
	Portugal (1)	UK (2)	France (3)
1 – 3	37 – 38	30 – 34	31 – 33
3 – 7	35	32	30 – 32
7 – 14	32	28 – 30	28 – 30
14 – 21	28	27	26 – 28
Adults: 21 – 29	No heating	18 – 21	26 – 23
28 – 35			20 – 23
Over 35			18 – 20

The hot water system, supplied by Skov, for each broiler house would involve the heating of water to a sufficient temperature via the boiler, which would be circulated through Spiraflex radiators situated along the side-walls of the broiler house, heating the air.

The fuel source for the heating system would be natural gas. Natural gas produces 60-90% less emissions than other fossil fuels. Although natural gas is far more abundant than other fossil fuels and can be sourced from some renewable resources such as landfill and incineration, it is still seen as a non-renewable resource.

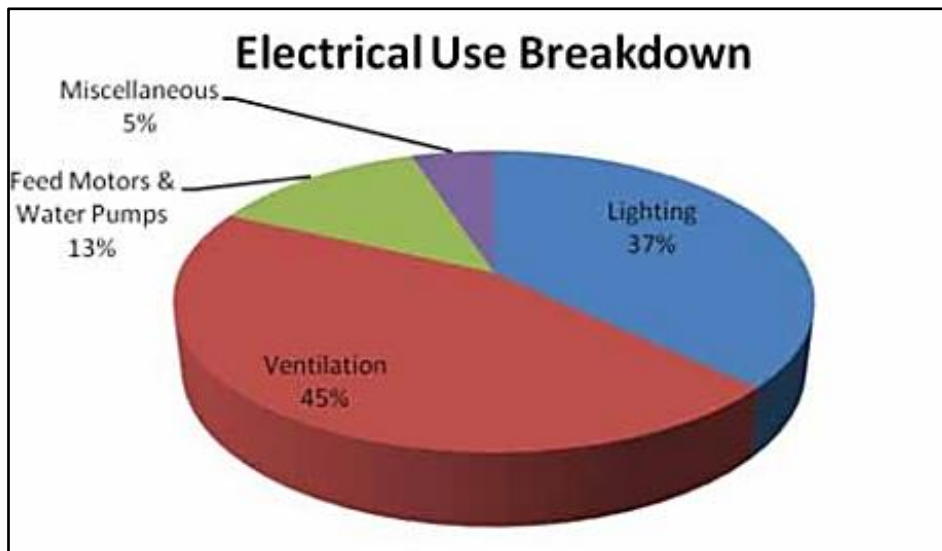
**Table 2.2:** Estimated Mass Emission per Batch from Natural Gas Usage

Estimated Mass Balance of Emissions						
		CO	CO <sub>2</sub>	NO <sub>x</sub> (as NO <sub>2</sub> )	SO <sub>x</sub>	PM <sub>10</sub>
<b>Natural Gas</b>	<b>kg/L</b>	0.0006	1.99	0.16	0.0011	0.00051
<b>Mass Emission per batch</b>	<b>kg/batch</b>	3,864	1.3 x 10 <sup>7</sup>	1 x 10 <sup>6</sup>	7,084	3,284

**Ventilation**

Ventilation is typically responsible for 45% of electrical input to a poultry house. During periods where extra ventilation is required (primarily during periods of warm weather), the ventilation systems would be automatically controlled and would be optimised for animal growth, energy efficiency, odour and noise considerations. All fans and ducts would be cleaned as part of the end of batch cleaning process.

<sup>1</sup> BREF Document for Intensive Rearing of Poultry or Pigs (2017) Reference Document for the Intensive Rearing of Poultry or Pigs.

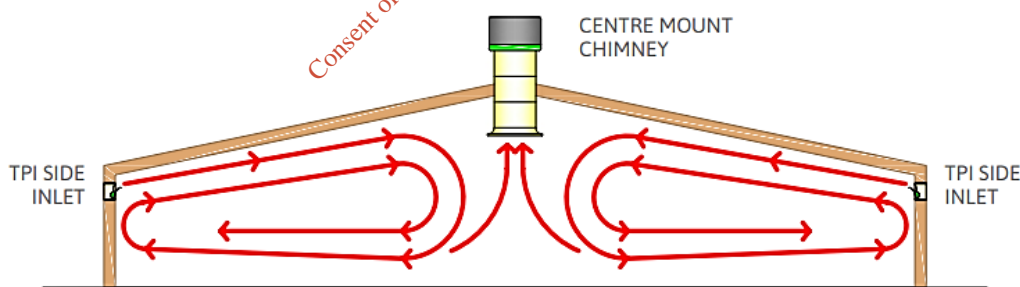


**Figure 2.2** Overall Electrical Use Breakdown for Poultry Farms (source: *Energy Use in Agriculture*, Teagasc 2011)

The suppliers, installers and maintainers of the ventilation systems would be SKOV.

The Skov ventilation system used in the broiler houses would be the conventional climate controlled automated ridge ventilation system. This consists of fans that are mounted in the roof chimneys along with wall inlets mounted along the two sidewalls of the house.

The system expels the stale air vertically into the atmosphere thus eliminating dust falling on the roof sheeting, which could be washed down to the gutters and foul the soil or surface water receptor. A diagram of the Skov conventional ridge ventilation system is presented in Figure 2.3.



**Figure 2.3** SKOV Conventional Ridge Ventilation System

The SKOV system used would be the low power ventilation (LPV) system. This has been designed for use in temperate climates. See Figure 2.4 for a diagram of the SKOV low power ventilation system. The SKOV system consists of four components:

**1. Air intake**

Fresh air is supplied with wall inlets. During cold periods, fresh air is directed towards the ceiling and mixed with the house air before it reaches the animal zone. In warm periods, the air is taken in the same way but is sucked into the livestock house at a higher speed. This creates air circulation around the birds and it stays cool without increased circulation to be perceived as draught.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**2. Air outlet**

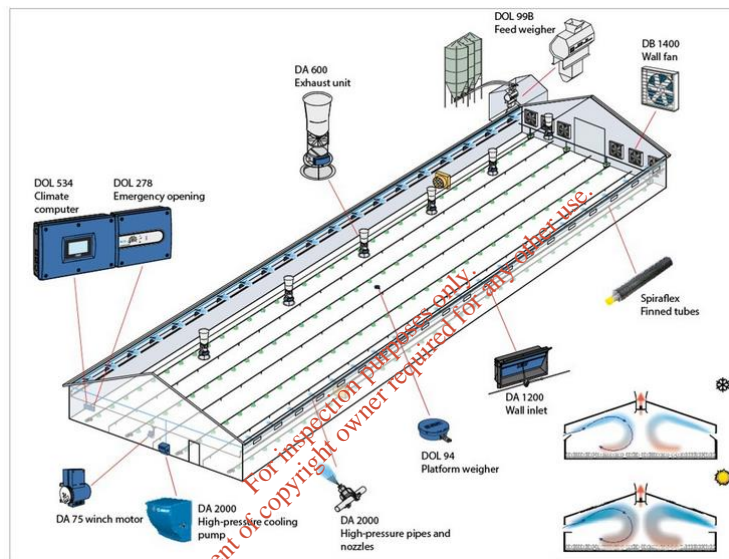
Air exhaust is handled by wall mounted exhaust units. These are designed for high output with low power consumption. The exhaust units are aerodynamic and the exhaust unit and fan are optimised as a unit.

**3. Controller**

The LPV system is controlled by SKOV house computer.

**4. Interlinking**

The open-close function of the system is handled by a winch motor, which is supplied with a complete mounting set.



**Figure 2.4** SKOV Low Power Ventilation System

**Wash-Water Storage Tank**

Wash-water generation would be minimised through the maximising of the effectiveness of the litter cleaning process and the efficient use of wash-water during cleaning. It is estimated that 0.23 M<sup>3</sup> of wash-water would be produced per 1,000 birds. Therefore, per batch of 100,000 broilers, approximately 23 M<sup>3</sup> of wash-water would be produced. At a maximum of 6.2 batches per year, it is estimated that 142.6 M<sup>3</sup> of wash-water would be generated per annum.

One underground wash-water storage tank, with an approximate 30,280-litre capacity, is proposed for the development. The wash-water tank location is detailed in Attachment A.2, with specifications similar to the details in Attachment A.4. Wash-water from the cleaning process between batches would be stored within the underground tank and spread on lands that would be held by the applicant. A preventative maintenance system would be in place for this tank, which would entail regular visual inspection and cleaning.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Disinfectants would be used in the washing of the poultry houses, and residues of cleaning and disinfectant chemicals are typical within agricultural dirty waters<sup>2</sup>.

The wash-water would be in compliance with the definition of 'soiled water' under the Nitrates Directive Part 1, Section 4 (2), (b) whereby soiled water does not include any liquid where such liquid has either: (i) a biochemical oxygen demand exceeding 2,500 mg per litre, or (ii) a dry matter content exceeding 1% (10 g/L).

As the majority of soiled water would be collected as a result of washing the buildings, the proposed wash-water tank would be in compliance with the requirement to provide sufficient capacity "to store all soiled water likely to arise on the holding during a period of 15 days", as per the Nitrates Regulations.

The collection and spreading of wash-waters would be undertaken on lands owned by the applicant, who would observe the setback distances specified in the Nitrates Directive Part 4, Section 17 when spreading soiled water as a matter of good environmental practice.

### **Water Provision**

A maximum of approximately 23 M<sup>3</sup> (23,000 litres) of water would be used while washing the four broiler houses upon removal of broilers (based upon approximately 0.23 M<sup>3</sup> per 1,000 birds). This would mean an estimated maximum annual usage for wash-water of 142.6 M<sup>3</sup> (based upon 6.2 batches per year).

It is estimated that 7M<sup>3</sup> of drinking water would be used per 1,000 birds per batch. This equates to 700 M<sup>3</sup> per batch of 100,000 birds. This would mean an estimated annual usage for drinking water of 4,340 M<sup>3</sup> (based upon 6.2 batches per year).

Therefore, it is estimated that the proposed development would use 723 M<sup>3</sup> of water per batch and 4,482.6 M<sup>3</sup> per year (based upon 6.2 batches per year).

It is proposed to source water required for stock drinking water and water required from the cleaning of the poultry houses from the existing mains water connection.

### **Feed Silos**

Feed silos would be located externally to the east of each broiler house upon a concrete apron (see Attachment A.2). Two single 12 tonne silos would measure between 7.5-9m in height and 2.3m in diameter, while a 35 tonne split silo would measure 11.4m in height and 3m in diameter. All silos would have a green finish. Feed would be delivered to the site on average five times over the 8-week batch period.

### **Drainage**

There would be no process emissions to either surface water or groundwaters from the proposed site.

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<sup>2</sup> Martinex-Suller, L., Provolo, G., Carton, T., Brennan, D., Kirwan, L. and Karl, G. (2010) The composition of dirty water on dairy farms in Ireland. *Irish Journal of Agricultural and Food Research*, 49, pp. 67-80.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The only emissions to ground would be water run-off from the roofs of the broiler houses and hard standing surfaces. Surface water run-off from roofs and hardstanding areas of the proposed development would be collected and discharged to ground via a system designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground. The risk of contamination of storm-water would be low.

The stormwater system would include a silt trap, interceptor and six soak pits, and would discharge to ground, as shown in Attachment A.2. While dimensions for the soak pits have been included on the drainage layout in Attachment A.2, it should be noted that these are indicative and dimensions would be confirmed once the filtration rate has been established.

In the event of a spill, the silt trap would remove solids and the interceptor would remove any hydrocarbons, ensuring there would be no potential contamination of groundwater.

It is intended to adopt best management practices in stormwater management as outlined in both the SuDS manual from CIRIA and the Technical Guidance document on SuDS published by British Water in conjunction with the Environment Agency along with other European and international industry standards.

**Waste Materials**

Domestic refuse would be collected in a covered on-site skip and removed as necessary by a licenced waste contractor.

Packaging waste and other recyclable waste would be collected in a designated container and removed as necessary by a licensed waste contractor.

Dead animals would be expected to number approximately 1,500 per batch, which equates to 1.5% of initial stock. The carcasses would be stored temporarily on-site in a sealed storage bin and removed on a two-week basis to College Proteins in County Meath.

As medication is administered through the automated water system, no veterinary sharps would be produced as waste products.

**Rodent Baiting**

It is important to control vermin, rodents and other pests on the site in order to prevent disease spread, particularly by contamination of feedstuffs. Rodent control on the farm would be managed by baiting in designated areas around the site.

Ecolab would be contracted to carrying out rodent control measures. This would involve the location of rodent baiting boxes at strategic locations throughout the site. Ecolab would inspect and remove boxes as necessary.

Baiting locations along with an accompanying map would be determined upon completion of the construction phase and consultation with Ecolab.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Topsoil & Landscaping**

It is planned that any soil moved during the construction phase would be deposited and used within the site for land levelling and landscaping.

As the proposed development would be located within the existing poultry development's footprint, and would use the existing site entrance, no existing hedgerows would be removed or altered as part of the proposed development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would provide additional visual screening of the site, in addition to adding ecological value.

**Site Access**

Access to the proposed broiler farm would be via the existing poultry farm entrance, located at the north-eastern corner of the site.

**2.3 PRODUCTION PROCESSES AND MANAGEMENT**

**2.3.1 PRODUCTION PROCESS**

The objective of the proposed activities would be: the rearing of chickens specifically bred for efficient poultry meat production, from day-old chicks until they are removed off site to the processing facility. This must be carried out as efficiently and economically as possible.

In poultry production, this is achieved by the efficient use of inputs (especially feed) and the best housing and management to sell the maximum output of lean carcass meat to the processing factory. The achievement of this objective requires:

1. Having optimal food conversion ratio (feed to lean meat conversion);
2. Having fast growth rate to slaughter weight;
3. Operating according to current Environmental Legislation.

To maximise output, the following are essential elements of the enterprise:

1. Good genetic potential of the stock;
2. Minimal disease status;
3. Good quality buildings and environments (i.e. optimal temperature control);
4. High quality feeds;
5. Good management and stockmanship.

The processes on the proposed site would consist of:

1. The bedding of the broiler house floors with straw/wood shavings;
2. The delivery of day-old chicks to the broiler houses;
3. Feeding and rearing of birds for approximately six weeks at optimally controlled temperatures and with optimal amounts of feed and water;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

4. Delivery of feed to farm, approximately 5 times per production cycle on articulated trucks;
5. Medication of broilers via automated feed and drinking water systems;
6. Removal of chickens for slaughter at the end of each product batch on approximately 8 articulated trucks;
7. Removal of litter (mixture of bedding material, feathers and manure) to a covered trailer for immediate removal by licenced haulier (M.J. Kehoe) and transported to the Walsh Mushrooms composting facility in Co. Wexford;
8. Washing of houses between batches and collection of wash-water in underground tank;
9. Collection and spreading of wash-water on lands owned by the applicant, subject to set back distances outlined in the Nitrates Regulations (S.I No. 31 of 2014);
10. Disinfecting and drying of the broiler houses (1-2 weeks) in preparation for the next production batch.

The proposed poultry houses would comply with BAT housing systems for broiler chickens as identified in the BREF Document for Intensive Rearing of Poultry or Pigs (2017), i.e. broilers would be kept on "*litter spread over the entire floor area*", bedding would comprise of "*straw or wood shavings*", houses would be equipped with "*controlled ventilation systems that allow climate control for animals, litter drying*" and "*automatic, height-adjustable feeding and drinking systems*" would be provided.

The floor of each broiler house would be built as a solid concrete slab. The broiler chickens would be kept on litter, (straw or wood shavings), which would be spread over the entire house floor area. Wet litter would be avoided both for stock health reasons and to minimise ammonia emissions. The dry matter content of the litter would be maximised by a well-insulated building, optimal temperature/humidity control and the use of a non-spill drinking system.

After removal of a batch, litter would be collected from the house and transferred to a covered trailer for immediate removal by a licenced contractor (M.J. Kehoe.) for use at the Walsh Mushrooms composting facility in Co. Wexford.

Each broiler house would then be washed with water. Wash-water from washing down of houses would be collected on-site in an underground wash-water storage tank (with an approximate 30,280-litre capacity), and applied to the applicant's lands as 'soiled water' subject to set back distances outlined in the Nitrates Regulations (S.I. No. 31 of 2014). The broiler houses would then be disinfected and left to dry at which stage the cycle would re-start.

Upon completion of the construction phase, there would be approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch, as outlined in Table 2.3 below. Based upon 6.2 batches per year, this would result in approximately 146 truck and 366 car journeys per annum.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 2.3:** Estimated Traffic Journeys per 8-Week Batch

	<b>HGV Journeys</b>	<b>Car Journeys</b>
Chick Delivery to Site	1	
Wood Shavings	1	
Operator Visits		56
Waste / Carcass Collection	3	
Feed	5	
Fuel Delivery	2	
Finished Broiler Collection	8	
Litter Removal	3	
Wash-water Removal	0.5	
Veterinary / Dept. of Ag.		1
Inspections by Customers		2
<b>TOTAL JOURNEYS</b>	<b>23.5</b>	<b>59</b>
<b>WEEKLY AVERAGE</b>	<b>2.9</b>	<b>7.4</b>

The estimated traffic movements would be for the most part the same as the traffic movements associated with the existing poultry farm at the site when operating at full capacity. Therefore, there would be no significant increase in traffic volumes due to the proposed development.

It should be noted that many of the delivery services provided for above would occur in tandem with deliveries to other poultry units in the area and would not add to the existing traffic on local roads. Therefore, the above figures would be considered conservative (i.e. overestimated). The majority of HGV journeys would occur during the two-week change-over periods between batches.

The principal inputs would be chicks, feed, water, veterinary medicines and a modest amount of energy (electricity and natural gas) for the automated feed system, lighting and heating. Water for stock and for washing would be acquired from a mains water connection. The broiler houses would be insulated and temperature controlled to minimise use of heating fuel and electricity.

The outputs from the operation would be broiler chickens (primary product) and animal manure (by-product). The waste products would be domestic refuse, recyclable packaging waste and broiler carcasses (typical mortality 1.5%).

**Management of Poultry Litter and Soiled Water**

On 31 March 2011, S.I. No. 126 of 2011 (EC Waste Directive Regulations) was signed into Irish law by the Minister for the Environment, Community and Local Government Mr. Phil Hogan. This clearly states that the Waste Management Act shall not apply to certain products particularly if they are already covered by other legislation.

The use of poultry litter from this installation as an organic fertiliser is required to be in accordance with the terms prescribed in Fertilisers and Soil Improvers Order (S.I. 253 of

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

2008) and the Nitrates Regulations (S.I. 31 of 2014). Therefore, this is a lawful use of the litter and is not a waste recovery activity.

The system for the management of broiler litter from this development and for the lawful transfer of litter to external parties who seek a supply from the farm would consist of:

- Where a site is regulated by the EPA under an IED licence, register litter and soiled water as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011);
- M.J. Kehoe Hauliers (Department of Agriculture, Food and Marine ABP Transport Registration No. HAC2340) would be collecting the poultry litter from the proposed development at Bekan, Co. Mayo. Poultry Litter would be delivered to the mushroom compost facility, Walsh Mushrooms, in Co. Wexford.
- Record all transfers of by-product from the farm/holding as is required by Article 23(1)(g) in S.I. 31 of 2014 and maintain the records for relevant inspectors; and
- Submit details of annual supplies of poultry litter to the Department of Agriculture, Food and the Marine.
- It is prescribed in Article 16 of SI 31 of 2014 that nutrient management planning is the responsibility of each occupier of a holding. This would apply should the applicant decide to supply litter to farmers for landspreading or should he decide to spread litter on his own farmland.

Poultry litter is composed of a mixture of bedding material, feathers and manure. Manure quantity, composition and volume are influenced by the species, age, diet and health of the birds and by farm management practices.

It is estimated that the quantity of litter generated at the farm with a capacity of 100,000 birds would be approximately 90 tonnes per batch. With an estimated 6.2 batches per year, litter production would be approximately 558 tonnes per annum.

After the removal of each batch, poultry litter would be collected in a covered trailer and transported by M.J. Kehoe, a registered contractor with the Department of Agriculture, Food and Marine, ABP Transport Registration No. HAC2340, to the mushroom composting facility in Co. Wexford. It is proposed that the regular removal of all animal by-product materials from the site by licenced hauliers would effectively control potential emissions.

As stated, the enterprise on the site would produce broiler chickens, with litter as a by-product. The litter would be removed from the site via covered trailers by licenced haulier immediately after the cleaning of each house, and transported to the Walsh Mushrooms composting facility in Co. Wexford. The proposed development would therefore be exempted under Article 14 (1) c from poultry litter storage requirements outlined in Article 11 of the Nitrates Regulations, due to the agreed collection of litter by-product by a licenced haulier (M.J. Kehoe).

Upon completion of the construction phase, there would be approximately three articulated truck journeys for litter transport per batch of 100,000 birds. All dispatches of litter from the site would be in a covered trailer.

Wash-water from the cleaning process between batches would be removed from site for application to lands owned by the applicant. The applicant would observe the setback

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

distances specified in the Nitrate Directive Part 4, Section 17 when spreading soiled water as a matter of good environmental practice.

At a maximum application rate of 25M<sup>3</sup>/ha (limit for karst areas) and approximately 23M<sup>3</sup> expected to be produced per cycle at the proposed development, only 1.5 ha of spreadable land would be required for wash-waters of the 1.66ha land-bank available. This would equate to an application rate of 15M<sup>3</sup>/ha

### 2.3.2 MANAGEMENT OF WASTES

#### Management of Wastes Arising from the Current and Proposed Operation

Measures to prevent any significant effect of the proposed installation and the proposed activity on environmental parameters would be directed towards ensuring that the systems for collecting wastes and removing them from the site for appropriate treatment in authorised waste treatment installations would be adequate for that purpose.

Waste materials generated would be collected and transported from the site by appropriately authorised waste contractors for disposal, recovery or recycling in appropriately authorised installations.

Implementation of the control measures proposed would ensure, in so far as it is possible, that significant adverse effects on environmental parameters would not occur and that accidental emissions are unlikely.

The expected waste materials that would result from the operation of the proposed development, other than poultry litter and soiled water, are set out in the table below. All waste materials would be transferred by a licensed haulier where appropriate.

**Table 2.4:** Expected Waste Generation and Disposal

WASTE MATERIALS	QUANTITY PER YEAR	ULTIMATE DESTINATION
Dead animals	Approx. 1,500 birds per batch of 100,000 birds	College Proteins
Veterinary –bottles	Combined with recyclable material	Civic Bring Centre
Packaging	Approx. 150 kg	Civic Bring Centre
Rodent waste	<1kg	Ecolab

#### **Dead animals**

Dead animals and animal tissues would be accumulated in a strategically placed sealed waterproof steel container on site for collection at two week intervals, or as appropriate for transport to an authorised rendering facility by an authorised waste collector.

It is expected that stock mortality would be 1.5%, approximately 1,500 per batch of 100,000.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Packaging Waste**

Packaging (paper and cardboard) derived from the outer covers of various inputs such as veterinary medicine products, and minor feed ingredients, in addition to the veterinary bottles, would be the only “domestic-type” recyclable material to be removed from the site. This would be collected in a covered skip to await removal by a licensed waste contractor. It can be consigned for recovery to the local collector of recyclables (i.e. Mayo County Council).

**Rodent Waste**

Ecolab would manage rodent baiting and removal from the site. Rodent waste would not be expected to be in excess of 1 kilogram per year.

**Construction Wastes**

All topsoil excavated during site preparation works would be deposited and used within the site for land levelling and landscaping. It is not intended to remove any soil/earth from the site. The construction contractor would be required to remove any construction wastes other than soil from the site for disposal or recovery in authorised sites elsewhere.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **3.0 ALTERNATIVES**

#### **3.1 EXAMINATION OF POSSIBLE ALTERNATIVES**

Schedule 6, Article 94 of the Planning and Development Regulations 2001 requires that: Information to be contained in an Environmental Impact Statement shall include –

- (1d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

This section investigates the following alternatives to the proposed development:

- Alternative Site;
- Alternative Layout;
- Alternative Process;
- Alternative Management of Litter / Manure By-Product.

#### **3.2 ALTERNATIVE SITE**

A review of the applicant's proposed site location reveals that this is the most appropriate site for the construction of a broiler operation for the following reasons:

1. Construction of an intensive agriculture unit at an isolated location is current best practice for biosecurity. Risks due to locating closer to existing farm enterprises would come in the form of a heightened risk of transmission of bacterial infections such as Salmonella and Campylobacter, which can be extremely detrimental in intensive farming settings. Bord Bia Poultry Products Quality Assurance Scheme requirements state the following;  
*"The site must be isolated from other farm/poultry enterprises and protected by a physical barrier (i.e. a 2m perimeter fence) that precludes entry of other farm animals."*
2. The proposed site for the proposed broiler operation would be a minimum of 50m from the public road and approximately 110m from the nearest occupied residence. These setback distances would minimise the potential for nuisance emissions outside the site boundary (particularly noise and odour).
3. As the existing poultry farm at Brackloon West, Bekan, was established around 1979-1980, it can be considered as long established and part of the existing landscape of the area. Therefore, the replacement of this poultry farm with a newly constructed broiler operation was considered to have the potential to pose a lesser risk of generating a significant visual impact in comparison to a greenfield site.
4. The proposed site, which currently holds an existing poultry farm, would have access to existing utilities, removing the need and cost associated with connecting to the electricity grid and mains water.
5. The proposed site has good availability of services, with the towns of Knock, Ballyhaunis and Claremorris located 5.3km, 5.7km and 10.7km from the site respectively.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

6. The site is located in close proximity to the N60 National Road (approximately 2.8km from site), which would ensure the efficient transport of product, feed, wastes and other materials to and from the site and would minimise the potential impact of traffic on the area.

It is noted that Policy E04 of the Mayo County Development Plan 2014 – 2020 states, “*Preference will be given to occupying vacant structures which the planning authority consider appropriate for the use proposed.*” There are no suitable vacant structures available within the area. However, the proposed development would replace the existing broiler farm at the proposed development site.

The proposed site would allow for biosecurity quality management and animal welfare concerns to be met while maintaining supply to market.

### **3.3 ALTERNATIVE LAYOUT**

Best practice for intensive poultry sheds is to orient them parallel to the prevailing wind. This minimises heat loss and optimises energy inputs. The layout of the site was considered for the proposed development to minimise the operational cost of the development, to consider animal welfare and to minimise visual impact.

However, the footprint of the proposed site is subject to a number of physical constraints such as land-take and the utilisation of existing landscape screening.

The proposed layout and designs were selected after alternatives were thoroughly researched against a background of extensive experience in the design and operation of poultry units. The design of the new development takes into account European Communities (Welfare of Farmed Animals) Regulations (S.I. No. 311 of 2010) as amended. These regulations lay down standards for the protection of poultry kept in intensive or other systems of production.

### **3.4 ALTERNATIVE PROCESSES**

The objective of the proposed activity that would be carried out at this facility would be: the rearing of birds specifically bred for efficient poultry meat production, from day olds until they are removed off site to the processing facility. This must be carried out as efficiently and economically as possible to sell the maximum output of lean carcass meat to the processing factory. Therefore, no other alternative process was considered.

This is proposed to be achieved using the best housing, equipment, managerial and operational practices available.

### **3.5 ALTERNATIVE MANAGEMENT OF LITTER / MANURE BY-PRODUCT**

M.J. Kehoe Hauliers would be collecting the poultry litter from the proposed development at Bekan, Co. Mayo. M.J. Kehoe is a registered contractor with the Department of Agriculture, Food and Marine, ABP Transport Registration No.: HAC2340.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Poultry litter would be delivered to Walsh Mushrooms in Co. Wexford. Composting of poultry litter for use in mushroom facilities is common practice throughout the industry. It is seen by the mushroom industry as a cheap and fairly reliable source of nitrogen. Mushroom facilities prefer litter from broilers and turkeys (i.e. rather than battery hens or laying turkeys) as it is quite dry - moisture content lower than 50 % is normal - and easy to scatter. This is very important for good distribution through the compost.

### 3.6 “DO NOTHING” ALTERNATIVE

The “do-nothing” alternative consists of retaining the existing broiler farm, operating at reduced capacity, on the site at Bekan, Co. Mayo without the proposed construction of the four new broiler houses.

The “do-nothing” alternative would deny the locality the opportunity to gain from the improved economic benefits associated with the operation of the facility – namely the employment of construction workers for approximately 3-4months, continued employment for 1-2 broiler house operators and additional work for local agricultural contractors for the removal of litter and wash-water and servicing of equipment. The additional provision of employment would likely contribute to the economy of the area through direct spending of goods and services in the Bekan area and surrounds.

Should the proposed development proceed, it would support the following County Development Plan Policies outlined in the Mayo County Development Plan, 2014:

*E-04: It is an objective of the Council to facilitate agri-industry and other rural enterprise activities that are dependent on their locality in rural locations, where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity. Preference will be given to occupying vacant structures which the planning authority consider appropriate for the use proposed.*

*AG-01: It is an objective of the Council to support the sustainable development of agriculture, with emphasis on local food supply and agriculture diversification (e.g. agri-business and tourism enterprises) where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity.*

The “do-nothing” alternative would deny local farmers and composting facilities of a potential valuable source of fertiliser. The former legal definition of organic fertilisers as a ‘waste’ requiring disposal has changed and has been redefined as a by-product, indicating that this product is recognised as an economically valuable resource produced by the intensive agriculture industry.

Due to increasing costs for chemical fertilisers, poultry organic fertiliser by-products are becoming an essential part of the agricultural industry in Ireland. Higher transportation costs in the future will make the availability of local organic fertiliser by-product producers an

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

asset to local agri-business. This is particularly true of poultry litter, which is easily handled and high in nitrates.

An assessment on any potential impacts upon the integrity of the Natura 2000 network, residential amenity and visual amenity has been carried out. As discussed in further detail in the following sections of this document and its attachments, the level of risk under these headings and to the environment in general would not increase significantly as a result of the proposed development. This is due to the proposed building design, operational and managerial standards, along with mitigation measures to be employed.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**PART II - ENVIRONMENTAL IMPACTS**

This section of the EIAR describes the likely significant environmental impacts arising from the proposed construction of four new broiler houses with a total capacity of 100,000 places for broilers, feed silos and all ancillary site works and services at Bekan, Co. Mayo. Where possible, design measures have been included to reduce or eliminate possible impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**SECTION A - HUMAN ENVIRONMENT**

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed scheme on human beings.

These effects have been grouped into:

**Air Quality Impacts**

The impact of emissions to air generated by the proposed development.

**Odour Impacts**

The impact of odours generated by the proposed development on nuisance odour in the general vicinity has been assessed.

**Noise and Vibration Impacts**

The impact of noise and vibration generated by the proposed development on noise and vibration levels in the general vicinity has been assessed.

**Landscape and Visual Impacts**

The impact of the proposed development on the visual amenity of the landscape has been assessed.

While human beings interact in some way with every aspect of the environment, the above interactions are considered the most significant in this case. The impacts of the proposed development on human beings in relation to effects on the natural environment are further considered in **Section B**, while the impacts of effects on material assets and archaeology, architecture, and cultural heritage are considered in **Section C and D** respectively.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **4.0 POPULATION AND HUMAN HEALTH**

### **4.1 INTRODUCTION**

Any development that alters the existing environment has the potential to impact upon human beings at a local and / or regional scale, through impacts upon socio-economic factors including demographics, land use, economic development and employment.

This section of the EIAR provides an overview of the receiving social-economic environment of the area and briefly outlines the main potential impacts of the proposed development, at both the construction and operational phases, on human beings. The following sections of this EIAR provide detailed assessments of potential impacts to human beings and detail proposed mitigation measures to address the identified impacts.

### **4.2 METHODOLOGY**

A study was undertaken to assess the potential impact of the proposed development on the receiving socio-economic environment. This study comprised a review of available information with regards population and dynamics, economic activity, employment, land use and residential amenity. Information was obtained from the Central Statistics Office (CSO) and the Mayo County Development Plan 2014-2020.

### **4.3 RECEIVING ENVIRONMENT**

#### **4.3.1 POPULATION AND DYNAMICS**

According to the 2016 Census, County Mayo had a population of 130,507, comprising 65,047 males and 65,460 females, growing from 130,638 in 2011. This represents a slight population decrease of approximately 0.1% since the previous Census in 2011.

The proposed development is located within the Bekan Electoral District (ED), which had a population of 752 during the 2016 Census. This was a decrease (4%) upon the 2011 Census results.

Table 4.1 shows the changes in population by age group in County Mayo between the 2011 Census and 2016 Census. Considerable increases are noted for the older age groups, with an increase of 14.8% for the 60-84 age group. Population decreases were only noted in the younger age groups, with decreases of 1.6% in the 0-19 age group and 12.1% in the 20-39 age group.

**Table 4.1:** Population Change between 2011 Census and 2016 Census per Age Group

<b>Age Group (Years)</b>	<b>2011 Census</b>	<b>2016 Census</b>	<b>% Change</b>
0 – 19	35,483	34,899	-1.6
20 – 39	32,913	28,930	-12.1
40 – 59	34,963	35,633	+1.9
60 – 84	24,795	28,458	+14.8
85+	2,484	2,587	+4.1

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **4.3.2 ECONOMIC ACTIVITY**

The Department of Agriculture, Food and the Marine (DAFM) reports that the agri-food sector is Ireland's largest indigenous industry, contributing €26 billion to the national economy in 2015, employing 8.4% of the working population and accounting for 10.7% of Ireland's exports. The DAFM's report, "Food Wise 2025", identifies further growth opportunities for the sector, with the aim to position Ireland as a world leader in sustainable agri-food production.

A number of small-scale commercial enterprises are located within the vicinity of the proposed development, including a construction enterprise, public house and an enterprise classed as "specialised design activities" located within 1km of the site.

Several facilities licenced by the EPA are located within 15km of the development site, including three with an "Intensive Agriculture" class of activity. One of these intensive agriculture facilities is operated by the applicant. Further details are provided in Sections 13 and 14 of this EIAR.

### **4.3.3 EMPLOYMENT**

The total labour force for 2016 in County Mayo was 60,036 individuals, which represents 46% of the total population. In the 2016 Census, the labour force participation rate was calculated by expressing the labour force, aged 15 years and over who are at work, looking for their first regular job or unemployed, as a percentage of the total population aged 15 years and over. The labour force participation rate for 2016 was 57.7%, with an unemployment rate of 14.3%.

Table 4.2 below provides a summary of the working population for County Mayo. The agriculture sector accounted for 7% employment of the labour force in 2016.

**Table 4.2:** Summary of Working Population in Co. Mayo, 2016

<b>Area</b>	<b>Number of People</b>	<b>% of Labour Force</b>
Total at work	51,439	85.7
Unemployed looking for first regular job	768	1.3
Unemployed, having lost or given up previous job	7,823	13

### **4.3.4 LAND USE AND SETTLEMENT PATTERNS**

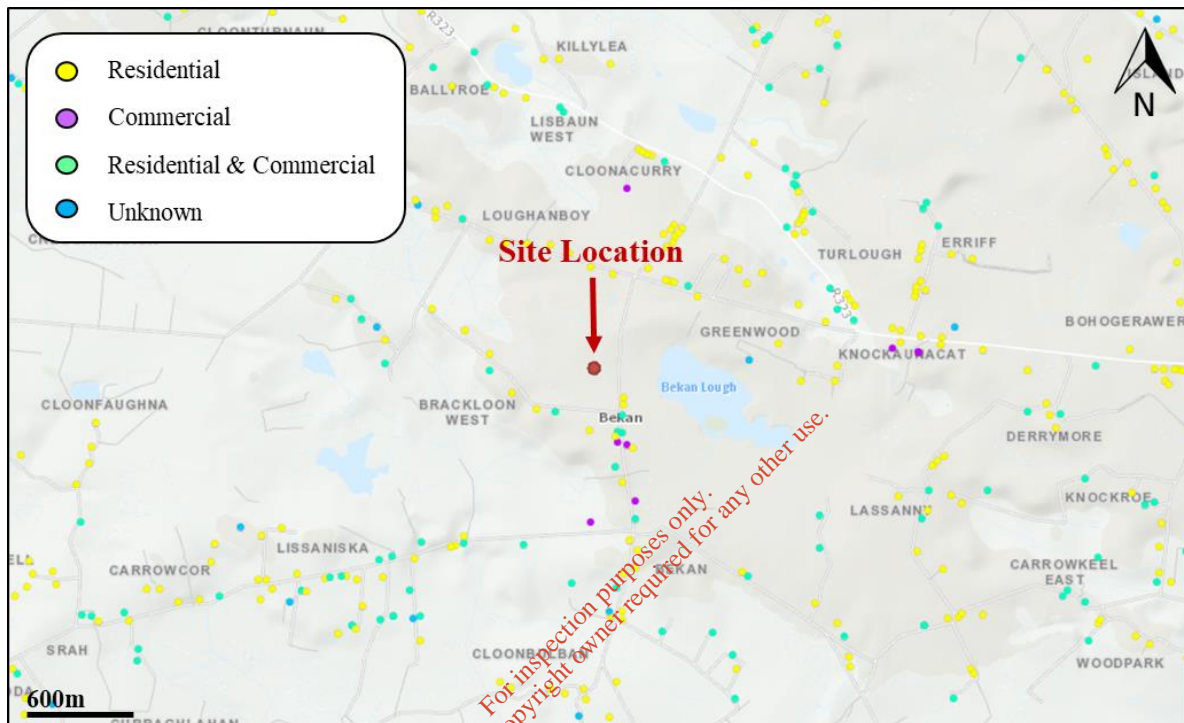
The proposed development would be located within the townland of Brackloon West, at Bekan, Co. Mayo. The nearest settlement to the proposed development site is the village of Bekan, located approximately 150m south of the site. The towns of Knock, Ballyhaunis and Claremorris are located approximately 5.3km north-west, 5.7km east and 10.7km south-east from the proposed site respectively.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads, as well as some commercial developments, are also located within the area.

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO

Figure 4.1 below shows the address points of properties within the vicinity of the proposed development. Points in yellow represent residential properties, points in purple represent commercial only properties, points in green represent properties accommodating both residential and commercial uses while points in blue are unknown. As can be seen in the figure below, the majority of development within the vicinity of the proposed development are residential properties and properties accommodating both residential and commercial uses.



**Figure 4.1:** Address Points by Buildings for Properties within the vicinity of the Proposed Development (Source: myplan.ie)

### 4.3.5 COMMUNITY AND SOCIAL INFRASTRUCTURE

Community infrastructure within the vicinity of the proposed development would be primarily located within the village of Bekan and the towns of Knock, Ballyhaunis and Claremorris.

The nearest settlement (approximately 150m) to the proposed development is Bekan village. Community infrastructure includes a church, cemetery, community centre, national school and public house. Other facilities within the vicinity of the proposed development include a Montessori located 600m north-east of the proposed development and Connacht GAA Centre Services located approximately 1km north of the proposed site.

Community infrastructure within Knock, Ballyhaunis and Claremorris towns would include a number of schools, churches of different religions, medical centres, a library, restaurants, supermarkets, shops, banks, visitor accommodation and businesses.

The Dublin to Westport/Ballina train line (operated by Iarnróid Éireann) services both Ballyhaunis and Claremorris towns.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

#### **4.4 IMPACTS**

A brief overview of the potential impacts upon human beings and human health is provided below. More detailed assessments are discussed in the following sections of this EIAR.

##### **4.4.1 ECONOMY AND EMPLOYMENT**

The proposed development would have a positive impact upon the local economy by providing temporary employment for the duration of the construction phase and permanent, full-time employment for 1-2 operators. The development would also provide employment for contract workers including hauliers delivering feed and removing products and wastes, in addition to pest control contractors.

The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the Bekan area and surrounds.

##### **4.4.2 AIR, DUST AND ODOUR**

While it is not considered that the proposed development would adversely impact upon air quality, there would be a potential nuisance impact upon human beings with regards the generation of dust during the construction phase and odour during the operational phase. An assessment of the potential air quality impacts and odour impacts arising from the proposed development are discussed in detail in Sections 5 and 6 of this EIAR.

The potential for dust generation during construction works may impact upon the community and residents on the local roads to the proposed site. However, the potential impact of dust would be temporary, given the transient nature of construction works. Dust control measures would be implemented throughout the construction phase to reduce the potential impact. Mitigation measures for dust control are outlined in Section 5.7.

During the operational phase of the proposed development, there would be potential for odour generation from the proposed broiler farm. The potential for odour impacting upon human beings would be considered low, given that odour control and operational measures would be implemented at the site, as discussed in detail in Section 6.6 and the Environmental Odour Assessment Report (Attachment B.1), and an Odour Management Plan implemented for the site as per Attachment B.2.

##### **4.4.3 NOISE**

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings within the vicinity of the site. An assessment of potential impacts upon human beings due to noise associated with the proposed development is discussed in Section 7. A Noise Impact Assessment has also been undertaken and is included in Attachment C.

During the construction phase, it would be anticipated that there would be an impact, for a limited period of time, on local residences within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in Section 7.10. Given the transient nature of construction works and provided the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

recommended control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

No significant additional noise impact would be anticipated during the operational phase of the proposed development. It is anticipated that there would be a slight to moderate impact on the closest noise sensitive locations due to noise from agricultural/delivery vehicles. Following the implementation that all collections and deliveries from the site be conducted during normal working hours, it is predicted that there would be no significant noise impact upon noise sensitive locations. During the normal operation of the ventilation system, noise is predicted to be inaudible at the nearest noise sensitive locations. During warm days, it is predicted that there would be a minor additional noise impact due to infrequent maximum ventilation noise while ambient temperatures in excess of 21°C persist.

In order to facilitate and promote good practice at the site, it is recommended that the applicant implement a noise management plan.

Further details on the potential for noise and mitigation measures during the operational phase are provided in Section 7.9.

#### **4.4.4 TRAFFIC**

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact upon the generation of noise and dust emissions. While there would be increased vehicle movements during the construction phase of the development, this would be for a limited period of time only owing to the transient nature of construction activities.

During the operational phase, there would be no significant increase in traffic volumes, with an estimated weekly average of 2.9 truck movements and 7.4 car movements. As discussed in Section 2.3.1, these figures are likely to be overestimates. Furthermore, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity.

The traffic assessment undertaken by RoadPlan Consulting (Attachment G) concluded that the L1501 road, along which the proposed development site is located, would operate within capacity when the proposed development is fully operational for the future assessment years 2019, 2024 and 2034. The report noted that there would be no queues and minimal delays to the existing L1501 / development access priority junction as a result of the proposed development for the future assessment years 2019, 2024 and 2034.

#### **4.4.5 LAND-USE**

The proposed development would not be anticipated to have any significant impact upon the land use of the area. The proposed poultry farm would replace an existing poultry farm (operated by the applicant) at the site. Therefore, there would be no land use change at the proposed development site.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

#### **4.4.6 VISUAL AMENITY**

There would be a slight to no significant impact upon the visual landscape due to the proposed development, the visibility of the development would be limited to the uppermost sections of the feed silos and small sections of the poultry house roof apex, this would be limited in extent and would be in conformance with the character of the existing agricultural environment. The structures would be of a similar visual character to existing poultry farm at the site.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.

#### **4.4.7 WATER**

A deterioration in water quality has the potential to impact upon human beings by adversely affecting drinking water quality. Detailed assessments of potential impacts to water quality are included in Sections 10 and 11 of this EIAR.

The proposed development would have the potential to impact upon water quality during both the construction and operational phases.

During construction, there would be a potential impact upon groundwater quality due to potential spillages of hydrocarbons. Groundwater would be protected by the implementation of mitigation measures as outlined in Sections 10.7 and 11.5, such as the appropriate handling and storage of potentially polluting substances and the regular inspection and maintenance of construction plant.

The operational phase of the development has the potential to impact upon groundwater quality through discharges to ground from the soak pits and the spreading of wash-waters. There would be no process effluent emissions from the site. The proposed storm-water system would be designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground.

Wash-waters would be in compliance with the definition of 'soiled water' under the Nitrates Directive Part 1, Interpretation 4. (2), (b) whereby soiled water does not include any liquid where such liquid has either: (i) a biochemical oxygen demand exceeding 2,500 mg per litre, or (ii) a dry matter content exceeding 1% (10 g/L). The applicant would adhere to the setback distances specified in the Nitrates Regulations (S.I. No. 31 of 2014) as a matter of good environmental practice.

#### **4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS**

As noted in Directive 2014/52/EU, precautionary actions need to be put in place for certain projects which, “*due to their vulnerability to major accidents and/or natural disasters (such as flooding, sea level rise or earthquakes) are likely to have significant adverse effects on the environment*”.

The site does not propose to store significant volumes of any chemicals or materials which could pose a significant spill risk to the aquatic environment. The fuel for heating the houses would be natural gas. Natural gas would be stored within tanks, located at the northern section of the proposed development site. These tanks would be located at points which minimise the risk of collision, and would be surrounded by protective barriers to further reduce the risk of collision.

With regards potentially polluting substances, the only potential contaminant to be stored at the proposed development in significant volume would be wash-water. This would be stored in a designated leak-proof tank, which would be regularly visually inspected for integrity and cleaned as necessary and subject to hydrostatic integrity tests every three years.

During the construction phase of the proposed development, the risk of spills to the environment would be minimised through the implementation of measures, such as the appropriate storage of potentially polluting substances (e.g. oils, fuels), the regular maintenance and inspection of construction plant, the implementation of good housekeeping practices and the provision of spill kits. Further details are provided in Sections 10.7 and 11.6.

It is considered that the most likely natural disaster to which the proposed development may be vulnerable to and could have significant adverse effects on the environment, is fluvial flooding. However, the proposed development site is not located in an area of fluvial, pluvial or groundwater flood zones, as discussed in Section 11.3.2. Further details are provided in Sections 11.3 and 11.4 of this EIAR.

#### **4.6 MITIGATION MEASURES**

The following sections of this EIAR provide further information on the potential impacts to human beings as a result of the proposed development. Mitigation measures have been proposed to address the potential impacts and are detailed under the following sections:

- Air Quality;
- Odour;
- Noise;
- Biodiversity – Aquatic Environment;
- Soils, Geology and Hydrology;
- Climate;
- Material Assets;
- Architectural, Archaeological and Cultural Heritage.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**4.7 REFERENCES**

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Department of Agriculture, Food and the Marine. Available at: <https://www.agriculture.gov.ie/agri-foodindustry/>

Environmental Protection Agency Licence public access information, Available at: <http://www.epa.ie/licensing/iedipcse/>

Myplan.ie Viewer. Available at: <http://www.myplan.ie/viewer/>

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **5.0 AIR QUALITY**

### **5.1 INTRODUCTION**

This air quality study identifies, describes and assesses the impact of the proposed poultry farm with a total capacity of 100,000 places for broiler chickens, feed silos and all ancillary site works and services at Bekan, Co. Mayo.

Particular attention has been given to sensitive receptors, such as residential areas and to the extent of the exposure of these receptors to airborne pollutants derived as a result of the development. This assessment was prepared in accordance with the EPA documents "*Guidelines on the information to be contained in an Environmental Impact Statement, 2002*" and draft "*Guidelines on the information to be contained in an Environmental Impact Assessment Reports, 2017*".

Impacts due to odour are addressed in Section 6 below and a predictive odour impact assessment for the proposed site has been conducted; the report is attached to this EIAR (Attachment B.1).

#### **5.1.1 AIR EMISSIONS**

Air quality is variable and subject to significant spatial and temporal variation. In relation to spatial variation in air quality, concentrations generally fall significantly with distance from major sources. Thus, residential exposure is determined by the location of sensitive receptors relative to major sources in the area. Temporally, air quality can vary significantly due to changes in traffic volumes, meteorological conditions and wind direction.

The main potential sources of air pollutants from the proposed development would be the digestive processes, poultry litter and the burning of fuel for heating.

Emissions from digestive processes and manure of poultry include primarily ammonia, nitrogen oxides and methane.

Due to the high standard of design of the proposed poultry houses and requirement for maximum production efficiency, the burning of fuel for heating would be optimally balanced between ensuring optimal growth temperatures for broiler-rearing and minimisation of fuel input. Therefore, this would ensure associated air emissions are minimised.

#### **5.1.2 DUST**

Any significant dust generation, dispersion and deposition operational activities are considered an environmental nuisance for sensitive receptors within the vicinity of a development.

Poultry dust is comprised of feather fragments, faecal material, skin debris or dander, feed particles, mould spores, bacteria, fungus fragments and litter fragments.

Dust levels in the poultry houses vary with age of flock, the number of birds and the season of the year. Dust and gas concentrations increase with flock size and with flock age. Inside dust levels are higher in the winter because ventilation is decreased to conserve heat.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Dust levels rise in the poultry houses during clean-out and when birds are moved. Litter tilling can result in high levels of dust and odour in the houses.

## **5.2 LEGISLATIVE CONTEXT**

The main legislation and guidelines pertaining to air quality in Ireland is outlined below.

### **Air Pollution Act, 1987**

Under this act, local authorities and / or the Environmental Protection Agency (EPA) are given responsibilities relating to air quality monitoring, to the prevention of air pollution and the issuing of air pollution licences. Owners of certain industrial facilities must obtain an air pollution licence from their local authority or an Industrial Emissions / Integrated Pollution Prevention and Control licence from the EPA.

### **Air Quality Standards Regulations, 2011 (S.I. No. 180 of 2011)**

These regulations transpose the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) into Irish legislation. The regulations specify the limit or target values for specific air pollutants including sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), lead, benzene, carbon monoxide and ozone. The EPA is the competent authority for the purpose of the CAFE Directive.

### **TA Luft Air Quality Standard**

There are no statutory limit values for dust deposition in Ireland, above which nuisance is considered to exist. Generally, the German regulation “*Technical Instructions on Air Quality Control*”, commonly known as the “TA Luft Air Quality Standard”, is referred to in measuring and assessing the level of dust deposition and potential for dust nuisance.

## **5.3 METHODOLOGY**

This section has been prepared following a desktop review, which involved reviewing baseline air quality monitoring data for the area, the identification of existing air emissions sources and any sensitive receptors, and the assessment of potential impacts to air quality resulting from the proposed development.

## **5.4 DESCRIPTION OF BASELINE AIR QUALITY**

### **5.4.1 SITE LOCATION AND ACCESS**

The proposed development site is located in the townland of Brackloon West, at Bekan, Co. Mayo. The site is located 5.3km south-east of Knock town centre, 5.7km west of Ballyhaunis town centre and 10.7km north-east of Claremorris. The site is accessed by a local road which links to the R323 some 1.8km to the north-east of the site. The R323 road connects to the N60 and N86 roads some 4.4km to the east at Ballyhaunis town.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**5.4.2 EXISTING SOURCES OF AIR EMISSIONS**

The townland of Brackloon West (in Bekan) is a rural area. According to the EPA Air Quality Index for public health, Bekan is located in the Rural West Air Quality Index for Health (AQIH) Region, which is classed as 1 - Good. This is the highest category for air quality. The index is based on information from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution.

The dominant existing sources of air pollution in the area would be local road traffic, private residences and emissions from agricultural activities, such as housing of animals and spreading of organic fertilisers. However, the combined effect on air quality would be expected to be low. Dust would also be generated on local roads and from agricultural activities, particularly during dry periods.

Air quality is judged relative to the Air Quality Standards, which are concentrations of pollutants in the atmosphere, which achieve a certain standard of environmental quality. Air Quality Standards are formulated on the basis of an assessment of the effects of the pollutant on public health and ecosystems.

The EPA has been monitoring national air quality from a number of sites around the country. This information is available from the EPA's website. According to the EPA's classification of zones for air quality, the proposed development would be located in Zone D – Rural.

There are no air monitoring stations currently operating within the vicinity of the proposed development. The nearest monitoring station located within the same zone, Zone D, is located at Castlebar, approximately 31km from the proposed development site. While this station is located a considerable distance from the proposed development site, it may be used to provide an indicative baseline assessment of air quality for the area of the proposed development.

Table 5.1 below summarises the annual mean results for monitoring during 2013, 2014 and 2015 for the nearest monitoring station (Castlebar) to the proposed development. All results returned were below the relevant annual mean limit values.

**Table 5.1:** Annual Mean for Air Monitoring undertaken at Castlebar Monitoring Station for the 2013-2015 period.

Parameter ( $\mu\text{g}/\text{m}^3$ )	Annual Mean Limit Value	Castlebar Station		
		2013	2014	2015
NO <sub>2</sub>	40	11	8	8
NO <sub>x</sub>	30	16	12	11
SO <sub>2</sub>	20	-	-	-
PM <sub>10</sub>	40	15	12	13

While station specific monitoring information is not available in the EPA's report, "Air Quality in Ireland, 2016", the report concludes that all results returned for NO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>10</sub> at monitoring stations within Zone D were below the relevant annual mean limit values.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## 5.5 IMPACTS

The potential impacts to air quality relating to the operation of the proposed development would be associated with the burning of natural gas for the heating system, vehicles, the broilers and poultry litter.

### 5.5.1 AIR QUALITY

Emissions to the atmosphere from the proposed development would consist of warm air from the ventilation system in the buildings and odour and gas volatilisation from the organic manure. Emissions of odour, dust (PM), ammonia, methane and nitrogen oxides would occur from the digestive processes and litter of the pullets. Impacts from odours are addressed in Section 6 and an Odour Management Plan for the proposed site is included in Attachment B.2.

The annual production of air quality pollutants at this farm would be minor in a regional context.

Increased emissions may at times be associated with loading of poultry and/or the loading of poultry litter. The potential impact to air quality during the loading of poultry litter is deemed to be a minor issue as this occurs once per batch, after the removal of broilers at the end of a 6 week cycle (6 week production cycle plus 1 – 2 weeks preparation).

Table 5.2 details the estimated emissions associated with the proposed broiler farm with a maximum of 100,000 birds at any one time (batch of 100,000 birds with 6.2 production cycles annually) and an average of 42 days per production cycle. The figures for ammonia, methane and nitrous oxide were obtained using the EPA's AER PRTR Intensive Agriculture Emissions Calculation Tool.

**Table 5.2:** Estimated Annual Emissions of Ammonia, Methane and Nitrous Oxide

<b>Emission Parameter</b>	<b>Proposed (Total) KG/Year</b>
Ammonia (NH <sub>3</sub> )	6,956
Methane (CH <sub>4</sub> )	7,826
Nitrous oxide (N <sub>2</sub> O)	754

The fuel source for the heating system would be natural gas. Using the figures specified in Teagasc's 2011 report and the SEAI's net calorific value coefficient for natural gas fuel, the estimated fuel input requirements for the proposed development have been calculated.

Of this overall energy requirement, the required heating energy input would be 59,640 kWh per batch. This equates to 6,440 M<sup>3</sup> (6,440,000L) of natural gas per batch. An estimated mass emission balance is shown in Table 2.2.

The level of annual production of air quality pollutants at this farm would be typical of the industry and would be anticipated to have no significant to slight air quality impacts in the regional context. Air quality in the vicinity of the development would be expected to continue to be good and would remain dominated by external traffic and agricultural sources within the region.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The cumulative impact on air quality of the proposed development with other intensive agriculture operations in the area is not deemed to be significant in the context of the existing agricultural operations in the area and the current "good" status of air quality.

As the fuel source would be natural gas and the volume used would be minimised in order to achieve maximum process efficiency, combustion products associated with other fossil fuels such as carbon monoxide, NO<sub>x</sub>, SO<sub>x</sub> and particulate matter would not be emitted in significant quantities.

### **5.5.2 DUST**

Dust levels generated by the development during the operational phase would be expected to be negligible.

As outlined in EMEP/CORINAIR Emission Inventory Guidebook (2016), there are several sources of the enrichment of airborne particulate matter within livestock buildings. The feed itself and the feeding process may contribute to 80 to 90% of the total dust generation. Bedding materials like straw or wood shavings can also have extraordinary effects on the particle concentration in the livestock air. Depending on the type and the amount of litter and its spreading, its contribution can be between 55 and 68% of the total airborne particulates observed. The animal skin, fleece or plumage of housed animals and their faeces and urine cause dust emissions which may contribute up to 12% of the total dust amounts released within livestock buildings. To a lesser extent, particles may originate from friction against floors, walls and other structural elements and from the air intake into the house. Animal activity may also lead to re-suspension into the livestock house atmosphere of dust already settled (re-entrainment).

The level of dust arising within the houses would be controlled primarily through feed and litter selection as a matter of animal husbandry to promote an optimal growing environment.

## **5.6 MITIGATION MEASURES**

### **5.6.1 LITTER STORAGE AND TRANSPORT**

There are a number of measures that would be taken to mitigate potential emissions associated with intensive broiler production. The use of adequate quantities of bedding material serves to minimise odour emissions. Stocking densities would be appropriate for the size of the houses and nature of the operation. This would also ensure the standard of stock health is maintained to a high level, which would minimise carcasses.

In addition, good housekeeping practices would be employed throughout the site and would be required to be followed by contractors.

No litter would be stored on site long-term, aside from within the houses during each production cycle.

Upon completion of each production cycle and removal of broilers, litter from the poultry house floors would be collected in a covered trailer and transported to the Walsh Mushrooms

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

composting facility in County Wexford. Litter transport would not constitute a major potential source of emissions, as it would take place once per 8-week cycle.

In addition, it would take no more than 3 hours to completely empty the litter from each house, therefore, this process, which would give rise to the most atmospheric emissions, would be short-lived.

### **5.6.2 DUSTING**

During the operational phase of the proposed development, all efforts would be made to ensure no dusting occurs.

To minimize the potential for dust complaints, ventilation ducts, screens and hoods would be cleaned as part of the cleaning procedure at the end of each batch, preventing a build-up of dust.

Automated ventilation ensures increased dust dispersion, which minimises nuisance deposition. Implementing state of the art ventilation is one of the best methods of avoiding excessive dust accumulation and emissions and ensuring efficient movement of air.

Dust can be reduced in poultry houses by ensuring that pelleted feed is high quality. "Fines" in feed can contribute to higher dust levels.

## **5.7 CONSTRUCTION IMPACTS AND MITIGATION**

The primary potential nuisance associated with construction activities is dust. Excavations and earth moving operations may generate quantities of construction dust, particularly in drier weather conditions. The extent of any construction dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for construction dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

### **5.7.1 IMPACTS**

Emission of air pollutants would typically arise from the operation of plant onsite and emissions from delivery vehicles. It is anticipated that air emissions from these sources would have a negligible impact upon air quality in the area in the context of emissions from traffic on nearby roads.

It would be expected that traffic exiting the proposed construction site would result in increased levels of dust in the area of the exit onto the public road.

It is proposed to use locally sourced rock and concrete for the supply of rock fill and processed aggregate (if required) where possible.

Earthworks during construction are a potential source of dust pollution. Minimal levels of dust would be expected to be generated during the construction phase given the confined area of earthworks and the short term of the construction phase.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravels/concrete/etc. to and from the site having the potential to cause an environmental nuisance to use of the local road.

Construction dust control is a common part of construction management practices. The effect of construction activities on air quality, in particular construction dust, would not be significant following the implementation of the proposed mitigation measures outlined below.

Periodic rainfall, which is common in Ireland, would also mitigate the dispersal of dust generated by from the site.

### **5.7.2 MITIGATION**

It is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated would be minimal during the construction phase and are unlikely to cause any significant environmental nuisance.

Top soil would be used in the levelling off and landscaping of the site. Any exposed soil within the site would be re-seeded within two weeks, or as soon as practically possible, upon completion of the construction phase. This would promote rapid stabilisation of soils.

Hard surface roads would be swept to remove mud and aggregate materials from their surface. Any un-surfaced roads would be restricted to essential site traffic only. Public roads outside the site would be regularly inspected for cleanliness, and cleaned as necessary.

Material handling systems and site stockpiling of materials would be designed and laid out to minimise exposure to wind.

Should construction activities occur during particularly dry weather, a water misting system would be installed to reduce the level of dust traveling offsite.

All construction plant would be regularly maintained so that they do not discharge excessive quantities of emissions / visible smoke, which could result in a local nuisance. Construction vehicle speeds within the site would be controlled.

### **5.8 REFERENCES**

*Air Pollution Act, 1987, 6 of 1987.*

*Air Quality Standards Regulations, S.I. No. 180 of 2011, Dublin: Stationery Office.*

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **6.0 ODOUR**

### **6.1 INTRODUCTION**

This section presents the results of a predictive odour assessment, which was conducted at the site of the proposed development at Bekan, Co. Mayo.

Particular attention has been given to sensitive receptors, such as residential areas and to the extent of the exposure of these receptors to airborne odours derived as a result of the development. This assessment was prepared in accordance with the EPA documents '*Guidelines on the information to be contained in an Environmental Impact Statement, 2002*' and draft '*Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017*'.

#### **6.1.1 ODOURS IN INTENSIVE AGRICULTURE (POULTRY)**

Odours are indigenous to all livestock production operations. In modern production facilities, odours are generated primarily from the confinement buildings, from manure storage structures, from manure/litter applied to cropland, and from disposal of dead animals.

The main potential source of odour emissions from poultry operations is from the storage and land spreading of poultry litter. Bacterial growth during storage results in the release of volatile compounds, which are emitted to the atmosphere from the litter surface, particularly during litter tilling for removal.

While EPA BATNEEC Guidance recommends a set-back distance of 400m from third party residences, this set back distance cannot always be achieved in the real world, particularly given the proliferation of one-off housing developments in rural Ireland in recent years. Therefore, it is considered that site-specific assessments carried out to determine the likely impact of the proposed development in the context of the proposed site location would take precedence.

### **6.2 EXISTING ODOUR CLIMATE**

There are no significant dominant odour sources in the region as the local area is rural.

Within a 1.5km proximity of the site there are three operational poultry farms: Greenwood Farm located 650m north-east; Hunts Farm located 845m south; and Ballyhaunis Farm located 1.5km north-east. These three existing farms were included in the odour dispersion model.

Significant odours would generally be present during the slurry-spreading season associated with the agricultural industry in the area.

### **6.3 PREDICTIVE ODOUR MODEL**

As part of this EIAR, odour dispersion modelling was carried out by Panther Environmental Solutions, which consisted of performing a predictive impact assessment of the proposed

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

development utilising library emission data and dispersion-modelling software AERMOD Prime.

Attachment B.1 presents the materials and methods of the dispersion modelling assessment.

The main objective of the odour impact assessment is to ascertain the levels of ground level concentrations (GLCs) in the vicinity of the cumulative impacts of the proposed poultry farms.

The resultant cumulative ground level concentrations of the proposed poultry farms at sensitive receptor locations within approximately 1km of the facility were also determined as part of the modelling assessment.

The methodology adapted involved a number of distinct steps. These included:

- Calculation of odour emission rates for such air components from library based data;
- Prediction of ground level concentrations (GLCs) of compounds dispersed from the emission point source from the cumulative existing and proposed farm operations.

One distinct scenario was assessed within the dispersion model. The output data was analysed to calculate the following:

1. Predicted odour emission contribution of overall cumulative impact of the proposed and existing poultry farms operation, to odour plume dispersal at the 98<sup>th</sup> percentile for an odour concentration of less than or equal to 3.0 OuE/m<sup>3</sup> for meteorological years 2013-2017.

The predicted air quality impact from the operation of a poultry farm was modelled in line with the following guidance documents:

- Irish EPA 2002 and Environment Agency 2002 Guideline limit of less than 6.0 and 3.0 OuE/m<sup>3</sup> at the 98th percentile of hourly averages for medium risk odours - Existing.
- EPR H1 (2008) – Environmental Risk Assessment Part 1 – Simple assessment of environmental risk for accidents, odour, noise and fugitive emissions.
- EPR H1 (2008) - Environmental Risk Assessment Part 2 – Assessment of point source release and cost benefit analysis.
- Irish EPA Guidance document – Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).

## **6.4 IMPACTS**

Emissions to the atmosphere from the proposed development would consist of warm air from the ventilation system in the buildings and odour from the organic manure. Emissions of odour would occur from the digestive processes and litter of the broilers.

Increased odour emissions may at times be associated with loading of poultry and/or the loading of poultry litter. The potential odour impact of poultry litter is deemed to be a minor issue as it happens once after the removal of a production batch, which occurs after each 6

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

week cycle. This would take no more than 3 hours to completely empty the litter from each house, therefore, this process that would give rise to the most atmospheric emissions, would be short-lived.

Odour emission rate values were gathered from the publication 'Van Geel, P.L.B.A. (2006) *Annex 1 - Odour nuisance and farming act, Netherlands*'. A value of 0.35 Ou<sub>E</sub>/s/bird was used for the proposed units. These values are likely to overestimate the odour emission factors for the existing and proposed site as emission factors are greatly influenced via housing management and feed types.

Table 6.1 presents the predicted overall odour emission rates for the various existing and proposed broiler houses at Bekan, Co. Mayo.

**Table 6.1:** Predicted Mass Emission Value Results for Odour

House	Stock Numbers	Odour Emission Rate Ou <sub>E</sub> /bird/s	Total Odour Emission Rate Ou <sub>E</sub> /s
<b>Bernie's Farm (Proposed)</b>			
No.1	25,000	0.35	8,750
No.2	25,000	0.35	8,750
No.3	25,000	0.35	8,750
No.4	25,000	0.35	8,750
<b>Total</b>	<b>100,000</b>	<b>0.35</b>	<b>35,000</b>
<b>Hunts Farm (Existing)</b>			
No.1	24,000	0.35	8,400
No.2	24,000	0.35	8,400
No.3	24,000	0.35	8,400
No.4	24,000	0.35	8,400
<b>Total</b>	<b>96,000</b>	<b>0.35</b>	<b>33,600</b>
<b>Greenwood Farm (Existing)</b>			
No.1	12,500	0.35	4,375
No.2	12,500	0.35	4,375
<b>Total</b>	<b>25,000</b>	<b>0.35</b>	<b>8,750</b>
<b>Ballyhaunis Farm (Existing)</b>			
No.1	20,000	0.35	7,000
<b>Total</b>	<b>20,000</b>	<b>0.35</b>	<b>7,000</b>

The results for the potential air quality impact for dispersion modelling of odour from the existing and proposed poultry units based on the emission rates in Table 6.1 is presented in Attachment B.1 – Appendix B: Predicted odour plume spread of proposed Poultry Units at the 98<sup>th</sup> percentile of hourly averages for odour concentrations of ≤ 3.0 Ou<sub>E</sub> m<sup>-3</sup>, and Table 7.1: Predicted pollutant GLC at each sensitive receptor for cumulative emissions.

The plotted odour concentration of ≤ 3.0 Ou<sub>E</sub> m<sup>-3</sup> for the 98<sup>th</sup> percentile for the cumulative impact from the proposed poultry farms is illustrated in *Attachment B.1 - Table 7.1 and Appendix B*.

As can be observed from *Attachment B.1 - Table 7.1*, all identified receptors located in the vicinity of the proposed facility will perceive an odour level less than the guideline odour

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

limit of less than 3.0 O<sub>uE</sub>/m<sup>3</sup> for the 98<sup>th</sup> percentile of worst case hourly averages for met years 2013 – 2017.

It is therefore predicted that the siting of the new poultry unit based on the input parameters provided in: *Table 6.1* above; *Attachment B.1 - Table 6.2: Predicted volumetric airflow rate calculations*; and *Attachment B.1 - Table 6.3: Stack source characteristics*, would not impact on nearby sensitive receptors with respect to odour.

## **6.5 MITIGATION MEASURES**

Emissions from this site would be minimised through the implementation of the following measures:

- Litter management kept to a high standard;
- Adequate use of litter bedding material;
- Stocking density maintained at design level;
- Quality ventilation due to computerized/automated control;
- Quality house design with state of the art insulation standards;
- Minimisation of carcasses by keeping the flock health to the highest possible standard. Any dead birds would be stored in a covered leak-proof container awaiting collection by College Proteins of Co. Meath;
- The feed used would be formulated to the optimum crude protein levels, thus minimizing nitrogen excretion. This would keep ammonia emissions from the ventilation system and from manure transport to a minimum;
- Water and feed systems would be maintained in optimum condition and operation so as to minimise water and feed wastage.
- Appropriate timing, considering weather conditions, for emptying the poultry houses.

These measures would have a significant mitigating effect on possible odour emissions from the facility. All managerial practices would be under constant review with a view to seeking further reductions in odour emission potential in line with industry standard.

It is recommended that an odour management plan is implemented on site to ensure that high standards are maintained in this regard. A draft plan is included with this application (Attachment B.2).

This odour management plan would be used as a template and would be reviewed and amended over time, incorporating revised and additional management measures as appropriate to ensure continuous management and improvements in odour control at the farm.

Aspects of the formalised Odour Management Plan would include:

1. Maintenance of good hygiene practices on the proposed site, particularly in and around the broiler houses;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

2. All carcasses stored in sealed containers and removed regularly for rendering; and
3. Any complaint about odour in the vicinity of the installation recorded and investigated so as to establish the source and the cause whenever possible, in order that a management practice or a restriction might be identified and incorporated into normal practice to avoid repetition of any nuisance or interference with amenity.

## **6.6 REFERENCES**

EPR H1 (2008) – Environmental Risk Assessment Part 1 – Simple assessment of environmental risk for accidents, odour, noise and fugitive emissions.

EPR H1 (2008) - Environmental Risk Assessment Part 2 – Assessment of point source release and cost benefit analysis.

Guidance for Poultry Processing IPPC S6.11, Issue 3,

IPPC Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs,

IPPC Application form for a variation to a pig and poultry farm, NIEA Q57/20 Part C version 1.

IPPC NI, Standard farming installation rules and guidance for poultry production Ver 3. (2009).

Navaratnasamy, M. and Feddes, J.J.R. (2004). Odour emissions from poultry # manure/litter and barns. PIC Project No. 155, Poultry Industry Council.

PPC (NI) Regulations 2003, Example – Odour Management Plan Template, Laying Hens.

Valli, L., Moscatelli, N., (2008). Odour emissions from livestock production facilities. Centro Ricerche Produzioni Animali – CRPA SpA Corso Garibaldi 42, 42100 Reggio Emilia, Italy.

Van Geel, P.L.B.A. (2006) Annex 1 - Odour nuisance and farming act, Netherlands.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **7.0 NOISE**

### **7.1 INTRODUCTION**

Western Brand Group proposes to construct a new broiler-rearing facility, with a total capacity of 100,000 places for broilers, new feed silos, underground wash-water tank and all ancillary site works and services at Bekan, Co. Mayo. The proposed development would occur on a site of an existing poultry farm currently in the ownership of the applicant.

A Noise Impact Assessment Report has been prepared to accompany this EIAR for Western Brand Group, who is applying to Mayo County Council for planning permission for the proposed development as mentioned above. The background noise survey was conducted by Ms. Lorraine Wyse of Panther Environmental Solutions Ltd at three noise monitoring locations surrounding the proposed development on Friday 20<sup>th</sup> April 2018. The report is attached to this EIAR (Attachment C.1) and was prepared with reference to the EPA Guidance Note on Noise (NG4).

The study identifies, describes and assesses the impact of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (sensitive receptors) in the vicinity of the proposed development.

This section of the EIAR summarises the findings of the Noise Impact Assessment Report (Attachment C.1).

### **7.2 LEGISLATIVE CONTEXT**

#### **Planning and Development Act 2000 (S.I. No. 30 of 2000), as amended**

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanála attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

#### **The EPA Act (Noise) Regulations 1994 (S.I. No. 179 of 1994)**

The relevant part of the Environmental Protection Agency Act 1992 dealing with noise is Part VI, Sections 106 to 108. These Sections deal with the control of noise, the power of local authorities to prevent or limit noise and the issue of noise as a nuisance.

The 1994 Regulations came into effect in July 1994 and outline the procedures for dealing with noise nuisance. The Regulations allow affected individuals, local authorities or the EPA to take action against an activity causing a noise nuisance.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

These Regulations replaced the procedures for noise complaints contained in the Local Government (Planning & Development) Act 1963. Companies must show that reasonable care was taken to prevent or limit the noise from their activities. If the courts decide that a company is responsible for causing a noise nuisance, they can order the company to take measures to reduce, prevent or limit it.

**EPA 'Guidance Note on Noise (NG4)' (2016)**

It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the settling of noise Emission Limit Values (ELVs) and compliance monitoring. In relation to production facilities and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELV's at the nearest noise-sensitive receptor:

<b>Divisions</b>	<b>Times</b>	<b>dB(A)</b>
Day	(07:00 to 19:00hrs)	55dB LAr,T
Evening	(19:00 to 23:00hrs)	50dB LAr,T
Night	(23:00 to 07:00hrs)	45dB LAeq,T

**The National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)**

The NRA's guidance document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) is the recognised Irish guidance document for the assessment of road traffic noise. This document sets out the key items that should be included in a noise and vibration assessment for any significant road scheme. As a minimum, it stipulates that the following items should be included:

- A series of noise surveys to quantify the prevailing noise climate at sensitive receptors along the existing and proposed routes
- Preparation and calibration of a suitable noise prediction model;
- Prediction of Do Minimum and Do Something noise levels for opening and design years;
- Comparison of predicted Do Something noise levels with the design goal and three conditions that must be satisfied before mitigation measures are deemed necessary;
- Specification and assessment of road traffic mitigation measures, where required;
- Assessment and review of construction impacts and mitigation measures;
- Assessment and review of vibration.

This document has been referred to in the consideration of road traffic noise associated with the proposed development. The document also presents maximum permissible noise levels at dwelling facades during construction activities. This provide a useful reference for assessing construction noise of the proposed development.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The National Roads Authority (NRA) Guideline Construction Noise Limits

Days / Times	L <sub>Aeq</sub> (1hr) dB	L <sub>pA</sub> (max)slow dB
Monday to Friday (07:00 to 19:00hrs)	70	80
Monday to Friday (07:00 to 22:00hrs)	60	65
Saturday (08:00 to 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30hrs)	60	65

### 7.3 REGIONAL ENVIRONMENTAL SETTINGS

Western Brand Group proposes to construct four new poultry units together with feed silos, underground wash-water tank and all associated site works at Bekan, Co. Mayo.

The site is located 5.3km south-east of Knock town, 5.7km east of Ballyhaunis, and 10.7km north-east of Claremorris. The site is accessed by a local road that links to the N60 road 2.6km to the south of the site. The N60 road connects Castlebar to Roscommon, via Claremorris and Ballyhaunis.

The surrounding area is composed of undulating drumlins and eskers. The area is rural in character with residences in the area predominantly linearly aligned along the existing road network. The closest noise sensitive locations to the proposed broiler houses in each geographical direction are as follows:

- a residence 120 metres to the south-east of the site boundary,
- a farmyard 200 metres to the north-west of the site boundary,
- a residence 210 metres to the south-west of the site boundary,

A map of the proposed site boundary and surrounding noise sensitive locations is provided in Appendix A.

Panther Environmental Solutions Ltd was commissioned by Western Brand Group to carry out a Noise Impact Assessment and compile an accompanying Environmental Impact Assessment Report (EIAR).

The proposed site contains an existing poultry farm owned by the applicant. In support of the EIAR, the primary aims of this survey are to:

1. Identify noise sensitive locations (NSL's);
2. Determine the baseline noise levels at the closest NSL's;
3. Predict the impact of the proposed development's construction and operational phases on the noise sensitive receptors.

### 7.4 EXISTING NOISE CLIMATE

There are no significant dominant point noise sources in the region as the local area is rural and not influenced by any local industry. While the proposed development is in a rural area,

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

the influence of traffic from the local roads during the daytime is the dominant noise source in the area.

Additional occasional noise occurs from the operation of agricultural vehicles on local roads and surrounding farmlands. This noise source would be particularly notable during spring and autumn.

## **7.5 SURVEY PROTOCOLS**

### **7.5.1 MONITORING LOCATIONS**

In order to predict the impact of the construction and operational phases of the proposed development, sample noise-sensitive locations were been selected based upon the nearest location within groups of NSLs sharing similar orientation with regard to the proposed site and intervening topography.

<b>NSL1</b>	140 metres to the south-east of the nearest proposed noise source,
<b>NM2</b>	225 metres to the north-east of the nearest proposed noise source,
<b>NSL3</b>	235 metres to the south-west of the nearest proposed noise source,

The baseline environmental noise levels at these locations were determined. This was determined by taking 30-minute broadband noise measurements at these four noise sensitive locations.

### **7.5.2 INSTRUMENTATION**

The equipment used for the noise monitoring was a Cirrus CR:831C Sound Level Meter. The noise meter and calibrator were calibrated externally on 25<sup>th</sup> August 2017. The meter was also calibrated at the start and end of each measurement session using a class 1 calibrator, which conforms to BS 7189: 1989 and IEC942: 1988.

Ms. Lorraine Wyse of Panther Environmental Solutions Ltd conducted monitoring on Friday 20<sup>th</sup> April 2018.

A calibration check to 94 dB(A) was carried out on the instrument before and after measurement and was found to be satisfactory.

Measurement periods were appropriate to establish a typical noise level reading at each location in order to establish a dB(A)  $L_{Aeq}$ (30 minutes) reading.

### **7.5.3 SURVEY IMPLEMENTATION**

Baseline noise monitoring was carried out between 9:25am and 11:07am on 20<sup>th</sup> April 2018. The measurement parameters included meteorological observations of prevailing conditions at the time of the survey, associated particulars such as a description of the noises audible and a description of the noise environment (also provided in each location report in Attachment C.1).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**7.6 SURVEY RESULTS**

The assessment has been conducted in accordance with international best practice, represents an accurate assessment of current background noise levels, and predicts noise levels at noise sensitive locations surrounding the proposed development. The results for the environmental noise survey are reported in Table 7.1 below.

<b>Table 7.1: Baseline Noise Survey Results Summary</b>				
<b>Ref. No.</b>	<b>Location</b>	<b>Leq30</b>	<b>L10</b>	<b>L90</b>
NSL1	120m N-E	62	62	48
NM2	200m S-E	53	52	45
NSL3	210m S-W	46	47	40

To determine the impact of noise from the facility during construction activities and normal operation, the resultant noise levels at noise sensitive locations were calculated (included in Attachment C – Appendix B). Table 7.2 below summarises the findings of this predictive noise assessment.

The source construction noise is based upon the operation of one 15-30 tonne excavator operating within the farm boundary.

Operation noise takes into account maximum ventilation noise at the farm, and noise from large agricultural and delivery vehicles, which would occasionally be at the site.

As maximum ventilation rates, large farm vehicles and delivery trucks would not be frequently operating at the farm, the noise at noise sensitive locations as a result of the ventilation fans (typical operation) have also been included in this assessment. Climate controlled fans operating at maximum power would likely only occur during the daytime period of warm summers.

<b>Table 7.2: Predicted Noise Results Summary (dBA)</b>				
<b>NSL Ref</b>	<b>Location</b>	<b>Construction</b>	<b>Operation (Large Vehicles, Ventilation)</b>	<b>Operation (Normal Ventilation)</b>
<b>Source Noise Level (dBA)</b>		111	94	66
<b>NSL1</b>	140m SE	58	42	15
<b>NM2</b>	225m NE	53	38	11
<b>NSL3</b>	235m SW	53	38	11

The methodology outlined in BS4142 requires that predicted noise levels be compared to existing L<sub>90</sub> figures at noise sensitive locations in order to determine the likely noise impact.

As can be seen in Table 7.1 above, the background L<sub>90</sub> noise levels at all monitored locations were similar. Therefore, the average of these results will be used for comparison in this assessment.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**BS4142:2014 Assessment**

The following tables detail the results of predicted noise levels, employing the BS4142 methodology, at selected noise sensitive locations during worst-case scenario noise levels at the proposed development during construction and operational phases.

A noise character penalty of +5 has been applied to predicted noise levels containing machine noise. This is to account for distant impulsive noise from operating machinery.

Table 7.3 below determines the likelihood of construction noise impacts at noise sensitive locations following the BS4142 methodology:

<b>Table 7.3: BS4142 Construction Noise Assessment</b>					
<b>Location</b>	<b>Background Noise (L<sub>90</sub>)</b>	<b>Predicted Noise</b>			<b>Difference from Existing Background</b>
		<b>Predicted Noise</b>	<b>Predicted Penalty</b>	<b>Rating Level</b>	
<b>NSL1</b>	<b>48</b>	58	+5	<b>63</b>	15
<b>NM2</b>	<b>45</b>	53	+5	<b>58</b>	13
<b>NSL3</b>	<b>40</b>	53	+5	<b>58</b>	18

The following table determines the likelihood of maximum operational noise impacts at noise sensitive locations following the BS4142 methodology:

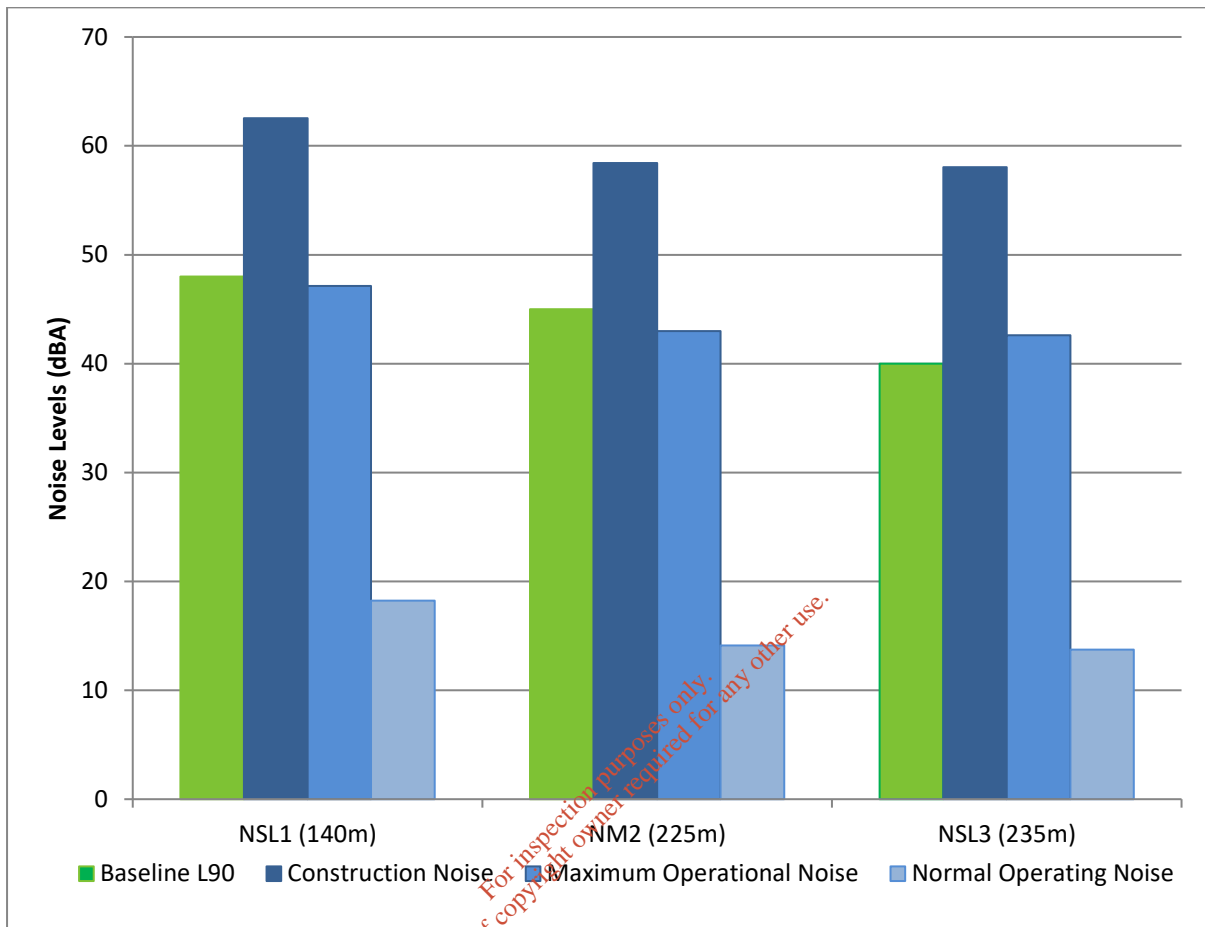
<b>Table 7.4: BS4142 Max Operational Noise Assessment (Vehicles &amp; Ventilation)</b>					
<b>Location</b>	<b>Background Noise (L<sub>90</sub>)</b>	<b>Predicted Noise</b>			<b>Difference from Existing Background</b>
		<b>Predicted Noise</b>	<b>Predicted Penalty</b>	<b>Rating Level</b>	
<b>NSL1</b>	<b>48</b>	42	+5	<b>47</b>	-1
<b>NM2</b>	<b>45</b>	38	+5	<b>43</b>	-2
<b>NSL3</b>	<b>40</b>	38	+5	<b>43</b>	3

The following table determines the likelihood of normal operational noise impacts from temperature controlled fans only at noise sensitive locations following the BS4142 methodology. A noise character penalty of +3dB has also been applied to ventilation noise to account for potential distant tonal noise from fans.

<b>Table 7.5: BS4142 Operational Noise Assessment (Normal Ventilation)</b>					
<b>Location</b>	<b>Background Noise (L<sub>90</sub>)</b>	<b>Predicted Noise</b>			<b>Difference from Existing Background</b>
		<b>Predicted Noise</b>	<b>Predicted Penalty</b>	<b>Rating Level</b>	
<b>NSL1</b>	<b>48</b>	15	+3	18	-30
<b>NM2</b>	<b>45</b>	11	+3	14	-31
<b>NSL3</b>	<b>40</b>	11	+3	14	-26

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The following graph compares the calculated noise rating arising from onsite activities (blue) and existing baseline noise at noise sensitive locations (green), as summarised in Section 7.6 above.



**Figure 7.1:** Predicted BS4142 Noise Rating vs. Existing Baseline Noise (L<sub>90</sub>)

## 7.7 EVALUATION OF THE RESULTS

### Baseline Noise

Weather conditions during the baseline assessment were dry and cloudy, calm with wind speeds < 5 m/s.

As can be seen in Table 7.1 above, there is a typical moderate noise environment at the surrounding noise sensitive locations, predominantly influenced by traffic noise. The L<sub>90</sub> readings, used to give an indication of the actual background noise in the area, were low for all three NSLs. This is as expected in a rural area.

### Construction Phase

As can be seen in **Table 7.3** and **Figure 7.1** above, noise levels are predicted to exceed existing background noise levels during the construction phase of the project.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Worst-case scenario construction noise is predicted to range from  $L_{Ar}$  58 to 63 dBA at the closest noise sensitive locations.

Considering existing background noise, predicted levels would range from 13 dBA at NM2 and 18 dBA at NSL3 above background noise levels.

This is predominantly due to the high noise levels associated with excavation/site clearance works and the noise character-rating penalty applied to account for the subjective impact of impulsive noise.

It is anticipated that construction noise would be clearly audible at all selected locations, with the character of construction type noise being more clearly audible during intermittent impulsive noise events (banging, falling stone etc.) onsite.

It should be noted that the theoretical peak noise level is a worst-case scenario and it would be unlikely that all site works would occur concurrently. Site clearance and excavation works would occur only during short periods during the initial phase of construction.

The construction phase itself would be temporary (3-4 months) and works would be conducted during normal working hours, reducing the risk of negative impacts. Therefore, the subjective impact of noise from the proposed development would be mitigated.

Predicted construction noise levels at all noise sensitive locations have been determined to be below the NRA guidance limit of 70 dBA for weekdays.

Therefore, during worst case scenario noise from initial construction works, it is predicted that there would be a significant short term impact for a limited period of time on noise sensitive locations. However, noise levels would be in compliance with Irish guideline standards for construction noise.

It is recommended that all likely high noise generating activities are carried out exclusively between the hours of 07:00 to 19:00 hours on weekdays, in order to minimise potential noise nuisances.

### **Operational Phase - Worst Case Scenario**

In order to predict the highest likely risk of impact from the work on the farm during its operational phase, noise sources likely to contribute to the highest noise levels onsite at any one time were included in this assessment.

Spring and summer periods at the farm are likely to generate the highest noise levels onsite, due to increased climate controlled ventilation noise on warm days in combination with agricultural vehicles at the site for collections and deliveries.

Worst-case scenario operational noise at the proposed development would be dominated by noise from large vehicles operating at the site. The combination of vehicle and ventilation noise sources is predicted to generate a source noise level of 94 dBA within the site (dominated by vehicles). This figure constitutes the maximum probable noise level within the site during operation.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Farm vehicles (tractors) typically generate noise levels of 78 – 95 dBA, depending on their size. Delivery vehicles would also provide noise levels greater than the normal operating noise at the proposed development, with a similar noise level depending on the size of the vehicle.

It should be noted that noise from agricultural vehicles is a normal part of rural life and thus the subjective impact of noise from this source would not normally be expected to result in nuisance. Agricultural vehicle noise would be expected to result in disturbance where the engine noise is abnormal, particularly loud, occurring over a long period of time, occurring at unsociable hours or the activity being conducted is perceived to be unnecessary.

Maximum noise levels at the site are expected to be equivalent to noise levels experienced during the operation of large agricultural machinery within the existing farm site, or other agricultural lands in this rural area. Therefore, it is anticipated that maximum noise levels within the site would not be increased above current maximum noise levels in the area, due to agricultural machinery being commonplace in this rural area.

Noise from the operation of large agricultural vehicles or delivery vehicles would occur for short periods of the normal workday (i.e. high revving of engines while traveling to the site). Therefore, these peak noise levels would occur only during short periods of operation. However, such noise levels would become more frequent in the area due to monthly deliveries of feed at the site. It is recommended that all deliveries and removals of litter occur within normal working hours (07:00am to 19:00pm weekdays) to mitigate the subjective impact of such activities.

As can be seen in **Table 7.4** and **Figure 7.1**, noise arising from these worst case scenario onsite activities is predicted to be between -1 and 3 dBA above the background noise level at each of the nearest noise sensitive locations. Therefore, maximum source noise levels during the operational phase on the proposed site, principally agricultural/delivery vehicle noise, are predicted to be dimly audible at NSL3, and not audible at NSL1 and NM2.

Due to the intermittency and the increased frequency (average 6.6 events/week) of such vehicle noise, it is anticipated that vehicle noise would have a slight to moderate noise impact at the closest noise sensitive locations.

The impact of noise from this source has been based upon fans working at maximum power and includes a correction for potential tonal noise from malfunctioning fans. Therefore, the predicted noise levels may be seen as a worst-case scenario for ventilation noise during the operation of the site.

The proposed poultry houses would each be fitted with thirty-six ventilation fans (4 houses with 9 fans each) operated and controlled by a climate control system. The climate control system would monitor the internal air temperature of the houses and modulate the speed of the fans.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 7.6:** Examples of Required Temperature for Broiler Rearing (BREF, 2017)

Ages (days)	Indoor environment Temperature (°C)		
	Portugal <sup>(1)</sup>	UK <sup>(2)</sup>	France <sup>(3)</sup>
1 – 3	37 – 38	30 – 34	31 – 33
3 – 7	35	32	30 – 32
7 – 14	32	28 – 30	28 – 30
14 – 21	28	27	26 – 28
Adults: 21 – 29	No heating	18 – 21	26 – 23
28 – 35			20 – 23
Over 35			18 – 20

As can be seen in **Table 7.6** above, poultry sheds are typically kept to a high temperature, relative to ambient air temperature. Fans on poultry sheds would predominantly be used for the introduction of fresh air to the sheds and would not normally be required to regulate indoor temperature. Therefore, these fans would normally be operating at a steady state and would only operate at maximum during the hottest periods of summer days.

The following table details the average number of days per month where the maximum recorder air temperature at Claremorris Weather Station (10km from the site) was at or above 21°C (years 2007 – 2017).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.0	0.0	0.0	0.0	2.7	5.4	4.8	1.6	1.2	0.0	0.0	0.0

As can be seen from the above table, it is likely that ventilation fans would only be operating at maximum during May to September, and for a small number of days during these months, and only for short periods of these days.

At the closest noise monitoring location, NSL1 (140 metres), maximum worst case scenario ventilation fan noise has been predicted to be below the existing L90 background noise levels. Maximum fan noise at other nearby noise sensitive locations would be significantly below existing background noise levels.

Maximum worst-case scenario ventilation fan noise would only be expected to occur during the daytime in the summer, and only during short periods of these days.

Therefore, due to the low predicted resultant noise levels and the infrequency of occurrence it is predicted that maximum fan noise would have a slight to no significant impact upon noise sensitive locations.

It is considered that, should proposed mitigation measures be implemented, there would be a slight to no significant noise impact due to maximum operational noise (vehicles and ventilation) at the proposed development.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Operational Phase – Normal Noise Levels**

During normal farm operations alone, the noise environment is likely to be characterised by noise from ventilation fans particularly, and the occasional operation of the feed silos.

As can be seen in **Table 7.5** and **Figure 7.1** above, during periods of normal operational noise, all rating levels are below the background  $L_{90}$ . An 'inaudible' noise will typically be 10dB or less below the measured  $L_{90}$  background noise level at a noise sensitive locations.

Therefore, it is predicted that there would be no significant impact upon noise sensitive locations in the vicinity of the proposed development during normal operations.

**7.8 CONCLUSIONS**

As a result of this baseline noise survey and predictive analysis, it is anticipated that the proposed development would have a significant but short term impact on the closest noise sensitive locations during the initial construction phase. This impact would be mitigated by the short period of time over which construction activities are likely to occur and the carrying out of construction during normal working hours. Predicted construction noise levels would be in compliance with NRA guidance for construction noise.

Worst case scenario operational phase at the proposed development, it is anticipated that there would be a slight to moderate impact on the closest noise sensitive locations due to noise from agricultural/delivery vehicles. Following the implementation of proposed mitigation measures, it is predicted that there would be no significant noise impact upon noise sensitive locations.

Maximum worst-case scenario ventilation fan noise would only be expected to occur during the daytime in the summer, and only during short periods of these days. Due to the low predicted resultant noise levels and the infrequency of occurrence it is predicted that maximum fan noise would have a slight to no significant impact upon noise sensitive locations.

As agricultural vehicle noise would be similar to that currently experienced in the area, no additional noise impact as a result of agricultural work in the adjacent land-banks is anticipated during the operational phase.

The normal operation of the ventilation system is not predicted to be audible at the nearest noise sensitive locations.

It is the conclusion of this report that there would be a significant impact for a limited period of time on noise sensitive locations as a result of the initial construction phase and that there would be no significant impact on noise sensitive locations as a result of the operational phase of the proposed development at Bekan, Co. Mayo.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **7.9 MITIGATION MEASURES**

The following mitigation measures would be proposed for the operational phase of the proposed project:

- Potentially noisy activities, such as the removal of litter and the delivery of feed, would be restricted to normal working hours (7:00am and 7:00pm, Monday to Saturday). Any operations which, by necessity, are required to be carried out outside of these times should be notified to any potentially affected local residents in good time and prior to specified works commencing;
- Regular maintenance would be carried out on all equipment, machinery and vehicles to ensure that potential noise disturbance from such sources would be kept to a minimum;
- All onsite workers, hauliers and contractors would be informed of noise considerations onsite and on public access roads;
- Site access roads would be maintained in a state of good repair to reduce excessive noise from the passage of vehicles;
- In order to facilitate and promote good practice in relation to the management of noise at the proposed development, it is recommended that the applicant implement a noise management plan. An outline of this plan is included in Attachment C.2.

## **7.10 CONSTRUCTION IMPACTS & MITIGATION**

### **7.10.1 IMPACTS**

As can be seen in **Table 7.3** and **Figure 7.1** above, noise levels are predicted to exceed existing background noise levels during the construction phase of the project. It is predicted to be 13 dBA to 18 dBA above the background noise level at noise sensitive locations. This is predominantly due to the noise levels associated with excavation works and the character penalty applied to account for the subjective impact of impulsive noise.

It is anticipated that peak construction noise would be a dominant source of noise at the closest noise sensitive locations during such works, with the character of construction type noise being more clearly audible during intermittent impulsive noise events.

It should be noted that these peak noise levels (100 dBA from excavation) would occur only during short periods during the construction phase. The construction phase itself would be temporary (3-4 months). Therefore, these peak noise works would be for limited periods of workdays and only during the construction phase of the project.

During the construction phase, there is potential for a temporary increase in noise levels from traffic transporting construction materials to and from the site, in addition to plant equipment used during the construction phase.

Therefore, due to works being carried out during the daytime period, it is predicted that there would be moderate impact for a limited period of time on noise sensitive locations as a result of the construction phase of the proposed development.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **7.10.2 MITIGATION MEASURES**

The following mitigation measures are proposed for the construction phase of the proposed project:

- All construction activities would take place between 8:00am and 6:00pm, Monday to Saturday. Any works which, by necessity, are required to be carried out outside of these times would notified to the local council and any potentially effected local residents in good time and prior to specified works commencing;
- Cognisance would be taken of the National Roads Authority's '*Guidelines for the Treatment of Noise and Vibration in National Road Schemes*' and British Standard 5228-1 '*Code of practice for Noise Control on Construction and Open Sites*';
- Regular maintenance would be carried out on all construction equipment, machinery and vehicles;
- Ensure any compressors required would be silenced or of sound reduced models fitted with acoustic enclosures;
- Ensure all pneumatic tools required would be fitted with silencers or mufflers;
- Deliveries would be organised to arrive during daytime hours;
- Ensure care would be taken when unloading vehicles to minimise noise disturbance;
- All onsite workers, hauliers and contractors would be informed of noise considerations onsite and on public access roads;
- Where required, screens or barriers would be installed to shield particularly noisy activities.

### **7.11 REFERENCES**

BREF Document for Intensive Rearing of Poultry or Pigs (2017) Reference Document for the Intensive Rearing of Poultry or Pigs.

EN BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites.*

EN BS 4142:2014. *Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.*

Grant S. Anderson and Ulrich J. Kurze, "*Outdoor Sound Propagation,*" Chapter 5 in *Noise and Vibration Control Engineering – Principals and Applications*, edited by L.L. Beranek and I.L. Vér, (John Wiley & Sons, NY, NY 1992).

ISO 9613-2:1996. *Attenuation of Sound during Propagation Outdoors.*

National Roads Authority, (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes.*

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Joint Research Centre, European IPPC Bureau (2013). *Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry and Pigs.*

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **8.0 LANDSCAPE AND VISUAL**

### **8.1 INTRODUCTION**

This section of the EIAR provides an assessment of the likely landscape and visual impacts of the proposed development at Bekan, Co. Mayo. This assessment involved a detailed review of all plans, sections and elevations of the proposed scheme and various publications and reports, together with a visit to the proposed site and its environs.

### **8.2 METHODOLOGY**

This assessment is made with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development. The methodology used in the assessment is based on the EPA's "*Guidelines on the information to be contained in Environmental Impact Statements, 2002*", "*Advice Notes on Current Practice in the preparation of Environmental Impact Statements, 2003*" and draft "*Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017*".

#### **8.2.1 BASELINE STUDY METHODOLOGY**

In order to facilitate the assessment of the proposed development, the visual envelope was determined. The envelope defines the general area within which the development site may be visible, whether completely or slightly due to topography. The visual envelope extends to 1.9 km from the site at its furthest point (see Attachment E3). Beyond the visual envelope, any visual impacts are considered negligible.

Potential viewpoints were established using online mapping sources. These were investigated along with all other potential viewpoints identified during the site survey.

The site survey was carried out on Friday 20<sup>th</sup> April, 2018 in clear weather conditions. The visibility assessment concentrated on the publicly accessible areas such as road networks, residential and amenity areas.

Desktop and fieldwork was supported by online mapping tools from Bing, Google, OSI, and the Mayo County Development Plan 2014-2020 and the and the Landscape Appraisal of County Mayo 2008.

Photographs illustrating views from viewpoints were taken using a Canon EOS 1100D Digital SLR Camera.

#### **8.2.2 LANDSCAPE ASSESSMENT CRITERIA**

With regard to landscape assessment, there are two separate but closely related aspects. The first aspect is visual impact, i.e. the extent to which a new structure in the landscape can be seen. Visual impacts may be categorised under "Visual intrusion" and "Visual Obstruction", where:

**Visual intrusion** is impact on a view without blocking, and

**Visual obstruction** is impact on a view involving blocking thereof.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

In assessing visual impact, various aspects and stages are considered in detail including, impact during phasing, impact on completion and longer term established impact.

The second aspect is **impact on landscape character**, i.e. responses that are felt towards the landscape and drawn on the appearance of the land, including aspect, land-use topography, vegetative cover etc. and their interaction to create specific patterns and landscape units distinctive to particular localities. The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, vegetation, land-use, built environment together with the visibility of and the views to and from the landscape.

The significance criteria used in the assessment are based on the impact levels suggested in the EPA Guidelines on the information to be contained in EPA's "Guidelines on the information to be contained in Environmental Impact Statements, 2002", and draft "Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017", which are set out in this volume of the EIAR.

### **8.2.3 LANDSCAPE PLANNING**

The Mayo County Development Plan is the statutory development control and forward planning document pertaining to the project area. The Landscape Appraisal of County Mayo was published by Mayo County Council as part of the Mayo County Development plan 2014-2020.

Under the Landscape Appraisal of County Mayo, the proposed site is not listed in or in the vicinity of a scenic or highly scenic route.

The following areas in Mayo are designated as being sensitive with regard to development:

- Natural Grassland
- Peat Bogs
- Moors and Heathland
- Transitional Woodland Scrub
- Beaches, dunes and sands
- Estuaries
- Broad Leaved Forest
- Mixed Forest
- Inland and Salt Marshes
- Intertidal flats
- Water courses/bodies
- Agricultural lands with significant areas of natural vegetation

The proposed site is not located on any of the above designations.

The following sites are designated as being normal with regard to development:

- Pasture Lands
- Complex cultivation patterns
- Coniferous Plantations

The site is located in an area dominated by pasture lands. These areas have a potential to absorb a wide range of new developments subject to normal planning and development control procedures.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

According to The Landscape Appraisal of County Mayo the site is located within Principle Policy Area 4: Drumlins and Inland lowlands. Regarding this landscape classification, the following policies are recommended:

**Policy 14:** *Encourage development that will not interrupt or penetrate distinct linear sections of primary ridge lines when viewed from areas of the public realm.*

**Policy 16:** *Preserve from development any areas that have not already been subject to development, which have retained a dominantly undisturbed upland/moorland character.*

**Policy 21:** *Recognise that these areas are made up of a variety of working landscapes and contain the vast proportion of the County's population within principle towns and on rural holdings. These also incorporate all of the major national primary and regional roads, and railways.*

**Policy 22:** *Continue to permit development that can utilise existing infrastructure, whilst taking account of absorption opportunities provided by the landscape and prevailing vegetation.*

**Policy 23:** *Encourage development that will not significantly interfere or detract from scenic lakeland vistas, as identified in the Development Plan, when viewed from areas of the public realm.*

**Policy 24:** *Encourage development that will not result in detrimental impacts (through excessive bulk, scale or inappropriate siting) on the landscape at a local or micro level as viewed from areas of the public realm.*

### **8.3 EXISTING ENVIRONMENT**

According to the Landscape Appraisal of County Mayo, Bekan is located in the Landscape Character Unit K 'East Central Drumlin Spine' (see Figure 8.1).

#### **8.3.1 EAST-CENTRAL MAYO, BRACKLOON WEST TOWNLAND LANDSCAPE**

This is a low-lying landscape with an elevation in the range of 105 – 118 m. Principal land-cover is given over to pasture although some tillage uses exist. Large Loughs are also an occasional feature of this landscape. Topography is characterised by low lying small to medium sized drumlins predominantly in a north to south orientation.

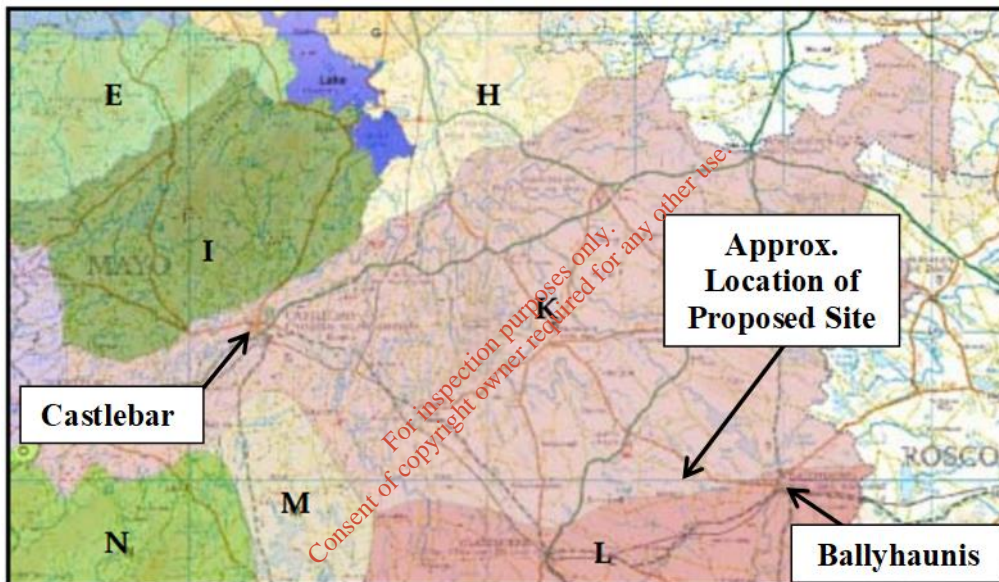
The East Central Drumlin Spine is defined by glacial drumlins that are uniform at its western end near its transition with the distinct drumlins of Clew Bay. In the east, these become less uniform and severe and the terrain merges into several sets of geologically distinct and isolated hills as the unit encapsulates the towns of Castlebar, Swinford, and Charlestown. Land cover consists of a mixture of bog/moorland, poor quality pasture and transitional woodland scrub with better quality pasture to the east and south.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The townland of Brackloon West is composed of undulating hills of glacial origin. The hills are characterised by generally steep gradients and are covered by irregularly shaped fields. The fields and roads are bounded by a combination of well-established treelines and hedgerows. According to the CORINE data series, land cover in the Brackloon West area is dominated by pasture land. The CORINE data series also shows that the surrounding region is primarily occupied by pastureland, with some areas of peatland to the west and south-west, coniferous forest to the north and an area of land principally occupied by agriculture with areas of natural vegetation to the south-east.

Residential development in the area is predominantly linearly aligned along the existing road network. There is also a prevalence of farmyard complexes in the area, including agricultural sheds.

**Figure 8.1.** East Central Drumlin Spine (K) (Source: Landscape Appraisal of County Mayo)



### 8.3.1 LANDSCAPE SETTING OF THE PROPOSED SITE

The proposed development is situated on moderate gradient land, at an approximate elevation of 100-110m above sea level. Topography is characterised by low-lying small to medium sized drumlins

Rural, agricultural land with undulating topographic relief leads from the site, particularly to the west. Throughout the area, the land is farmed with fields enclosed with a varied mix of hedges, banks, dry stone walls, drainage ditches and fences. Pasture for cattle and sheep is the primary agriculture type in the area. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **8.3.2 “DO-NOTHING” SCENARIO**

Should the proposed development not proceed, the existing use of the site as a three-house broiler farm and landscape would remain unaltered. There would be no impact to the visual amenity of the area.

### **8.3.3 “DO-SOMETHING” SCENARIO**

Should the proposed development proceed, the landscape would be altered with the permanent inclusion of four poultry unit buildings and feed silos, wash water tank and all associated site works at Bekan, Co. Mayo. These proposed structures would replace the three-house broiler farm which currently exists at the site.

## **8.4 CHARACTERISTICS OF THE PROPOSAL**

The applicant, Western Brand Group, proposes to carry out a series of modifications to the site, as set out in detail in Section 2 in this volume of the EIAR.

The proposed development entails the demolition of existing broiler houses and the construction of four new broiler houses with a total capacity of 100,000 places for broilers, feed silos and all associated site development works at Bekan, Co. Mayo.

The proposed broiler houses would each measure 67.8m x 21.1m, covering an area of 1,430.6m<sup>2</sup>. Each house would measure approximately 5.8m high to ridge level, with ridge vents approximately 1m above the house apex. The material finish to the broiler houses would comprise of concrete up to a height of 1m, with the upper section constructed of selected green metal cladding. The two 12 tonne silos would measure between 7.5-9m in height and 2.3m in diameter, while a 35 tonne split silo would measure 11.4m in height and 3m in diameter. All silos would have a green finish.

No existing hedgerows would be removed or altered as part of the proposed development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would provide additional visual screening of the site.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **8.5 IMPACTS**

### **8.5.1 IMPACT ASSESSMENT**

The assessment of potential visual amenity impacts involved examining the locations of domestic dwellings, views from public roads and the location of the proposed development, as shown in Attachment E. In assessing the impact, potential impacts associated with both the construction and operational phases were considered.

### **8.5.2 CONSTRUCTION PHASE**

The construction phase would have a relatively low landscape and visual impact. Aspects which pertain to the construction phase proper include:

- (i) General site works,
- (ii) Modification of existing foundations (for tank installation),
- (iii) The construction of the proposed broiler houses and feed silos.

Removal of vegetation and excavation of topsoil & subsoil is not required as there is an existing foundation on the site.

By its nature, this phase would take place at a relatively low level.

There would be a moderate and temporary visual impact from construction works at visible locations from the adjacent public road and dwellings immediately to the south-east and south-west of the proposed site. This impact would be predominantly construction vehicles and plant, such as excavators and delivery vehicles, and structures as they are erected.

The undulating landscape, along with the existing hedgerows, would screen construction works in all other areas and ensure no associated significant visual impact is observable. It is anticipated that the visual impact of the construction phase in all other areas would be insignificant due to intervening topography and treelines.

### **8.5.3 OPERATIONAL PHASE**

The existing structures are visually shielded to the west and south-west by rises in the ground level at the site boundary. This has the effect of reducing the prominence of the development as a visual element, causing the structures to be at a low level, the roofs forming a continuation of the existing landscape topography.

Undulating topography, as represented in much of the surrounding landscape, has the ability to both shelter and absorb the visual impact of developments. Firstly, the physical shielding of a built form within the lee of hill where it does not break the skyline renders it visually unobtrusive and reflective of landscape scale. Secondly, the dynamic and complex nature of undulating country provides fore, middle, and distant ground to a vista that helps to provide a realistic scale and visual containment not available in open country.

As mentioned, the topography of the landscape in the immediate vicinity of the proposed site is characterised by low-rise but relatively steep hills of glacial origin – particularly to the north-west - which serve to screen the proposed development from the majority of

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

surrounding residences and public roads. In addition, the majority of the surrounding hedgerows are well-established, are high and are thick, providing good screening.

As part of this EIAR a visual assessment was carried out at locations where the proposed poultry units and silos would have the potential to create a visual impact. The existing poultry units currently upon the proposed site have been used as a visual reference and to represent the proposed poultry units, which would be similar in nature.

It should be noted that the roof and sidewall cladding of the proposed buildings would be composed of cladding with a dark green finish. The silos would also be finished in dark green. This would act to blend the proposed structures with the boundary vegetation in the foreground and make the edges of the structures less well defined against the vegetation.

This section should be read in conjunction with the Visual Assessment Maps E.3 & E.4 in Attachment E.

**Visual Point No.1**

VP1 is located approximately 195 meters south-east of the site boundary, at the T-junction between the Bekan/Cloonacurry Road and the Brackloon West Road.



From this junction, the Brackloon West Road passes immediately south of the site and the Cloonacurry Road immediately east of the site. This location provides a continuous and unobstructed view of the site, which forms a significant visual feature in the background.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.2**

VP2 is located just north of Bekan Village, approximately 269 meters south-south-east of the site boundary and 90 meters south of VP1, upon the Bekan Road.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



This location is on the northern outskirts of Bekan Village and is at a lower elevation than the site, as a result the existing sheds are partially obscured by a small hill within the green field adjacent to the site. All of the site silos and the roof section of the most southern house is visible at this location.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.3**

VP3 is located within Bekan Village approximately 334 meters south-south-east of the proposed site boundary and 70 meters south of VP2, upon the Bekan Road.



This location is within Bekan Village, adjacent to the Local Church and Community Centre. The houses are laid out such that, from this perspective, the majority of the buildings are obscured behind a residential property and hedgerow, with a small section of roof of the nearest shed and two silos being partially visible in the distance.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.4**

VP4 is located upon the Cloonacurry Road, approximately 140m south-east of the site boundary and 50 meters north of VP1.



This visual point is located on the Cloonacurry road, which runs in a south to north direction adjacent to the site. From this location the roof area and gable of the nearest house is visible. All site silos are visible from this location, similar to VP1.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.5:**

VP5 is located on the Cloonacurry Road, at the access gate to the green field adjacent to the site, approximately 78 meters east of site boundary and 95 meters north of VP4.



This visual point is located on the Cloonacurry road, which runs in a south to north direction adjacent to the site, and is at a lower elevation than the site. From this location, the gables of the existing poultry houses are clearly visible. All site silos are visible at this location as they noticeably break the horizon line.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

The proposed site would only contain four silos, in contrast to the six at the existing farm. The proposed silos would also be in pairs and in an orientation that from this location there would appear to be only two silos on site (i.e. one would be shielded by the other).

**Visual Point No.6**

AP6 is located at the entrance to site on the Cloonacurry Road, approximately 55 meters east of the site boundary and 120 meters north of VP5.



This visual point is located at the road access to the site from the Cloonacurry road, which runs in a south to north direction adjacent to the site. From this location, the gables of the existing houses are visible. All site silos are visible at this location as they noticeably break the horizon.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

The proposed site would only contain four silos, in contrast to the six at the existing farm. The proposed silos would also be paired-up and in an orientation that from this location there would appear to be only two silos on site (i.e. one will be shielded by the other).

**Visual Point No.7**

VP7 is located on the Cloonacurry Road, approximately 195 meters north-north-east of the site boundary and 200 meters north of VP6.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



At this location, which is at a lower elevation to the site, the majority of the development would be hidden behind the peak of a slight ridge in the adjacent field. The roof of the northern most house is partially visible, while the silos are visible as they noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.8**

VP8 is located on the Greenwood Road, 20 meters east of the cross-road junction between the Cloonacurry Road and the Greenwood/Loughanboy Roads, approximately 195 meters north-north-east of the site boundary.



At this location, which is at a similar elevation to the site, the southernmost poultry house is shielded from view by the intervening ridgeline, as well as the established hedgerows. The top of the northernmost silo is partially visible just above the intervening hedgerows. None of the site silos noticeably break the horizon and are not visible at this location.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, nullifying any visual impact.

**Visual Point No.9**

VP9 is located on the Greenwood Road approximately 535 meters north-east of the site boundary and 140 meters east of VP8.



At this location, while the majority of the development would be obscured behind the lip of the ridge, the roofs of the houses and silos would be visible in the distance.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.10**

VP10 is located on the Greenwood Road approximately 600 meters north-east of site boundary and 155 meters east of VP9.



At this location, which is at a lower elevation to the site and separated by a small drumlin, the houses are shielded from view by the intervening ridgeline and vegetation. The top of the northernmost silo is just visible above the ridgeline. None of the site silos noticeably break the horizon and are not visible at this location.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment, nullifying any visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.11**

VP11 is located on the Loughanboy Road, approximately 580 meters north-north-west of the sit boundary and 365 meters west of the cross-road junction between the Cloonacurry Road and the Greenwood/Loughanboy Roads.



At this location, which is at a similar elevation to the site and separated by lowland between drumlins, the houses are partially shielded from view by the intervening ridgeline and vegetation. The top of the northernmost silo is just visible in the distance above the ridgeline, however none of the site silos noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment, nullifying any visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.12**

VP12 is located on the Loughanboy Road, approximately 675 meters north-north-west of the sit boundary and 365 meters west of VP11.



At this location, which is at a similar elevation to the site and separated by lowland between drumlins, the houses are partially shielded from view by the intervening ridgeline and vegetation. The roof of the northernmost shed is partially visible in the distance above the ridgeline, while none of the site silos noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment, helping to nullify any visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.13**

VP13 is located on the Loughanboy Road approximately 725 meters north-west of the site boundary and 165 meters west of VP12.



At this location, which is at a similar elevation to the site and separated by lowland between drumlins, the houses are partially shielded from view by the intervening ridgeline and vegetation. The roof of the northernmost shed is partially visible in the distance above the ridgeline, while none of the site silos noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment helping to nullify any visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.14**

VP14 is located on the Brackloon West Road, approximately 469 meters west of the proposed site boundary.



At this location, which is at a lower elevation to the site and separated by a small drumlin, the houses are shielded from view by the intervening ridgeline and vegetation. The top of the southernmost silo is just visible above the ridgeline, while none of the other site silos noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment helping to nullify any visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Visual Point No.15**

VP15 is located on the Brackloon West Road, approximately 370 meters west-south-west of the proposed site boundary.



At this location, which is at a lower elevation to the site and separated by a small drumlin, the houses are shielded from view by the intervening ridgeline and vegetation. The top of the southernmost silos are just visible above the ridgeline and partially shielded by vegetation.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment helping to nullify any visual impact.

**Visual Point No.16**

VP16 is located on the Brackloon West Road, approximately 210 meters south-west of the site boundary and 300 meters west of the T-junction between the Cloonacurry road and the Brackloon West Road.



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

At this location, which is at a lower elevation to the site and separated by a small drumlin, the houses are shielded from view by the intervening ridgeline and vegetation. The roof of the southernmost house is just visible above the ridgeline, while none of the other site silos noticeably break the horizon.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment, reducing the visual impact.

**Visual Point No.17**

VP17 is located on the Lassanny Road, approximately 1.9 km east-south-east of the site boundary.



At this location, which is at a lower elevation to the site and separated by a small drumlin, the houses are shielded from view by the intervening ridgeline and vegetation. The top of the southernmost silo is just visible above the ridgeline.

It is anticipated that the proposed houses and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing houses, would significantly help to blend the structures into the existing environment helping to nullify any visual impact.

**8.5.4 LANDSCAPE PLANNING IMPACT**

The following table assesses the proposed development in relation to visual amenity planning policies, objectives and recommendations of the Mayo County Development Plan 2014-2020 and the Landscape Appraisal of County Mayo.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 8.2:** Visual Amenity Planning Policies, Objectives and Recommendations

<b>POLICY / OBJECTIVE REF</b>	<b>POLICY / OBJECTIVE / RECOMMENDATION</b>	<b>COMPLIANCE ASSESSMENT</b>
LP-01	It is an objective of the Council, through the Landscape Appraisal of County Mayo, to recognise and facilitate appropriate development in a manner that has regard to the character and sensitivity of the landscape and to ensure that development will not have a disproportionate effect on the existing or future character of a landscape in terms of location, design and visual prominence.	<p>The proposed poultry farm would be replacing an existing poultry farm and would be of a similar visual character to the existing poultry farm at the site.</p> <p>However, it is proposed to finish that the new sheds and silos in a dark green colour which would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.</p> <p>Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.</p>
LP-02	It is an objective of the Council that all proposed development shall be considered in the context of the Landscape Appraisal of County Mayo with reference to the four Principal Policy Areas shown on Map 3A Landscape Protection Policy Areas and the Landscape Sensitivity Matrix (Figure 3), provided such policies do not conflict with any specific objectives of this Plan.	<p>Policy Area 4.</p> <p>These undulating areas of pasture, woodland and forest make up the largest area of the County and are considered to have a generally similar ability to absorb development. Many of these areas are underlain by glacial drumlins and incorporate low-lying Lakelands.</p> <p>Relevant Policies: 14, 16, 21, 22, 23 &amp; 24.</p>
LP-03	It is an objective of the Council to protect the unique landscape of the County which is a cultural, environmental and economic asset of inestimable value.	The proposed poultry farm would be replacing an existing poultry farm and would be of a similar visual character to the existing poultry farm at the site.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

<b>POLICY / OBJECTIVE REF</b>	<b>POLICY / OBJECTIVE / RECOMMENDATION</b>	<b>COMPLIANCE ASSESSMENT</b>
VP-01	It is an objective of the Council to ensure that development does not adversely interfere with views and prospects worthy of preservation and protection as outlined on Map 4, or on the views to and from places and features of natural beauty or interest (e.g. coastline, lakeshores, protected structures, important historic sites) when viewed from the public realm.	The proposed development is not located within the vicinity of views and prospects worthy of preservation and protection as outlined on Map4. The proposed development is not located within the vicinity of, or visually impinge upon, coastline, lakeshores, protected structures, important historic sites.
Landscape Appraisal of County Mayo, 2008		
3.3(b)	<u>Policy with Regard to Areas Designated as Normal</u> A large areas of County Mayo is designated as a normal landscape. These areas have a potential to absorb a wide range of new developments subject to normal planning and development control procedures. In these areas the Planning Authority will have regard to general restrictions to development such as scenic routes, siting, road set backs, road widening plans, parking numbers, road and sewage disposal criteria.	The proposed poultry farm would be constructed on the site of an existing poultry farm, and does not fall in to either of the following categories: <ul style="list-style-type: none"> <li>• Pasture Lands,</li> <li>• Complex cultivation patterns,</li> <li>• Coniferous Plantations.</li> </ul>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

<b>POLICY / OBJECTIVE REF</b>	<b>POLICY / OBJECTIVE / RECOMMENDATION</b>	<b>COMPLIANCE ASSESSMENT</b>
3.6(b)	<p><u>Policy with Regard to Scenic Routes</u>            Scenic routes indicate public roads from which views and prospects of areas of natural beauty and interest can be enjoyed. Sightseeing visitors are more likely to be concentrated along these routes. The onus should be on the applicant when applying for permission to develop in the environs of a scenic route, to demonstrate that there will be no obstruction or degradation of the views towards visually vulnerable features nor significant alterations to the appearance or character of sensitive areas.</p>	<p>The proposed development site is not located within the vicinity of any scenic route identified in the County Development Plan or Landscape Appraisal of County Mayo.</p>
3.7(b)	<p><u>Policy with Regard to Protected Views</u>            Highly scenic views or vistas indicate areas along public roads from which views and prospects of areas of high natural beauty and interest can be enjoyed. Sightseeing visitors are more likely to be concentrated along these areas. Development located between the public road and the seashore, lakeshore or riverside should be subject to strict visual criteria. New development should only be considered where it can be demonstrated that it does not obstruct or designated highly scenic vistas nor alters or degrades the character of the surrounding landscape.</p>	<p>The proposed development site is not located within the vicinity of any protected views or designated highly scenic vistas identified in the County Development Plan or Landscape Appraisal of County Mayo.</p>
Policy 14	<p>Encourage development that will not interrupt or penetrate distinct linear sections of primary ridge lines when viewed from areas of the public realm.</p>	<p>Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.</p>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

<b>POLICY / OBJECTIVE REF</b>	<b>POLICY / OBJECTIVE / RECOMMENDATION</b>	<b>COMPLIANCE ASSESSMENT</b>
Policy 16	Preserve from development any areas that have not already been subject to development, which have retained a dominantly undisturbed upland / moorland character.	The proposed poultry farm would be constructed on the site of an existing poultry farm (i.e. an existing area of development).
Policy 21	Recognise that these areas are made up of a variety of working landscapes and contain the vast proportion of the County's population within principle towns and on rural holdings. These also incorporate all of the major national primary and regional roads, and railways.	Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.
Policy 22	Continue to permit development that can utilise existing infrastructure, whilst taking account of absorption opportunities provided by the landscape and prevailing vegetation.	The proposed poultry farm would be constructed on the site of an existing poultry farm, and would be constructed upon the same area of hardstand, which will not be extended in anyway, thus incurring no loss greenfield area within the vicinity of the development.
Policy 23	Encourage development that will not significantly interfere or detract from scenic lakeland vistas, as identified in the Development Plan, when viewed from areas of the public realm.	The proposed development is not located within the vicinity of, or visually impinge upon, scenic lakeland vistas.
Policy 24	Encourage development that will not result in detrimental impacts (through excessive bulk, scale or inappropriate siting) on the landscape at a local or micro level as viewed from areas of the public realm.	The proposed poultry farm would be constructed on the site of an existing poultry farm, and would be constructed upon the same area of hardstand. The development would not result in detrimental impacts on the landscape at a local or micro level.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **8.5.5 LANDSCAPE AND VISUAL IMPACT SUMMARY**

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall long-term negative landscape and visual impact.

As a result, it is considered that the proposal may be viewed as having an acceptable level of landscape and visual impact.

### **8.6 MITIGATION MEASURES**

All existing hedgerows would be retained and no alterations to hedgerows would be required as part of the proposed development. In order to further screen the proposed development, any gaps in the existing hedgerows would be filled where necessary with native, deciduous trees.

Native species planted should be chosen for speed of growth and level of concealment provided. In addition, this would increase the ecological value of the site by improving wildlife corridors and shelter for fauna. Native tree species may include species such as Ash, Hawthorn and Blackthorn.

The structures would be of a similar visual character to existing poultry farm at the site. However, it is proposed to finish the new sheds and silos in a dark green colour, which would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact. Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.

### **8.7 RESIDUAL IMPACTS**

The completed development, on its own or in combination with other developments, would result in no significant residual impact to the visual amenity of the landscape, given that the proposed development would replace the existing poultry houses at the site.

### **8.8 REFERENCES**

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports.*

Environmental Protection Agency (2003) *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements).*

Environmental Protection Agency (2002) *Guidelines on the information to be contained in an Environmental Impact Statement.*

Mayo County Council (2014) *Mayo County Development Plan 2014-2020.*

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Mayo County Council (2008) *Landscape Appraisal of County Mayo.*

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**SECTION B - THE NATURAL ENVIRONMENT**

This Section of the Environmental Impact Assessment Report deals with the potential effects of the proposed development on the natural environment. The effects have been grouped as follows:

- Impacts on Biodiversity – Terrestrial Environment**
- Impacts on Biodiversity – Aquatic Environment**
- Impacts on Land – Soils, Geology and Hydrogeology**
- Impacts on Climate**

The various aspects of the natural environment interact to some degree with each other so that assessing one aspect in isolation can be misleading. For example, the survival of terrestrial fauna can be dependent on floral composition, which is in turn dependent on soil composition and groundwater levels. Similarly, the diversity of aquatic flora and fauna would be impacted by both hydrology and the quality of waters receiving drainage from the proposed scheme.

Human Beings also interact with the natural environment, often by altering land-use and landscape patterns for the purpose of agriculture and settlement.

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## **9.0 BIODIVERSITY - TERRESTRIAL ENVIRONMENT**

### **9.1 INTRODUCTION**

This section outlines the terrestrial biodiversity currently present in the area of the proposed development and assesses the impact of the proposal on the terrestrial habitats and species identified. This section should be read in conjunction with the site layout plans for the proposed development and project description sections of the EIAR. Mitigation measures have been proposed where feasible.

The ecological assessment involved a desktop review and the undertaking of a field assessment of the site to identify habitats and species of flora and fauna present in order to determine the ecological diversity of this area. An Appropriate Assessment Screening Report has been prepared by Ms. Lorraine Wyse of Panther Environmental Solutions (Attachment D.1).

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review to identify Natura 2000 sites within the vicinity of the proposed development and to determine previously recorded flora and fauna for the area;
- To undertake a field assessment of the proposed development site and surroundings;
- To evaluate the biodiversity value of the proposed development and surroundings;
- To determine and assess the potential impacts of the proposed development on terrestrial biodiversity;
- To propose mitigation measures for both the construction and operational phases of the development to reduce potential impacts upon terrestrial biodiversity.

## **9.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY**

### **9.2.1 LEGISLATIVE CONTEXT**

The main legislation pertaining to ecology, biodiversity and nature conservation in Ireland is outlined below.

#### **The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000**

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife and provides for the control of specific activities, which could adversely affect wildlife, for example the regulation of hunting and wildlife trading. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE’S FARM, BEKAN, CO. MAYO**

**The Flora (Protection) Order, 2015 (S.I. 356 of 2015)**

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats.

**European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)**

These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the “Habitats Directive”) and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the “Birds Directive”) into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.

**9.2.2 PLANNING POLICIES**

**National Policies**

A number of documents have been published in relation to the Government’s commitment to sustainable development, including the National Spatial Strategy 2002-2020 and the Sustainable Development: A Strategy for Ireland 1997.

**Regional Policies**

The Regional Planning Guidelines (RPGs) for the West Region 2010-2022, which includes the counties of Galway, Mayo and Roscommon, outlines the long-term spatial planning strategy for the area. As part of the guidelines, a number of policies relating to biodiversity were outlined, as per Table 9.1 below.

**Table 9.1:** Regional Policies Relevant to Biodiversity and the Proposed Development

STRATEGIC POLICY REFERENCE	POLICY
EAP12	To implement the EU Directives with regard to the protection and enhancement of the natural environment.
EAP13	To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.
EAP14	Promote awareness of non-native invasive species and, in consultation with NPWS support control and eradication programmes. Any such eradication programmes proposed close to Natura 2000 sites must be subject to Habitats Directive Assessment

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

STRATEGIC POLICY REFERENCE	POLICY
	procedures.
EAP17	To support the maintenance and, as appropriate, the achievement of favourable conservation status for the habitats and species in the West Region to which the Habitats Directive applies. Local Authorities shall take full account of the requirements of the Habitats and Birds Directives, as these apply both within and without Natura 2000 sites in the performance of their functions.

**Local Policies**

Local planning policies are detailed in the Mayo County Development Plan 2014. This plan was prepared for the 2014-2020 period. Policies and objectives relating to biodiversity are outlined in Table 9.2.

**Table 9.2:** Local Policies and Objectives Relevant to Biodiversity and the Proposed Development

POLICY / OBJECTIVE REFERENCE	POLICY / OBJECTIVE
NH-01	<p>It is an objective of the Council to protect, enhance, conserve and, where appropriate restore:</p> <ul style="list-style-type: none"> <li>- Candidate Special Areas of Conservation, Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed National Heritage Areas, Statutory Nature Reserves, Ramsar Sites and Biogenetic Reserves, including those listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan and any modifications or additional areas that may be so designated during the lifetime of the plan.</li> <li>- Natural habitats and plant and animal species identified under the Habitats Directive, Birds Directive, Wildlife Act and the Flora Protection Order, or any other relevant legislation that may be implemented during the lifetime of the plan.</li> <li>- Features of natural interest and amenity, which provide a unique habitat for wildlife including ecological networks, riparian zones, hedgerows, stonewalls and shelterbelts.</li> <li>- Bogs, fens and turloughs listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan.</li> <li>- Surface waters, aquatic and wetland habitats and freshwater and water-dependent species through the implementation of all appropriate and relevant Directives and transposed legislation.</li> <li>- Trees or groups of trees protected under Tree Preservation Orders listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan , as well as trees and woodlands of particular amenity and nature conservation value, or which make a valuable contribution to the character of the landscape, a settlement or its setting.</li> <li>- Sites of local conservation importance including those identified in the Local Biodiversity Action Plan.</li> </ul>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

POLICY / OBJECTIVE REFERENCE	POLICY / OBJECTIVE
NH-03	It is an objective of the Council to implement Article 6(3) and 6(4) of the EU Habitats Directive, by screening all plans and projects for appropriate assessment and to ensure those with potential to have significant effects on the integrity of Natura 2000 or European Sites (cSACs, SPAs), whether directly (in situ), indirectly (ex-situ) or in combination with other plans or projects, are subject to an appropriate assessment and the preparation of an NIR or NIS in order to inform decision making.
NH-04	It is an objective of the Council to fully integrate wildlife and biodiversity considerations into all areas of the Council's roles and responsibilities and into all its works and operations.
NH-06	It is an objective of the Council to support the implementation of the National Biodiversity Plan.
NH-07	It is an objective of the Council to promote best practice in the control of invasive species in the carrying out of both local authority and private development.
NH-08	It is an objective of the Council to assist in the control of native and non native invasive or harmful species which represent a serious threat to our environment, fresh water systems and lakes.
NH-09	It is an objective of the Council to utilise appropriate opportunities to enhance and create wildlife habitats where they arise.

**Biodiversity Plans**

Ireland's third National Biodiversity Plan 2017–2021, identifies actions towards understanding and protecting biodiversity with a vision that, "*biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally*".

A number of Local Biodiversity Action Plans have been prepared, including the County Mayo Biodiversity Action Plan 2010-2015, which identifies the actions required to protect and enhance biodiversity at local level.

**9.3 METHODOLOGY**

This section has been prepared following a desktop review, the undertaking of a field assessment by Ms. Lorraine Wyse on the 20<sup>th</sup> April 2018 and by reviewing the Appropriate Assessment Screening Report prepared for the proposed development following the outline of the NPWS Guidance document (DoEHLG, 2009).

**9.3.1 DESKTOP REVIEW**

The desktop review comprised gathering information on designated sites within 15km of the proposed development, reviewing mapping sites to provisionally identify any potential ecologically important features prior to the site assessment and determining what notable species, including protected, rare or invasive, had previously been recorded for the proposed

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

development area and environs. As part of the desktop study, cognisance was taken of the Appropriate Assessment Screening Report prepared for the proposed development and included as Attachment D.1.

### **9.3.2 SITE ASSESSMENT**

A site assessment was undertaken on the 20<sup>th</sup> April 2018 by Ms. Lorraine Wyse, BSc. of Panther Environmental Solutions Limited to examine the ecological context of the proposed development. This comprised a walkover of the proposed development at the proposed site.

The assessment involved determining the habitats present within the proposed development. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", (Fossitt, 2000), a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.*, 2011). The relative abundances of flora was determined using the DAFOR Scale, an acronym for the abundance levels – Dominant, Abundant, Frequent, Occasional and Rare.

During the site walkover, notable flora and fauna were recorded, with an emphasis on statutorily protected or rare species, species of conservation significance and invasive species. Bird species were identified by sight and sound. Direct observation methods were used for the survey of fauna, however, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests/droppings, food items and hair. Cognisance was also taken of guidelines published by the National Roads Authority (NRA) for Badger (*Meles meles*) and Otter (*Lutra lutra*) activity (NRA, 2006a; NRA, 2006b).

### **9.3.4 SURVEY LIMITATIONS**

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time. This study is a snapshot in time and should not be regarded as a complete study.

The site assessment was undertaken within the optimal habitat survey period of April to September, the growing season for the majority of plants (Smith *et al.*, 2011). The site assessment was also undertaken during the optimal survey period for avifauna. With regards limitations for mammal surveying, a bat survey was not undertaken as part of the site assessment.

## **9.4 DESCRIPTION OF EXISTING ENVIRONMENT**

### **9.4.1 DESIGNATED SITES**

The subject site is not designated under any Regional, National or European Environmental Designation. It does not therefore require assessment under the Wildlife (Amendment) Act 2000 (S.I No. 38 of 2000) or the European Communities (Natural Habitats) Regulations, 1997 (S.I No. 94 of 1997).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Maps detailing European sites within 15km of the proposed site are included in Attachment D.1 – Appendix A. Seven Special Areas of Conservation (SAC) sites occur within 15km of the proposed development and are shown in the following table:

**Table 9.3:** Designated Sites within 15km of the Proposed Development

SITE NAME	DESIGNATION	SITE CODE	DISTANCE
River Moy	SAC	002298	3.8km NE
Lough Corrib	SAC	000297	8.5km SE
Errit Lough	SAC	000607	10.8km NE
Urlaur Lakes	SAC	001571	11.3km NE
Carrowbehy/Caher Bog	SAC	000597	12.9km NE
Derrinea Bog	SAC	000604	13.3km NE
Drumalough Bog	SAC	002338	15km NE

There are also nine proposed NHAs within 15km of the proposed development, comprising of bogland and lakes. These are listed in the following table:

**Table 9.4:** Proposed Designated Sites within 15km of the Proposed Development

SITE NAME	DESIGNATION	SITE CODE	DISTANCE
Mannin and Island Lakes	pNHA	001910	3.9km NE
Errit Lough	pNHA	000607	10.8km NE
Attishane Turlough	pNHA	001618	11.1km SE
Urlaur Lakes	pNHA	001571	11.3km NE
Carrowbehy/Caher Bog	pNHA	000597	12.9km NE
Derrinea Bog	pNHA	000604	13.3km NE
Lough Gowen	pNHA	000523	13.5km N
Lough O'Flynn	pNHA	001645	14.1km E
Drumalough Bog	pNHA	001632	15km NE

Of the seven SAC sites within 15km of the proposed development, only one site, Lough Corrib SAC (Site Code: 000297) is located within the same river catchment (Corrib catchment). Therefore, the proposed development would be hydrologically connected to the Lough Corrib SAC.

However, it should be noted that the proposed development site is located a short distance, approximately 200m, away from the Moy and Killala Bay catchment, in which the River Moy SAC (Site Code: 002298) is located. As the proposed development site is located in a karst area, the nature of groundwater flow can be unpredictable. Although considered unlikely, there may be a potential connection to the River Moy SAC.

Therefore, for this assessment, taking into consideration the scale of the proposed development, distances to designated sites and potential hydrological connectivity, the sites considered to be within the zone of influence of the proposed development are the River Moy SAC (Site Code: 002298) and Lough Corrib SAC (Site Code: 000297). Given the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

considerable distances, and in the absence of a likely source-pathway-receptor relationship, the remaining SAC sites within 15km of the proposed development have been screened out.

**River Moy SAC**

The conservation objectives for the River Moy SAC (Site Code: 002298) are to maintain or restore the favourable conservation condition of the qualifying interests. The SAC, measuring almost 15,390 hectares, is designated for six Annex I habitats, including two priority habitats, and five Annex II species. The Annex I habitats include degraded raised bog [7120], Rhynchosporion vegetation [7150], alkaline fens [7230], old oak woodlands [91A0] and the priority habitats raised bog (active) [7110] and alluvial forests [91E0]. The Annex II species include White-clawed Crayfish (*Austropotamobius pallipes*), Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), Atlantic Salmon (*Salmo salar*) and Otter (*Lutra lutra*).

According to the site's Natura 2000 Data Form, the site comprises almost the entire freshwater element of the Moy and its tributaries, including both Lough Conn and Lough Cullin. The underlying geology is Carboniferous Limestone for the most part. The river and its tributaries rise in a number of locations, some of which are upland areas dominated by blanket bog and heath. Throughout most of its course, however, the river flows through low-lying countryside where most of the adjoining land consists of agricultural grassland. In addition to river and lake habitats, the site contains adjoining habitats of ecological interest such as raised bogs, heath, wet grassland and deciduous woodland. Small pockets of conifer plantations, close to the lakes and along parts of the rivers, are included. Improved grassland is also included where it occurs along the river channels.

The site contains good examples of the Annex 1 habitats active raised bog, degraded raised bog, Rhynchosporion vegetation, alkaline fen, alluvial woodland and old oak woodlands. Water quality of the river channels is generally good and the majority is classified as unpolluted. Lough Conn is classified as a mesotrophic system, while Lough Cullin is classified as an oligotrophic system. The rivers and lakes support important populations of Otter, White-clawed Crayfish, Brook Lamprey and Sea Lamprey. The Moy system is one of the most important in Ireland for Salmon and is an internationally renowned fishery. Lough Conn supports a nationally important population of Greenland White-fronted Goose (*Anser albifrons flavirostris*) and has regionally important numbers of Whooper Swan (*Cygnus cygnus*) and Golden Plover (*Pluvialis apricaria*). The lakes support a range of other wintering waterfowl, notably nationally important populations of Tufted Duck (*Aythya fuligula*) and Goldeneye (*Bucephala clangula*). Lough Conn / Cullin represents one of only 4 breeding sites in Ireland for Common Scoter (*Melanitta nigra*).

A range of mammals listed in the Red Data Book occur within the site, including Pine Marten (*Martes martes*) and Daubenton's Bat (*Myotis daubentoni*). At least five Red Data Book plant species occur, including Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*).

The site vulnerabilities, including any key pressures or trends within and around the River Moy SAC that have been identified as impacting upon the site, may be summarised as forestry, agricultural intensification, pollution of surface waters and invasive species.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Lough Corrib SAC**

The conservation objectives for the Lough Corrib SAC (Site Code: 000297) are to maintain or restore the favourable conservation condition of the qualifying interests. The SAC, measuring almost 25,208 hectares, is designated for 15 Annex I habitats, including six priority habitats, and nine Annex II species.

The Annex I habitats include the following, with priority habitats indicated by means of an asterisk:

- Oligotrophic waters containing very few minerals [3110]
- Oligotrophic to mesotrophic standing waters [3130]
- Hard Water Lakes [3140]
- Floating River Vegetation [3260]
- Orchid-rich Calcareous Grassland\* [6210]
- Molinia Meadows [6410]
- Raised Bog (Active)\* [7110]
- Degraded Raised Bog [7120]
- Rhynchosporion Vegetation [7150]
- Cladium Fens\* [7210]
- Petrifying Springs\* [7220]
- Alkaline Fens [7230]
- Limestone Pavement\* [8240]
- Old Oak Woodlands [91A0]
- Bog Woodland\* [91D0]

The Annex II species include Freshwater Pearl Mussel (*Margaritifera margaritifera*), White-clawed Crayfish (*Austropotamobius pallipes*), Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), Atlantic Salmon (*Salmo salar*), Lesser Horseshoe Bat (*Rhinolophus hipposideros*), Otter (*Lutra lutra*), Slender Green Feather-moss (*Drepanocladus vernicosus*) and Slender Naiad (*Najas flexilis*).

According to the site's Natura 2000 Data Form, Lough Corrib is the second largest lake in Ireland. The lake supports extensive Chara beds, many wooded islands and large areas of swamp and fen in the shallow south-east section. The north-west part is deeper, wider and more oligotrophic. Shore is mainly karst, bog and small areas of callow. The surroundings are farmland and holiday-home areas. Most of the main rivers and their tributaries which flow into the lake are included within the site, including the Abbert, Clare, Cong, Cornamona, Dalgan, Drimeen, Grange, Owenwee, Owenriff and Sinking rivers. The River Corrib flows from the southern point of the lough into the sea at Galway city.

The site is of immense importance for the occurrence of scarce and specialised habitats, as well as animal and plant species. Lough Corrib is the second largest oligotrophic lake in the country and is a superb example of a hardwater system. The site holds 15 Annex I habitats, 6 of these are priority Annex I habitats of the EU Habitats Directive, 5 Red Data Book plant species, also Slender Green Feather-moss and Otter, and a rare chironomid *Corynorera ambigua*, good populations of Freshwater Pearl Mussel, White-clawed Crayfish, Sea Lamprey, Brook Lamprey and Atlantic Salmon. The site is also important for wintering and

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

breeding birds with Greenland White-fronted Goose (*Anser albifrons flavirostris*), Common Tern (*Sterna hirundo*) and Arctic Tern (*Sterna paradisaea*).

The site vulnerabilities, including any key pressures or trends within and around the Lough Corrib SAC that have been identified as impacting upon the site, may be summarised as agricultural intensification, pollution of surface waters, invasive species, peat extraction and other human intrusions or disturbances.

## **9.4.2 BIODIVERSITY**

### **Flora and Habitats**

The location of the proposed development is in a rural, farming area, primarily dominated by pastureland, at an approximate elevation of 100-110m above sea level. The proposed site is located approximately 250m west of Bekan Lough, with areas of peatland and coniferous forest located within the environs.

Throughout the area, the land is farmed with fields enclosed with a varied mix of hedges, banks, dry stone walls, drainage ditches and fences. Pasture for cattle and sheep is the primary agriculture type in the area. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape.

The proposed development site comprises of three poultry houses and a substantial area of hardstanding, surrounded by hedgerows and stone walls. During the site walkover, four main habitats were identified.

The dominant habitat at the site was identified as buildings and artificial surfaces (BL3) habitat, with little to no vegetation present. Areas of recolonising bare ground (ED3) was noted adjacent each poultry house where areas of stone have been recolonised by a range of flora such as various grasses, Buttercup (*Ranunculus* spp.), Dandelion (*Taraxacum* spp.), Cleavers (*Galium aparine*), Daisy (*Bellis perennis*), Dock (*Rumex* spp.), Groundsel (*Senecio vulgaris*), Hairy Bitter-cress (*Cardamine hirsute*), Herb-Robert (*Geranium robertianum*), Nettle (*Urtica dioica*), Ribwort Plantain (*Plantago lanceolata*), Thistle (*Cirsium* spp.), and Willowherb (*Epilobium* spp.).

The boundaries of the site are comprised of hedgerows and stone walls. The eastern boundary, comprised of hedgerow (WL1) habitat, is dominated by Leyland Cypress (*Cupressus leylandii*), with ground flora including various grasses, Bramble (*Rubus fruticosus*), Buttercup, Cleavers, Dandelion, Nettle, Thistle and Willowherb. The southern and western boundaries, also hedgerow (WL1) habitat, are comprised of Gorse (*Ulex europaeus*), Hawthorn (*Crataegus monogyna*), Bramble, Elder (*Sambucus nigra*), Ivy and Willow (*Salix* spp.). Ground flora includes Buttercup, Cleavers, Dandelion, Dock, Foxglove (*Digitalis purpurea*), Herb-Robert, Nettle, Sticky Mouse-ear (*Cerastium glomeratum*) and Willowherb.

A portion of the northern boundary along the access roadway was identified as stone walls (BL1) habitat, dominated by grasses and mosses, with other flora present including Bramble, Buttercup, Dandelion, Foxglove, Nettle, Speedwell (*Veronica* spp.), Sticky Mouse-ear, Thistle and Willowherb. The remainder of the northern boundary is comprised of hedgerow

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

(WL1) / stone walls (BL1) mosaic habitat, with similar flora to species encountered at the northern and western hedgerows.

The four habitats identified as per the Fossitt habitat classification scheme for the proposed development are summarised in Table 9.5, and are shown on a habitat map included as Figure 9.1. A photo log and full list of plants recorded are included in Attachments D.2 and D.3 respectively.

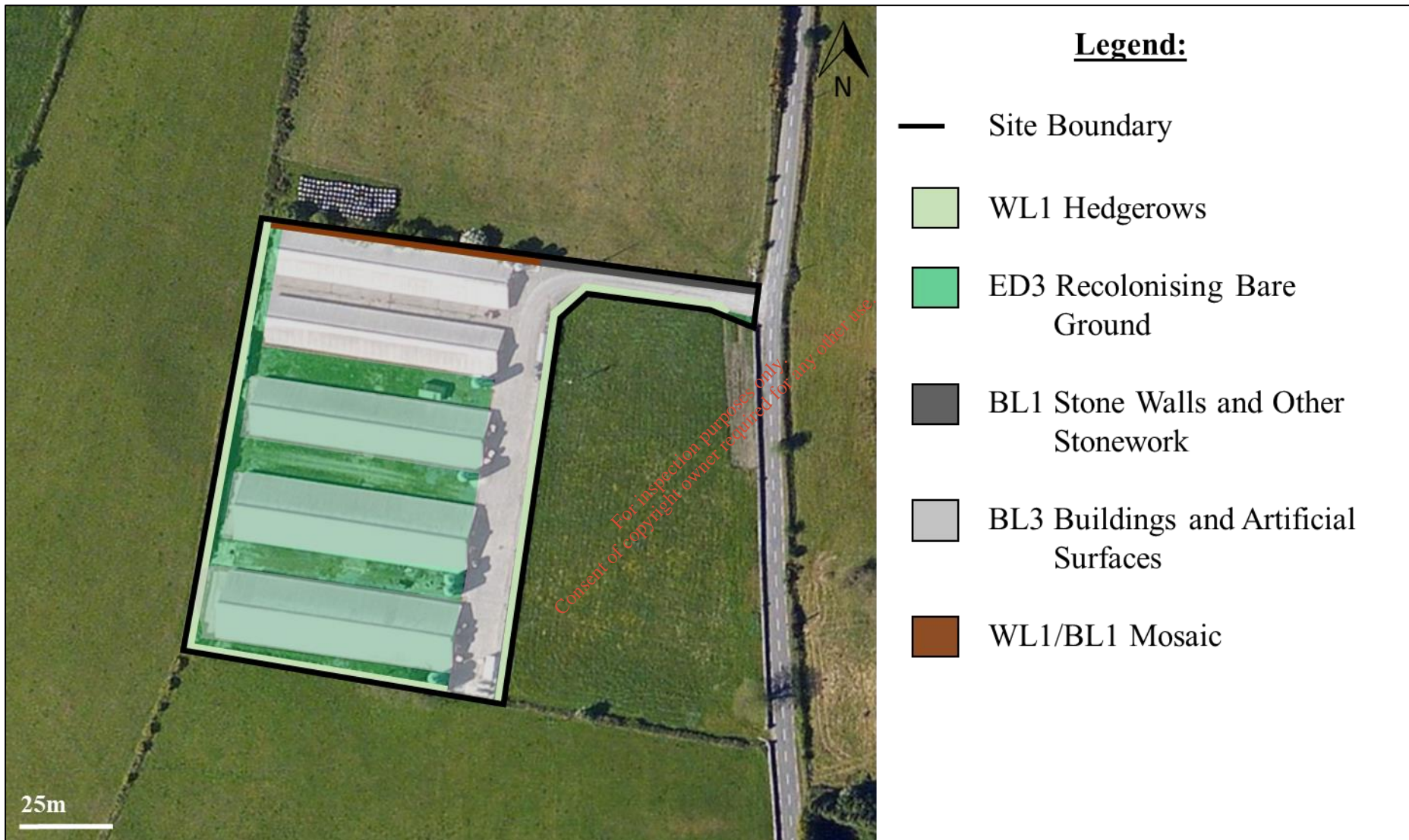
**Table 9.5:** Summary of Habitats Identified at the Proposed Development Site

<b>HABITAT CLASSIFICATION HIERARCHY</b>		
<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>
<b>W</b> – Woodland and scrub	<b>WL</b> – Linear woodland / scrub	<b>WL1</b> – Hedgerows
<b>E</b> – Exposed rock and disturbed ground	<b>ED</b> – Disturbed ground	<b>ED3</b> – Recolonising bare ground
<b>B</b> – Cultivated and built land	<b>BL</b> – Built land	<b>BL1</b> – Stone walls and other stonework
		<b>BL3</b> – Buildings and artificial surfaces

Generally, the habitats identified during the onsite assessment were of low conservation value. No plant species of conservation significance or invasive plant species were noted during the site assessment.

Beyond the site boundary, improved agricultural grassland (GA1) habitat dominates, with areas of hedgerows (WL1), stone walls (BL1), wet grassland (GS4) and cutover bog (PB4) also present.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO



**Figure 9.1:** Habitat Map of Encountered Habitats at the Proposed Development Site, Bekan, Co. Mayo.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Fauna**

Approximately 80% of the land area of Ireland is given over to farming. Within this section, there are three main types of habitat, hedgerows, farmyard and fields. A wide variety of types of fauna, typical of that found throughout the rest of Ireland, would be expected to be present in the area, including bat species, Hedgehog (*Erinaceus europaeus*), Rabbit (*Oryctolagus cuniculus*), Irish Hare (*Lepus timidus hibernicus*), Fox (*Vulpes vulpes*), Badger (*Meles meles*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), Red Squirrel (*Sciurus vulgaris*), Grey Squirrel (*Sciurus carolinensis*), Wood Mouse (*Apodemus sylvaticus*), Pygmy Shrew (*Sorex minutus*) and the Common Rat (*Rattus norvegicus*).

No fauna were observed during the site walkover. No evidence of fauna, including burrows/setts/nests, tracks or droppings were recorded at the proposed site. The hedgerow habitats at the site may provide suitable foraging habitat for bat species. Given the design and use of the poultry houses at the site, it is not considered that the existing houses would provide suitable roosting conditions for bat species.

There are no freshwater habitats at the development site, therefore the site does not support aquatic fauna such as the Common Frog (*Rana temporaria*) or Smooth Newt (*Lissotriton vulgaris*).

**Avifauna**

Bird species noted during the site walkover included Robin (*Erithacus rubecula*), Blackbird (*Turdus merula*), Starling (*Sturnus vulgaris*), Chaffinch (*Fringilla coelebs*), Wren (*Troglodytes troglodytes*), Blue Tit (*Parus caeruleus*), Coal Tit (*Parus ater*), Woodpigeon (*Columba palumbus*) and Rook (*Corvus frugilegus*). Birds recorded offsite, within the immediate vicinity of the proposed development, included Dunnock (*Prunella modularis*), Magpie (*Pica pica*) Mistle Thrush (*Turdus viscivorus*) and Pheasant (*Phasianus colchicus*).

Given the agricultural land use in the area, it would be expected that common grassland and hedgerow bird species would be present in the area. The proposed site would likely be within the hunting ranges of birds of prey such as Kestrel (*Falco tinnunculus*), Sparrowhawk (*Accipiter nisus*) and Buzzard (*Buteo buteo*).

Table 9.6 details the protection and conservation concern statuses of the bird species noted during the site assessment. None of the bird species are listed under Annex I of the E.U. Birds Directive. Two species, Robin and Starling, are amber listed under the BoCCI classification.

**Table 9.6:** Protection and Conservation Concern Statuses for Recorded Birds

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BOCCI* RED LIST	BOCCI* AMBER LIST
Blackbird	<i>Turdus merula</i>	-	-	-
Blue Tit	<i>Parus caeruleus</i>	-	-	-
Chaffinch	<i>Fringilla coelebs</i>	-	-	-
Coal Tit	<i>Parus ater</i>	-	-	-
Robin	<i>Erithacus rubecula</i>	-	-	√
Rook	<i>Corvus frugilegus</i>	-	-	-
Starling	<i>Sturnus vulgaris</i>	-	-	√

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BOCCI* RED LIST	BOCCI* AMBER LIST
Woodpigeon	<i>Columba palumbus</i>	-	-	-
Wren	<i>Troglodytes troglodytes</i>	-	-	-

\*The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.

### **National Biodiversity Data Centre Records**

In addition to the site walkover, flora and fauna records were reviewed on the National Biodiversity Data Centre website for the footprint of the development site and the immediate area.

No protected flora species or invasive species listed under Part 1 of the Third Schedule of the European Communities (Birds and Habitats) Regulations 2011 were recorded for the development site and surrounding 5km.

Flora and fauna records for the previous 15 years were obtained for the 10km square in which the site is located. Three invasive flora species were returned: Canadian Waterweed (*Elodea canadensis*), Bohemian Knotweed (*Fallopia japonica x sachalinensis*) and Sycamore (*Acer pseudoplatanus*).

A number of bird records returned were birds favouring wetland habitat, including Eurasian Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Tufted Duck (*Aythya fuligula*), Little Grebe (*Tachybaptus ruficollis*), Mute Swan (*Cygnus olor*), Coot (*Fulica atra*), Great Cormorant (*Phalacrocorax carbo*), Black-headed Gull (*Larus ridibundus*) and Pochard (*Aythya ferina*), in addition to wintering Eurasian Wigeon (*Anas penelope*), Snipe (*Gallinago gallinago*) and Whooper Swan (*Cygnus cygnus*).

Other bird species of note which may be present include Skylark (*Alauda arvensis*), Spotted Flycatcher (*Muscicapa striata*), Common Starling (*Sturnus vulgaris*), Grasshopper Warbler (*Locustella naevia*), Northern Wheatear (*Oenanthe oenanthe*), House Martin (*Delichon urbicum*), Sand Martin (*Riparia riparia*), Swallow (*Hirundo rustica*), Common Linnet (*Carduelis cannabina*), House Sparrow (*Passer domesticus*), Lapwing (*Vanellus vanellus*), Eurasian Curlew (*Numenius arquata*), Golden Plover (*Pluvialis apricaria*), Barn Owl (*Tyto alba*), Kestrel (*Falco tinnunculus*), Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*).

Fauna of note recorded in the area for the previous 15 years included the protected Freshwater White-clawed Crayfish (*Austropotamobius pallipes*), Smooth Newt, Marsh Fritillary (*Euphydryas aurinia*), Badger, Pygmy Shrew, Red Squirrel, Otter (*Lutra lutra*), and Pipistrelle bat species (*Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*), and the invasive American Mink (*Mustela vison*).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

## **9.5 IMPACTS**

### **9.5.1 "DO-NOTHING"**

Should the development not be built, there would be no change to the environmental impacts of the existing site.

### **9.5.2 "DO-SOMETHING"**

#### **Designated Sites – Natura 2000 Sites**

A Screening for Appropriate Assessment report has been prepared for the proposed development and is included as Attachment D.1.

The proposed development does not directly impinge on any part of a Natura 2000 site, and as such would not be expected to impact upon a protected site through destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

The closest Natura 2000 sites to the proposed development are the River Moy SAC (Site Code: 002298) and Lough Corrib SAC (Site Code: 000297), located 3.8km north-east and 8.5km south-east from the site respectively.

It is not considered that the proposed development site would contain the habitats and species for which these Natura 2000 sites have been designated. No peatland, fen, woodland, limestone pavement or grassland habitats of note are present at the site. No aquatic habitats of note are present at the site, therefore aquatic qualifying interests of the River Moy SAC and Lough Corrib SAC such as the White-clawed Crayfish or Atlantic Salmon would not be present.

Given the site's current use as a poultry farm, with habitats of low conservation value, and in the absence of evidence of otter (including spraints and tracks) during the site assessment, it is unlikely the site would support Otter. In the absence of woodlands and dense vegetation, it is not considered that the site would support Lesser Horseshoe Bat.

The potential disturbance on protected habitats and species due to noise from the operation of the proposed poultry development would not be considered significant, given the scale of the proposed development and the distance between the proposed development and designated sites. Furthermore, a noise management plan would be in place for the site, which would ensure minimal noise pollution outside the site boundary.

There would be no process effluent from the site operations and, according to the Preliminary Flood Risk Assessment (PFRA) indicative flood mapping website, the site is not located within fluvial, pluvial or groundwater flood zones.

While the proposed development site is located within the same catchment as the Lough Corrib SAC, it is located a considerable distance upstream of the site (greater than 50km), as drainage from the area enters the River Robe, from where it enters Lough Mask, before entering the Lough Corrib SAC. Although considered unlikely, given that the proposed development site is located within a karst area, the nature of groundwater flow can be unpredictable, and therefore, there may be a potential connection to the River Moy SAC.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

All storm-water from roofs and hardstanding areas of the proposed development would be collected and discharged to ground via a system designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground. The stormwater system would include a silt trap, interceptor and soak pits which would discharge to ground. The proposed silt trap and interceptor would remove solids and any hydrocarbons, ensuring there would be no potential contamination of surface water.

It is therefore considered that due to the drainage system design and the distance of the proposed development to Lough Corrib SAC and River Moy SAC, there would be no significant impact upon a designated site due to drainage.

The potential impacts and mitigation measures for water quality are further discussed in Sections 10 and 11 of this EIAR.

Poultry litter would be collected at the end of each batch and transported by the contractors M. J. Kehoe (registered with the Department of Agriculture, Food and Marine, ABP Transport Registration No. HAC2340), to the Walsh Mushrooms composting facility in Co. Wexford. Therefore, there would be no landspreading of litter near protected sites within 15km of the proposed development, and there would be no risk to the aquatic environment.

All wash-water would be stored within one underground wash-water tank for application to lands held by the applicant. The spreading of wash-water would be done so in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic manures.

Due to the site location, design and operational measures, there is considered to be a low risk that this development would have an adverse influence on the Natura 2000 network or any site's conservation objectives. Its operation would not affect any site significantly, as it would be managed in compliance with the Nitrates Directive and all other statutory obligations along with best practice for industry.

**Determination of Ecological Value**

The ecological value of the habitat types identified at the proposed development site have been assessed following the criteria outlined in the National Roads Authority (NRA) guidelines (2009). Table 9.7 below details the habitats recorded at the site and their associated ecological value.

**Table 9.7:** Ecological Value of Identified Habitats

HABITAT TYPE	HABITAT RATING	QUALIFYING CRITERIA
Hedgerows (WL1)	Local importance, higher value	Area of semi-natural habitat, approximately half of which is dominated by native species. May provide opportunities for bird nesting and foraging for bats.
Recolonising bare ground (ED3)	Local importance, lower value	Area of disturbed ground with recolonising vegetation. Low ecological value.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

HABITAT TYPE	HABITAT RATING	QUALIFYING CRITERIA
Stone walls and other stone work (BL1)	Local importance, lower value	Stone walls with some areas covered by vegetation (mainly grasses and mosses). Low ecological value.
Buildings and artificial surfaces (BL3)	Local importance, lower value	Area of concrete and poultry houses with no vegetation. Low ecological value.

**Flora**

The proposed development would occupy the same footprint as the existing poultry farm at the site, mainly located upon buildings and artificial surfaces (BL3) and recolonising bare ground (ED3) habitats. There would be a potential minor loss of plant species from the proposed footprint, where areas of ED3 habitat are disturbed. However, given the small area of ED3 habitat and its low conservation value, this would not be considered significant.

No existing hedgerows would be removed or altered as part of the development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would add ecological value to the site.

No rare plant species or protected flora under the Flora (Protection) Order 2015, were recorded within the proposed development area or immediate vicinity during the site assessment.

No invasive species of concern were noted as present during the onsite assessment. Given the nature of the operational phase of the proposed development (i.e. no soil movement works or importation of material with the potential to contain invasive plant species), it is considered that there would be no risk of introducing invasive species during the operational phase.

As noted in the section above, wash-waters would be applied to lands held by the applicant, in accordance with the Nitrates Regulations. This would minimise the risk of pollution occurring, and therefore would not result in a significant impact upon flora.

**Birds**

As the proposed development would take place primarily within man-made habitats and habitats of low ecological value, the potential impacts upon bird species would be greatly reduced.

It is noted that many of the bird species recorded during the site assessment and recorded by the National Biodiversity Data Centre for the area are common grassland and hedgerow bird species.

There would be no displacement of avifauna due to vegetation removal at the proposed site, as all existing hedgerows would be retained. The proposed filling of gaps in hedgerows where necessary with native species would be of benefit to bird species.

No significant impacts on birds would be envisaged due to noise from the proposed development. A noise management plan would be in place for the development to ensure minimal noise pollution outside the site boundary.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Fauna**

As the proposed development would take place primarily within man-made habitats and habitats of low ecological value, the potential impact upon mammals due to habitat loss, habitat fragmentation or disturbance would be greatly reduced.

There would be no displacement of fauna due to vegetation removal at the proposed site, as all existing hedgerows would be retained. The proposed filling of gaps in hedgerows where necessary with native species would be of benefit to fauna species.

There would be no significant potential disturbance upon fauna due to noise from the proposed development. As mentioned above, a noise management plan would be in place for the development to ensure minimal noise pollution outside the site boundary.

Intensive animal farms have historically been associated with rodent infestations. The feed silos and broiler houses would be effectively sealed against pests, thereby reducing the attractiveness of the site as a shelter or source of food for pests. Rodent control on the farm would be managed by Ecolab, who would install baiting in designated areas around the site.

The proposed development would not include the installation of significant outdoor artificial lighting. Therefore, there would be no disturbance to bat species, should they be present in the area, due to illumination of their foraging and potential nearby roosting habitats.

As there are no freshwater habitats the site, the proposed development would not have any potential impact upon aquatic fauna.

**9.6 MITIGATION MEASURES**

The nature of the proposed development is such that the loss of habitats generally of low ecological value is of low impact and no mitigation is required.

The following design and operational measures would further reduce the likelihood of significant impacts to Natura 2000 sites and the ecology of the area:

- Good housekeeping practices should be observed throughout the operational phase.
- The site would not propose to store any significant volumes of chemicals or materials, which could pose a significant spill risk to the aquatic environment.
- The ventilation system would ensure good dispersion of air, minimising the deposition of dust on rooftops.
- There would be a minimal risk of spillage of poultry litter, as litter would be removed directly from the house floor in a covered trailer after the removal of each batch.
- Removal and transport of litter should be avoided during heavy rain.
- Rodent populations on the farm would be controlled by a combination of rodenticide (managed by Ecolab), high spec buildings, good housekeeping and well-designed storage and dispensing of feed.

## **9.7 CONSTRUCTION IMPACTS AND MITIGATION**

### **9.7.1 IMPACTS**

Construction works for the proposed development could have the potential to impact upon the biodiversity of the area and designated sites through disturbance to habitats and species, introduction of an invasive flora species and a deterioration in water quality. The potential impacts and mitigation measures for water quality are further discussed in Section 10.

Site clearance has the largest impact on biodiversity, involving considerable soil disturbance. Site clearance would have least impact on fauna if carried out in the August-November period, avoiding the main bird and mammal breeding time. Excavation and infill require the use of heavy machinery, which has to be stored and maintained on site, but also has to gain access to the working area. This may cause damage to a wider zone of vegetation, particularly in wet weather when compaction and physical damage is likely.

The construction phase of the development would not result in the alteration of any habitat type present at the site, with the proposed development to be situated within the footprint of the existing poultry operation. Therefore, there would be no significant loss of habitat due to the proposed development.

No existing hedgerows would be removed or altered as part of the development. It would be planned to fill any gaps in the existing hedgerows where necessary with native, deciduous trees, which would add ecological value to the site.

During construction works, there is potential for invasive species to be introduced to an area through the movement of materials, such as soil and stone, and the arrival of construction plant and equipment from an area with invasive species. Materials containing invasive species such as Japanese Knotweed (*Fallopia japonica*) are considered "controlled waste" and, as such, there are legal restrictions on their handling and disposal. In Ireland, under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), it is a legal requirement to obtain a license to move "vector materials" listed in the Third Schedule, Part 1. Under Regulation 49(2) of the aforementioned regulations, it is an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow in any place any plant which is included in Part 1 of the Third Schedule.

No importation of soil to the proposed development site would be required, given that the proposed development would be located within the existing poultry farm footprint, upon hardstanding.

Any stone required would be sourced locally where possible. Material delivery loads would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site.

Throughout the construction phase, regular site inspections would be undertaken to ensure no growth of invasive species has taken place. As standard practice, construction plant would be thoroughly washed and inspected prior to arriving to, and leaving from, the development site. Therefore, it is considered that there would be no significant risk of introducing invasive species during construction works from importation of materials or the arrival to site of construction plant and equipment.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

While there would be increased noise emissions during the construction phase of the development, these would not be considered to pose a significant risk to fauna owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Where possible, no construction works would be conducted outside of normal working hours, therefore there would be no disturbance to nocturnal species.

During the construction phase of the development, there would be potential for dust emissions, which may have the potential to impact upon flora by disrupting photosynthesis, respiration and transpiration processes due to the blocking of leaf stomata and may cause disturbance to fauna. However, dust emissions would not be considered to have a significant potential impact on terrestrial biodiversity due to the transient nature of construction works and the implementation of dust control measures, as discussed in Section 5.7 of this EIAR. It is considered unlikely that dust emissions would impact upon the River Moy SAC or the Lough Corrib SAC, given the distance of the proposed site to the designated sites and dust control measures implemented as standard practice.

No protected fauna, or evidence of protected fauna, were noted as present on the proposed development site. As the majority of the site is of low ecological value, the potential for the site to support protected fauna species is reduced. Should a protected species such as badger (*Meles meles*) or bat species be found during demolition or construction works, an officer of the National Parks and Wildlife Services (NPWS) would be notified prior to the resumption of construction works.

Direct mortality of fauna may occur due to the removal of vegetation at the site, in addition to the use of heavy construction plant and machinery. Mortality of fauna is most likely to occur during the mammal and bird breeding season, when young are at their most vulnerable. As the existing hedgerows at the site would be retained, there would be negligible potential for mortality to occur.

### **9.7.2 MITIGATION**

The following mitigation measures are proposed to ensure there would be no significant impact upon the ecology of the area and designated sites:

- All construction works should be confined to the development footprint;
- As a minimum, the construction work contractor should comply with all legislative provisions relating to hedgerow / tree removal and the protection of birds and bats and would have regard to reducing impacts on nesting birds and breeding/roosting bats;
- In the unlikely event works are required on existing hedgerows, no works would be conducted during 1<sup>st</sup> March to the 31<sup>st</sup> August so as not to disturb nesting bird species;
- Where sections of hedgerows require gaps to be filled, only native flora species should be used;
- Should a protected fauna species, such as the badger or common frog, be found during the construction phase of the project, an officer of the NPWS should be consulted prior to the resumption of construction works. Works should only continue in accordance with advice from the NPWS Conservation Ranger;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- In the unlikely event of an invasive flora species listed under Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity should cease until the invasive plant had been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011. Cognisance should be taken of the National Roads Authority's Guidelines, "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*".
- All plant machinery and equipment should be maintained in good working order and regularly inspected.

## 9.8 RESIDUAL IMPACTS

There would be no residual impacts upon the biodiversity of the area, given that the proposed development would be located within the footprint of the existing poultry operation, and given that there would be no removal or alteration to existing hedgerows at the site.

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## **10.0 BIODIVERSITY – AQUATIC ENVIRONMENT**

### **10.1 INTRODUCTION**

The abundant supplies of surface and groundwater within Ireland dictate the importance of measures to protect the aquatic environment. This chapter outlines the aquatic environment currently present in the area and assesses the impact of the proposed development comprising of four newly constructed poultry houses with a total capacity of 100,000 places for broilers, feed silos and all ancillary site works and services at Bekan, Co. Mayo.

This section should be read in conjunction with the site layout plans for the proposed development and the project description sections of the EIAR. Risks to the aquatic environment were considered during the design of the proposed development and mitigation measures have been proposed where feasible.

This aquatic ecological assessment involved a desktop review and site assessment. An Appropriate Assessment Screening Report has been prepared by Panther Environmental Solutions (Attachment D.1).

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review of the aquatic habitats within the vicinity of the proposed development;
- To assess the current water quality status of the River Robe within the vicinity of the proposed development and Bekan Lough;
- To undertake a field assessment of the proposed development site and surroundings in the context of aquatic ecology;
- To determine and assess the potential impacts of the proposed development on aquatic biodiversity;
- To propose mitigation measures for both the construction and operational phases of the development to reduce potential impacts upon aquatic biodiversity.

## **10.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY**

### **10.2.1 LEGISLATIVE CONTEXT**

The main legislation pertaining to aquatic ecology, biodiversity and nature conservation in Ireland is briefly outlined below.

#### ***The Local Government (Water Pollution) Act, 1977, as Amended***

This Act provides for the control of water pollution, by prohibiting the discharge of unlicensed polluting matter into waters.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009)**

The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.

**The Fisheries (Consolidation) Act, 1959, as Amended**

The Act prohibits the entry of polluting substances into waters, which have the potential to adversely impact upon fish, prohibits the obstruction of passage of certain fish species and provides legal protection to the spawn/fry of eels, salmon and trout, in addition to their spawning or nursery grounds.

**Fisheries (Amendment) Act, 1999**

This Act outlines the responsibilities of the Regional Fisheries Board to ensure the protection and conservation of fish and their habitats within its area of jurisdiction.

**European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. 293 of 1988)**

These regulations give statutory effect to Directive 78/659/EEC. The regulations designate salmonid waters, specify the quality standards for designated salmonid waters and outline the monitoring requirements.

**Water Framework Directive (2000/60/EC)**

The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain "good status" in all water bodies.

**The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000**

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife. Under the Amendment Act of 2000, the scope was broadened to include freshwater aquatic species, including the majority of fish. The Act provides for the control of specific activities, which could adversely affect wildlife. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

**European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)**

These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the "Habitats Directive") and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE’S FARM, BEKAN, CO. MAYO**

“Birds Directive”) into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. Under the Habitats Directive, a number of Annex I habitats are aquatic habitats, while Annex II species include Atlantic salmon, white-clawed crayfish and the three species (Brook, River and Sea) lamprey.

**The Flora (Protection) Order, 2015 (S.I. 356 of 2015)**

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats. The Flora (Protection) Order includes aquatic species such Opposite-leaved Pondweed (*Groenlandia densa*) and Short-leaved Water-Starwort (*Callitriche truncata*).

**10.2.2 PLANNING POLICIES**

**Regional Policies**

The Regional Planning Guidelines (RPGs) for the West Region 2010-2022, which includes the counties of Galway, Mayo and Roscommon, outlines the long-term spatial planning strategy for the area. The policies relating to aquatic biodiversity and relevant to the proposed development are outlined in Table 10.1 below.

**Table 10.1:** Regional Policies Relevant to Aquatic Biodiversity and the Proposed Development

STRATEGIC POLICY REFERENCE	POLICY
IP29	Key specific environmental issues identified in the River Basin District Management Plans for the Western and the Shannon International Regions should be addressed in accordance with the Water Framework Directive.
IP33	To ensure the protection and improvement of all waters - rivers, lakes, groundwater, estuaries (transitional waters), coastal waters and their associated habitats and species throughout the Region.
IP34	To implement the EC Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9); the EC (Good Agricultural Practice for Protection of Waters) Regulations, 2009 (S.I. No. 101), the Bathing Water Quality Regulations, 2008 (S.I.79) and EC (Quality of Shellfish Waters) Regulations 2006 and amendment Regulations.
IP35	To implement the Water Services Act, 2007 and all water and wastewater regulations.
EAP12	To implement the EU Directives with regard to the protection and enhancement of the natural environment.
EAP13	To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

STRATEGIC POLICY REFERENCE	POLICY
EAP14	Promote awareness of non-native invasive species and, in consultation with NPWS support control and eradication programmes. Any such eradication programmes proposed close to Natura 2000 sites must be subject to Habitats Directive Assessment procedures.
EAP17	To support the maintenance and, as appropriate, the achievement of favourable conservation status for the habitats and species in the West Region to which the Habitats Directive applies. Local Authorities shall take full account of the requirements of the Habitats and Birds Directives, as these apply both within and without Natura 2000 sites in the performance of their functions.

**Local Policies**

Local planning policies are detailed in the Mayo County Development Plan 2014. This plan was prepared for the 2014-2020 period. Policies and objectives relating to aquatic biodiversity and relevant to the proposed development are outlined in Table 10.2.

**Table 10.2:** Local Policies and Objectives Relevant to Aquatic Biodiversity and the Proposed Development

POLICY / OBJECTIVE REFERENCE	POLICY / OBJECTIVE
WQ-01	It is an objective of the Council to implement the Western River Basin District Management Plan "Water Matters" 2009-2015 to ensure the protection, restoration and sustainable use of all waters in the County, including rivers, lakes, ground water, coastal and transitional waters, and to restrict development likely to lead to deterioration in water quality or quantity.
WQ-02	It is an objective of the Council to require development in an unsewered area which includes a septic tank/proprietary effluent treatment unit and percolation area to be rigorously assessed in accordance with the accepted EPA Code of Practice for single houses or small communities, business, leisure centres and hotels, taking into account the cumulative effects of existing and proposed developments in the area. Any planning applications for development which require such systems shall be accompanied with an assessment carried out and certified by a suitably qualified person (i.e. the holder of an EPA FETAC certificate or equivalent) with professional indemnity insurance.
WQ-03	It is an objective of the Council to require any new development to connect to a public water supply or Group Water Scheme. Connections to wells for individual housing units in unserved rural areas will only be considered where there is no public water main or Group Water Scheme serving the site and where it can be demonstrated that connection to the proposed well will not have significant adverse effects on water quality or water quantity in the area and can provide a potable water supply in accordance with EU Drinking Water standards.
NH-01	It is an objective of the Council to protect, enhance, conserve and, where appropriate restore: <ul style="list-style-type: none"> <li>- Candidate Special Areas of Conservation, Special Areas of</li> </ul>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

POLICY / OBJECTIVE REFERENCE	POLICY / OBJECTIVE
	<p>Conservation, Special Protection Areas, Natural Heritage Areas and proposed National Heritage Areas, Statutory Nature Reserves, Ramsar Sites and Biogenetic Reserves, including those listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan and any modifications or additional areas that may be so designated during the lifetime of the plan.</p> <ul style="list-style-type: none"> <li>- Natural habitats and plant and animal species identified under the Habitats Directive, Birds Directive, Wildlife Act and the Flora Protection Order, or any other relevant legislation that may be implemented during the lifetime of the plan.</li> <li>- Features of natural interest and amenity, which provide a unique habitat for wildlife including ecological networks, riparian zones, hedgerows, stonewalls and shelterbelts.</li> <li>- Bogs, fens and turloughs listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan.</li> <li>- Surface waters, aquatic and wetland habitats and freshwater and water-dependent species through the implementation of all appropriate and relevant Directives and transposed legislation.</li> <li>- Trees or groups of trees protected under Tree Preservation Orders listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan, as well as trees and woodlands of particular amenity and nature conservation value, or which make a valuable contribution to the character of the landscape, a settlement or its setting.</li> <li>- Sites of local conservation importance including those identified in the Local Biodiversity Action Plan.</li> </ul>
NH-03	It is an objective of the Council to implement Article 6(3) and 6(4) of the EU Habitats Directive, by screening all plans and projects for appropriate assessment and to ensure those with potential to have significant effects on the integrity of Natura 2000 or European Sites (cSACs, SPAs), whether directly (in situ), indirectly (ex-situ) or in combination with other plans or projects, are subject to an appropriate assessment and the preparation of an NIR or NIS in order to inform decision making.
NH-04	It is an objective of the Council to fully integrate wildlife and biodiversity considerations into all areas of the Council's roles and responsibilities and into all its works and operations.
NH-06	It is an objective of the Council to support the implementation of the National Biodiversity Plan.
NH-07	It is an objective of the Council to promote best practice in the control of invasive species in the carrying out of both local authority and private development.
NH-08	It is an objective of the Council to assist in the control of native and non native invasive or harmful species which represent a serious threat to our environment, fresh water systems and lakes.
NH-09	It is an objective of the Council to utilise appropriate opportunities to enhance and create wildlife habitats where they arise.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### 10.3 METHODOLOGY

This section has been prepared following a desktop review, a site assessment by Ms. Lorraine Wyse on the 20<sup>th</sup> of April 2018 and a review of the Appropriate Assessment Screening Report prepared for the proposed development following the outline of the NPWS Guidance document (DoEHLG, 2009).

#### 10.3.1 DESKTOP REVIEW

The desktop review comprised gathering information pertaining to watercourses and waterbodies, including the River Robe and Bekan Lough, within the vicinity of the proposed development, reviewing mapping sites and determining if notable aquatic species, including protected, rare or invasive, had previously been recorded for the watercourses in the vicinity of the proposed development.

#### 10.3.2 SITE ASSESSMENT

A site assessment was undertaken on the 20<sup>th</sup> of April 2018 to examine the ecological context of the proposed development. This comprised a walkover of the proposed development site and an assessment of any watercourses / drainage ditches encountered.

### 10.4 DESCRIPTION OF EXISTING ENVIRONMENT

The proposed site is located in the Robe Sub-Catchment (30\_9) of the Corrib hydrometric area (30).

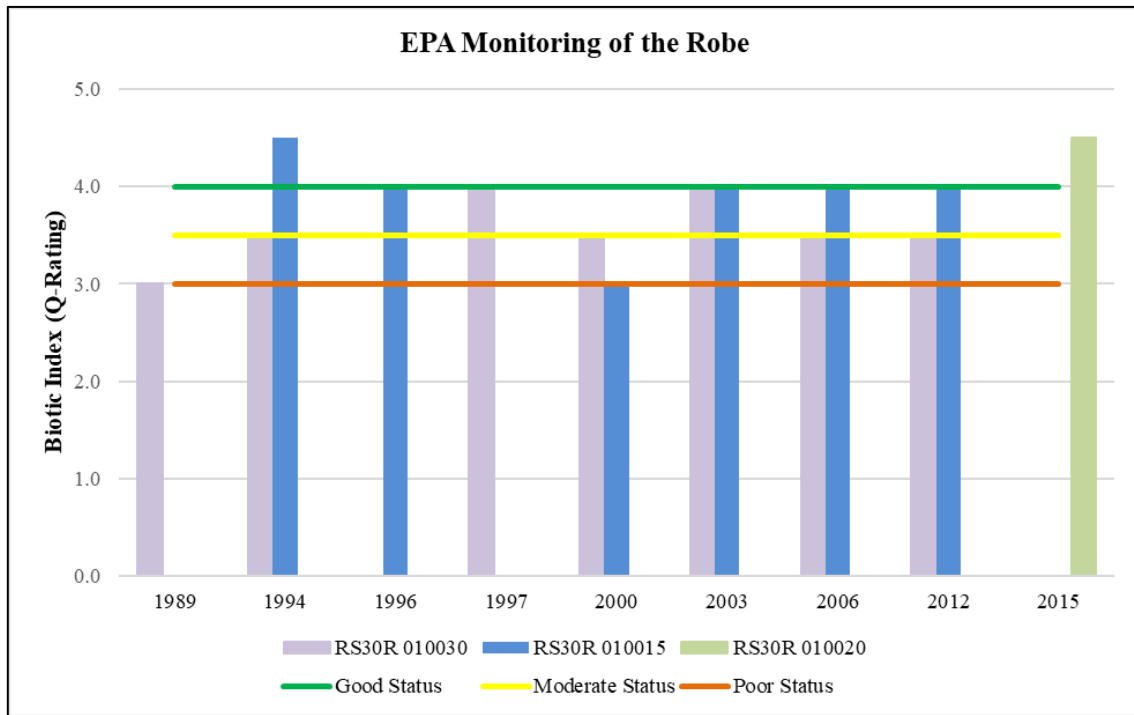
There are no drains at the proposed site. According to mapping websites, the River Robe is located approximately 825m south-west of the site, from where it flows approximately 64km before merging with Lough Mask. From Lough Mask, the Cong Canal connects with Lough Corrib, from where the Corrib River flows to Galway Bay.

The EPA undertake water quality monitoring along the River Robe, with details of the monitoring stations closest to the proposed development site included in Table 10.3 below. The Q-Value results for the three stations for the period 1989 – 2015 are detailed in Figure 10.1 below.

**Table 10.3:** EPA monitoring points on the Robe Hydrometric Area

Station No.	Station Location	National X	National Y	Approx. Location from River's Nearest Point to Proposed Site
RS30R01 0015	Robe - Br S of Cloonbullan	143573	276990	2.73km Downstream
RS30R01 0020	Brickeen's Bridge	141773	274735	8.41km Downstream
RS30R01 0030	Kilknock Bridge	141030	273690	9.84km Downstream

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Figure 10.1:** EPA Ecological Monitoring of the Robe from 1989-2015

As can be seen in Figure 10.1, the quality of the River Robe has varied over the monitoring period, with Stations RS30R 010015 and RS30R 010030 returning values from Q3 to Q4-5 between the years 1989 – 2012. Water quality improved in 2015 at Station RS30R 010020, returning a Q4-5 value.

The River Robe is not designated as a salmonid water under the European Commission (Quality of Salmonid Waters) Regulations, 1988.

Bekan Lough is located approximately 240m east of the proposed development site. According to the EPA Envision website, the lough is highly / strongly eutrophic and is assigned a Water Framework Directive classification of “possibly at risk of not achieving good status”.

There are no freshwater habitats at the development site, therefore the site does not support aquatic flora and fauna such as the Common Frog (*Rana temporaria*) or Smooth Newt (*Lissotriton vulgaris*).

## 10.5 IMPACTS

### 10.5.1 “DO-NOTHING”

Should the proposed development not take place, there would be no changes to the quality of surface waters in the area.

### **10.5.2 “DO-SOMETHING”**

The potential for the proposed development to impact upon aquatic biodiversity would not be considered significant, given the nature of the development and the proposed management of stormwater, wash-water and litter.

#### **Process Water**

There would be no process effluent discharge from the proposed development, either to surface-water or groundwaters. Therefore, the potential for negative impacts upon water quality, and hence aquatic biodiversity, is reduced.

#### **Stormwater**

All storm-water from roofs and hardstanding areas of the proposed development would be collected and discharged to ground via a system designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground. The stormwater system would include a silt trap, interceptor and soak pits which discharge to ground, as shown in Attachment A.2. The proposed silt trap and interceptor would remove solids and any hydrocarbons, ensuring there would be no potential contamination of surface water.

#### **Wash-Waters**

Wash-water generated during the cleaning of the poultry houses would be stored in an underground storage tank, with an approximate 30,280-litre volume, the location of which is shown in Attachment A.2.

It is estimated that 0.23M<sup>3</sup> of wash-water would be produced per 1,000 birds. Therefore, per batch of 100,000 broilers, approximately 23M<sup>3</sup> of wash-water would be produced. At a maximum of 6.2 batches per year, it is estimated that 142.6 M<sup>3</sup> of wash-water would be generated per annum.

Soiled wash-water would be collected and spread on lands owned by the applicant. The wash-water would be in compliance with the definition of ‘soiled water’ under the Nitrates Directive Part 1, Interpretation 4. (2), (b) whereby soiled water does not include any liquid where such liquid has either: (i) a biochemical oxygen demand exceeding 2,500 mg per litre, or (ii) a dry matter content exceeding 1% (10 g/L). Setback distances specified in the Nitrates Regulations (S.I. No. 31 of 2014) would be adhered to as a matter of good environmental practice.

#### **Management and Landspreading of Litter**

Both the storage and removal of manure/litter from intensive farming operations typically carry a risk of storm-water contamination. The expected litter production on the site is 558 metric tonnes per annum.

As outlined in Section 2.3.1, litter would be removed from the floors of broiler houses at the end of each batch and transported from the site via a covered trailer operated by the contractor M. J. Kehoe, who is registered with the Department of Agriculture, Food and Marine ABP Transport Registration No. HAC2340.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Poultry litter would be delivered to the Walsh Mushrooms composting facility in Co. Wexford. Therefore, there would be no risk to the aquatic environment from the spreading of poultry litter from the site on farmland.

**Potentially Polluting or Hazardous Materials**

The site does not propose to store significant volumes of any chemicals or materials which could pose a significant spill risk to the aquatic environment. The fuel source for the heating of the houses would be natural gas. Natural gas would be stored within tanks, located at the northern section of the proposed development site. These tanks would be located at points which minimise the risk of collision, and would be surrounded by protective barriers to further reduce the risk of collision.

**Flood Risk**

According to the Preliminary Flood Risk Assessment (PFRA) indicative flood mapping website, the site is not located within fluvial, pluvial or groundwater flood zones.

**Summary**

Therefore, there is deemed to be a minor risk of environmental impact on the aquatic environment from the operation of the proposed development. Mitigation measures relating to the operational phase of the project are outlined below in Section 10.6.

Potential impacts to groundwater and mitigation is further discussed in Section 11 of the EIAR.

**10.6 MITIGATION MEASURES**

As noted in Section 10.5 above, the potential for the proposed development on aquatic biodiversity is not considered significant. The following design and operational measures would further reduce the potential for significant impacts to the aquatic environment:

- Good housekeeping practices should be observed throughout the operational phase;
- Drainage from yard and roofs would pass through a SuDS surface water system, which would reduce the rate of emissions and remove suspended solids. The system would include a silt trap, oil interceptor and soakpits. The silt trap and interceptor would remove solids and any hydrocarbons, ensuring there would be no potential contamination of surface water;
- It is recommended that a sampling / inspection chamber be provided in the surface water drainage design. The inspection chamber should be visually inspected daily and solids regularly removed from the system;
- There would be a minimal risk of spillage of poultry litter, as litter would be removed directly from the house floor in a covered trailer after the removal of each batch;
- The removal and transport of litter should not be carried out during heavy rain, which could increase the risk of storm-water contamination;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- The site would not propose to store any significant volumes of chemicals or materials, which could pose a significant spill risk to the aquatic environment;
- The natural gas tanks would be strategically placed and would be surrounded by protective barriers;
- The ventilation system would ensure good dispersion of air, minimising the deposition of dust on roof-tops.

## **10.7 CONSTRUCTION IMPACTS AND MITIGATION**

### **10.7.1 IMPACTS**

#### **Loss or Alteration of Aquatic Habitats and Species**

In the absence of aquatic habitats and species at the proposed site, it is not considered that the proposed development would have an impact upon aquatic biodiversity due to loss or alteration of habitat.

#### **Disturbance to Aquatic Species**

While the construction phase would result in increased noise emissions and potential dust emissions, it is not considered that these would have a significant impact upon aquatic species, given the absence of aquatic habitats and species during the site walkover, the transient nature of construction works and given that noise and dust control measures would be implemented during construction works as standard practice.

#### **Increased Suspended Solids**

During construction works, there is potential for water quality deterioration through the release of suspended solids during soil disturbance works. Suspended solids could become entrained in surface water run-off and could affect aquatic habitats through deposition. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. An increase in suspended solids has the potential to reduce water clarity, which can impact the light penetration of water and may also affect certain behaviours of aquatic fauna such as foraging success. Aquatic flora and fauna could also be impacted upon by an increase in nutrients which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

As construction works would be confined to the proposed development footprint, which is located more than 100m from any watercourse, the risk of suspended solids impacting upon water quality would be greatly reduced.

#### **Pollutants and Waste**

A potential source of chemical contamination of storm water would be from the release of hydrocarbons (oils, fuels) from construction plant and equipment. Hydrocarbons can affect water quality, potentially resulting in toxic and / or de-oxygenating conditions for aquatic

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flora and fauna. Pollution could occur in a number of ways, such as neglected spillages, the storage handling and transfer of oil and chemicals and refuelling of vehicles.

Accidental leakage or discharge of chemicals and pollutants would have a minor impact on the fauna and flora due to the low volume of potentially hazardous substances that would be stored on site. Contractors would be informed of the importance of good housekeeping practices, including the immediate cleaning of spillages.

Another potential source of contamination of storm water would be the release of uncured concrete. In the event of uncured concrete entering a waterbody, the pH would be altered locally, potentially leading to the death of aquatic flora, fish and macroinvertebrates and alteration to the waterbody substrate. The handling, storage and pouring of concrete would be strictly supervised and controlled.

As noted above, construction works would be confined to the proposed development footprint, which is located more than 100m from any watercourse. Therefore, the risk of hydrocarbons or uncured concrete impacting upon surface water quality would be greatly reduced.

### **10.7.2 MITIGATION**

The following mitigation measures are proposed to ensure there is no significant impact upon the aquatic biodiversity of the area owing to a deterioration in water quality:

- Provision of silt control features where necessary;
- Where spoil is generated, this should only be stored temporarily. Where possible, spoil should be covered or alternatively, graded to avoid ponding or water saturation;
- If necessary, placing of silt fencing around spoil areas;
- Where possible, surface water run-off should be diverted from areas of bare / exposed ground;
- The use of pre-cast concrete where possible;
- The delivery and pouring of concrete should be supervised;
- The wash-out of Ready Mix Truck drums should not be permitted onsite;
- The disposal of excess uncured concrete should be removed from site by an authorised waste contractor;
- All plant machinery and equipment should be maintained in good working order and regularly inspected;
- Any fuels, oils or chemicals should be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas, with adequate bund provision to contain 110% of the largest drum volume;
- Fuels / oils should be handled and stored with care to avoid spillage or leakage;
- Where appropriate, small construction plant equipment should be placed on drip trays;
- Any waste fuel / oils should be collected in bunded containers at designated areas and properly disposed of to an authorised waste contractor;

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, should be available onsite;
- In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material should be properly disposed of to an authorised waste contractor;
- Cognisance should be taken of Inland Fisheries Ireland's "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- In the event of a suspected deterioration in water quality, works should immediately cease, an investigation into the cause undertaken and the relevant NPWS and IFI personnel informed.

## **10.8 RESIDUAL IMPACTS**

Assuming all mitigation measures are put in place, there would be no significant residual impacts to the aquatic environment from the proposed development.

## **10.9 REFERENCES**

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## **11.0 LAND – SOILS, GEOLOGY AND HYDROGEOLOGY**

### **11.1 INTRODUCTION**

This chapter describes the soils, geology, hydrology and hydrogeology of the existing environment surrounding the proposed development site. The objective of this chapter is to determine the likely significant impacts on the soils, geology, hydrology and hydrogeology of the area arising from the proposed development and to propose measures to mitigate these impacts, if required.

A detailed description of the existing and proposed development is outlined in Chapter 2 of this EIAR.

### **11.2 METHODOLOGY**

The following works were undertaken to complete the assessment of the potential effects on soils, geology, hydrology and hydrogeology:

- Desk study to collate and examine available existing information on soils, geology, hydrology and hydrogeology for the proposed development site and surrounding area;
- Review of information for the proposed development with particular regard to proposed soil/subsoil excavations; management of soiled wash waters water and clean stormwater; and estimated water usage.
- Site walkover and drive over of the surrounding catchment on 19<sup>th</sup> April 2018;
- Excavation of 4 No. trial holes on the site on 20<sup>th</sup> April 2018;
- Sampling of nearby private well on 26<sup>th</sup> April 2018;
- Interpretation of all data, assessment and reporting.

This chapter was prepared in accordance with the following national guidance documents on environmental impact assessment:

Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, 2002);

Advice Notes on Current Practice in the preparation of Environmental Impact Statements (Environmental Protection Agency, 2003);

Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (Institute of Geologists of Ireland, 2013);

Revised Guidelines on the Information to be contained in Environmental Impact Statements (Environmental Protection Agency, September 2015);

Advice Notes for Preparing Environmental Impact Statements (Environmental Protection Agency, 2015);

Guidelines on the information to be contained in Environmental Impact Assessment Reports draft (Environmental Protection Agency, August 2017).

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The IGI's and EPA's recommended methodology for assessing impacts was used. Each potential impact is described in terms of its Quality, Significance, Duration and Type.

In addition to those outlined above, the following sources of information were consulted during the desk study:

- McConnell, B. and Long C.B. (Compilers) 1995. *Bedrock Geology 1:100,000 Scale Map Series, Sheet 11, South Mayo*. Geological Survey of Ireland;
- Environmental Protection Agency's online mapping viewer 'EPA Maps!';
- Environmental Protection Agency's online mapping viewer on [www.catchments.ie](http://www.catchments.ie);
- Geological Survey of Ireland's online mapping viewers;
- Ordnance Survey of Ireland's online mapping viewers.

### **11.3 DESCRIPTION OF EXISTING ENVIRONMENT**

This section describes the existing baseline environment in terms of the soils, geology, hydrology and hydrogeology of the proposed development site and the surrounding area. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate any identified negative impacts.

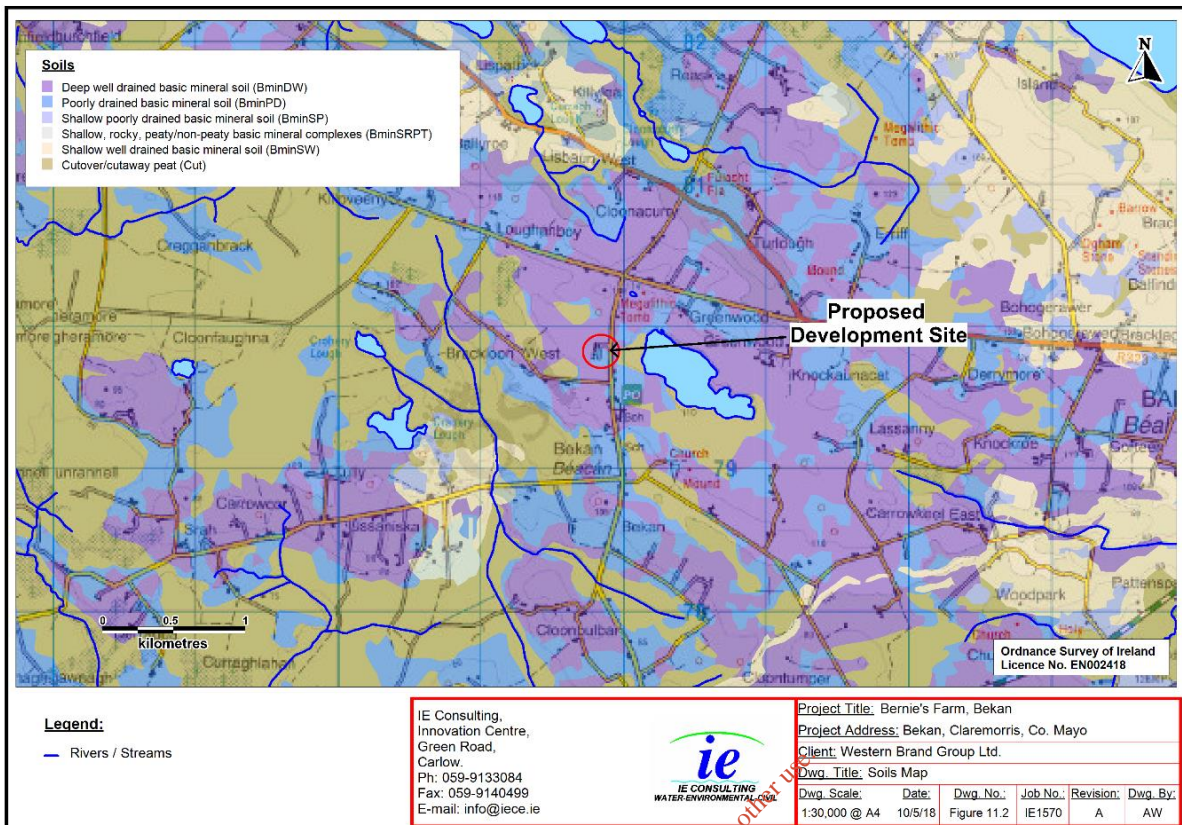
#### **11.3.1 LAND & SOILS**

##### **11.3.1.1 Regional Soils/Subsoils**

Soil is the top layer of the earth's crust. The formation of soil is dependent upon geology, climate, vegetation, altitude, landform shape and finally management over time. Soil landscapes found in Ireland are a consequence of the changing climatic conditions over the last 100,000 years (with periods of glaciation, the last of which was c.12,000 years ago) and the management of land by farmers.

Soils can be subdivided into topsoil and subsoil. Topsoil is the active layers at ground level where living organisms occur. In soil science this is referred to as the 'A' and 'B' horizons. Subsoil is the loose uncemented (unlithified) sediments present between the soil 'B' horizon and bedrock. In soils science this is termed the 'C' horizon.

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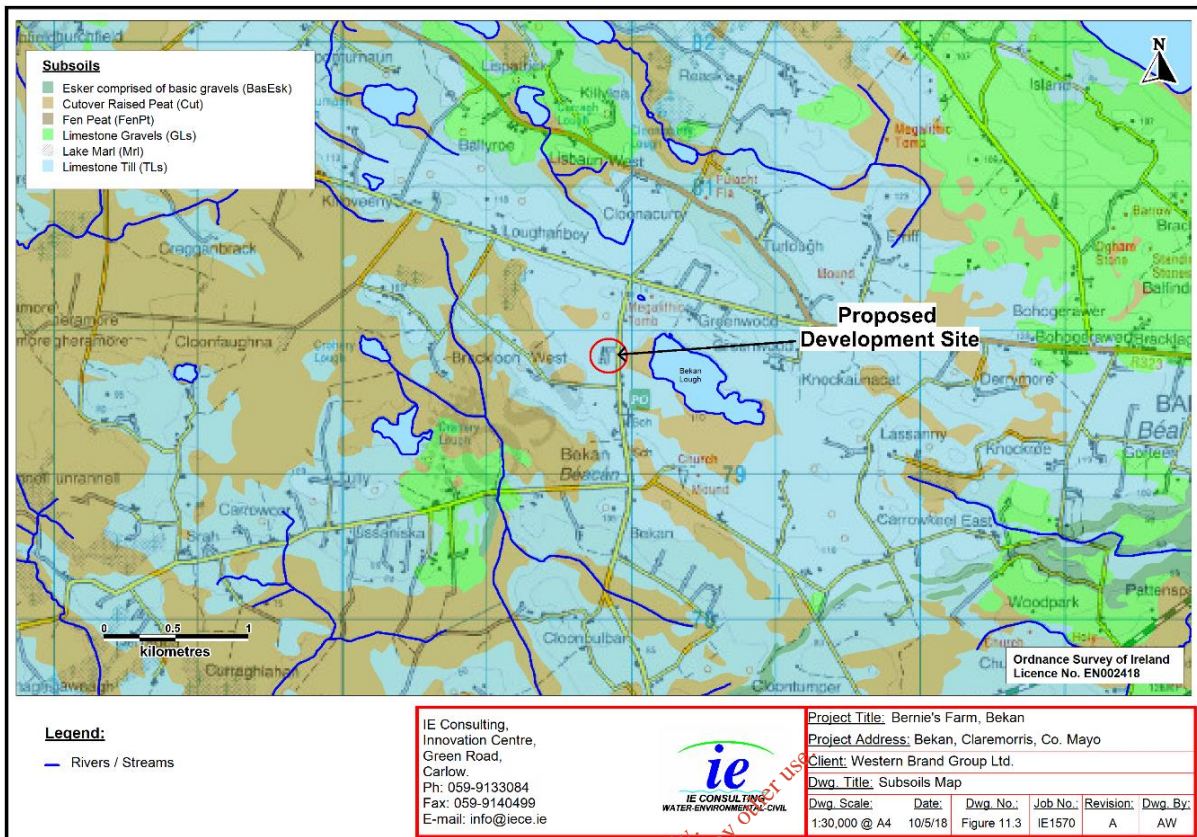
**Figure 11.1: Soils Map**

GSI online mapping indicates that the soils underlying the majority of the site are classed as ‘Poorly drained basic mineral soils’ (gleys) BminPD (see Figure 11.1 above). The soils underlying the northern area of the site are mapped as ‘Deep well drained basic mineral soil’ (BminDW). These are the predominant subsoil type in the surrounding area along with cut peat (Cut) which is mapped c. 70 m to the east of the site towards Bekan Lough.

The two main deposits of Quaternary subsoil in Ireland are glacial till, deposited at the base of the ice sheets and sand and gravel deposits associated with the melting of the ice sheets, which are generally called glaciofluvial outwash sands and gravels.

The subsoils beneath the majority of the site are mapped as ‘Limestone Till’. This subsoil type is the dominant subsoil type in the surrounding area (see Figure 11.2).

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**Figure 11.2: Subsoils Map**

An area of 'Cutover Peat' is mapped c. 80 m to the east of the site towards Bekan Lough. Areas of peat are also mapped c. 100 m to the southwest and 140 m to the northwest of the site. An area of 'Limestone Sands & Gravels' (GLs) is mapped c. 80 m to the southwest. The GSI's National Groundwater Recharge map indicates that the till is expected to be of Moderate (M) permeability. The GSI's vulnerability map (discussed further in Section 11.3.2.10) suggests the subsoils are greater than 10 m deep beneath the site. (This is based on a moderate groundwater vulnerability rating and assuming moderate permeability subsoils).

**11.3.1.2 Site Specific Information on Soils/Subsoils**

Site specific information on subsoils was available from trial hole excavations undertaken at the site on 20<sup>th</sup> April 2018. A total of 4 No. trial holes were excavated at the locations shown in Figure 11.3. A summary of the subsoils encountered in each trial hole is provided in Table 11.1 below.

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**Figure 11.3: Trial Hole Locations**

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**Table 11.1: Summary of Trial Hole Information**

<b>Trial Hole Ref.</b>	<b>TP1</b>	<b>TP2</b>	<b>TP3</b>	<b>TP4</b>
<b>Date Excavated</b>	20/4/18	20/4/18	20/4/18	20/4/18
<b>Total Depth (m bgl<sup>3</sup>)</b>	2.6	2.5	3.0	2.4
<b>Lithology</b>	<p><b>0 – 0.05 m</b> Topsoil</p> <p><b>0.05 – 0.2 m</b> FILL (angular coarse calcareous gravel with some loose silt/clay)</p> <p><b>0.2 – 0.5 m</b> Soft orange/brown sandy SILT</p> <p><b>0.5 – 2.2 m</b> Soft grey/brown sandy gravelly CLAY. Gravels are fine to coarse and angular to subangular. Becoming sandier with depth. Damp. Boulder at 1.5 m</p> <p><b>2.2 – 2.6 m</b> Medium dense clayey SAND with gravel. Gravel is fine to medium. Damp.</p>	<p><b>0 – 0.05 m</b> Topsoil</p> <p><b>0.05 – 0.3 m</b> FILL (angular coarse calcareous gravel)</p> <p><b>0.3 – 0.8 m</b> Very soft very light grey slighty sandy SILT/CLAY (marly?) with some small pockets of dark peaty organic material</p> <p><b>0.8 – 2.0 m</b> Firm light grey gravelly SILT/ with small pockets of brown and orange/red peaty organic material</p> <p><b>2.0 – 2.5 m</b> Loose clayey GRAVEL. Gravels are medium to coarse and subangular to subrounded. Wet. Occasional boulder.</p>	<p><b>0 – 0.7 m</b> FILL (Cobbles with some brown silt and occasional boulder)</p> <p><b>0.7 – 0.8 m</b> Grey gravelly SILT. Gravels are fine.</p> <p><b>0.8 – 1.0 m</b> Brown PEAT with 30-40 mm thick iron pan at 1.0 m</p> <p><b>1.0 – 3.0 m</b> Soft orange very gravelly CLAY with occasional boulders. Gravel is medium to coarse.</p>	<p><b>0 – 0.4 m</b> FILL (Brown gravelly silt. Gravel is fine)</p> <p><b>0.4 – 0.5 m</b> FILL (Light grey coarse calcareous gravel)</p> <p><b>0.5- 1.0 m</b> – Orange brown gravelly CLAY. Iron pan at 0.7 m on southern end of trial pit only–not continuous.</p> <p><b>1.0 – 2.4 m</b> Loose very clayey sandy GRAVEL with frequent cobbles and occasional boulders. Gravel is fine.</p>
<b>Depth Water Ingress (m bgl)</b>	No water ingress. Subsoils slightly damp from 2.2 m.	No water ingress. Subsoils wet from 2.0 m	Dry	Dry
<b>Water Level (m bgl)</b>	-	-	-	-
<b>Other Observations</b>	Pit sides unstable and collapsing from 2.4 m	Pit sides collapsing from 2.4 m		Pit sides collapsing from 2.2 m

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In general the subsoils encountered comprised FILL to depths of 0.2 m to 0.7 m. This was underlain by natural subsoils generally ranging from gravelly/sandy CLAY to clayey SAND and clayey GRAVEL. An iron pan was encountered in TP3 and TP4 at 1.0 m and 0.7 m respectively. The subsoils encountered in the trial holes are generally in line with the classification of 'Limestone Till' of moderate permeability as indicated on the GSI's on line mapviewer.



#### **11.3.1.3 Regional Bedrock & Structural Geology**

The Geological Survey of Ireland's (GSI's) online webviewer indicates that the proposed development site and the surrounding area is underlain by **Dinantian Pure Bedded Limestones (DPBL)**. They are further classified as undifferentiated **Visean limestones (VIS)**.

In the area around Bekan, there are no structural features mapped by the GSI. The nearest mapped fault is c 6.2 km east of the site at Ballyhaunis.

#### **11.3.1.4 Site Specific Information on Bedrock Geology**

No site specific information on bedrock characteristics was available. No bedrock outcrop was observed on the site, encountered in the trial holes or observed in the surrounding area during the site visit on 20/4/18.

#### **11.3.1.5 Geological Heritage**

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology. The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA).

Reference to the GSI online database confirms there are no geological heritage sites within the perimeter of the site or within a 2 km radius of the site. The nearest geological heritage site is a field located c. 3.2 km to north of the site and just west of Mannin Lake. This site is designated under the Quaternary IGH 7 theme and is classified as a County Geological Site (CGS).

### **11.3.1.6 Current & Historic Land Use**

The available historic maps, aerial images and Mayo Co. Co. online planning files were reviewed. A poultry unit currently exists on the site and has been so since 1979. The land in the immediate vicinity of the site and surrounding area is mainly used as low intensity agricultural grazing land with once off housing and occasional farmyards. The small village of Bekan is located c. 150 m to the southwest of the site while the Connaght GAA Centre of Excellence is located c. 850 m to the north of the site.

### **11.3.1.7 Potentially Contaminated Land & EPA Licensed Sites**

The existing poultry unit to which this EIAR refers has been licensed by the EPA (IPPC Licence No. P0911-01) since 2010. Two other poultry units, also operated by the owner of Bernie's Farm and licensed by the EPA, are located c. 700 m to the south of the site (IPPC Licence No. P0912-01) and c. 1.7 km to the east of the site (IPPC Licence No. P0831-01). There are no other EPA licensed sites within a 5 km radius of the site.

### **11.3.1.8 Economic Geology**

According to the GSI's online Pits and Quarries database there are no active operational quarries in the immediate vicinity of the site or within a 10 km radius of it. The nearest record on the GSI's database is c. 3.1 km to the northeast and this is for a possible location of a sand pit noted on aerial photography. There are a small number of other historic sand pits within a 10 km radius of the site recorded on the GSI's database. The nearest record of a bedrock quarry is c. 5.5 km to the north and this is recorded as 'limestone quarry filled in'.

### **11.3.1.9 Geohazards**

#### **Landslides**

The GSI's online landslide database indicates there are no historic landslides recorded on the site or within a 2 km radius of it. The nearest recorded landslide is c. 17 km northwest of the site at Treannagleragh where there was a translational slide in peat in December 2001.

#### **Karst**

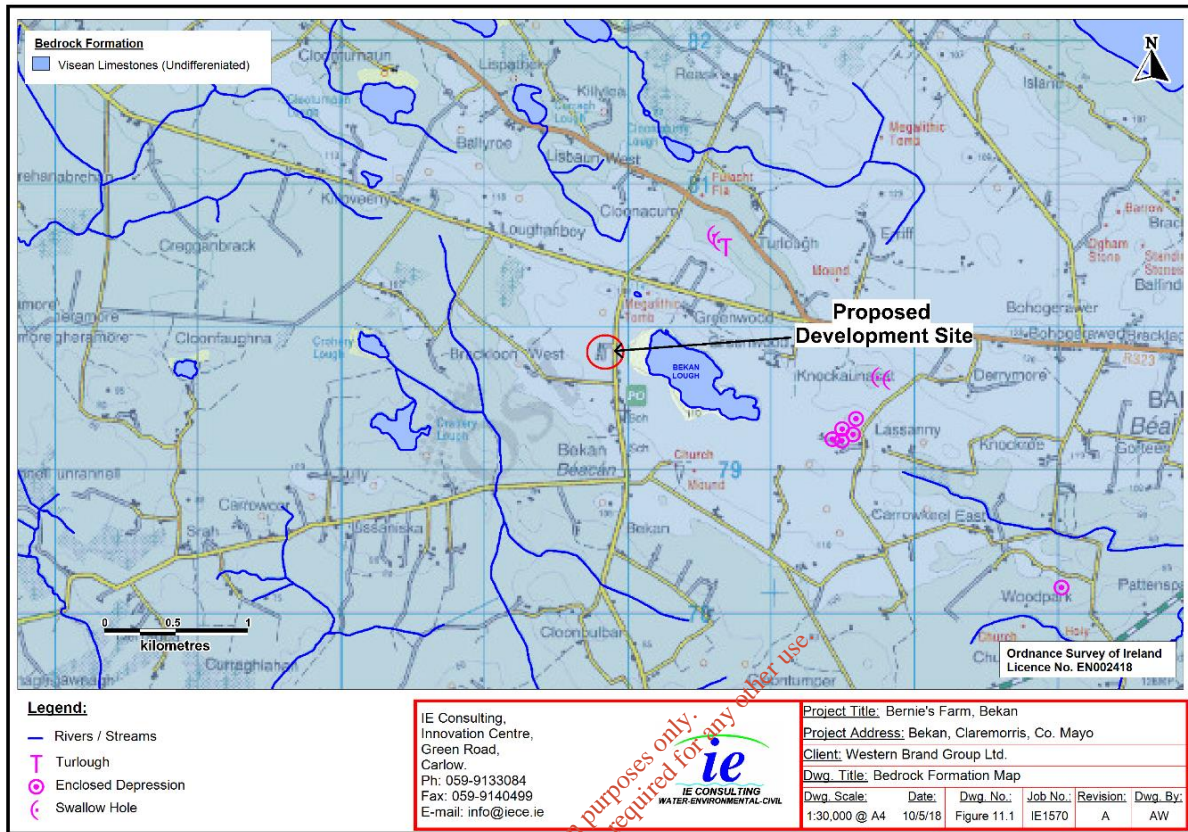
Pure limestones, comprising 100% calcium carbonate ( $\text{CaCO}_3$ ), are readily dissolved by weak acid rainfall. The dissolution and enlargement of discontinuities in the limestone (such as joints, fractures, etc.) over geological time leads to the formation of unique landforms such as closed depressions (dolines), sinkholes, springs, turloughs and caves. Dissolution features in karst limestones, whether open or infilled present significant environmental challenges, particularly with respect to protection of groundwater quality and groundwater fed ecosystems. They also present unique engineering challenges, particularly with respect to slope instability and control of drainage. Karstification is known to be widespread in the area surrounding the site.

The GSI's karst database indicates there are no karst features mapped within the proposed development site. There are numerous karst features mapped to the east of the site as follows:

- Turlough c. 1.1 km to the northeast in the townland of Greenland
- Two swallow holes 1.1 km to the northeast in the townland of Greenland

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- Five enclosed depression c. 1.7 km to the east/southeast in the townland of Lassany
- Two c. 1.9 km to the east in the townland of Lassany



**Figure 11.4: Bedrock Related Features**

The GSI's karst database is by no means comprehensive and other karst features that are not mapped may be present in the area. No surface expression of karst depressions or collapse features was observed on the site or the immediate surrounding area during the site visit on 20/4/18. However such karst features may be present but not visible at surface. Detailed karst studies and site investigation would be required to establish this.

### Radon

Radon is a naturally occurring radioactive gas formed by the radioactive decay of uranium and thorium which may be present in varying quantities in rocks, soils and groundwater. Classified by IARC (International agency for research on cancer) as *Group 1 - carcinogenic to humans* - Radon is second only to smoking as the leading cause of lung cancer. It is estimated that some 250 lung cancer cases each year in Ireland are linked to radon exposure and accounts for more than half of the total radiation dose received by the Irish population (EPA, 2016). The acceptable level, or Reference Level, for homes and schools in Ireland is 200 becquerel per cubic metre (Bq/m<sup>3</sup>). For workplaces the Reference Level is 400 Bq/m<sup>3</sup>.

Consultation with the EPA's online Radon Map shows a prediction of the number of homes in a given grid square that exceed the national Reference Level (200 becquerel per cubic metre (Bq/m<sup>3</sup>)). Grid squares in which the predicted percentage of homes is 10% or greater are called High Radon Areas.

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The EPA's Radon Map shows that the site is located a High Radon area. In the vicinity of the site >20% of homes are estimated to have radon levels above the Reference Level.

### **11.3.2 WATER**

#### **11.3.2.1 Topography**

The site is located in an area of rolling hills which has been moulded by ice and slopes very gently on a regional scale to the southwest.

The site itself is located at an elevation of approximately 117 mOD on the eastern side of local hill. Cut and fill works have been undertaken to make the site flat. The western side of the site is cut into the hill while the eastern side has been filled to raise it on this side with the result that the eastern side of the site is raised c. 1 m above the field to the east. This field slopes away to the east towards Bekan Lough and also to the north and south.

#### **11.3.2.2 River Basin & Nearby Surface Water Features**

The site lies within the Western River Basin District (WRBD). The WRBD extends over some 12,193 km<sup>2</sup> square kilometres with some 2,700 km of coastline and an extensive off shore area. The WRBD includes practically all of Mayo and Sligo, the Galway Urban District area, portions of Galway and Leitrim counties and smaller portions of Roscommon and County Clare. It also includes offshore islands such as the Aran Islands and Inishboffin.

The proposed development site lies within the Corrib River catchment. The main surface water features in the vicinity of the site are Robe River and Bekan Lough. The Robe River is located c. 1.2 km southwest of the site close to its source. From here it flows in generally southwesterly direction before discharging to Lough Mask c. 32 km distance from the site. Bekan Lough, a permanent lake, lies c. 235 m to the east of the site.

There are no surface water features on the site itself. The nearest feature is a drainage channel located c. 120 south/southwest of the site where it flows in a westerly direction and where it is assumed it ultimately discharges to the River Robe. A small pond or lake is mapped c. 330 m to the north of the site and is referred to on historic OSI maps as Loughagormadeen.

#### **11.3.2.3 Surface Water Body Status, Pressures & Water Quality**

For the purposes of the Water Framework Directive (WFD) the water quality 'status' of the nearby surface water bodies has been categorised (2010-2015). In addition the 'risk' of each water body not achieving 'good status' has also been assessed. The status and risk of the nearby surface water features are shown in Table 11.2 below. The EPA's catchment website indicates that the Robe River is subject to 'hydromorphological' pressures in the vicinity of the site.

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**Table 11.2:** Status & Risk of Nearby WFD Surface Water Bodies

<b>River Water Body</b>	<b>Water Body Type</b>	<b>Status (2010-2015)</b>	<b>Risk</b>
Robe River	River	'Moderate'	'At risk'
Bekan Lough	Lake	'Unassigned'	'Review'

The Robe River is not indicated as being salmonid on the EPA's Catchment website.

**11.3.2.4 Site Drainage**

There are no existing open surface water drains on the site. All surface water collected on clean hardstanding areas drains to two gullies located along the eastern site boundary. From here it is understood they drain to a soakaway which discharges to ground. Because of the age of the site, the exact layout and location of the existing drainage pipes and soakaway is not known. Based on topography it would seem that that the discharge from the soakaway would drain eastwards towards Bekan Lough. However because of the complexities of groundwater flow direction in the area (see Section 11.3.2.8) it's possible that underground drainage and groundwater flow does not simply follow surface topography.

**11.3.2.5 Flood Risk**

A preliminary assessment of the risk of flooding at the site was undertaken as part of this EIAR. In order to assess the flood risk to the site, OPW indicative flood mapping was consulted as shown below.

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA indicative flood map number 2019/MAP/296/A illustrates indicative flood zones within this area of County Mayo.

Figure 11.5 below illustrates an extract from the above indicative flood map overlain onto high resolution background mapping in the vicinity of the proposed development site.

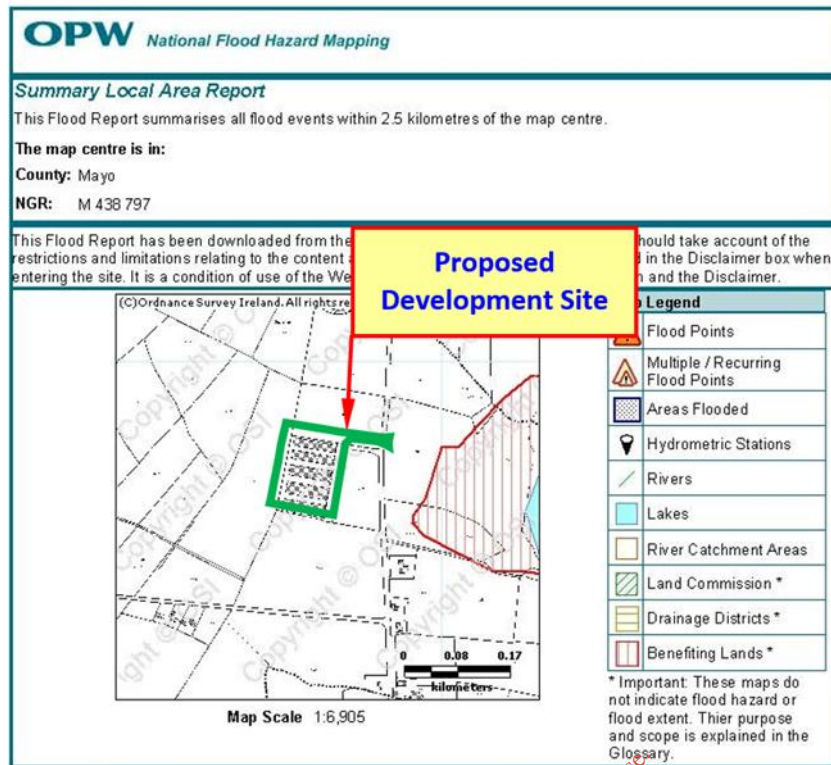


**Figure 11.5:** PFRA Fluvial Mapping

The PFRA indicative flood mapping indicates no fluvial, pluvial or groundwater flood zones within the boundary of the proposed development site. It should be noted that the indicated extent of flooding illustrated on this map was developed using a low resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only.

The OPW Flood Maps Website ([www.floods.ie](http://www.floods.ie)) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. Figure 11.6 below illustrates mapping from the Flood Maps website in the vicinity of the site.

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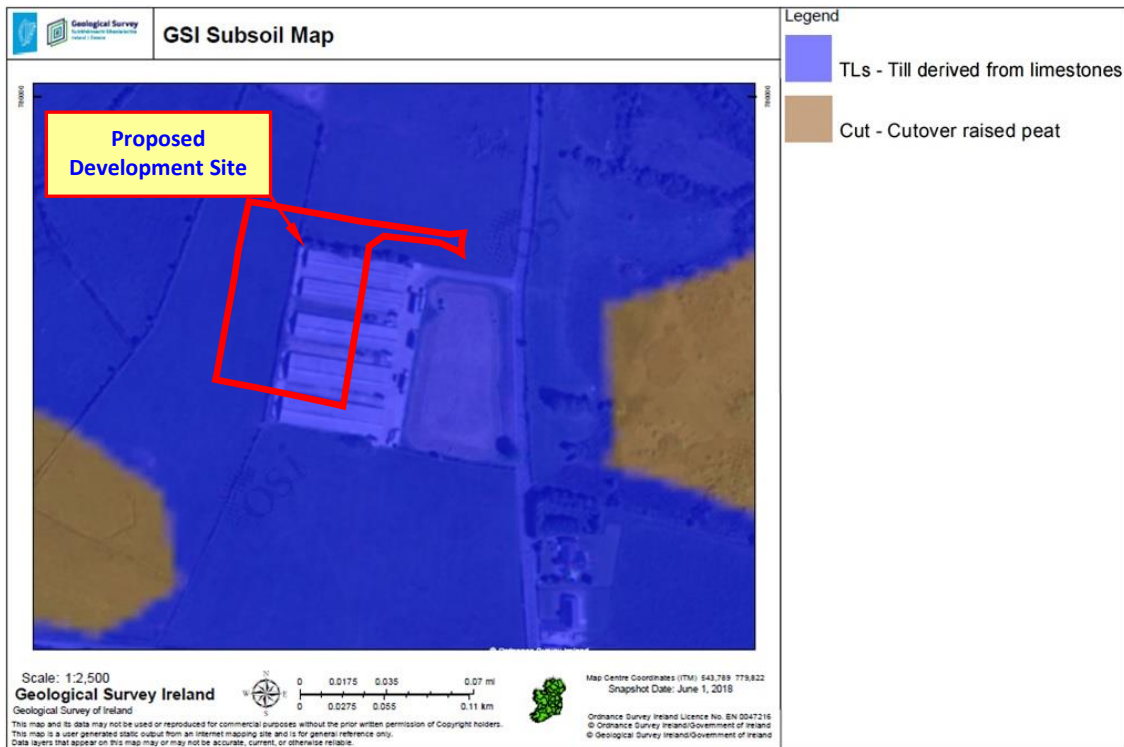
**Figure 11.6: OPW Flood Maps**

Figure 11.6 above indicates that there are no recorded or anecdotal instances of flooding at or in the immediate vicinity of the proposed development site.

The alluvial deposit maps of the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site. Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past.

Figure 11.7 below illustrates the sub-soils mapping for the general area of the site.

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**Figure 11.7: GSI Subsoil Mapping**

Figure 11.7 above indicates that the proposed development site is entirely underlain by Till derived from limestones. There are no mapped alluvial deposits within or in the vicinity of the site.

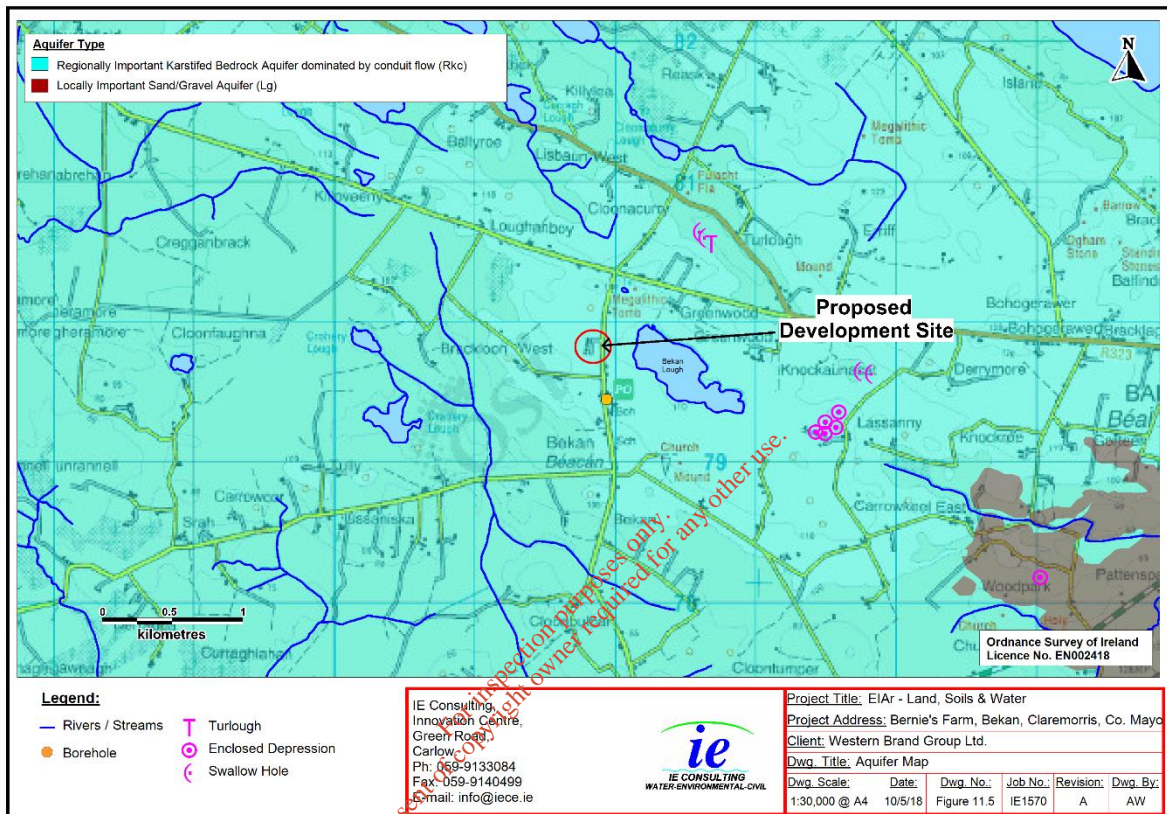
In summation, based on the collated mapping above, flood risk to the site is considered to be Low. There are no mapped flood zones, no recorded flood events and no alluvial deposits within or in the immediate vicinity of the site. The proposed development is sufficiently elevated above both Bekan Lough and the fore mentioned drainage channel. The lowest proposed finished floor level (F.F.L) within the site is 117.135m OD, this is 8.135m above Bekan Lough and approximately 7m above the drainage channel. There is no perceivable conveyance or discharge mechanism based on the local topography that would permit flood water to directly inundate the site. In consideration of the findings of this flood risk assessment, development of the site is not expected to result in an adverse impact to the hydrological regime of the area or to increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk perspective.

### **11.3.2.6 Aquifer Classification & Characteristics**

The limestone bedrock beneath the proposed development site is classified by the GSI as a **Regionally Important Karstified bedrock (Rkc) aquifer** dominated by conduit flow. It is reported that karstification is widespread in this area (GSI, 2004). 'Karstification' is the process whereby limestone is slowly dissolved away by percolating waters. It most often occurs in the upper bedrock layers and along certain fractures, fissures and joints, at the expense of others. Karstification frequently results in the uneven distribution of permeability through the rock, and the development of distinctive karst landforms at the surface (e.g. swallow holes, caves, dry valleys), some of which provide direct access for recharge/surface water to enter the aquifer. The landscape in areas of karst is characterised by largely underground drainage, with most flow occurring through the more permeable, solutionally-

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

enlarged, interconnected fissure/conduit zones, which may be several kilometres long. Groundwater velocities through fissures/conduits may be high and aquifer storage is frequently low. In these aquifers groundwater often discharges as large springs (>2,000 m<sup>3</sup>/d) which range from regular and dependable to highly variable ('flashy'). There is strong interconnection between surface water and groundwater. The degree of karstification in Rk aquifers ranges from slight to intense. GSI recognises two types of karst aquifer: those dominated by diffuse flow (Rkd) and those dominated by conduit flow (Rkc).



**Figure 11.8: Aquifer Designations**

The Rkc aquifer forms part of the **Cong-Robe Groundwater Body (GWB)**. The groundwater body (GWB) is the management unit under the WFD that is necessary for the subdivision of large geographical areas of aquifer in order for them to be effectively managed. The Cong-Robe GWB has the following characteristics as described by the GSI (GSI, 2004):

- These rocks are generally devoid of intergranular permeability. Groundwater flows through fissures, faults, joints and bedding planes.
- In pure bedded limestones these openings are enlarged by karstification which significantly enhances the permeability of the rock. Karstification can be accentuated along structural features such as fold axes and faults.
- Karstification is widespread in this GWB. Recorded karst features number 93 [in this GWB], but are considered to represent only a fraction of existing features.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- Most of the groundwater flow occurs in the upper epikarstic layer and in a zone of interconnected solutionally enlarged bedding planes and fissures, generally extending to a depth of 50 m below ground.
- Transmissivity is variable and storativity is low.
- Flow velocities can be rapid and variable, both spatially and temporally. Rapid groundwater flow velocities indicate that a large proportion of groundwater flow takes place in enlarged conduit systems.
- Groundwater flow in highly permeable karstified limestones is of a regional scale. Flow path lengths can be up to a several kilometres in length.
- Groundwater flow through karst areas is extremely complex and difficult to predict as evidenced by flow lines delineated from tracer tests contrasting with water table maps. As flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours, as shown by several tracing studies.
- Within the GWB, a surface water catchment has been shown to be bypassed by groundwater flowing beneath surface water channels and across surface water catchment divides. Tracer tests have shown that flow lines exist that do not relate to the expected flow lines inferred from water table maps. Although, there are two surface water catchments within the GWB, a key aspect is that groundwater can flow across the surface water divides and beneath surface water channels, as evidenced by a positive tracer test linking a turlough east of Cregduff spring to Fountainhill spring.
- There is a high degree of interconnection between groundwater and surface water in karstified limestone areas such as in this GWB. The close interaction between surface water and groundwater in karstified aquifers is reflected in their closely linked water quality. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa. Additionally the potential for contaminant attenuation in such aquifers is limited.
- Overall groundwater flow will be towards the rivers and lakes, but the highly karstified nature of the bedrock means that locally, groundwater flow directions can be highly variable.
- In winter, groundwater discharges to the many turloughs and transmitted via the artificial channels that were installed to alleviate flooding
- Recharge occurs via losing streams, point and diffuse mechanisms. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines.
- In terms of hydrochemistry, the groundwater has a calcium bicarbonate signature.

### **11.3.2.7 WFD Groundwater Body Status**

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least 'good quantitative status' and 'good chemical status' by 2015, as well as preventing deterioration in those waters that have been classified as 'good' status. The EC Environmental Objectives (Groundwater) Regulations 2010 (S.I No. 9 of 2010) as amended by Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016) give effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the WFD.

The Cong-Robe GWB which underlies the proposed development site is classified as being at 'Good' groundwater quality status (2010-2015 status classification) and is indicated as being under 'Review' for risk classification.

### **11.3.2.8 Groundwater Levels & Flow Direction**

Groundwater was not encountered in the trial holes excavated on the site in April 2018 although there were only left open for a short period after excavation. The trial holes were excavated to maximum depth of 3m.

No further information on groundwater levels was available for the surrounding area. It was not possible to measure the water level in the nearby borehole during sampling (see Section 11.3.2.12 below) as a water level measuring device could not be inserted in the borehole.

Groundwater levels in the nearest EPA groundwater level monitoring station at Lisatava c. 19 m southwest average at approximately 5 m bgl while groundwater levels in the next nearest station at Aghadrestan c. 20 km northeast of the site average at approximately 10 m below ground (bgl) Both these stations are located in karstified limestones. In the absence of any other information, it is assumed that groundwater levels in the area of the proposed development are in the region of 5-10 m bgl.

Based on topography and position of surface water features, shallow groundwater flow beneath the site would be expected to flow eastwards towards Bekan Lough while deeper, regional groundwater flow would be expected to be to the southwest towards the River Robe. However, as outlined in Section 11.3.2.6 groundwater flow direction can be highly variable and unpredictable in the underlying karst limestone aquifer. Therefore it's not possible to say with any certainty what direction actual groundwater flow beneath the site is.

### **11.3.2.9 Groundwater Abstractions & Source Protection Areas**

There are no wells on the proposed development site itself. The existing poultry unit obtains its water supply from the mains supply.

Reference to the Geological Survey of Ireland's (GSI) well database indicates there are no well records in the vicinity of the site. The nearest record is for a dug well (GSI Code 1427SWW003) located c. 9 km south/southeast of the site at Pollanalty.

It is understood the majority of properties in the area obtain their water from the public mains supply from Lough Mask Public Supply and therefore do not have boreholes. As part of the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

work undertaken for this assessment one nearby bored well was identified in the village of Bekan (see borehole location shown in Figure 11.5). It is understood this well is used periodically (along with mains water) to supply the pub and church in the village. No information on well depth or construction was available. Based on observations at surface, it was observed to be constructed with six inch diameter steel casing. It is assumed that it was drilled into bedrock and that it abstracts groundwater from the underlying bedrock aquifer.

There are no Groundwater Source Protection Areas (SPAs) mapped by the GSI in the vicinity of the site. The nearest SPA is for the Ballinlough/Ballybane Public Water Scheme (PWS) located c. 13 km to the southeast.

**11.3.2.10 Groundwater Vulnerability**

Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Where the subsoil thickness is <3 m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is >3 m, the vulnerability is rated as High, Moderate or Low (depending on the permeability and thickness of the subsoil). The GSI's criteria for classifying vulnerability are shown in Table 11.3 below.

**Table 11.3: Vulnerability Mapping Guidelines**

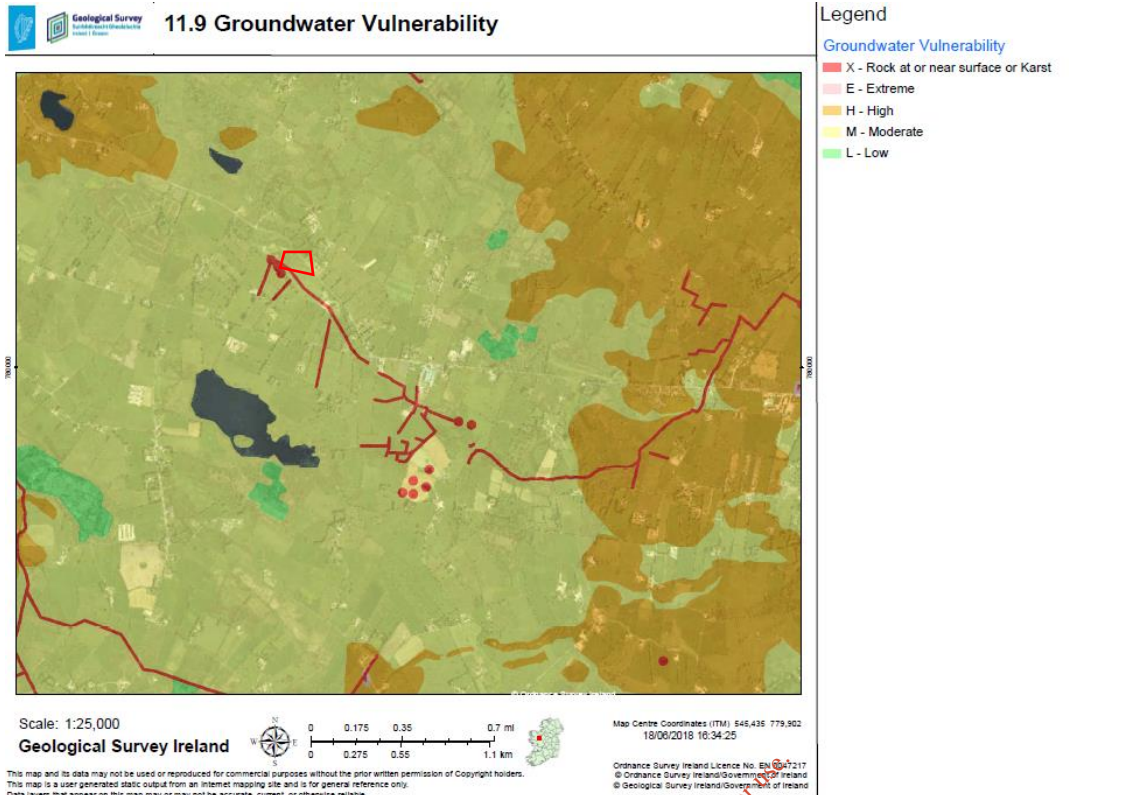
Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone (Sand/gravel aquifers only)	Karst Features (<30 m radius)
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)		
<b>Extreme (E)</b>	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
<b>High (H)</b>	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
<b>Moderate (M)</b>	N/A	> 10.0m	5.0 - 10.0m	N/A	N/A
<b>Low (L)</b>	N/A	N/A	> 10.0m	N/A	N/A

Notes: (1) N/A = not applicable.  
(2) Precise permeability values cannot be given at present.  
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

The GSI's online webviewer indicates the vulnerability of groundwater beneath the proposed development site is Moderate (M)

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO



**Figure 11.9:** Groundwater Vulnerability

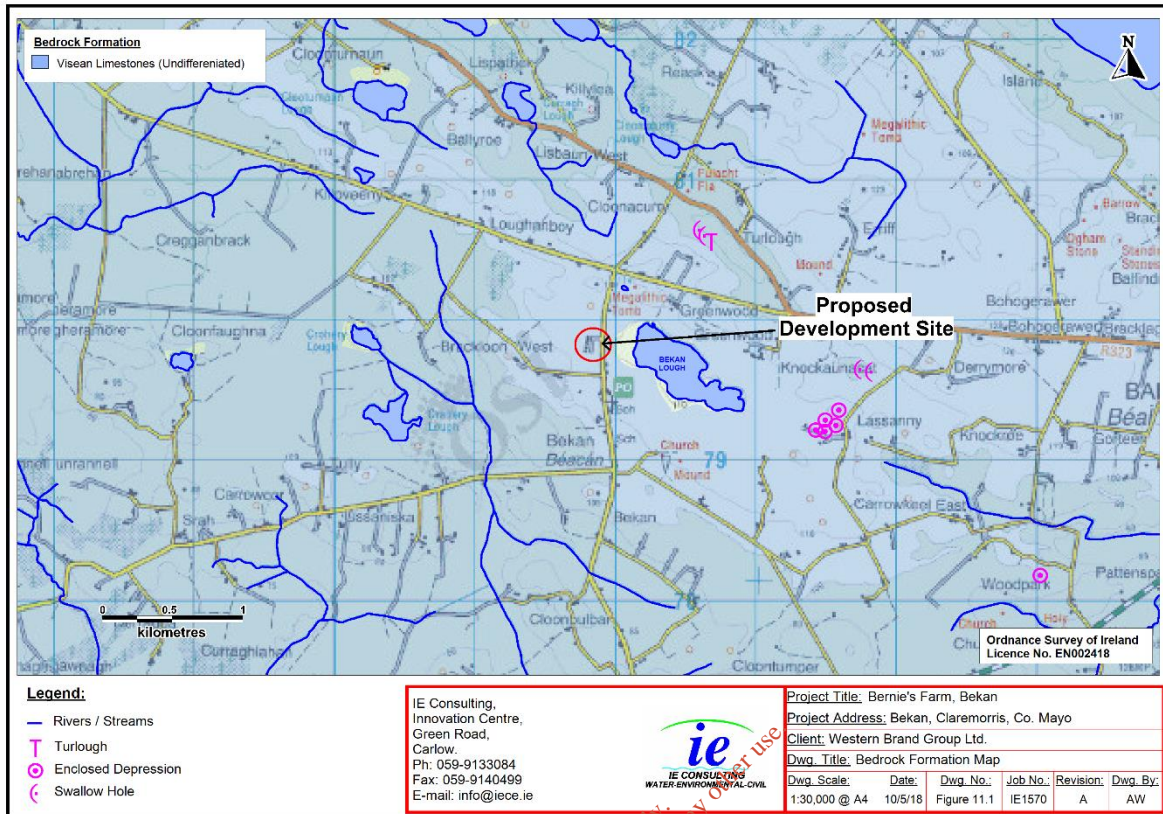
The results of the trial holes excavated in April 2018 indicate a depth of at least 3.0 m of low to moderate permeability subsoils is present on the site. This confirms that vulnerability is not Extreme (E/X) and could range from Low (L) to High (H) which is in line with the GSI classification.

### 11.3.2.11 Karst Features

Karstification is a process which occurs in soluble rocks such as limestone and can give rise to the formation of unique landforms such as closed depressions (dolines), sinkholes, springs, turloughs and caves.

The GSI's karst database indicates there are no karst features mapped within the proposed development site itself. The nearest karst features on the GSI database are as listed in section 11.3.1.9 above and shown in Figure 11.10. As indicated previously the GSI's karst database is by no means comprehensive and other karst features that are not mapped may be present in the surrounding area or on the site itself.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Figure 11.10: Karst Features**

**11.3.2.12 Groundwater Quality**

The description for the Cong-Robe GWS indicates groundwater in this GWS has a calcium bicarbonate signature. There are no EPA groundwater quality monitoring stations in the area but the underlying GWS is assessed as being at ‘Good’ groundwater quality status (2010-2015 status classification).

As part of the site investigation work undertaken for this EIAR a groundwater sample was taken from a nearby well for hydrochemical analysis for a range of general groundwater pollution indicator parameters. The nearby well is located in Bekan village and supplies the local pub and church (in conjunction with mains water). It is understood to be the only well in the vicinity of the site or Bekan village as all other properties in the area are on mains water.

It is understood the well is not in use every day so it was put into use on the day before sampling by the owner. On the day of sampling the raw water tap in the pump house was initially allowed to run to waste for approximately thirty minutes to flush the interior of the nozzle and discharge any stagnant water. Unstable parameters (pH, temperature and electrical conductivity) were monitored during period and achieved stability. The tap was subsequently disinfected thoroughly and allowed to run to waste for another ten minutes before the sample was taken. During this period a total of c. 240 litres was purged from the well. The samples were placed in a cooler box and transported to CLS in Galway City on the same day of sampling for laboratory analysis.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The sample results are tabulated below where they are compare with the Groundwater Threshold Values (GTVs) from the Groundwater Regulations 2016 and the maximum admissible concentrations (MACs) from the Drinking Water Regulations 2014

**Table 11.4:** Groundwater Sample Results

Parameter	Units	GW1	Drinking Water MAC (SI No. 122 of 2014)	Groundwater Threshold Value (SI No. 366 of 2016)
		26/4/2018		
Alkalinity	mg/l CaCO <sub>3</sub>	395	-	-
Ammonium	mg/l NH <sub>4</sub> - N	0.052	0.23	0.065
Calcium	mg/l	151	-	-
Chloride	mg/l	17	250	24
Coliforms (total)	cfu/100 ml	0	0	-
<i>E. coli</i>	cfu/100 ml	0	0	-
Copper	mg/l	<0.001	2	-
Electrical Conductivity @ 20°C	µS/cm	683	2,500	800
Hardness	mg/l CaCO <sub>3</sub>	279	-	-
pH	pH units	6.9	≥ 6.5 and ≤ 9.5	-
Iron	µg/l	<10	200	-
Magnesium	mg/l	6	-	-
Manganese	µg/l	14	50	-
Nitrate	mg/l NO <sub>3</sub>	13.8	50	37.5
Nitrite	mg/l NO <sub>2</sub>	<0.017	0.5	0.375
Orthophosphate	mg/l PO <sub>4</sub> - P	<0.01	-	0.035
Potassium	mg/l	3	-	-
Sodium	mg/l	13	200	-
Sulphate	mg/l	12.2	250	187.5
Zinc	mg/l	<5	-	0.075

The results indicate generally good groundwater quality. There were no exceedances of the TV's or the Drinking Water MAC's. The potassium/sodium ratio (0.2) is low. A value >0.4 is often a good indicator of contamination by soiled water and other farmyard wastes. The results indicate there was no significant contamination of the source from organic waste or inorganic fertilisers at the time of sampling. Both *E. coli* and total coliforms were not detected indicating groundwater of good bacteriological quality at the time of sampling.

**11.3.2.13 Hydrometeorology & Groundwater Recharge**

The GSI's website indicates the effective rainfall in the vicinity of the proposed development site is 843 mm/yr. The proportion of effective rainfall that recharges the underlying aquifer is based on a number of factors including soil and subsoil permeability and depth, groundwater vulnerability and bedrock permeability. The GSI have developed a model to estimate the percentage of effective rainfall that will recharge groundwater using regional information on these factors.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The GSI's National Recharge Map indicates the percentage of rainfall that will recharge groundwater varies across the proposed development site and surrounding area is as follows:

- 22.5% - where moderately permeable subsoils are overlain by poorly-drained soils with a moderate vulnerability rating. This occurs over much of the southern and eastern areas of the site. This equates to a recharge rate of 190 mm/yr.
- 60% - where moderately permeable subsoils are overlain by well-drained soil with a moderate vulnerability rating. This occurs over the remaining areas of the site and the majority of the surrounding area.
- 4% - where moderately permeable subsoils are overlain by cut peat with a moderate vulnerability rating. Areas of peat are mapped to the east of the site towards Bekan Lough and c. 100 m and c. 150 m to the southwest and northwest of the site respectively.

However, the GSI recharge map is to be used as a general guide only and in this case does not take into account that much of the area of the proposed development site is currently overlain by hardstanding. As part to the proposed development the majority of the site will remain under hardstanding. Where such 'Made Ground' is present the GSI recommend a recharge co-efficient of 20% be used (i.e. 169 mm/yr).

**11.3.2.14 Designated Sites & Groundwater Dependent Terrestrial Ecosystems**

There are no known protected groundwater dependant terrestrial ecosystems (GWDTE's) within 2 km of the proposed development site.

The nearest sites of ecological importance are the River Moy Special Area of Conservation (SAC) (Site Code 002298) and the Mannin and Island Lakes proposed Natural Heritage Area (pNHA) (Site Code 001910), both located c. 4 km northeast of the site. Both Mannin Lake and Island Lake are turloughs. These are seasonal lakes in topographic depressions in karst that are intermittently inundated on an annual basis (mainly from groundwater), that drain without overland stream outflow, and that have a substrate and/or ecological communities that are characteristic of wetlands.

The River Moy SAC contains the following habitats which are classified as GWDTE's by the EPA (EPA, 2008):

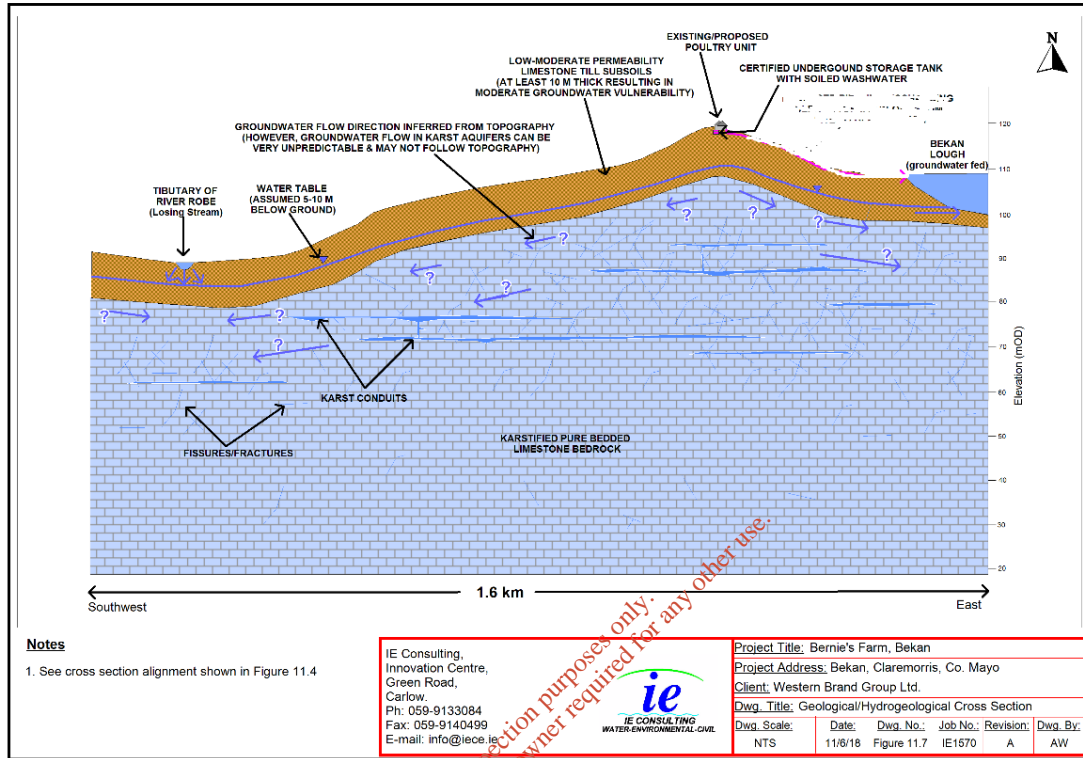
- Active raised bog
- Degraded raised bog
- Alkaline fens
- Alluvial forest

It is thought unlikely that there is a groundwater connection between groundwater beneath the site and the groundwater in the SAC; however because of the unpredictable nature of groundwater flow karst it cannot be ruled out that there is a connection.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**11.3.3 TYPE OF GEOLOGICAL ENVIRONMENT**

Based on the available regional and site specific geological and hydrogeological information described in the preceding sections of this chapter, a schematic cross section of proposed development site and surrounding area has been developed and is shown in Figure 11.11.



**Figure 11.11: Cross-Section**

A summary of the geological and hydrogeological conditions underlying the proposed development site is illustrated on the cross section above and is outlined thus:

- FILL ranging in depth from 0.2 m to 0.7 m;
- Underlying natural subsoils comprise gravelly/sandy CLAY to clayey SAND and clayey GRAVEL low to high permeability and proven to be at least 3 m deep from site investigations. GSI mapping suggest its >10 m deep.
- GSI vulnerability mapping suggests subsoils are at least 10 m thick beneath the site;
- Groundwater levels are greater than 3.0 m below ground beneath the site;
- The underlying bedrock is karstified limestone which is known to be widely karstified in the area and numerous karst features a mapped by the GSI in the surrounding area. No karst features were visually identified on the site itself or in the immediate surrounding area but in the absence of more detailed karst investigations it cannot be ruled out that karst features do not exist.
- Based on topography and position of surface water features, shallow groundwater flow beneath the site would be expected to flow eastwards towards Bekan Lough while deeper, regional groundwater flow would be expected to be to the southwest towards the River Robe. However, as outlined in Section 11.3.2.6 groundwater flow direction can be highly variable and unpredictable in the underlying karst limestone aquifer. Therefore it's not possible to say with any certainty what direction actual groundwater flow beneath the site is.



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

This will result in an overall improvement of the site because of a replacement of aged and dated infrastructure, with new clean modern infrastructure.

**11.4.1.2 Soil Removal**

It will be necessary to create some excavation on the site for pad foundations. These excavations will be 600mm deep, and will be backfilled with concrete and/or suitable Fill. Fill will also be required under the foundations and the floor slabs. It is not expected that excavations will be any greater than for existing foundations.

While it is proposed to re-use as much of the excavated soils and subsoils on the site (for landscaping etc.) in line with relevant Waste and Planning Legislation, there will be permanent removal of soil and subsoils from areas of the proposed development site, and this will be dealt with in accordance with waste management protocol. There will not be a need to import any soil for the construction process.

The majority of excavations will be shallow and extending into the MADE GROUND and natural subsoils. Subsoils are at least 10 m deep beneath the site so excavation of bedrock will/will not be required. There will be some excavation for the new tank, and for the silt trap and oil-water separator for the stormwater management system.

The stormwater soakaways will involve the excavation of 6 No. pits, that will be backfilled with appropriate granular material at the locations shown above.

The permanent removal of natural soils is a *negative slight permanent impact* on the soils and geology aspect of the environment.

The removal and disturbance of soil during the construction phase will also temporarily increase the risk to groundwater as the protective soil/subsoil layer is removed and the vulnerability of the groundwater to surface contaminants is increased.

The majority of excavations on the proposed development site itself will be < 2.5 m bgl extending into the MADE GROUND/CLAY subsoils. Any excavations will be filled with foundations for buildings or other infrastructure or will be backfilled and reprofiled with fill, aggregate or re-used in-situ soils/subsoils. The existing subsoils are at least 10 m deep beneath the site. Thus the removal of soil/subsoil cover during the construction phase would have a *negative slight to moderate temporary impact* on groundwater vulnerability on the proposed development site.

After excavation and installation of the soakaways the area will be backfilled with fill and granular material and road and pavement surfaces will be reinstated. The vulnerability will not change following backfilling and reinstatement. The removal of soil/subsoil cover during the construction phase would have a *negative slight to moderate temporary impact* on groundwater vulnerability.

**11.4.1.3 Bedrock Excavation**

The vast majority of the excavation and construction of the proposed development will be within the MADE GROUND/ natural subsoils.

#### **11.4.1.4 Vehicular Movement & Soil Compaction**

Soil compaction can occur due to movement of construction and maintenance traffic on the site. This is considered to be a *negative slight-moderate short term impact* on the soil and in-situ earth materials.

#### **11.4.1.5 Accidental Hydrocarbon Leakage/Spillage from Mobile Plant & Equipment**

Possible contamination of soil, subsoils, surface water and groundwater by accidental leakage or spillage of hydrocarbons from mobile plant and associated equipment may occur during the construction phase. Because of the indications of significant depth (> 10 m) of low to moderate permeability subsoils beneath the site it is unlikely that contamination of the underlying groundwater will occur. Any uncontrolled spillages/leaks would likely either slowly infiltrate through the subsoils and/or migrate via surface run-off to move the down slope towards Bekan Lough or land drains.

Depending on the magnitude of any uncontrolled leakages or spillages they would have a *negative slight-moderate short-medium term impact* on surface water quality in the site drainage and Bekan Lough, if not quickly contained and removed.

An accidental hydrocarbon spillage would have a *negative moderate short-medium term impact* on soil quality.

#### **11.4.1.6 Sediment Laden Run-off**

The construction of the proposed development will involve stripping and removal of some portion of topsoil and earthworks to facilitate construction of the new poultry housing units, installation of the new washwater tanks and surface water management system on the proposed development site. There is potential for erosion of exposed soil during this period and consequently the generation of run-off with high levels of silt/sediment. If uncontrolled, this run-off would enter the site drainage and impact on downstream water bodies.

Additionally construction of the proposed stormwater system will require excavation of soak pits. Evidence from the trial pits undertaken on the site, would suggest suitable conditions for the soak-pits. There is unlikely to be any run-off from this process. Removed soils will be immediately taken to a designated stockpile.

Such uncontrolled entry of sediment laden run-off would have a *negative temporary slight to moderate impact* on water quality in Bekan Lough.

#### **11.4.1.7 Spillage of Concrete/Cement Material**

The spillage of concrete/cement material poses a potential risk to surface water and groundwater quality as this material is alkaline and corrosive. During the construction phase this risk may be realised during the construction of buildings and equipment washdown. However, because of the significant depth (c. 10 m) of low permeability clay subsoils beneath the site it is unlikely that contamination of the underlying groundwater from any such spills would occur. Any spillages would likely migrate by surface run-off and then the down slope towards Bekan Lough.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Depending on the magnitude of any spills, the release of such cement material into nearby surface water would have a *negative slight-moderate short term impact* on surface water quality in the site drainage and the downstream Bekan Lough.

**11.4.1.8 Pumping of Groundwater Ingress to Excavations**

It is not anticipated that there will be any need for significant pumping of groundwater from excavations during the construction phase as the excavations are generally to a depth of 2.5 m only. No groundwater was encountered in the trial holes excavated on the site in April 2018. Some very localised pumping may be required to prevent ingress of any minor flows of shallow perched groundwater encountered. This will be discharged to the temporary storm water management system implemented during construction. Such pumping of groundwater can lower groundwater levels but as there are no groundwater users in the area the impact on groundwater levels will be *negative temporary slight impact*.

**11.4.2 OPERATIONAL PHASE**

During the operational phase of the proposed development there is a potential for impact on soils, geology and water.

**11.4.2.1 Storage & Recovery of Manure**

It is estimated that 90 tonnes of manure will be generated per crop of birds. With an estimated 6.2 crops per year this equates to an estimated 558 tonnes of manure per year. This has the potential to negatively impact on the water quality in the surrounding environment if not collected, stored and recovered appropriately.

The proposed development will comprise litter based housing units. Housing will be constructed to current standards and have good insulation and ventilation to assist in minimising moisture content of manure. The litter collected on the floor of each house will be removed after each crop of birds to a covered trailer and transported by a licensed contractor to Walsh Mushrooms in Wexford for use as compost.

**11.4.2.2 Storage of Soiled Washwater**

After removal of manure from the houses after each crop of birds, the floors will be washed down with water. The soiled washwaters will be diverted to the rear of each house and from there to a newly constructed underground storage tank located in the central area of the site (see Figure 11.12) Currently there are 3 No. washwater storage tanks on the existing site along the western side of the site. These will be replaced by a new centrally placed single tank, along the western side of the site.

All existing and proposed washwater pipelines will also be subject to integrity tests prior to the construction stage and repaired or replaced with new pipelines as appropriate.

**11.4.2.3 Spreading of Soiled Washwater**

It is proposed to spread the collected soiled washwater on agricultural land owned by the applicant or alternatively it will be provided to a third party contractor for spreading on suitable lands identified for such purposes in accordance with the *Good Agricultural Practice for the Protection of Waters Regulations 2017* and '*Landspreading of Organic Waste –*

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

*Guidance of Groundwater Vulnerability Assessment of Land' (EPA, 2004).* The impact will be slight if done in accordance with good practice.

**11.4.2.4 Foul Water**

Currently wastewater from the existing office and staff facilities on the site discharges to groundwater via a septic tank system. The septic tank system is several years' old and little information on its construction or design is available. It is not proposed to have any on-site facilities other than hand-washing, which will be diverted to the on-site washwater tank.

**11.4.2.5 Accidental Leakage/Spillage of Hydrocarbons**

Possible localised contamination of soils, subsoils and nearby Bekan by surface run-off in wet conditions, accidental leakage or spillage of hydrocarbons from vehicles, other machinery or on-site fuel/heating oil tanks may occur during the operational phase. Leakages or spillages associated with these activities would have a *negative moderate medium term impact* on soils, subsoils and surface water if mitigation measures are not put in place. Because of the significant depth (at least 10 m) of low to moderate permeability subsoils beneath the site it is unlikely that contamination of the underlying bedrock or groundwater from any such leaks/spills will occur. Also because of the distance to the lake, and the intervening roadway, significant contamination of the lake by accidental spillage of hydrocarbon is unlikely other than in exceptional circumstances or prolonged uncontrolled releases.

**11.4.2.6 Flood Risk**

The proposed storm-water management system for the development incorporates six soak pits, and silt traps and oil interceptors on the soakpits taking hard- surface run-off, are all deemed to be sufficient in limiting the run-off from the proposed site to the greenfield run-off rate to prevent increased flood risk. In addition the four proposed poultry units are replacing five existing poultry units within made ground, there is no intended change of use for this site, consequently there is no anticipated increase in runoff or flood risk to the site or the surrounding land. Therefore the Environmental impact is considered to be Low.

Overall it is assessed that will be no increased risk of flooding on the site itself or downstream of the site arising from the proposed development and risk. Thus the impact will be a *neutral long term imperceptible impact* and no further mitigation is required.

**11.4.2.7 Water Usage**

It is proposed to obtain water from the mains supply. The impact will be to increase the demand on the public water supply. It is assumed that the impact of the increased abstraction on the aquifer has been addressed by Strategic Environmental Assessment (SEA) and the EIA for the public abstraction itself and therefore it is not addressed here.

**11.4.2.8 Disruption of Groundwater Flow Paths**

Subsurface structures have the potential to impact on groundwater flow regimes if they are built in the aquifer's flow path. Theoretically, groundwater mounding can occur where large impermeable structures are placed perpendicular to groundwater flow paths and the depth of

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

excavation is unlikely to penetrate to bedrock. Therefore the will be *neutral slight imperceptible impact* on groundwater flow paths.

**11.4.2.9 Storage of Feed**

There is some potential for leakage of food and the subsequent contamination of clean surface water.

**11.4.2.10 Disposal of Carcasses**

Decaying animal carcasses have the potential to impact on surface water and groundwater quality if not appropriately stored and disposed of. In the event of bird mortality, carcasses will be removed from the housing units and stored in a leak-proof steel metal container on the site which will be collected weekly by College Proteins for rendering and re-use as animal feed or similar.

In the event of an outbreak of disease requiring de-stocking, a suitable location for the construction of a lined carcass disposal area will be identified. This carcass disposal site will be constructed as Department of Agriculture guidelines to ensure protection of groundwater and surface water quality.

Because of the above proposed measures there will only be a *negative slight short to medium term impact* on groundwater or surface water quality.

**11.4.2.11 Soil Sealing**

The proposed ongoing presence of poultry housing and hardstanding on the site will result in ongoing sealing of the soil. This sealing effect can impact on natural exchanges occurring between soils and the atmosphere which influence the natural function and associated biodiversity of soils. This will have a *negative slight permanent impact* on the soil.

**11.4.3 “DO-NOTHING”**

Under the ‘Do Nothing’ scenario the site would continue to be used as a poultry unit with the existing housing units and site infrastructure. The proposed development would be an improvement on the current situation as the existing houses are in disrepair. Improvement to septic tank etc. New housing will better insulation and ventilation to assist in minimising moisture content of manure.

**11.4.4 “DO-SOMETHING”**

Under the ‘Do Something’ scenario the site use could change, but the most likely usage is for continued agricultural.

**11.5 MITIGATION MEASURES**

This section describes a range of mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the effects of any impacts on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

### **11.5.1 CONSTRUCTION PHASE**

#### **11.5.1.1 Construction Management**

In order to reduce the impacts on the soils, geology and water environment a number of mitigation measures will be adopted as part of the construction works on site as follows:

- Existing topsoil will be retained on site to be used for the proposed development. Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works.
- Top-soiling and landscaping of the works will take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties.
- Stockpiled material will be covered/dampened during dry weather to prevent spreading of sediment/dust;
- Handling, transport and storage of fuel and chemicals will be controlled e.g. oil and fuel stored on site will be stored in designated areas. These areas will be bunded and located away from any surface water drainage. Refuelling of construction machinery will be undertaken in designated areas located away from surface water drainage. Spill kits shall be kept in these areas in the event of spillages.
- Controls for storage of any other potentially polluting materials/chemicals on-site e.g. any chemicals used on site will be required to be stored in designated bunded areas and the construction manager will be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at the site office.
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads will be provided.

#### **11.5.1.2 Controls on Damage to Underlying Geological Materials**

The removal of soils and subsoils/bedrock is an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock that will be excavated. It is proposed that all of the excavated subsoils removed during construction will be re-used on site in the form of landscaping. Any subsoils that cannot be re-used on-site will be treated, recycled or disposed of where suitable using a licenced waste contractor.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.

**11.5.1.3 Control and Re-use of Potentially Contaminated Material On-site**

It is not anticipated that any contaminated materials. During demolition works on the existing housing units works, all demolished materials will be visually assessed for signs of contamination. Should material appear to be contaminated, samples will be analysed by an appropriate testing laboratory. All potentially contaminated material will be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material will be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

**11.5.1.4 Control on Sources of Fill and Aggregates**

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status;
- Regulatory and Legal Compliance status of the Company.

**11.5.2 OPERATIONAL PHASE**

**11.5.2.1 Storage & Recovery of Manure**

The following measures will be undertaken to assist in minimising the volume and nutrient load of manure generated.

- Animals will be fed to requirements only
- Feedstuffs which optimise the digestibility of phosphorous will be used where possible
- Use of low phosphorous feed where possible
- Use of nipple and cup drinker (rather than hanging bowl drinkers) to minimise water spillage in the houses. Drinkers will be maintained in good working order such that leaks are prevented.
- Separation of 'clean' runoff from roofs and clean hardstanding area from soil washwaters to minimise volumes of soiled water to be managed. It is proposed that all clean water will be collected and diverted to 6 No. soakpits around the facility footprint.

### **11.5.2.2 Storage & Spreading of Soiled Wash Waters**

The washwater storage tank on the site will be subject to an integrity test every five years. Where the tank fails an integrity test, repair works will be undertaken on the tank or if not feasible it will be replaced with a new tank.

It is proposed that washwaters will be spread on the operators own land or will be taken by a third party contractor for disposal on suitable land banks.

It is proposed that all washwaters will be landspread in accordance with the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2017*.

### **11.5.2.3 Treatment & Monitoring of Stormwater**

As indicated previously it is proposed that only rainwater from roofs and clean hardstanding areas will be collected and diverted to the storm water management system. All soiled washwater will be diverted and collected in the soiled water collection system and stored in the on-site washwater storage tank.

It is proposed that run-off from all roofs and clean hardstanding areas will be discharged to 6 No. soakaways on the site in an arrangement as shown on Fig 11.12.

### **11.5.2.4 Foul Water**

Apart from hand washing, there will be no requirement for welfare facilities on the site. Hand wash water will be diverted to the washwater storage tank.

### **11.5.2.5 Storage of Feed**

Feeding systems will be maintained in good working condition such that feed wastage and spoilage are kept to a minimum.

### **11.5.2.6 Flood Risk**

Due to the fact that there is no perceivable flood risk and that there is an adequate storm-water management system proposed which will result in no additional runoff, the flood risk remains Low. As a result of this it is unnecessary to propose any mitigation measures.

### **11.5.2.7 Heating**

Heating will be provided by gas from a gas storage tank.

## **11.6 RESIDUAL IMPACTS**

The predicted residual impacts of the proposed development are outlined in the detailed assessment Tables 11.5 and 11.6 below.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**11.6.1 CONSTRUCTION PHASE**

The predicted impacts of the construction phase are described in Table 11.5 in terms of quality, significance and duration. The relevant mitigation measures are detailed and the corresponding residual impacts are determined which take account of these mitigation measures.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 11.5:** Summary of Predicted Construction Phase Impacts

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Soils	Natural soil excavation for building foundations	Negative	Slight	Permanent	Material will be reused on site where possible	Negative slight
Earthworks	Soils	Vehicular movement and soil compaction.	Negative	Slight-moderate	Short-term	Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.	Slight
Storage of potentially polluting materials	Soils / Bedrock	Potential leak or spillage from vehicles/machinery or construction related liquids on site resulting in soil/bedrock contamination	Negative	Moderate	Short-medium term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Designated refuelling areas will be used. Spill kits retained on-site.	Imperceptible
Earthworks	Surface Water (site drain, Bekan Lough)	Erosion of exposed soils/subsoils and entry of sediment laden run-off to nearby surface water	Negative	Slight to moderate	Temporary	Stockpiles of topsoil/soils will be covered/dampened during dry weather to prevent spreading of sediment/dust. Run-off from the site will pass through settlement ponds prior to discharge to the site drain. Top-soiling and landscaping of the works will take place as soon as finished levels are achieved.	Negative slight
Earthworks/ Excavations	Groundwater in the Rf aquifer	Temporary removal of part of the protective soil/subsoil cover thus increasing groundwater vulnerability to contamination	Negative	Slight to moderate	Temporary	Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.	Negative slight
Hydrocarbons from construction	Surface Water (site)	Potential accidental leakage or spillage of hydrocarbons from	Negative	Slight-moderate	Short-term	.Oil and fuel will be stored on-site in designated bunded areas located	Slight

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
vehicles/ machinery/ equipment	drain, Bekan Lough	vehicles/machinery resulting in surface water contamination				away from any surface water drainage. Refuelling of construction machinery will be undertaken in designated areas located away from surface water drainage. All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be inspected on a daily basis for evidence of hydrocarbons leaking from machinery. Spill kits will be kept on-site.	
Cement material of other potentially polluting substances	Surface Water (site drain, Bekan Lough	Potential leakage or spillage of cement or other potentially polluting substances resulting in soil/bedrock/groundwater contamination	Negative	Slight-Moderate	Short Term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Spill kits retained on-site. Cement mixing will take place in designated areas on-site with impervious surface.	Negative slight
Earthworks/ Excavations	Surface Water (site drain, Bekan Lough	Excavation and reuse of Potentially Contaminated Made Ground/Soils (PCBs)	Negative	Moderate	Long-term		Negative slight

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**11.6.2 OPERATIONAL PHASE**

The predicted impacts of the operational phase are described in Table 11.6 below in terms of quality, significance and duration.

The relevant mitigation measures are detailed and the residual impacts are determined which take account of these mitigation measures.

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 11.6:** Summary of Predicted Operational Phase Impacts

Activity/Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual impact
Oil/Hydrocarbons from Vehicles. Machinery	Soils/groundwater/surfaces water and Bekan Lough	Accidental leakage/spillage of hydrocarbons resulting in localised contamination of soils/subsoils	Negative	Slight-Moderate	Medium term	All new oil/hydrocarbon storage facilities will be designed and maintained in accordance with best practice and standards (BS 5410 and BS799-5).	Imperceptible
Washwater Pipeline	Soils/groundwater and surface water and Bekan Lough	Accidental leakage of washwater from washwater pipeline resulting in localised contamination of soils/subsoils.	Negative	Moderate	Short term	Programme of inspection and maintenance of the washwater pipeline will ensure that any damage, blockages etc. are identified and remedied.	Imperceptible
Storage/use of potentially polluting materials/chemicals	Soils/groundwater and surface water and Bekan Lough	Accidental leakage or spillage resulting in localised contamination of soils/subsoils.	Negative	Moderate	Medium term	All potentially polluting/waste storage areas will be designed to afford adequate containment for any liquid or solid waste	Imperceptible
Production of manure	Soils/groundwater and surface water and Bekan Lough	Uncontrolled Release could result in localised contamination	NEGATIVE	slight-moderate	Short term	material will be removed in a controlled fashion from the houses	Imperceptible
Washwater	Soils/groundwater and surface water and Bekan Lough	Uncontrolled release of could result in localised contamination	NEGATIVE	slight-moderate	Short term	Washwater will be conveyed to secure holding tank, and landspread in accordance with gap	Imperceptible

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**11.7 REFERENCES**

Building Research Establishment, 2017. *Soakaway Design - Digest 365*.

Environmental Protection Agency, 1999. *Waste water Treatment Manual - Treatment for Small Communities, Business, Leisure Centres and Hotels*.

Environmental Protection Agency, 2004. *Landspreading of Organic Waste – Guidance on Groundwater Vulnerability Assessment of Land*.

Environmental Protection Agency, 2009. *Code of Practice: Waste Water Treatment and Disposal Systems Serving Single Houses (p.e. < 10)*.

European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2017 (S.I. No. 605 of 2017).

Geological Survey of Ireland, July 2004. *Cong-Robe Groundwater Body: Summary of Initial Characterisation (1<sup>st</sup> Draft)*.

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## **12.0 CLIMATE**

### **12.1 INTRODUCTION**

Climate can refer to both the long-term weather patterns in an area and also to localised atmospheric conditions in a given area, referred to as the microclimate. Climate has implications for many aspects of the environment from soils to biodiversity and land-use practices. In a global sense, much of the concern with facilities such as the applicant's proposed poultry operation is the atmospheric emissions from the operation and the potential for increases in air pollutants, which may contribute to climate change.

### **12.2 METHODOLOGY**

Ireland has a temperate oceanic climate according to the Koppen-Geiger Climate Classification System. This means, like most of North-West Europe it is mild, moist and changeable, with abundant rainfall and a lack of temperature extremes. Due to its proximity to the Atlantic Ocean, Ireland has mild damp summers and cool wet winters and does not experience the temperature extremes of other countries at similar latitudes.

Ireland's weather patterns are characterised by the frequent passage of Atlantic low pressure weather systems and associated frontal rain belts from the South-West. These moisture-laden fronts break on the mountainous west coast, resulting in the highest rainfall levels in the west. Valentia Island of Kerry receives twice the level of rainfall to Dublin (1,684mm vs 884mm). In summer months, the influence of anti-cyclonic weather conditions results in drier continental air, in particular when winds are from an easterly direction are interspersed by the continuing passage of Atlantic frontal systems.

Occasionally, the establishment of a high pressure area over Ireland and the UK results in calm, dry conditions. In the winter, these periods are characterised by the formation of low-level temperature inversions at night-time. Fog can occur in low-lying areas in the region under these conditions of slack winds and clear skies.

If anti-cyclonic conditions become established for a few days or more during the summer months, high daytime temperatures may be recorded, especially in Midland areas away from cooler coastal areas. Prolonged dry weather conditions are relatively infrequent but, should easterly continental airflows persist, drought conditions may result in the region, which may last for up to 2 to 3 weeks.

The potential effects of climate change on a global scale have been investigated by the Intergovernmental Panel on Climate Change (IPCC). The resulting impacts in Ireland are outlined in the National Climate Change Strategy 2007-2012 (Department of Environment Heritage and Local Government, 2007) and by the EPA's Climate Change Research Programme.

The potential impacts include the following:

- Significant increases in winter rainfall, of the order of 10% in the southeast, with a corresponding increase in the water levels in rivers, lakes and soils.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

- Lower summer rainfall, of the order of 10% in the southern half of the country. Less recharge of reservoirs in the summer.
- An overall annual increase in rainfall in the north and west. An overall decrease in rainfall in the east of the country and a resultant decrease in baseline river-flows.
- An overall mean temperature increase (0.7° between 1890 and 2008). This trend is set to continue and possibly accelerate.
- An increase in extreme weather events: serious flooding more frequent than at present – particularly in the southeast. More regular and prolonged droughts and associated water shortages, particularly in the southern half of the country.

Further adverse climate change impacts are projected to affect Ireland in the coming decades and during the rest of this century. Uncertainties remain in relation to the scale and extent of these impacts, particularly during the second half of the century. The greatest uncertainty lies in how effective global actions will be in reducing greenhouse gas emissions. Predicted adverse impacts include:

- Sea level rise;
- Further increase in intense storms and rainfall events;
- Water shortages in the summer in the east;
- Adverse impacts on water quality;
- Changes in distribution of plant and animal species;
- Adverse effects on fisheries.

The nearest Met Éireann meteorological station providing monthly averages is located in Knock Airport, Co. Mayo (53°54'36" N, 8°49'04" W, 205m above mean sea level). As 30-year data was not available from the Knock airport station, data from the nearest synoptic station at Claremorris, Co. Mayo (53°42'39" N, 8°59'33" W, 68m above mean sea level) was used to determine 30-year monthly averages for rainfall, mean maximum temperature, mean minimum temperature and mean wind speed. These measurements would be generally representative of prevailing conditions experienced in the vicinity of Bekan, Co. Mayo.

### **12.3 DESCRIPTION OF EXISTING ENVIRONMENT**

The 2017 total monthly rainfall, mean maximum temperature, mean minimum temperature and mean wind speed from the Claremorris weather station have been compared to the 30-year averages (1987 to 2017) for each month to determine the degree of representation of the actual meteorological conditions versus what is experienced on average at the site. This comparison is presented in Table 12.1.

Overall, rainfall during 2017 was 32mm lower than the corresponding 30-year averages. March and September had considerably higher rainfall than the 30-year average, while January and April were considerably lower.

The overall mean maximum temperature for 2017 was 0.2°C higher than the corresponding 30-year average, while the overall mean minimum temperature was 0.4°C higher than the 30-

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

year average minimum temperature. The average wind speed recorded during 2017 was 0.3 knots lower than the 30-year average.

**Table 12.1** 2017 and 30-year average meteorological conditions from Claremorris synoptic station

MONTH	RAINFALL		TEMPERATURE				WIND SPEED	
	2017 (mm)	Average (mm)	Mean Max 2017 (°C)	Mean Max Average (°C)	Mean Min 2017 (°C)	Mean Min Average (°C)	Mean 2017 (knots)	Mean Average (knots)
<b>Jan</b>	50.6	135.4	8.8	8	3.4	2.3	7.7	9.7
<b>Feb</b>	82.9	106.1	9.1	8.6	2.8	2.1	10.1	9.5
<b>Mar</b>	136.4	95.6	11.5	10.3	4.3	3	8.8	9.7
<b>Apr</b>	16.8	76.9	12.5	12.7	5.6	4	7.2	8.7
<b>May</b>	76.7	76.2	17.3	15.4	6.7	6.4	7.4	8.2
<b>Jun</b>	95.3	71.1	16.9	17.5	9.9	8.9	8.8	7.5
<b>Jul</b>	93.1	86.8	18.4	18.9	9.8	10.8	7.3	7.2
<b>Aug</b>	106.7	98.1	17.7	18.6	9.7	10.6	7.2	7.2
<b>Sept</b>	145.2	86.9	15.9	16.8	8.2	8.6	7.7	7.3
<b>Oct</b>	114.5	129.4	14.1	13.5	7.5	6.3	9.2	8.1
<b>Nov</b>	107.8	125.9	10.2	10.2	3.7	3.9	6.6	8.1
<b>Dec</b>	166.9	136.9	8.4	8.1	2.9	2.5	7.8	8.9
<b>Annual</b>	<b>1,193</b>	<b>1,225</b>	<b>13.4</b>	<b>13.2</b>	<b>6.2</b>	<b>5.8</b>	<b>8</b>	<b>8.3</b>

**12.4 IMPACTS**

**12.4.1 “DO NOTHING” IMPACT**

If the proposed development does not go ahead, the site would remain unaltered with the current poultry operation in use. The dominant greenhouse gas sources within the area, agriculture and vehicle traffic would not be altered.

**12.4.2 “DO SOMETHING” IMPACTS**

The proposed development would marginally increase the volume of greenhouse gas emissions in the area, due to a slight increase in the proposed number of broilers (100,000) from the existing broiler development (97,000 birds when farm was operating at full capacity). The construction phase would also lead to the presence of machinery and HGVs onsite.

Upon completion of the construction phase, there would be approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch (as outlined in Section 2.3.1), equating to 146 truck and 366 car journeys per year. As previously discussed, these figures are likely to be overestimates, given that many of the delivery services provided for the development would occur in tandem with deliveries to other poultry units in the area and would not add to

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

the existing traffic within the wider area. Furthermore, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity. It is therefore not considered that traffic associated with the operation of the development would have a significant impact upon greenhouse gas emissions in the area.

Agriculture, residences and traffic within the area would remain the dominant sources of greenhouse gases – namely methane and carbon dioxide.

Due to the relatively small footprint of the proposed site, there would be no significant impact on the microclimate of the area. There are no significant direct impacts predicted on the macroclimate as a result of the proposed development.

## **12.5 MITIGATION**

The Western Brand Group is aware of the necessity to ensure maximum efficiency in all areas of the proposed development. The proposed broiler houses and the supporting systems would be designed to the highest industry standard to ensure maximum efficiency of input to product ratio. This would entail the input of heating energy at optimal levels, to allow the stock to grow and develop efficiently, while minimising associated fuel costs.

The primary fuel source for the operation would be natural gas which produces 60-90% less emissions than other fossil fuels. Combustion of natural gas produces negligible amounts of sulphur, mercury, and particulates when compared to other fossil fuels. Although natural gas is far more abundant than other fossil fuels and can be sourced from some renewable resources such as landfill and incineration, it is still seen as a non-renewable resource.

However, as mentioned, the Western Brand Group's overall objective is to ensure maximum efficiency in terms of inputs into the system, and this would serve the dual purpose of minimising the overall carbon footprint of the site and the resource use of a non-renewable fuel.

Therefore, due to the small scale of the proposed development, the high design specification aimed at ensuring maximum efficiency of inputs and the proposed use of the most environmentally friendly fuel option reasonably available, the impact to the climate from the proposed development would be minor.

## **12.6 REFERENCES**

Department of Environment, Heritage and Local Government (2007) *National Climate Change Strategy 2007 – 2012*.

Environmental Protection Agency Climate Change Research Programme. Available at: <http://www.epa.ie/climate/climatechangeresearch/>

Met Éireann historical weather data. Available at: <http://www.met.ie/climate-request/>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**SECTION C - MATERIAL ASSETS**

This section of the Environment Impact Assessment Report deals with material assets that would potentially be affected by the proposed construction and operation of four new poultry houses with a total capacity of 100,000 places for broiler chickens, new feed silos and all ancillary site works and services at Bekan, Co. Mayo. These assets are grouped into:

Material Assets:       **Agricultural Properties** including all agricultural enterprises.

Material Assets:       **Non-Agricultural Properties** including residential, commercial, recreational and non- agricultural land

Material Assets:       **Natural or other resources** including mineral resources, land and energy.

Material Assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Agricultural enterprises interact, to a large extent, with the natural environment in terms of climate, air quality, soil, hydrology and hydrogeology. Some domestic animals, such as horses and milking cows, may be impacted by traffic-generated noise.

Resources required for the proposed development includes existing land, fill material which would have to be sourced from quarries and electricity required for the purpose of powering lighting and heating systems.

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## **13.0 MATERIAL ASSETS - AGRICULTURE**

### **13.1 INTRODUCTION**

This section outlines the potential agricultural impact of the proposed construction of four poultry houses with a total capacity of 100,000 places for broiler chickens, new feed silos and all ancillary site works and services at Bekan, Co. Mayo. The proposed development would replace the existing broiler farm at the site, operated by the applicant.

The proposed development would be situated primarily on existing hardstand, upon which the existing poultry farm is placed. The total built area, including the broiler houses, concrete apron, hardstanding, access road and potentially some areas of hard-core would be an estimated 2.5 acres, with the total area of the site measuring approximately 2.72 acres.

No other agricultural holdings would be directly impacted through the loss of land by the proposed development, as all lands proposed for development would be operated by the Western Brand Group.

### **13.2 METHODOLOGY**

Both a field survey and desktop study were carried out to assess the potential impact of the proposed installation on agriculture in the area.

The field survey consisted of a walkover inspection of the site, which was conducted on Friday 20<sup>th</sup> April, 2018. A photo log is included as Attachment D.2.

The desktop survey assessed potential impacts using statistical information from the CSO (Central Statistics Office) and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, CORINE land use mapping and myplan.ie.

## **13.3 DESCRIPTION OF EXISTING ENVIRONMENT**

### **13.3.1 MAYO**

According to the Census of Agriculture (2010), there are 383,542 hectares of agricultural land in County Mayo (278,997 excluding commonage). The average farm size in Mayo is 22.4 hectares, which is below the national average of 32.7 hectares.

There are 12,458 farms in Mayo, the majority (60.2%) of which are specialist beef production farms, 18.2% are specialist sheep, 11% are mixed grazing livestock, 7.3% are mixed field crops and the remainder are specialist tillage, mixed crops and livestock and "other".

### **13.3.2 BRACKLOON WEST, CO. MAYO**

According to the Landscape Appraisal of Co. Mayo the townland of Brackloon West is located within the Principle Policy Area 4, "Drumlins and Inland lowlands", and within Landscape Character Unit K, "East Central Drumlin Spine". The proposed development site is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by hedgerows.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE’S FARM, BEKAN, CO. MAYO**

Residential development in the area is predominantly linearly aligned along the existing road network. A number of farmyard complexes are located within the area.

The site has an approximate elevation of 100-110m above sea level and is located within an area of rural, agricultural land with undulating topography. The site itself is composed primarily of hardstanding. As discussed in Section 11, the soils underlying the majority of the proposed site are classed as “Poorly drained basic mineral soils” (gleys) BminPD, with the remainder of the site classed as “Deep well drained basic mineral soil” (BminDW). The subsoil at the site is classed as Limestone Till. The bedrock underlying the site is classed as Dinantian Pure Bedded Limestones.

The CORINE data series shows that the land within the immediate vicinity of the proposed development is primarily used for pasture. The CORINE data series also shows that the surrounding region is primarily occupied by pastureland, with some areas of peatland to the west and south-west, coniferous forest to the north and an area of land principally occupied by agriculture with areas of natural vegetation to the south-east.

### 13.3.3 AGRICULTURAL ENTERPRISES

In addition to agricultural farms and holdings, three agricultural enterprises are located within the surrounding area of the proposed development. Table 13.1 outlines the facilities licenced by the Environmental Protection Agency (EPA) for a class of activity defined as “Intensive Agriculture”, within 15km of the proposed development.

**Table 13.1:** EPA Licenced Agricultural Enterprises within 15km of the Proposed Development

Licence No.	Licensee Name	Agricultural Enterprise	Approximate Distance from Proposed Development
P0912-01	Mr. Eugene Lannon (Hunts Farm)	Poultry Farm	800m S
P0923-01	Mr. Paraig Kiely	Poultry Farm	6km SE
P0971-01	Martin and Mhairi Dempsey	Poultry Farm	9.8km NW

## 13.4 IMPACTS

### 13.4.1 “DO-NOTHING”

Should the proposed development not be built, the existing poultry farm would continue to be in operation by the applicant, at reduced bird capacity owing to the demolition of two of the five poultry houses due to storm damage.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **13.4.2 "DO-SOMETHING"**

Should the proposed development be granted planning permission, there would be no change in the agricultural land-use of the site as the proposed poultry development would replace the older, existing poultry development. As the proposed development would utilise the existing hardstanding at the site, there would be no increase in the footprint of the poultry farm. The replacement of the existing poultry farm, operating at reduced capacity, with the proposed development would benefit the local economy by providing an increase in employment and by increasing the potential broiler supply to market.

The potential for operational noise associated with the proposed development to cause disturbance to livestock within grassland surrounding the proposed development would be considered low. Animals would quickly become acclimatised to the new noise environment adjacent to the development, as with similar projects such as new roads and motorways.

There is predicted to be no significant increase in traffic volumes using the local road infrastructure as a result of the operation of the proposed development. As discussed in Section 2.3.1, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity, with approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch. This would result in approximately 146 truck and 366 car journeys per year, with these figures likely to be overestimates.

It is considered that the proposed development would therefore not result in a decrease or loss of material assets with regards agriculture.

### **13.5 MITIGATION MEASURES**

No mitigation measures are required as the development of this land would increase its material value to the landowner and not cause significant impacts upon the agricultural material assets of other parties.

### **13.6 CONSTRUCTION IMPACTS AND MITIGATION**

#### **13.6.1 CONSTRUCTION IMPACTS**

There are a number of specific issues that may impact on agriculture during the construction phase of the proposed development. These include:

**Noise:** Increased noise from construction machinery has the potential to be an issue with certain sensitive livestock such as dairy cows and horses.

**Traffic:** There would be construction-related traffic during the construction phase of the proposed development.

**Dust:** The proliferation of dust during construction has a nuisance value and livestock are at risk to eye irritation from high levels of wind blowing dust particles.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **13.6.2 MITIGATION**

**Noise:** No mitigation is required; if a complaint is received, an investigation would be commenced.

**Traffic:** Discussions would take place with local landowners to ensure that construction traffic causes minimum interference with movements of stock and does not hinder farm operations.

**Dust:** Mitigation measures for construction dust are outlined in Section 5.7 above. These measures would be followed.

### **13.7 RESIDUAL IMPACTS**

No significant residual impacts on agriculture as a result of the construction or operational phases are expected.

### **13.8 REFERENCES**

Central Statistics Office (2010). *Census of Agriculture 2010*. Available at: <http://www.cso.ie/en/media/csoie/releasespublications/documents/agriculture/2010/full2010.pdf>

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2015) Draft. *Advice Notes for Preparing Environmental Impact Statements*.

Environmental Protection Agency (2003) *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)*.

Environmental Protection Agency Licence public access information, Available at: <http://www.epa.ie/licensing/iedipcse/>

EPA Envision Online Mapping, Available at: <http://gis.epa.ie/Envision/>

Myplan.ie Viewer. Available at: <http://www.myplan.ie/viewer/>

Mayo County Council (2014) *Mayo County Development Plan 2014-2020*.

Teagasc Subsoil Mapping. Available at: <http://gis.teagasc.ie/soils/map.php>

## **14.0 MATERIAL ASSETS – NON-AGRICULTURAL PROPERTIES**

### **14.1 INTRODUCTION**

This section outlines the potential impact of the proposed poultry farm on non-agricultural properties including residential, commercial, recreational and non-agricultural land.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads, as well as some commercial developments, are also located within the area.

The nearest settlement to the proposed development site is the village of Bekan, located approximately 150m south of the site. The towns of Knock, Ballyhaunis and Claremorris are located approximately 5.3km north-west, 5.7km east and 10.7km south-east from the proposed site respectively.

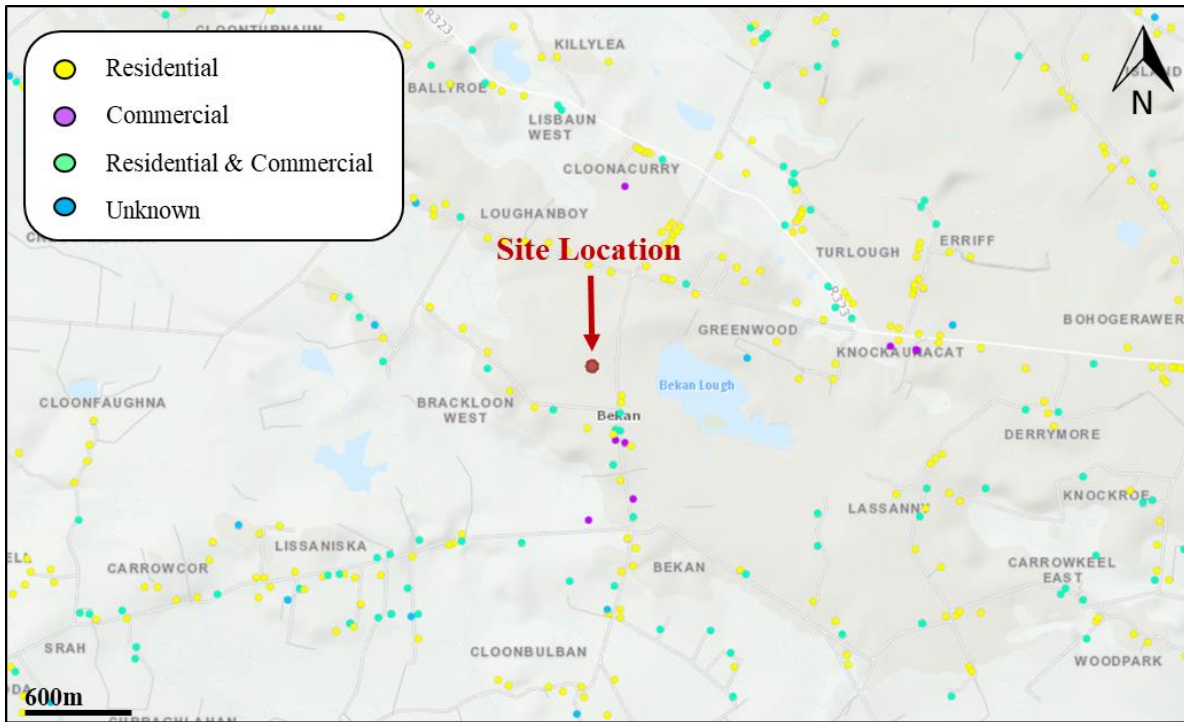
### **14.2 METHODOLOGY**

A desktop study was undertaken to assess the potential impact of the proposed development on residential and commercial properties, in addition to recreational and non-agricultural lands in the area. The desktop survey assessed potential impacts using statistical information from the Central Statistics Office (CSO), EPA licensing information and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, CORINE land use mapping, EPA Envision and myplan.ie.

### **14.3 DESCRIPTION OF EXISTING ENVIRONMENT**

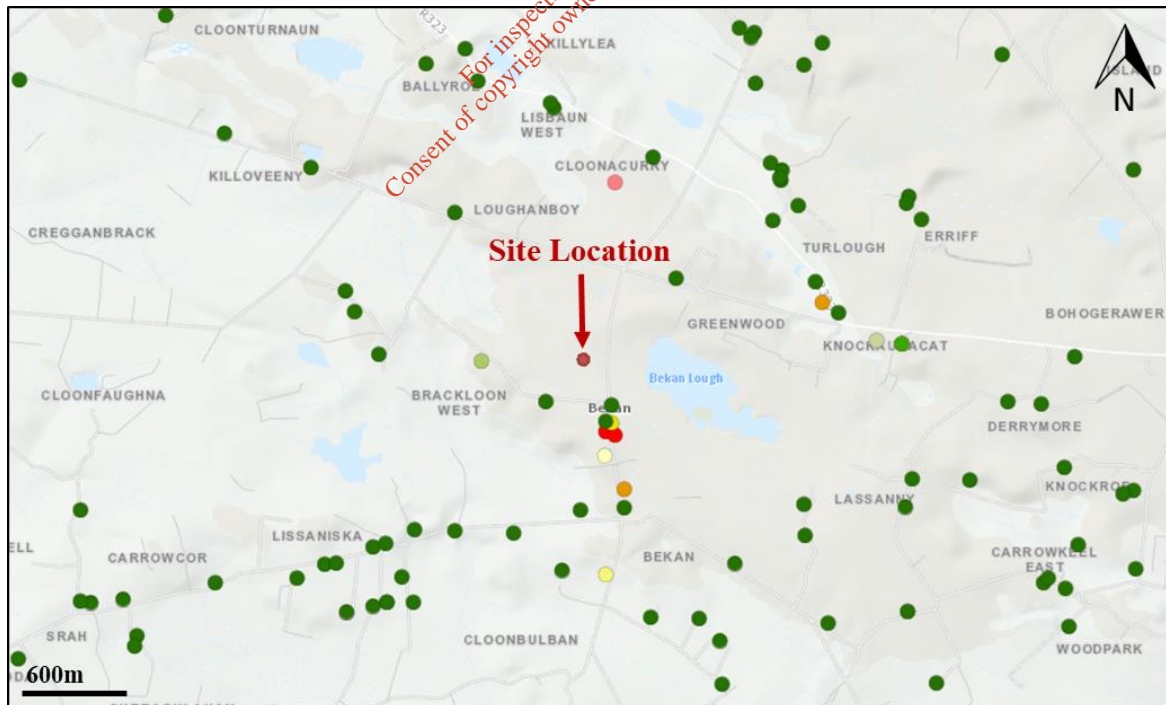
The proposed development is located within a rural, sparsely populated area with some commercial developments nearby. Figure 4.1 in Section 4 of this EIAR shows the address points of properties within the vicinity of the proposed development. For convenience, this figure has been reproduced in Figure 14.1 below. Points in yellow represent residential properties, points in purple represent commercial only properties, points in green represent properties accommodating both residential and commercial uses while points in blue are unknown.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Figure 14.1:** Address Points by Buildings for Properties within the vicinity of the Proposed Development (Source: myplan.ie)












Figure 14.2 below shows commercial properties, categorised per NACE Code, a pan-European classification system, in the surrounding area of the proposed development. Figure 14.2 is accompanied by Table 14.1, which outlines commercial activity per assigned colour.



**Figure 14.2:** Commercial Activities per NACE Code within the vicinity of the Proposed Development (Source: myplan.ie)

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 14.1:** NACE Activity per Assigned Colour

NACE Activity Colour for Figure 14.2			
	Agriculture, forestry & fishing		Accommodation and food service activities
	Manufacturing		Transport and storage
	Construction		Professional, scientific and technical activities
	Wholesale and retail trade		Arts, entertainment and recreation
	Education		Other
	Public administration and defense		

### 14.3.1 RESIDENTIAL PROPERTIES

From Figure 14.1, it can be seen that the majority of buildings within the surrounding area of the proposed development are residential properties, or residential properties that also accommodate commercial activities. Residential properties are primarily dispersed along the existing road network.

### 14.3.2 COMMUNITY INFRASTRUCTURE

Community infrastructure within the vicinity of the proposed development would be primarily located within the village of Bekan and the towns of Knock, Ballyhaunis and Claremorris.

The nearest settlement (approximately 150m) to the proposed development is Bekan village. Community infrastructure includes a church, cemetery, community centre, national school and public house. Other facilities within the vicinity of the proposed development include a Montessori located 600m north-east of the proposed development and Connacht GAA Centre Services located approximately 1km north of the proposed site.

Community infrastructure within Knock, Ballyhaunis and Claremorris towns would include a number of schools, churches of different religions, medical centres, a library, restaurants, supermarkets, shops, banks, visitor accommodation and businesses. The Dublin to Westport/Ballina train line services both Ballyhaunis and Claremorris towns.

### 14.3.3 COMMERCIAL ENTERPRISES

A number of small-scale commercial enterprises are located within the vicinity of the proposed development, with those situated within approximately 3km of the proposed development shown in Figure 14.2.

There are three non-agricultural enterprises within 1km of the proposed development. A construction enterprise is located 0.6km to the west of the site, while a public house and enterprise classed as “specialised design activities” are located 0.4km south-east and 0.5km south of the proposed site.

In addition to the above, two non-agricultural facilities licenced by the EPA are located within 15km of the proposed development. These are outlined in Table 14.2 below.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 14.2:** EPA Licenced Facilities within 15km of the Proposed Development

<b>Licence No.</b>	<b>Licence Name</b>	<b>Licence Type (First Schedule of EPA Act, 1992, as amended)</b>	<b>Approximate Distance from Proposed Site</b>
P0831-01	Western Brand Group Limited	7.4.1 Food and Drink	1.7km E
P0048-03	Dawn Meats Ireland t/a Western Proteins	7.4.1 Food and Drink	5.4km E

#### 14.3.4 TRAFFIC

Upon completion of the construction phase, there would be approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch, as outlined in Table 2.3 below. Based upon 6.2 batches per year, this would result in approximately 146 truck and 366 car journeys per annum. The breakdown of the estimated traffic journeys per 8-week batch is included in Table 2.3.

The estimated traffic movements would be for the most part the same as the traffic movements associated with the existing poultry farm at the site when operating at full capacity. Therefore, there would be no significant increase in traffic volumes due to the proposed development. As discussed in Section 2.3.1, many of the delivery services provided for the proposed development would occur in tandem with deliveries to other poultry units in the area and would not add to the existing traffic on local roads. Therefore, the above estimated traffic figures would be considered conservative (i.e. overestimated). The majority of HGV journeys would occur during the two-week change-over periods between batches.

Furthermore, the Traffic Assessment Report concluded that the L1501 road, along which the proposed development site is located, would operate within capacity when the proposed development is fully operational for the future assessment years 2019, 2024 and 2034. The report noted that there would be no queues and minimal delays to the existing L1501 / development access priority junction as a result of the proposed development for the future assessment years 2019, 2024 and 2034.

## 14.4 IMPACTS

### 14.4.1 "DO-NOTHING"

Should the proposed development not take place, there would be no changes or impacts upon non-agricultural properties including residential, commercial, recreational and non-agricultural land.

### 14.4.2 "DO-SOMETHING"

If the proposed development is granted planning permission, the proposed poultry farm would be located within agricultural lands belonging to the applicant. Therefore, the loss of land from the proposed development would have no impact upon residential, commercial, recreational and non-agricultural land.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

The potential for noise to impact upon residential, commercial and other non-agricultural facilities would be considered low, given the nature of the proposed development, the existing noise climate of the area and the distance from other facilities.

There is predicted to be no significant increase in traffic volumes using the local road infrastructure as a result of the operation of the proposed development. As noted in Section 14.3.4 above, given that traffic journeys would be similar to traffic journeys relating to the existing poultry operation at the site and based upon the Traffic Assessment Report which concluded that the L1501 road would operate within capacity when the proposed development is fully operational for the future assessment years 2019, 2024 and 2034.

It is therefore considered that the proposed development would not result in decrease or loss of material assets with regards residential, commercial, recreational and non-agricultural land.

#### **14.5 MITIGATION MEASURES**

No mitigation measures would be required, as the proposed development would not cause significant impacts upon residential, commercial or other non-agricultural facilities.

#### **14.6 CONSTRUCTION IMPACTS AND MITIGATION**

##### **14.6.1 CONSTRUCTION IMPACTS**

A number of specific issues may impact on residential, commercial or other non-agricultural facilities during the construction phase of the proposed development. These include:

**Noise:** Increased noise from construction machinery has the potential to impact upon nearby residences and commercial activities.

**Traffic:** There would be construction-related traffic during the construction phase of the proposed development.

**Dust:** The proliferation of dust during construction has a nuisance value to nearby residences and commercial activities.

##### **14.6.2 MITIGATION**

**Noise:** No mitigation would be required; works would be transient in nature. If a complaint is received, an investigation would be commenced.

**Traffic:** No mitigation would be required; construction traffic would primarily be located on the proposed site.

**Dust:** Mitigation measures for construction dust are outlined in Section 5.7 above. These measures would be followed.

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## **14.7 RESIDUAL IMPACTS**

There would be no significant residual impacts on residential, commercial or other non-agricultural facilities as a result of the construction phase of the proposed development.

## **14.8 REFERENCES**

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports.*

Environmental Protection Agency (2015) Draft. *Advice Notes for Preparing Environmental Impact Statements.*

Environmental Protection Agency (2003) *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements).*

Environmental Protection Agency Licence public access information, Available at: <http://www.epa.ie/licensing/iedipcse/>

EPA Envision Online Mapping, Available at: <http://gis.epa.ie/Envision/>

Myplan.ie Viewer. Available at: <http://www.myplan.ie/viewer/>

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## **15. MATERIAL ASSETS – NATURAL AND OTHER RESOURCES**

### **15.1 INTRODUCTION**

This chapter outlines the potential impacts on natural and other resources of the proposed construction of four new broiler houses with a total capacity of 100,000 places, feed silos and all ancillary site works and services at Bekan, Co. Mayo.

### **15.2 DESCRIPTION OF EXISTING RESOURCES**

The area in the immediate vicinity of the proposed operation is rural in nature, with much of the land in agricultural use. However, a network of utilities associated with residential houses, agricultural and commercial operations are all available in the general hinterland.

#### **15.2.1 LAND USE AND SOIL**

The proposed poultry farm would replace an existing poultry farm (operated by the applicant) at the site.

Following construction of the proposed development, the total surface area would cover an estimated 2.5 acres. However, as noted in previous sections of this EIAR, the proposed development would be situated within the footprint of the existing poultry farm. The soil types occurring within the footprint of the proposed development are composed primarily of "Poorly drained basic mineral soils" (gleys) BminPD, with a small are of the site composed of Deep well drained basic mineral soil" (BminDW). A detailed description of the existing soil environment is provided in Section 11 Land – Soils, Geology and Hydrogeology.

Topsoil would be stockpiled onsite for later landscaping use.

#### **15.2.2 TRANSPORT NETWORK**

The proposed development site is located in the townland of Brackloon West, at Bekan, Co. Mayo. The site is located approximately 150m from the village of Bekan, 5.3km from Knock town centre, 5.7km from Ballyhaunis town centre and 10.7km from Claremorris. The site is accessed by a local road which links to the R323 some 1.8km to the north-east of the site. The R323 road connects to the N60 and N86 roads some 4.4km to the east at Ballyhaunis town.

#### **15.2.3 UTILITIES**

It is proposed to source water required for stock drinking and for the cleaning of the broiler houses from the existing mains connection.

There would be no planned impact upon municipally operated wastewater schemes from the proposed development.

The site would have good electrical network connectivity, with power lines in the area. A back-up generator would also typically be used at such sites in the event of a power failure.

### **15.3 IMPACT AND MITIGATION**

Overall, the proposed development would have a minor negative impact on natural and other resources. Any disruption to services and existing transport networks would be minimal and of a temporary nature during the construction phase of the development.

#### **15.3.1 LAND AND SOIL**

In total, the proposed poultry farm would occupy an estimated 2.5 acres of existing hardstanding and hardcore areas for the main footprint. All of this would be within the lands operated by the applicant. As such, it is considered that there would be no significant impact on land or soil material assets. Impacts on the agricultural use of land are discussed in Section 13 Material Assets – Agriculture.

#### **15.3.2 TRANSPORT NETWORK**

During the construction stage, the presence of HGVs and small commercial vehicles for deliveries of construction materials and transport of construction workers would be noted.

Upon completion of the construction phase, there would be approximately 23.5 articulated truck journeys and 59 car journeys per 8-week batch, equating to 146 truck and 366 car journeys per year, with these figures likely to be overestimates. However, as previously discussed in Section 2.3.1, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity. Furthermore, the Traffic Assessment Report (Attachment G) concluded that the L1501 road would operate within capacity when the proposed development would be fully operational for the future assessment years 2019, 2024 and 2034.

Therefore, the expected volume of traffic on the road network would have a negligible additional effect on the structural integrity of the road network and its on-going maintenance costs.

#### **15.3.3 FUEL RESOURCES**

As detailed in Section 2.2.2, the proposed heating system is a hot water system, using natural gas as the fuel source. This is seen as an efficient means of heating a broiler farm.

As detailed in Section 2.2.2 and 12.5, the heating system would be fuelled by natural gas. As the broiler houses would be insulated and the heating system would be of high specification, the development would not require a high input of natural gas.

Electricity would be used for the feed and water delivery systems, the ventilation systems and lighting in the house. Due to the high standard of design and selection of materials and the requirement for maximum process efficiency, electricity input would be minimal.

#### **15.3.4 ECONOMIC MINERALS**

It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **15.3.5 RAW MATERIALS REQUIRED**

Construction material, when needed, would be sourced from nearby sources such as local quarries where practical.

### **15.3.6 UTILITIES**

Water usage volumes for the proposed development would not be considered significant. It is estimated that the proposed development would use 723 M<sup>3</sup> of water per batch of 100,000 birds, equating to approximately 4,482.6 M<sup>3</sup> of water per year. This would include water for drinking for stock and cleaning of the house. As discussed in Section 11.4, it is assumed that the increased abstraction on the aquifer has been addressed by the Strategic Environmental Assessment and the EIA for the public abstraction itself.

The electrical use at the site would be expected to be relatively moderate and therefore no significant impact upon electrical supply would be anticipated.

## **15.4 RESIDUAL IMPACTS**

No significant residual impacts are predicted.

## **15.5 REFERENCES**

Environmental Protection Agency Licence public access information, Available at: <http://www.epa.ie/licensing/iedipcse/>

EPA Envision Online Mapping, Available at: <http://gis.epa.ie/Envision/>

Myplan.ie Viewer. Available at: <http://www.myplan.ie/viewer/>

Teagasc Subsoil Mapping. Available at: <http://gis.teagasc.ie/soils/map.php>

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**SECTION D – ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL  
HERITAGE**

This section of the Environmental Impact Assessment Report examines impacts of the proposed development on archaeology, architecture and cultural heritage.

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Mayo. As part of the scope and examination of alternatives phases of this development, every effort has been made to avoid known Archaeological, Architectural and Cultural Heritage sites.

This section of the EIAR examines the impacts of the development on known sites (which could not be avoided) or potential sites which have come to light during the field survey of the proposed development.

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## **16.0 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE**

### **16.1 INTRODUCTION**

This section assesses what, if any, impact the subject development at this site in Brackloon West townland, Co. Mayo will have on the Cultural Heritage of the area. The assessment was compiled by Richard Crumlish, Consultant Archaeologist, B.A., M.I.A.I. and consisted of the necessary research/desktop study and a walkover survey of the site on 24 April and 2 May 2018.

Brackloon is translated as Bhreac-chluain, the speckled (breac) meadow (cluain). The townland is located within the parish of Bekan, in the barony of Costello, in County Mayo.

### **16.2 LEGISLATION AND POLICY CONTEXT**

- Cultural Heritage in Ireland and specifically within County Mayo is protected under the National Monuments Acts 1930-2014, the Planning Act of 2000 and the Mayo County Development Plan 2014-2020.
- The National Monuments (Amendment) Act 1994 gave legal protection to recorded monuments through the establishment of the Record of Monuments and Places (RMP), which incorporated the Sites and Monuments Record (SMR) for each county into law.
- The Planning Act 2000 incorporates the Record of Protected Structures (RPS) for each county, giving legal protection to all buildings and structures listed.
- Under AoH-01 of the Archaeological Heritage section of the Environment, Heritage & Amenity Strategy of the Mayo County Development Plan 2014-2020, it is an objective of the Council to:
  - (a) Protect the archaeological heritage and especially sites identified in the Record of Monuments and Places, National Monuments in the ownership or guardianship of the State, and National Monuments that are the subject of Preservation Orders, and to safeguard the integrity of the archaeological sites in their setting.
  - (b) Require that planning applications within the zones of archaeological potential as outlined in the Record of Monuments and Places include an archaeological assessment as set out in the Development Guidance document accompanying this Plan.
  - (c) Require that all large scale planning applications (i.e. development of lands on 0.5 ha or more in area or 1km or more in length) include an archaeological assessment as set out in the Development Guidance document accompanying this Plan.
- Under AH-01 of the Architectural Heritage section of the Environment, Heritage & Amenity Strategy of the Mayo County Development Plan 2014-2020, it is an objective of the Council to protect buildings and structures included in the Record of Protected Structures (RPS) which forms part of this plan (Volume 4).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### 16.3 METHODOLOGY

The following resources have been consulted in the compilation of this Cultural Heritage Section of the EIAR:

- Available aerial photographs
- Mayo County Development Plan 2014-2020.
- National Monuments Acts 1930 to 2014.
- Ordnance Survey 1:10560 (6-inch) map of County Mayo, Sheet No. 92, 1st Edition of 1838.
- Ordnance Survey 1:10560 (6-inch) map of County Mayo, Sheet No. 92, Edition of 1917.
- Ordnance Survey 1:2500 (25-inch) map of County Mayo, Late 19th/early 20th century edition.
- Record of Monuments and Places, County Mayo; Dúchas, The Heritage Service; Department of Arts, Heritage, Gaeltacht and the Islands; Dublin 1996.
- Record of Protected Structures for County Mayo (Mayo County Development Plan 2014-2020).
- Topographical Files of the National Museum of Ireland.
- Unpublished files of the National Monuments Archive, Department of Culture, Heritage and the Gaeltacht.
- [www.archaeology.ie](http://www.archaeology.ie)
- [www.excavations.ie](http://www.excavations.ie)
- [www.heritage.maps.ie](http://www.heritage.maps.ie)
- [www.logainm.ie](http://www.logainm.ie)

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A list of abbreviations is included as Attachment F.

### 16.4 EXISTING ENVIRONMENT

#### 16.4.1 RECORD OF MONUMENTS AND PLACES

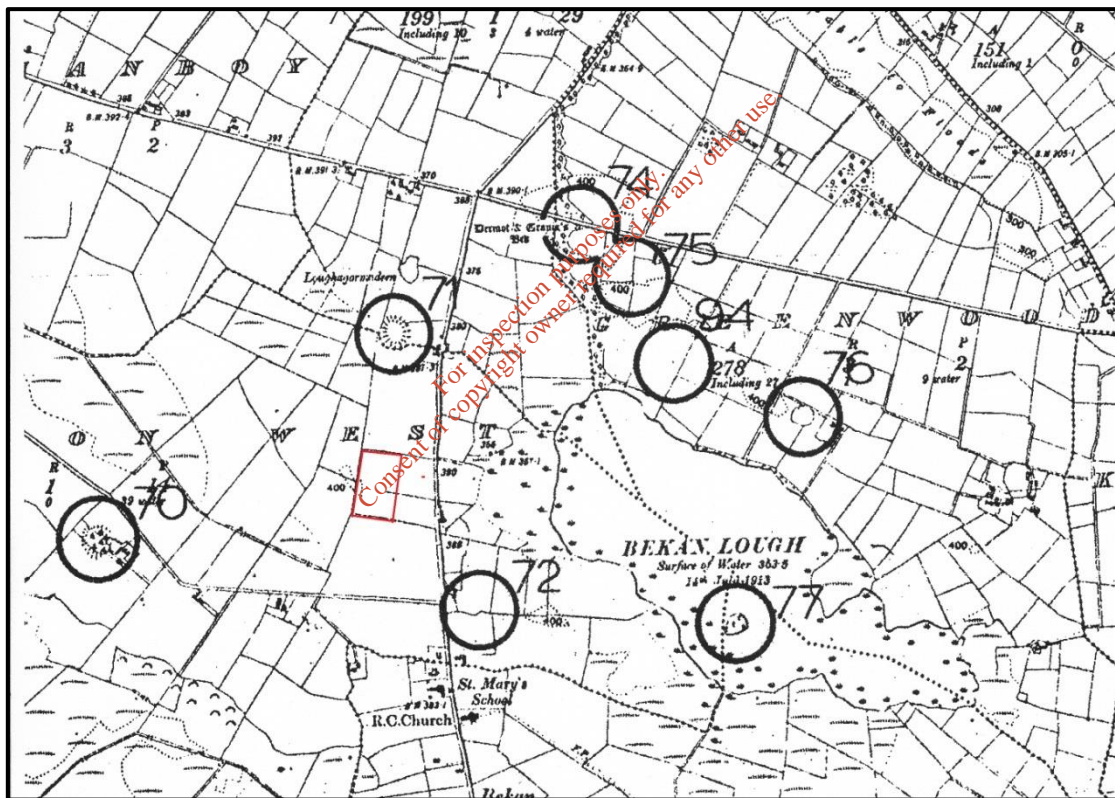
Having consulted the Record of Monuments and Places for County Mayo (1996) (Figure 16.1) and [www.archaeology.ie](http://www.archaeology.ie) (Figure 16.2) the following monuments are located within 1km of the development area (Table 16.1).

**Table 16.1:**List of Recorded Monuments within 1km of development

RMP No.	Description	Townland	ITM Co-ordinates	Distance
MA092-070	Enclosure	Brackloon West	543209,779749	c.450m
MA092-071	Enclosure	Cloonacurry	543788,780126	c. 200m
MA092-072	Enclosure	Brackloon West	543913,779607	c. 200m
MA092-074	Wedge Tomb	Greenwood	544146,780309	c. 550m

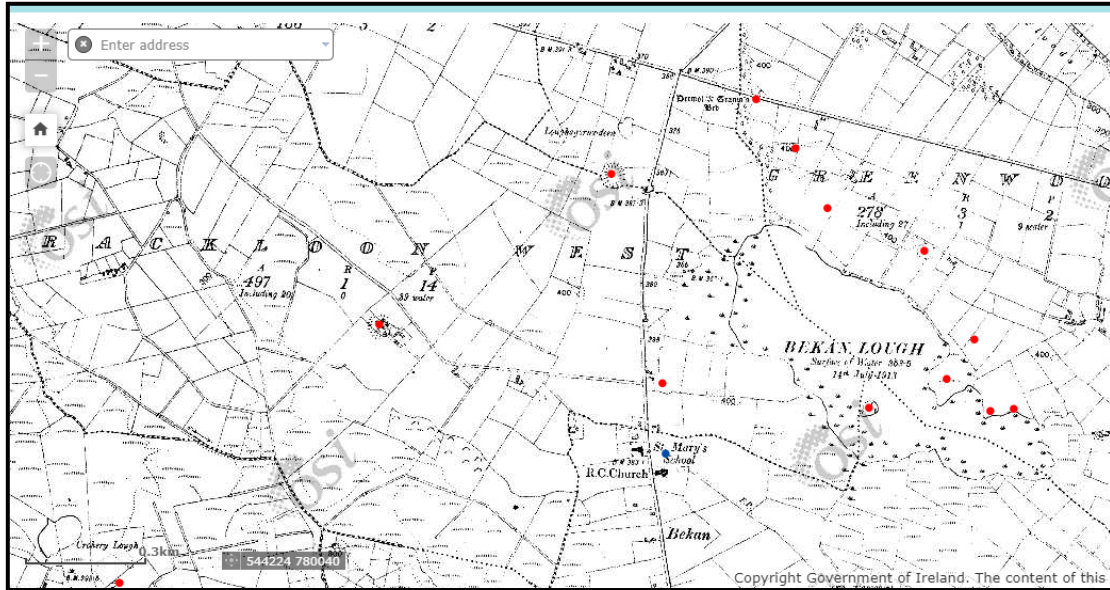
**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

RMP No.	Description	Townland	ITM Co-ordinates	Distance
MA092-075	Enclosure	Greenwood	544244,780185	c. 550m
MA092-076	Possible Enclosure	Greenwood	544564,779931	c. 750m
MA092-077	Possible Crannog	Bekan	544425,779541	c. 700m
MA092-078001	Church	Bekan	544306,779057	c. 900m
MA092-078002	Graveyard	Bekan	544306,779013	c. 900m
MA092-094	Enclosure	Greenwood	544320,780036	c. 550m
MA092-095	Enclosure	Bekan	544413,779053	c. 950m
MA092-114	Burnt Mound	Greenwood	544621,779612	c. 850m
MA092-115	Burnt Mound	Greenwood	544729,779536	c. 980m
MA092-116	Burnt Mound	Greenwood	544689,779710	c. 900m
MA092-122	Enclosure	Cloonacurry	543935,780833	c. 900m



**Figure 16.1:** Extract from Mayo RMP, Sheet No. 92, showing recorded monuments. Site outlined in red. Ordnance Survey Ireland Licence No. EN 0066018  
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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Figure 16.2:** Extract from OS 6-inch map showing recorded monuments (marked with red dots), courtesy of [www.archaeology.ie](http://www.archaeology.ie)

#### 16.4.2 RECORD OF PROTECTED STRUCTURES

Having consulted the Record of Protected Structures for County Mayo, there are no protected structures within or in the immediate vicinity of the proposed development site. There are no protected structures within 1km of the site, however, there is one building in the area which is included in the National Inventory of Architectural Heritage. The Church of St. Margaret Mary Alacoque in Bekan, which was built in 1934-5 and renovated in 1968, is located c. 350m S of the proposed development site (Figure 16.1 & Plate 16.1).



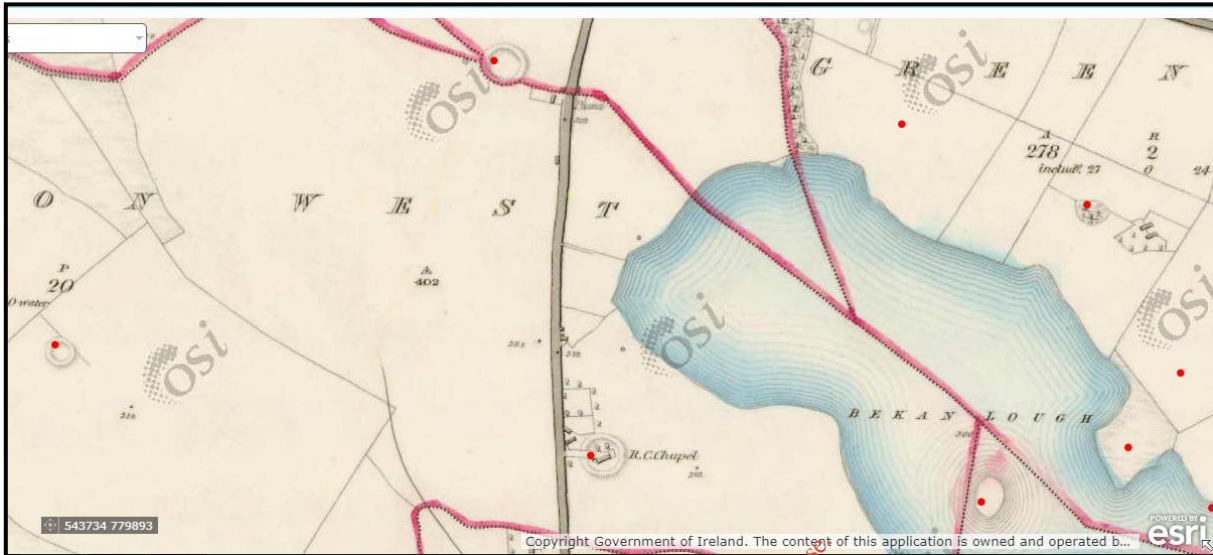
**Plate 16.1:** Looking S towards the church from the site

#### 16.4.3 TOPOGRAPHICAL FILES OF THE NATIONAL MUSEUM OF IRELAND

There are no entries for Brackloon West in the Topographical Files of the National Museum of Ireland, however, a dug-out canoe is recorded along the southern shore of Bekan Lough in Bekan townland, c. 700m ESE of the proposed development site.

#### 16.4.4 PREVIOUS ARCHAEOLOGICAL EXCAVATIONS

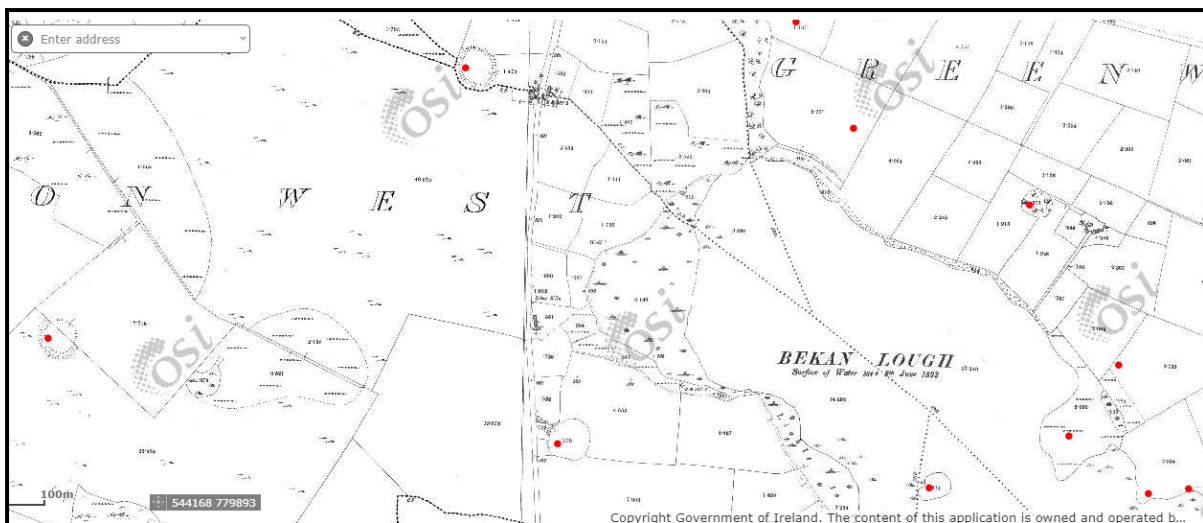
Having consulted [www.excavations.ie](http://www.excavations.ie), which records summaries of all licensed excavations carried out in Ireland during the period 1969 – 2017, no licensed excavations have taken place in Brackloon West townland.



**Figure 16.3:** Extract from 1<sup>st</sup> edition OS 6-inch map (1838) courtesy of [www.archaeology.ie](http://www.archaeology.ie)

#### 16.4.5 CARTOGRAPHIC SOURCES

Nothing is shown on the proposed development site on the 1838 (1<sup>st</sup>) edition of the OS six-inch sheet (Figure 16.3), apart from a Trigonometrical Point near the west side of the site. In terms of archaeology, seven of the fifteen recorded monuments within 1km of the subject site area are depicted (RMP Nos. MA092-070, -071, -072, -076, -077, -078001, -078002), five of which are visible on the extract above (MA092-070, -071, -072, -076, -077) (Figure 16.3). The church (RMP No. MA092-078001) in Bekan townland is marked and named 'Church in Ruins'. The associated graveyard (RMP No. MA092-078002) is named 'Grave Yard'.



**Figure 16.4:** Extract from historical OS 25-inch map courtesy of [www.archaeology.ie](http://www.archaeology.ie)

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

Nothing is shown at the site location on the OS 25-inch map of the late 19<sup>th</sup>/early 20<sup>th</sup> century (Figure 16.4). In terms of the archaeology of the area, the same seven recorded monuments which were depicted on the 1<sup>st</sup> edition OS six-inch sheet (Figure 16.3) are still marked. The church (RMP No. MA092-078001) and graveyard (RMP No. MA092-078002) in Bekan townland are named '*Church (in Ruins)*' and '*Grave Yard*'. The same five monuments, as those shown on the 1<sup>st</sup> edition OS six-inch sheet, are visible on the extract above (Figure 16.4).

By the time of the 1917 edition of the OS six-inch sheet (Figure 16.2), the site area is now enclosed with field boundaries. In terms of archaeology, six of the seven monuments marked on the previous editions of the OS 6-inch and OS 25-inch sheet are shown with the enclosure (RMP No. MA092-072) to the S having disappeared. The wedge tomb (RMP No. MA092-074) in Greenwood townland is marked and named '*Dermot & Grania's Bed*'. The church (RMP No. MA092-078001) and graveyard (RMP No. MA092-078002) in Bekan townland are named '*Church (in Ruins)*' and '*Grave Yard*'. Five of these monuments are visible on the extract above (Figure 16.2).

#### **16.4.6 AERIAL PHOTOGRAPHS**

Having consulted available aerial photographs including Google and Bing satellite images, no further archaeological features are visible within or in the immediate vicinity of the subject site area.

#### **16.4.7 FIELD SURVEY**

The site contains three chicken broiler houses (Nos. 10, 11 and 12) and the concrete floor remains of two more (Nos. 8 and 9) to the N (Plate 16.2). There are a number of silos, tanks and sheds at various locations around the site (Figure 16.5 and Plates 16.2, 16.4).



**Plate 16.2:** Looking SSW across site showing House Nos. 10, 11 & 12.

The remainder of the site is a concrete hardstand (Plate 16.3).

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Plate 16.3:** Looking W across site of House Nos. 8 & 9.

Between the existing buildings are green areas which are clearly disturbed (Plate 16.4).



**Plate 16.4:** Looking E between House Nos. 11 & 12.

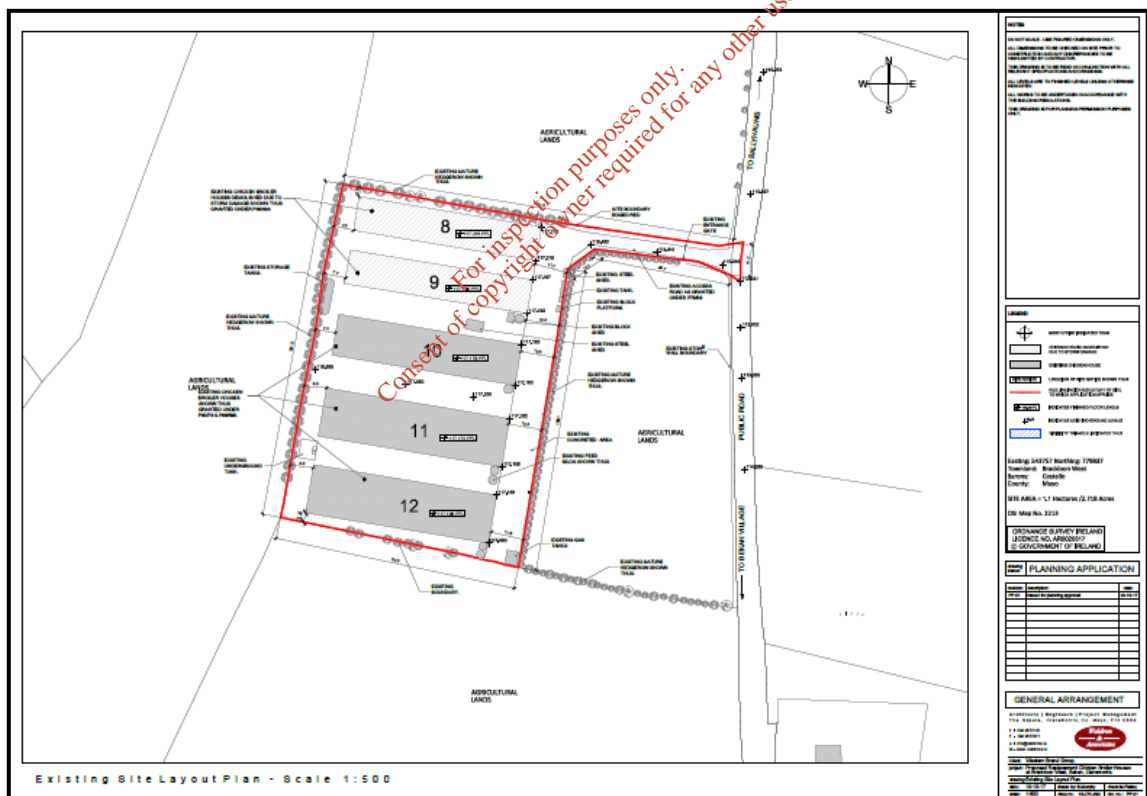
Access to the site is via a 4m wide concrete road off the L25021 (Plate 16.5). The site has clearly been reduced and filled as part of its original construction in 1979-80.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**



**Plate 16.5:** Looking E along concrete access road with Bekan Lough in background.

The site boundaries to the N, W and S consist of a combination of drystone walls and earth and stone banks, lined with hawthorn, whins/gorse and briars. To the E is a concrete block wall lined with Leylandi.



**Figure 16.5:** Existing Site Layout

The subject development site is located in undulating pastureland to the W of a local road (L25021) with Bekan Lough visible to the E (Plates 16.4 & 16.7) and Bekan church visible to the SSE (Plate 16.1).

## **16.5 POTENTIAL IMPACTS**

### **16.5.1 PHYSICAL IMPACTS**

- The nearest extant monument is an enclosure (RMP No. MA092-071), located *c.* 200m away in Cloonacurry townland (Figure 16.1). Given the distance involved the proposed development will not adversely impact on any known recorded monument.
- There are no protected structures within 1 km of the proposed development site.
- The site has been completely disturbed during its initial development in 1979-80.
- As a result of these factors the proposed development will have no impact on the Cultural Heritage of the area.



**Plate 16.6:** Looking N towards enclosure (RMP No. MA092-071) from site. The monument is in the centre middleground.

### **16.5.2 VISUAL IMPACTS**

- Two of the recorded monuments located within 1km are visible from the subject development site: an enclosure located *c.* 200m away in Cloonacurry townland (RMP No. MA092-071) (Plate 16.6) and a possible crannog located *c.* 700m away in Bekan Lough (RMP No. MA092-077) (Plate 16.7). The enclosure (RMP No. MA092-071) is completely overgrown (Plate 16.6). The distances from the proposed development site to both monuments, i.e. *c.* 200m and *c.* 700m respectively, result in any potential visual impact being negligible.
- No protected structures are located within 1km of the subject development site. The local 'Church of St. Margaret Mary Alacoque' is visible, at *c.* 350m away (Plate 16.1). Given the distance involved any adverse visual impact the proposed development may pose is deemed negligible.

### 16.5.3 'DO NOTHING' SCENARIO

- In the event of such a scenario, given that the site has been completely disturbed during its original development, there would be no impact on any potential features/deposits and/or artefacts of archaeological significance which may have been located on the site.



**Plate 16.7:** Looking ESE towards possible crannog (RMP No. MA092-077) from site. The monument is in the centre middleground.

### 16.6 MITIGATION MEASURES

As the proposed development will pose a negligible impact on the Cultural Heritage of the area, no mitigatory measures are necessary.

### 16.7 CONSTRUCTION IMPACTS AND MITIGATION

- Any groundworks which are part of the proposed development will have no impact on potential features/deposits and/or artefacts of archaeological significance which may have been located within the site, given the previous development of the site in 1979-80 which would have removed any potential features/deposits and/or artefacts at that time.
- No mitigatory measures are necessary

### 16.8 CONCLUSION

No adverse physical or visual impacts on the known Cultural Heritage of the area have been identified as a result of the proposed development. The nearest recorded monument is c. 200m away, which is also the nearest visible monument to the proposed development. No protected structures are located within 1km of the subject development. The nearest known

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

artefact is a dug-out canoe found on the shore of Bekan Lough c. 700m away. No licensed excavations have been carried out in the townland. The entire site has been completely disturbed during the original phase of construction. The cartographic evidence shows no features marked within or in the immediate vicinity of the site, while the aerial photos show no archaeological features in the vicinity.

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**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**17.0 INTERACTIONS AND INTER-RELATIONSHIPS**

In line with requirements of EC Directive 85/337/EC (as amended) and the Planning and Development Regulations 2001, any interactions/inter-relationship between the various environmental factors was also taken into account as part of the EIAR scoping and assessment.

Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed. An overview of these potential interactions is provided in Table 17.1, with the main interactions or inter-relationships discussed in Sections 17.1 to 17.13 below.

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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**Table 17.1:** Summary of Potential Interactions/Inter-Relationships

<b>Receptor Source</b>	<b>Human Beings</b>	<b>Air</b>	<b>Noise</b>	<b>Landscape &amp; Visual</b>	<b>Biodiversity</b>	<b>Water</b>	<b>Soils</b>	<b>Climate</b>	<b>Material Assets</b>	<b>Cultural Heritage</b>
<b>Human Beings</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Air</b>	✓		x	x	✓	x	x	✓	✓	x
<b>Noise</b>	✓	x		x	✓		x	x	✓	x
<b>Landscape &amp; Visual</b>	✓	x	x		x	x	x	x	x	✓
<b>Biodiversity</b>	✓	✓	✓	x		✓	x	✓	x	x
<b>Water</b>	✓	x	x	x	✓		✓	x	x	x
<b>Soils</b>	✓	✓	x	✓	✓	✓		x	✓	✓
<b>Climate</b>	✓	✓	x	x	✓	x	x		x	x
<b>Material Assets</b>	✓	✓	✓	x	✓	x	x	x		✓
<b>Cultural Heritage</b>	✓	x	x	✓	x	x	x	x	✓	

✓ - Anticipated Interaction  
x - No Anticipated Interaction

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

### **17.1 AIR AND SOILS**

Excavations and earth moving operations during construction works may generate quantities of dust, which have the potential to impact upon air quality in the vicinity of the proposed development. Consequently, an impact upon air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna (further discussed in Section 17.3).

The extent of dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Mitigation measures to control dust emissions would be implemented, which would include good working practices, dust suppression measures and the undertaking of reinstatement works as soon as practicable.

### **17.2 AIR AND CLIMATE**

The proposed development has the potential to impact upon the air quality and climate of the area through air emissions, including potential greenhouse gases, arising from the rearing of broiler chickens and exhaust fumes from traffic.

The greenhouse gases methane and nitrogen oxides would be generated from the digestive processes and litter of the broilers. As discussed in Section 5.5.1, the greenhouse gases potentially released to the atmosphere from the proposed development would be typical of the industry and would be anticipated to have no significant impacts on air quality or climate in the regional context.

There would be a small increase in traffic during the construction phase, however, this would not be considered significant given the transient nature of works. The operation of the proposed development would result in approximately 23.5 HGV movements and 59 car movements per batch, resulting in approximately 146 HGV movements and 366 car movements per year, with these figures likely to be overestimates, as discussed in Section 2.3.1. Furthermore, the estimated traffic movements would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity. Therefore, traffic associated with the development would not be considered to have a significant impact upon air quality or climate of the area.

Local heating of air over the new broiler-rearing farm could cause a minor microclimate change in the vicinity.

### **17.3 AIR, HUMAN HEALTH AND BIODIVERSITY**

An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance to humans and fauna and has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. However, as discussed in Section 17.2, the risk to air quality as a result of the

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

proposed development would not be considered significant, both at the local community level and on a broader national / global scale.

During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and flora and fauna in the surrounding area. The potential impact of dust would be temporary, given the transient nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required.

Odour is another aspect of air quality with the potential to impact upon human beings, in the context of nuisance. Odour dispersion modelling, included as Attachment B, concluded that all identified receptors in the vicinity of the proposed development would perceive an odour level less than the Irish EPA and UK EA guidance guideline odour limit of less than 3.0  $O_{UE}/m^3$  for the 98<sup>th</sup> percentile of worst-case hourly averages for the 2013-2017 meteorological years. It is therefore considered that the proposed development would not have a significant impact upon human beings with respect to odour.

It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions generated through bird respiration and discharged via vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

#### **17.4 NOISE, HUMAN HEALTH AND BIODIVERSITY**

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings and fauna within the vicinity of the site.

During the construction phase, it would be anticipated that there would be an impact, for a limited period of time, on local residences within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in Section 7.10. Given the transient nature of construction works and provided the recommended control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

No significant additional noise impact would be anticipated during the operational phase of the proposed development. It is anticipated that there would be a slight to moderate impact on the closest noise sensitive locations due to noise from agricultural/delivery vehicles. Following the implementation that all collections and deliveries from the site be conducted during normal working hours, it is predicted that there would be no significant noise impact upon noise sensitive locations. During the normal operation of the ventilation system, noise is predicted to be inaudible at the nearest noise sensitive locations. During warm days, it is predicted that there would be a minor additional noise impact due to infrequent maximum ventilation noise while ambient temperatures in excess of 21°C persist. In order to facilitate and promote good practice at the site, it is recommended that the applicant implement a noise management plan.

## **17.5 MATERIAL ASSETS AND HUMAN BEINGS**

The proposed poultry farm would replace an existing poultry farm (operated by the applicant) at the site. Therefore, there would be no land use change at the proposed development site.

During the construction phase, there would be an increase in traffic volume using the local road network. However, given the nature of activities and temporary duration of construction works, this would not be considered significant. There would be no significant impact upon traffic volumes during the operational phase, as traffic volumes would be similar to the traffic movements associated with the existing poultry farm at the site when operating at full capacity.

The potential of the proposed development to create short-term employment during the construction phase and permanent full-time employment for 1-2 operators would positively impact upon material assets.

## **17.6 MATERIAL ASSETS AND BIODIVERSITY**

The proposed development would not significantly alter flora cover and the species of fauna supported due to land take or soil disturbance works, given that the site is primarily comprised of man-made habitats and habitats of low ecological value, and given that the proposed development would be situated within the footprint of the existing poultry farm at the site.

## **17.7 MATERIAL ASSETS AND NOISE**

The proposed development is located in a rural agricultural area, primarily dominated by pastureland. Increased noise emissions during the construction or operational phases would have the potential to impact upon livestock due to disturbance. The potential for noise associated with the proposed development on livestock would be considered low, given the temporary duration of construction works and given that no significant increase in noise emissions would be anticipated for the operation of the proposed broiler farm. Furthermore, any livestock within the immediate area of the proposed development would become quickly acclimatised to the new noise environment.

## **17.8 MATERIAL ASSETS AND AIR**

As noted above, the proposed development is located in a rural agricultural area. The proliferation of dust during construction has a nuisance value and livestock would be at risk to eye irritation from high levels of wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression, in addition to the transient nature of construction works, the potential for dust to impact upon livestock would be considered low.

## **17.9 WATER QUALITY AND SOILS**

There would be a potential impact on water quality during the construction phase of the proposed development due to the release of suspended solids during soil disturbance works. Surface water run-off passing over exposed spoils has the potential to entrain suspended solids and release them into receiving waters. Water quality may also be impacted upon by an increase in nutrients, which are bound to suspended solids.

Appropriate mitigation measures would be implemented during the construction phase, as detailed in Sections 10 and 11, such as the appropriate storage of excavated material and the provision of silt control features where necessary.

## **17.10 WATER QUALITY AND HUMAN BEINGS**

A deterioration in groundwater quality has the potential to impact upon human beings by adversely affecting drinking water quality. The proposed development would have the potential to impact upon groundwater quality during both the construction and operational phases.

During the construction phase, the development would have a potential impact upon groundwater quality due to hydrocarbon and uncured concrete spillages. Groundwater would be protected through the implementation of mitigation measures, which include the appropriate storage of potentially polluting substances, the regular inspection and maintenance of construction plant, the provision of spill kits onsite and supervised concrete works.

The operational phase of the development has the potential to impact upon groundwater and surface water quality through surface water run-off emissions and the spreading of wash-water.

There would be no process effluent emissions from the site. The proposed storm-water system would be designed to SuDS and CIRIA technical guidance specifications. This water should be uncontaminated and therefore should have no impact on the ground.

Poultry litter from the development would be collected by the contractor M. J. Kehoe (registered with the Department of Agriculture, Food and Marine, ABP Transport Registration No. HAC2340), and delivered to the Walsh Mushrooms composting facility in Co. Wexford. Therefore, there would be no risk to water quality from the spreading of poultry litter from the proposed development.

Wash-water onsite would be stored in a designated leak-proof tank, which would be regularly inspected for integrity and cleaned as necessary. Therefore, the risk of a spillage would be considered low. Wash-water would be applied to lands under ownership of the applicant. Wash-waters would be in compliance with the definition of 'soiled water' under the Nitrates Directive Part 1, Interpretation 4. (2), (b) whereby soiled water does not include any liquid where such liquid has either: (i) a biochemical oxygen demand exceeding 2,500 mg per litre, or (ii) a dry matter content exceeding 1% (10 g/L). The spreading of wash-waters would be in compliance with the setback distances specified in the Nitrates Directive Part 4, Section 17.

### **17.11 WATER QUALITY AND BIODIVERSITY**

A deterioration in water quality in the surrounding waterbodies, which would adversely impact upon aquatic biodiversity, could occur during the construction phase of the proposed development due to releases of suspended solids, uncured concrete and hydrocarbon spillages. During the construction phase, surface and ground water quality would be protected through the implementation of mitigation measures, which include the appropriate storage of potentially polluting substances, the regular maintenance and inspection of construction plant, supervised concrete works and the provision of silt control features where necessary.

The operational phase of the development would have the potential to impact upon water quality, and thus impact upon aquatic biodiversity, through surface water run-off emissions and the generation of wash-waters and litter.

As discussed in Section 17.10 above, there would be no process emissions from the site. Surface-water run-off from roofs and hardstanding areas would be collected and discharged to ground via a system designed to SuDS and CIRIA technical guidance specifications, comprising of a silt trap, interceptor and soak pits. This water should be uncontaminated and therefore should have no impact on the ground. Therefore, there would be no emissions to surface waters from the site.

As noted above, wash-water would be suitably stored onsite and applied to lands under ownership of the applicant. The application of wash-waters to land would be undertaken in accordance with the Nitrates Regulations.

Poultry litter from the development would be collected by the contractors M. J. Kehoe and delivered to the Walsh Mushrooms composting facility in Co. Wexford. Therefore, there would be no risk to water quality from the spreading of poultry litter from the proposed development.

### **17.12 LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS**

There would be a slight to no significant impact upon the visual landscape due to the proposed development, the visibility of the development would be limited to the uppermost sections of the feed silos and small sections of the poultry house roof apex, this would be limited in extent and would be in conformance with the character of the existing agricultural environment. The structures would be of a similar visual character to existing poultry farm at the site.

It is anticipated that the proposed sheds and silos, which would be finished in a dark green colour, in contrast to the red finished walls and galvanised steel finished roofs and silos of the existing sheds, would significantly help to blend the structures into the existing environment helping to reduce or even nullify any visual impact.

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall negative landscape and visual impact.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**WESTERN BRAND GROUP, BERNIE'S FARM, BEKAN, CO. MAYO**

**17.13 CULTURAL HERITAGE, SOILS AND HUMAN BEINGS**

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Mayo. Potential impacts to archaeological, architectural and cultural sites may occur during excavation and soil movements during the construction phase of the development.

There are no protected archaeological, architectural or cultural heritage sites or features within the proposed development site, or within its immediate environs. The nearest recorded monument is approximately 200m from the site, which is also the nearest visible monument. No protected structures are located within 1km of the proposed development site. The entire site has been completely disturbed during the original phase of construction. The cartographic evidence shows no features marked within or in the immediate vicinity of the site, while the aerial photos show no archaeological features in the vicinity.

Therefore, it is not anticipated that the proposed development would have any adverse physical or visual impacts upon the known cultural heritage of the area.

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