

Appendix 28: Environmental Statement

Client:



Owner's Engineer:



Local Designer:



Environm. Consultant:



PROJECT: 119003 WEPA UK BRIDGEND

CLIENT: WEPA UK

PHASE: PLANNING APPLICATION

DOCUMENT: ENVIRONMENTAL STATEMENT

ID: 57200-0223

Issue and Revision Schedule

Version	Planning Application
---------	----------------------

Issue Date	31/01/2020
------------	------------

For enquiries please contact:

QUORUM CONSULTING ENGINEERS

89 Eastgate, Cowbridge,

Vale of Glamorgan CF71 7AA

Tel. 01446 774493

Email: info@qapm.com

List of Contents

1.0	Introduction.....	8
1.1	The Developer.....	8
1.2	Rationale of the Project.....	8
1.3	Regulatory Context and Legislative Regime.....	9
2.0	Description of the Development Site and its Surroundings	11
2.1	Site Location.....	11
2.2	Site History	12
2.3	Physical Setting and Baseline Conditions.....	13
3.0	Description of the Development.....	20
3.1	Overview	20
3.2	Alternatives and Design Evolution	20
3.3	Final Site Layout.....	23
3.4	Detailed Layout and Design	25
3.5	Process Description and Technical Data	34
3.6	Operational Releases.....	38
3.7	Construction Phase	38
3.8	Access	39
3.9	Predicted Operational Traffic	42
3.10	Construction Traffic	44
3.11	Parking	44
4.0	Planning Policy Context.....	45
4.1	Introduction.....	45
4.2	National Welsh Policies.....	45
4.3	Local Planning Policies	47
5.0	Environmental Impact Assessment	49
5.1	Overview	49
5.2	Scoping	49
5.3	Pre-Application Consultation.....	50
5.4	EIA Assessment Methodology	51
6.0	Air Quality and Dust	56
6.1	Introduction and Scope	56
6.2	Legislation and Planning Context.....	56
6.3	Assessment Methodology	62
6.4	Baseline Conditions.....	68
6.5	Assessment of Effects.....	77
6.6	Mitigation Measures	94
6.7	Residual Effects	98
6.8	Summary and Conclusion	99
7.0	Noise and Vibration.....	101
7.1	Introduction and Scope	101
7.2	Legislation and Planning Context.....	101
7.3	Assessment Methodology	104

7.4	Baseline Conditions.....	116
7.5	Assessments of Effects	119
7.6	Mitigation Measures	126
7.7	Residual Effects	127
7.8	Summary and Conclusion	128
8.0	Landscape and Visual Amenity	130
8.1	Introduction and Scope	130
8.2	Legislation and Planning Context.....	132
8.3	Assessment Methodology	136
8.4	Assessment Criteria	137
8.5	Baseline Conditions and Receptors	142
8.6	Assessment of Effects	151
8.7	Mitigation Measures	162
8.8	Residual Effects	163
8.9	Summary and Conclusion	163
9.0	Ecology and Nature Conservation	166
9.1	Introduction and Scope	166
9.2	Legislation and Planning Context.....	166
9.3	Assessment Methodology	168
9.4	Assessment Criteria	175
9.5	Baseline Conditions and Receptors	181
9.6	Assessment of Effects	195
9.7	Mitigation Measures	201
9.8	Summary and Conclusion	209
10.0	Flood Risk and Drainage.....	214
10.1	Introduction and Scope	214
10.2	Legislation and Planning Context.....	214
10.3	Assessment Methodology	215
10.4	Baseline Conditions.....	216
10.5	Assessments of Effects	217
10.6	Mitigation Measures	220
10.7	Residual Effects	221
10.8	Summary and Conclusion	221
11.0	Archaeology and Cultural Heritage.....	222
11.1	Introduction and Scope	222
11.2	Legislation and Planning Context.....	222
11.3	Assessment Methodology	224
11.4	Baseline Conditions.....	228
11.5	Assessments of Effects	230
11.6	Mitigation Measures	231
11.7	Summary and Conclusion	232
12.0	Water Resources and Water Quality	233
12.1	Introduction and Scope	233

12.2	Legislation and Planning Policy	233
12.3	Assessment Methodology	238
12.4	Baseline Conditions.....	243
12.5	Assessment of Potential Effects.....	251
12.6	Proposed Mitigation Measures.....	261
12.7	Cumulative Effects	265
12.8	Conclusions	265
13.0	Traffic and Transportation	267
13.1	Introduction and Scope	267
13.2	Legislation and Planning Context.....	267
13.3	Baseline Conditions.....	270
13.4	Assessment Methodology and Significance Criteria.....	273
13.5	Assessment of Effects and Mitigation Measures	276
13.6	Cumulative Effects	280
13.7	Summary and Conclusion	280
14.0	Socio-Economics	283
14.1	Introduction and Scope	283
14.2	Legislation and Planning Context.....	283
14.3	Assessment Methodology	284
14.4	Baseline Conditions.....	285
14.5	Assessments of Effects	290
14.6	Mitigation Measures	292
14.7	Summary and Conclusion	292
15.0	Geology and Ground Conditions	293
15.1	Introduction and Scope	293
15.2	Legislation and Planning Context.....	293
15.3	Assessment Methodology	294
15.4	Baseline Conditions.....	298
15.5	Assessments of Effects	304
15.6	Mitigation Measures	307
15.7	Residual Effects	309
15.8	Summary and Conclusion	309
16.0	Appendices	312
17.0	Figures	313

List of Tables

Table 2.3-1:	Designated sites of ecological importance within 10km of the site	15
Table 3.3-1:	Approximate building footprints and heights	24
Table 3.9-1:	Predicted operational traffic for Pulp, RM PM/CV, Pallets & FGs trucks	42
Table 3.9-2:	Predicted Employee Car Movements.....	43
Table 5.4-1:	Environmental Value (or Sensitivity) and Typical Descriptors.....	51
Table 5.4-2:	Magnitude of Impact and Typical Descriptors	52
Table 5.4-3:	Descriptors of the Significance of Impact Categories	53
Table 5.5-4:	Descriptors of the Significance of Impact Categories	54
Table 6.2-1:	Relevant Air Quality Strategy Standards and Objectives.....	57

Table 6.2-2:	Relevant Public Exposure	57
Table 6.2-3:	Legislation for the Protection of Nature Conservation Sites.....	58
Table 6.3-1:	Scoping Opinion – Air Quality Considerations	62
Table 6.3-2:	Definition of Magnitude of Impact – Long-term Concentrations	65
Table 6.3-3:	Definition of Magnitude of Impact – Short-term Concentrations	65
Table 6.3-4:	Definition of Receptor Sensitivity – Long-term Concentrations	66
Table 6.3-5:	Impact Significance Descriptors – Assessment of Long-term Concentrations	66
Table 6.3-6:	Impact Significance Descriptors – Assessment of Short-term Concentrations	67
Table 6.4-1:	Modelled Discrete Receptors – Human Receptors	69
Table 6.4-2:	Designated Ecological Sites	71
Table 6.4-3:	DEFRA Mapped Background Concentrations.....	74
Table 6.4-4:	AERA Conversion Factors for Environmental Standards.....	75
Table 6.4-5:	Calculated and Applied Background Concentrations	75
Table 6.4-6:	Baseline Concentrations and Levels – Ecological Receptors	76
Table 6.4-7:	Nitrogen Critical Levels, Loads and Current Loads.....	76
Table 6.4-8:	Acid Critical Load Functions and Current Loads	76
Table 6.5-1:	Potential Dust Emission Magnitude.....	78
Table 6.5-2:	Sensitivity of the Area	80
Table 6.5-3:	Risk of Dust Impacts.....	80
Table 6.5-4:	Maximum Predicted Long-term Impacts: Combustion Emissions Assessment	82
Table 6.5-5:	Maximum Predicted Short-term Impacts: Combustion Emissions Assessment	83
Table 6.5-6:	Predicted Annual Mean NO ₂ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	84
Table 6.5-7:	Predicted Annual Mean PM ₁₀ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	85
Table 6.5-8:	Predicted 1-hour Mean NO ₂ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	86
Table 6.5-9:	Predicted 24-hour Mean PM ₁₀ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	87
Table 6.5-10:	Predicted 24-hour Mean SO ₂ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	88
Table 6.5-11:	Predicted 1-hour Mean SO ₂ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	89
Table 6.5-12:	Predicted 15-minute Mean SO ₂ Impacts at Discrete Receptors: Combustion Emissions Assessment.....	90
Table 6.5-13:	Predicted 8-hour Rolling Mean Impacts at Discrete Receptors: Combustion Emissions Assessment.....	91
Table 6.5-14:	Impact on Critical Levels	93
Table 6.5-15:	Impact on Nitrogen Critical Load	93
Table 6.5-16:	Impact on Acid Critical Load	94
Table 6.6-1:	Construction Dust Mitigation Measures.....	95
Table 6.8-1:	Summary of Assessment.....	99
Table 7.3-1:	Example Threshold Values for Construction Noise.....	105
Table 7.3-2:	Approximate distances at which vibration may just be perceptible	108
Table 7.3-3:	Construction Noise – Impact Magnitude	110
Table 7.3-4:	Operational Noise – Impact Magnitude	110
Table 7.3-5:	Traffic Noise – Impact Magnitude.....	110
Table 7.3-6:	Significance of Noise Effects	111
Table 7.3-7:	Site Clearance and Enabling Works – Plant List.....	113
Table 7.3-8:	Groundworks – Plant List	113
Table 7.3-9:	Substructure Works – Plant List	114
Table 7.3-10:	Superstructure Works – Plant List.....	114
Table 7.3-11:	Operational Plant Sound Levels.....	115
Table 7.3-12:	Internal HGV Movements	116
Table 7.4-1:	Noise Sensitive Receptors	116
Table 7.4-2:	Summary of Measured Noise Levels, dB	118
Table 7.4-3:	Baseline Sound Levels, dB.....	119
Table 7.5-1:	Predicted Construction Noise Levels, dB L _{Aeq}	119
Table 7.5-2:	Predicted Construction Noise Levels, dB L _{Aeq}	120

Table 7.5-3:	Predicted Operational Specific Sound Levels, Free-Field dB	121
Table 7.5-4:	BS4142 Assessment without Mitigation, dB	122
Table 7.5-5:	Operational Noise Effect Impact Magnitude and Significance	124
Table 7.6-1:	BS4142 Assessment with Mitigation, dB	127
Table 7.8-1:	Summary of Effects	128
Table 8.2-1:	Planning Policies for Landscape	132
Table 8.4-1:	Sensitivity to Change Rating (Landscape Character)	137
Table 8.4-2:	Definition of Visual Receptor Sensitivity	138
Table 8.4-3:	Definition of Magnitude of Effects	140
Table 8.4-4:	Assessing the Significance of Landscape / Visual Effects	141
Table 8.4-5:	Definition of Significance of Landscape / Visual Effects	141
Table 8.6-1:	Schedule of viewpoints	152
Table 8.8-1:	Summary of Viewpoint assessment	164
Table 8.8-2:	Summary of Landscape Assessment	165
Table 9.4-1:	Criteria for assessing the value (relative sensitivity) of Ecological Receptors	175
Table 9.4-2:	Criteria for assessing potential suitability of a site for bats	176
Table 9.4-3:	Criteria Determining Magnitude of Impact	178
Table 9.4-4:	Assessing the Significance of Effects	179
Table 9.5-1:	Summary of Designated Site Abbreviation	181
Table 9.5-2:	Designated sites of ecological importance within 10km of the site	182
Table 9.5-3:	SEWBRc Nesting Birds	183
Table 9.5-4:	Assessment criteria for evaluation of reptile populations	194
Table 9.6-1:	Impact on Critical Levels	195
Table 9.6-2:	Impact on Nitrogen Critical Load	196
Table 9.6-16:	Impact on Acid Critical Load	196
Table 9.8-1:	Summary of effects arising during construction phase	210
Table 10.3-1:	Assigning Sensitivity to Flooding	216
Table 11.3-1:	Criteria for assessing the value (relative sensitivity) of Cultural resources	225
Table 11.3-2:	Broad Criteria for Assessing the Magnitude of Change / Effect	226
Table 11.3-3:	Assessing the Significance of Change / Effect	227
Table 11.4-1:	Identified Archaeological Interests	230
Table 11.5-1:	Effect on Known Sites	230
Table 12.3-1:	Value / sensitivity assessment	240
Table 12.3-2:	Magnitude of change (impact)	241
Table 12.3-3:	Significance of Effect	242
Table 12.4-1:	WFD Summary Data (2016 Cycle 2) for potential receptor	246
Table 12.4-2:	Summary of Permitted Discharges into Controlled Water (NRW)	248
Table 12.4-3:	Groundwater Levels from 2018 Monitoring	250
Table 12.5-1:	Unmitigated significance of increased turbidity of surface water	254
Table 12.5-2:	Summary of Unmitigated of Potential Impacts	258
Table 12.6-1:	Summary of the Residual Potential Impact after Mitigation	262
Table 13.4-1:	Significance Criteria Magnitude of Impact	274
Table 13.4-2:	Impact Significance	276
Table 13.7-1:	Summary and Residual Effects	281
Table 14.3-1:	Assessment of Significance	285
Table 14.4-1:	Population distribution by sub area	286
Table 14.4-2:	Industry of employment by proportion of working population, Bridgend and Wales, 2010 and 2015	288
Table 14.5-1:	Calculation of Fulltime Employment (FTE)	291
Table 15.3-1:	Criteria for Determining Sensitivity (value) of receptor	294
Table 15.3-2:	Magnitude of Impact	296
Table 15.3-3:	Assessing the Significance of Effects	297
Table 15.4-1:	Summary of Site Hydrology	301
Table 15.4-2:	Summary of Site Hydrogeology	301
Table 15.8-1:	Assessment of Residual Impacts on Attributes	311

1.0 Introduction

1.1 The Developer

- 1.1.1 WEPA UK Limited is the UK subsidiary of the WEPA Group headquartered in Arnsberg (North Rhine-Westphalia), Germany. The WEPA Group is an independent, family-owned company, founded in 1948. Since that time, the company has grown considerably and it now operates 22 paper machines at 13 locations across Europe. It employs some 3,900 people.
- 1.1.2 WEPA UK is committed to bringing further inward investment to the Bridgend area through the development of the proposed plant in an environmentally acceptable and sustainable manner.
- 1.1.3 The office and contact address for the proposed development is:
- WEPA UK Ltd.
Bridgend Paper Mills
Llangynwyd Bridgend
Mid Glamorgan CF34 9RS

1.2 Rationale of the Project

- 1.2.1 The WEPA Group is one of the leading private-label specialists in the consumer market. With modern processing facilities for recycled fibres, WEPA Group has established itself as an expert in high quality, sustainable and ecological products. The company is specialised in selling a broad range of paper products consisting of baking paper, stationery, art paper, sandwich and lining paper.
- 1.2.2 WEPA UK is a growing consumer business selling high quality hygiene paper products in the UK retail sector. For 2019, WEPA UK is expected to produce approximately 50,000 tonnes of paper with its existing tissue paper machine in Bridgend (called “Jupiter”) as well as approximately 80,000 tons of finished goods. This means that the site in Bridgend currently imports and holds in storage approximately 30,000 tonnes of paper from other paper suppliers. When the CNV waste factor is added to jumbo reel requirements, the business needs to purchase approximately 34,000 tons of jumbo reel to supply the Bridgend converted volume. A further 8,000 tons of paper will be supplied to another converter to produce a customer’s volumes, making 42,000 tons of purchased jumbo reel.
- 1.2.3 By 2021 this 42,000 tons of jumbo reel is expected to have increased towards the 50,000 tons per year level for the UK consumer business that cannot be produced in the UK by WEPA. This paper will be purchased at a significant annual cost which would be eliminated by producing in-house with a new paper machine
- 1.2.4 WEPA UK, therefore, intend to submit a Planning Application to construct a second tissue paper machine and associated development at the WEPA UK site in Bridgend. The new paper machine will produce tissue paper only and will have a theoretical maximum capacity of approximately 250 tonnes/day. The average daily output is expected to be approximately 206 tonnes/day, which would amount to an average annual output of 75,000 tonnes.

- 1.2.5 The developer considers design to be a key constituent of the project. At a concept and design level, the Project must achieve a high quality and inclusive design that respects the receiving environment. The architectural input has been fundamental to the evolution of the design.

1.3 Regulatory Context and Legislative Regime

- 1.3.1 Environmental Impact Assessments (EIA) have been required for certain major developments since the implementation in the UK of the European Council Directive on Environmental Assessment (EC Directive 85/337/EEC). The Directive, which was implemented in the UK in 1988, has subsequently been amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and a codified Directive 2011/92/EU was adopted in 2011. The Directive is implemented principally by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. The EIA of the proposed development will be undertaken in accordance with these EIA Regulations.

Requirement for an Environmental Statement

- 1.3.2 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 (S.I. 2017 No. 571) require that, for certain types of development an Environmental Impact Assessment (EIA) be undertaken before planning permission can be granted. In accordance with the list of developments in Schedule 1 (No. 18b) of the EIA regulations the proposed development is described as an *“industrial plant for the production of paper and board with a production capacity exceeding 200 tonnes per day”*.

Schedule 1 Descriptions of development

18. Industrial plants for—

(a).....

(b) *the production of paper and board with a production capacity exceeding 200 tonnes per day.*

- 1.3.3 As the capacity of the proposed development exceeds this threshold, an Environmental Statement (ES) is required in every case. This ES has been prepared for the purposes of describing the likely significant environmental effects of the proposed development based on the environmental data which has been collated since the Scoping Report was submitted on the 9th August 2019 under Article 14 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

Environmental Permit Regulations

- 1.3.4 The installation requires authorisation under Section 6.1 A(1)(b) in Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2017. These regulations have been made under the Pollution Prevention and Control (PPC) Act 1999 and implement the EC Directive 96/61/EC.
- 1.3.5 A variation of the existing Environmental Permit for the facility (Ref. No. EPR/EP3738NG) will be required to operate the new development. The application for a variation of the Environmental Permit would be made parallel to the application for development consent

and it will be necessary for the operator to demonstrate that the design and choice of technology is the Best Available Technology (or BAT) which minimises impacts to the environment.

- 1.3.6 The pre-application discussions with Natural Resources Wales (NRW) will commence as soon as the details of the plant's design have been finalised. These discussions will focus on the Best Available Techniques (BAT) cases that need to be agreed in respect of the technology choices and emission parameters.

Water Abstraction Licence

- 1.3.7 Under the Water Resources Act 1991, a licence is required from NRW for the abstraction of water from any sources of supply. WEPA UK has an existing licence to abstract freshwater from the nearby Llynfi River. This was granted in 2013 (Licence Serial No. 21/58/41/0015) under the Water Resources Act 1991 (as amended). The maximum quantity of water to be abstracted for the purpose of non-evaporative cooling is limited to 5,760 m³/day and 2,102,400 m³/year.
- 1.3.8 All water required for the proposed development will be included in the existing abstraction licence.

Discharge Consent

- 1.3.9 Under sections 85 and 88 of the Water Resources Act 1991 (as amended), it is an offence to cause or knowingly permit the discharge of any poisonous, noxious or polluting matter or any solid waste matter to enter controlled waters except in accordance with a discharge consent or an Environmental Permit (or certain other types of authorisation which are not relevant in this case).
- 1.3.10 The Environmental Permit covers discharges from the paper mill's operations, but this would not extend to surface water drainage and dewatering discharges during construction.
- 1.3.11 Separate discharge consents to cover any such discharge would be applied for in time for the consents to be available when required early in the construction period.

Control of Major Accident Hazards (COMAH) and Hazardous Substances Consent (HSC)

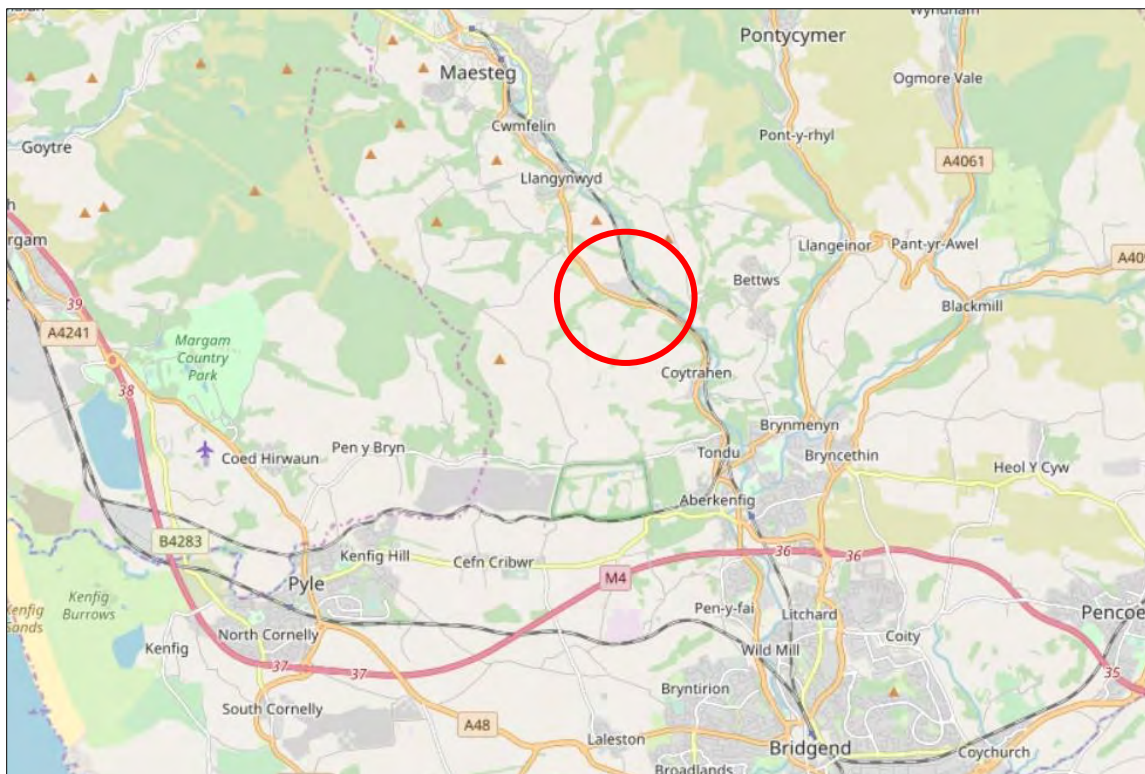
- 1.3.12 Given that there would be no storage of natural gas on the site, the quantity of gas present at any one time would be below the minimum quantity for which hazardous substances consent would be required.
- 1.3.13 Materials used and the quantities stored will not trigger COMAH requirements.

2.0 Description of the Development Site and its Surroundings

2.1 Site Location

- 2.1.1 The proposed development site is located on the site of the existing Bridgend mill site approximately 5 km to the north of Bridgend town centre, in an area bound to the south and to the west by the A4063, to the east by the River Llynfi, and to the north by open farmland. The site is orientated along its long axis in an approximate west to east direction and it is accessed via the A 4063 (Bridgend Road) between Maesteg and Coytrahen, with traffic generally proceeding south towards the M 4.
- 2.1.2 The Bridgend site covers a total area of around 25 hectares of which buildings and other hardstanding areas extend to approximately 15 ha. The new paper machine is centred on approximate National Grid Reference X: 287870, Y: 187088, as shown on Figure 2.1-1. The location of the proposed paper machine is within the existing WEPA UK site, situated adjacent the existing machine 'Jupiter'.

Figure 2.1-1: Site Location



Source: Open Street Maps

2.2 Site History

- 2.2.1 The history of the site and surroundings has been established from historical Ordnance Survey (OS) plans dated between 1877 and 1987 (www.old-maps.co.uk). Prior to development of the mill site most of the land in the area was undeveloped farmland with woodland in the bottom of the Nant Gwyn Valley. The two farmsteads of Brynllwarch-fach and Brynllwarch-fawr, were established by 1877, as was the Bridgend to Maesteg railway.
- 2.2.2 Signs of industrial activity, in the surrounding of the present day mill site, were two “old levels” and two quarries on the 1921 OS Map. Other signs of mining activity in the general area were an old tramway, air shaft and levels in the Nant Gwyn Valley.
- 2.2.3 Evidence from the Catalogue of Plans of Abandoned Mines held by the National Assembly for Wales shows two mine plans relating to workings beneath the western end of the mill site and extending into the expansion area around Brynllwarch-fach. All coal workings in the vicinity had been abandoned by 1944.
- 2.2.4 Aerial photographs indicate that earthworks were in progress at the mill site by 1947 and Wiggins Teape started production there in 1950 using water from the Afon Llynfi and power and steam from the adjacent Llynfi Power Station. By 1960 the mill was producing 20,000 tons per annum from four paper machines. Expansion took place in the early 1960s with a new machine and converting plant. By this time the Nant Gwyn had been culverted, the filtration plant and sludge ponds had been extended and further settling tanks constructed. It was at this time that the three bungalows on the site were constructed. The current “Jupiter” paper machine was installed in 1969.
- 2.2.5 The mill has continued to expand since the 1960s. Electricity and steam generation has been raised on the site. Parts of the mill site have been used for the tipping of ash from the power station and unsuitable wastes from construction have been deposited to the east of the railway line. The historical map of 1962 displays a (settling) pond between the waste water treatment plant and the A 4063. Land in the vicinity of the development site has remained undeveloped with only a few buildings being constructed at the surrounding farmsteads.

2.3 Physical Setting and Baseline Conditions

- 2.3.1 Figure 2.3-1 illustrates that the WEPA mill site is bordered to the south and west by the A4063. The River Llynfi runs to the east of the site. To the north of the site, there are open fields and farmland. In the immediate surrounding of the site, sheep farming is the predominant land use. Woodland cover in the area is generally sparse, mainly confined to lining roads, around villages and along the River Llynfi.

Figure 2.3-1: Development site and surrounding



Geology and Soils

- 2.3.2 The site has had an array of ground investigation carried out both recently and historically with further information to be published shortly. Works have been carried out by Golder Associates, Ove Arup and Integral Geotechnique to name a few.
- 2.3.3 Reference to British Geological Survey records for the area indicates that the site is underlain by Alluvium and Diamicton Till overlying the Brithdir Member, part of the Pennant Sandstone Formation (Coal Measures). It is also known from recent investigations that much of the site is underlain by Made Ground to depths of up to 8m below ground level.
- 2.3.4 The superficial deposits comprise of alluvium where the valley was historically located (now culverted watercourse) and glacial till surrounding this to the North and South.
- 2.3.5 Groundwater has been recorded at varying depths across the site along with seepages at shallow depth. To the West Golder Associates recorded ground water at depths of 7-9m Bgl,

Ove Arup recorded ground water at 4m Bgl in the same area. To the East Ove Arup have recorded ground water from approx. 3m Bgl which did rise in two of the boreholes.

2.3.6 It has been noted by Quorum Engineers Ltd. that during foundation installation for some of the existing buildings ground water was struck 1m down from surface level.

2.3.7 The bedrock is classified as a Secondary 'A' aquifer and the overlying superficial soils are classified as either a Secondary A or a Secondary – undifferentiated aquifer. The site is not underlain by a principle aquifer and is not located within a source protection zone.

Ecology - Protected Sites & Sites of Conservation Importance

Statutory Sites (SACs or SSSIs) Designated for Bats within 10km of Site

2.3.8 No SACs or SSSIs specially designated for bats lie within 10km of the site.

SACS and SSSIs within 2km of Site

2.3.9 There are no SACs or SSSIs within 2km of the proposed development site (Document Ref.: 57100-0216).

NNRs, LNRs and other protected sites

2.3.10 No NNRs, LNRs, or other protected sites are present within 2km of the site.

Non-Statutory Nature Conservation Designated Sites

SINCs

2.3.11 Multiple SINCs were recorded within 1km of the study area. These were:

- Bettws West;
- Coed Coytrahen;
- Coed Pentwyn;
- Coed Tondu;
- Cwm Cefnydfa;
- Cwm Nant Gwyn;
- Drysity'n-y-waun;
- Gelliheblig;
- Lletty Brongu;
- Llety Woods;
- Llywn-y-Brian;
- Moelgilau-fawr;
- Nant Bryncynan Woods;
- Nant Cwm-bach;
- Nant Mwrth;
- North Bettws Woodland;
- Rifle Range Wood;
- Tylacoch North;
- Tylacoch South;
- Ty'n-y-Waun; and
- Waun-y-Gilfach woods.

Ancient Woodland

2.3.12 There are 57 areas of ASNW located within 2km of the proposed development site, the nearest of which lies approximately 50m to the south-west of the site, just beyond the A4063 (Figure 2.3-2). In addition, 10 RAWs and two Ancient Woodland Sites of Unknown Category are present within the same search radius. Considering the scale and location of the works,

none of these woodlands are anticipated to be affected by works. Although an area of Unknown Category Ancient Woodland lies only 20m from the south-eastern corner of the site, it is separated from the proposed development site by the A4063.

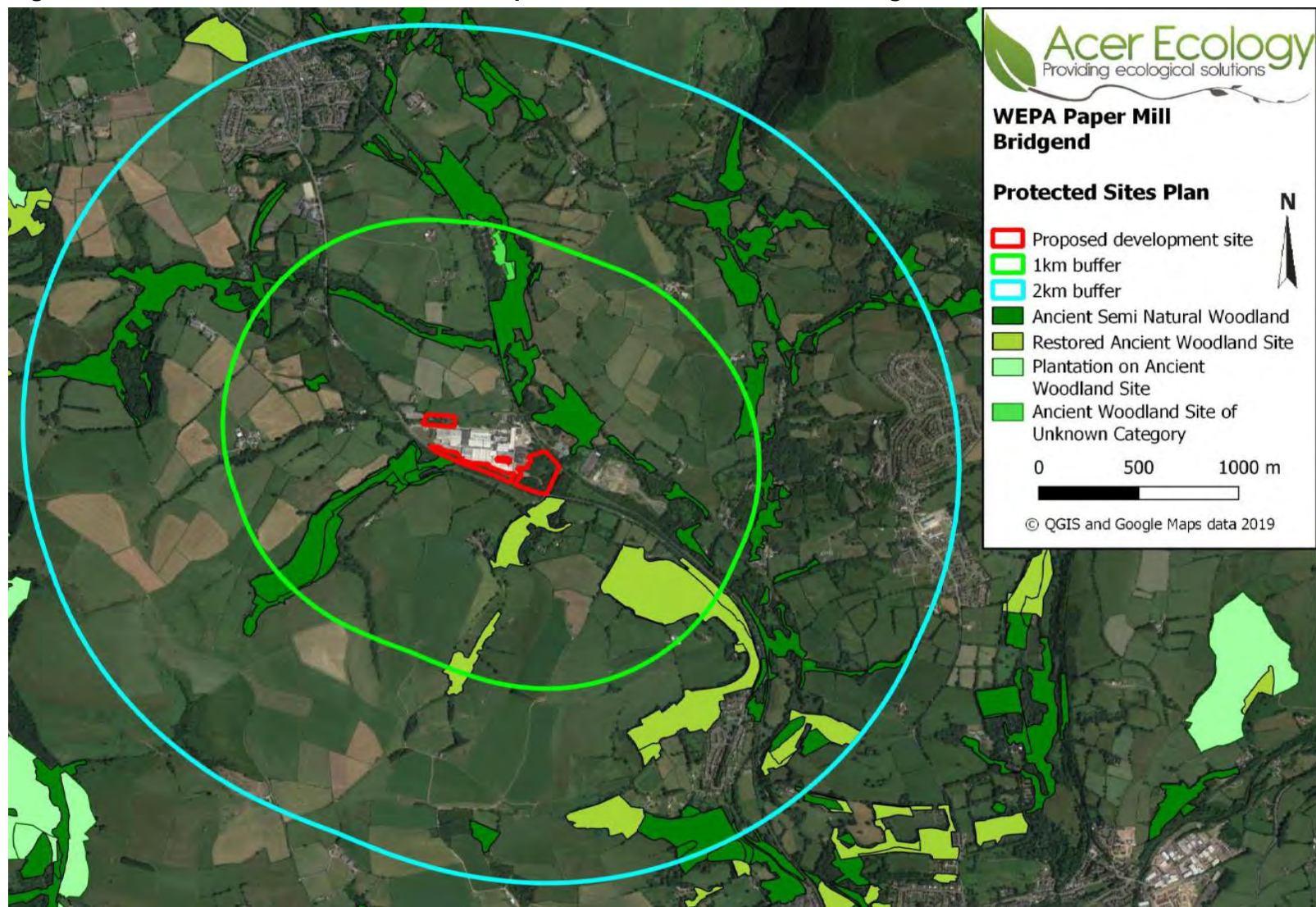
Statutory Sites within 10km of the Site

- 2.3.13 These sites are located beyond the 2 km zone of influence for air quality impacts to SACs and SSSIs, and due to the distances and their locations are not considered to be at risk of any other significant effects.
- 2.3.14 There are 15 statutory sites within a 10km radius of the Application Site of which 7 are internationally designated sites (Document Ref.: 57100-0217).

Table 2.3-1: Designated sites of ecological importance within 10km of the site

	Designation	Name	Distance from site
1	SSSI	MYNYDD TY-ISAF, RHONDDA	9.1km
2	SSSI	CWM DU WOODLANDS	1.9km
3	SSSI	CWM CYFFOG	4.9km
4	SSSI;	DAREN Y DIMBATH	7.5km
5	SSSI; SAC	BLACKMILL WOODLANDS	4.2km
6	SSSI	CWM RISCA MEADOW	2.4km
7	SSSI, SAC	BRYN - BACH, CEFN CRIBWR	3.7km
8	SSSI, SAC	CAEAU CEFN CRIBWR	4.0km
9	SSSI	WAUN CIMLA	4.6km
10	SSSI, SAC	WAUN-FAWR, CEFN CRIBWR	5.4km
11	SSSI, SAC	PENYCASTELL, CEFN CRIBWR	5.8km
12	SSSI; NNR, SAC	MERTHYR MAWR	9.0km
13	SSSI, NNR, SAC	CYNFFIG/ KENFIG	7.7km
14	SSSI	EGLWYS NUNYDD RESERVOIR	7.8km
15	SSSI	MARGAM MOORS	9.0km

Figure 2.3-2: Protected sites near the development site and in the surrounding



Vegetation and Habitats

- 2.3.15 A Phase 1 Habitat Survey of the site including an area expected to be used for construction compounds was conducted in April 2019 by Acer Ecology. The Bridgend site covers a total area of around 25 hectares of which buildings, hardstanding areas and infrastructure extend to approximately 15 ha. The site is situated in a rural area approximately 5km to the south-east of the town of Maesteg, and areas of farmland and woodland lie in all directions. The River Llynfi runs north-south, approximately 100 m to the east of the site.
- 2.3.16 The results of the general survey of habitats and vegetation are shown on Figure 2.3-3. The site consists of ten elements which are described in detail below. These comprise:
- Broadleaved Semi-Natural Woodland (A1.1.1);
 - Dense Scrub (A2.1);
 - Scattered Broadleaved Trees (A3.1);
 - Scattered Coniferous Trees (A3.2);
 - Poor Semi-Improved Grassland (B6);
 - Ephemeral/ Tall Ruderal Mosaic (C3.1/ J1.3);
 - Introduced Shrub (J1.4);
 - Intact Species-Poor Hedgerow (J2.1.2);
 - Building (J.3.6); and
 - Hard Standing (no alphanumerical code provided).

Data Trawl Results

- 2.3.17 South East Wales Biodiversity Records Centre (SEWBRc) provided no records of protected plant species or species of principal importance listed under the Environment (Wales) Act 2016, either within or directly adjacent to the proposed development site.

Field Survey Results

- 2.3.18 No plant species, which individually are considered to be of either of national, regional or local significance were recorded on the site.

Figure 2.3-3: Habitats and Vegetation



Landscape

- 2.3.19 The proposed development is located entirely on the WEPA UK premises which is heavily industrial and developed land. The new development will be viewed in the context of the existing paper mill. The paper mill site occupies a less elevated position (80–90m AOD) at the mouth of the Nant Gwyn valley. Currently the paper mill is relatively well hidden due to tree screening along the A4063 and as a result of a dip in the topography; the principal markers approaching from the south are a vent stack and steam plumes. It is, however, highly visible from the road and from elevated vantage points around.
- 2.3.20 The landscape and visual impact assessment takes into account the LANDMAP assessment for the area. This classifies the development site as part of Landscape Character Area 2 (“Llynfi Valley Floor and Lower Slopes”) which is described as an attractive rural area containing a network of irregular and small-scale pasture fields on land that gently rolls towards the River Llynfi with valley sides dissected by frequent tributaries creating a landform of rounded spurs between incised valleys.
- 2.3.21 It is largely a landscape of farmed valley sides, open topped hills and watercourses flanked by woodland. Hedges are common throughout the area and comprise mainly hawthorn with hedgerow trees. The more elevated areas contain commercial plantations, which often extend up onto the upland plateau.
- 2.3.22 Urban influences are generally limited. Settlement in the immediate vicinity of the paper mill is characterised by scattered dwellings and farmsteads. The central valley landscape is dominated by the large form of the Bridgend Paper Mills with landmark chimneys, along with pylons and other smaller industrial developments and sewage works dotted along the valley floor. There are extensive, open views across and along the valley and the landscape is of moderate value. Its capacity is moderate as a consequence of its undulating and generally well wooded character, which provides visual enclosure. However, open views across and out of the valley are important in places.
- 2.3.23 Two dwellings look across to the site. Bryn-y-fro, which lies at a distance of less than 400m to the west, has an open aspect towards the site. The nearest dwelling, Brynllwarch-fawr, has a southerly aspect, with a view directly across the existing mill site, the boundary of which is about 150m away; it is about 250m from the proposed high bay warehouse.
- 2.3.24 Other prominent features are the pylons of the 400kV overhead power line, which crosses the site east-west.

Water Resources

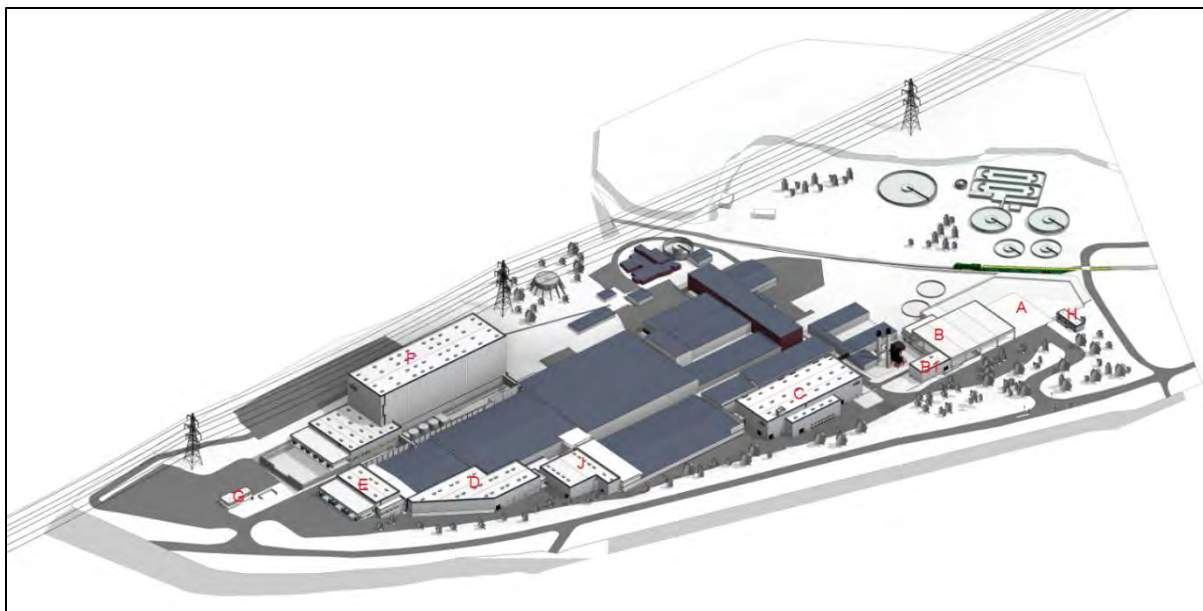
- 2.3.25 The WEPA UK Bridgend site is located to the southwest of a watercourse called Llynfi River (or Afon Llynfi) that flows in a generally south-easterly direction past the site. Two small tributaries drain onto the site from the west and combine to form Nant Gwyn. This stream then flows eastward into the river. These tributaries are mostly culverted beneath the site.
- 2.3.26 The Site’s Environmental Permit (EPR/EP3738NG) and a separate abstraction licence (21/58/41/0015) allows for process water from existing operations on the site to be abstracted from the two watercourses. The permit also permits treated effluent from the plant to be discharged back to the river subject to strict water quality and temperature controls.

3.0 Description of the Development

3.1 Overview

- 3.1.1 The proposed development will include the buildings and areas as displayed in the following Figure.

Figure 3.1-1: Site overview



Existing buildings in grey; new buildings in white

3.2 Alternatives and Design Evolution

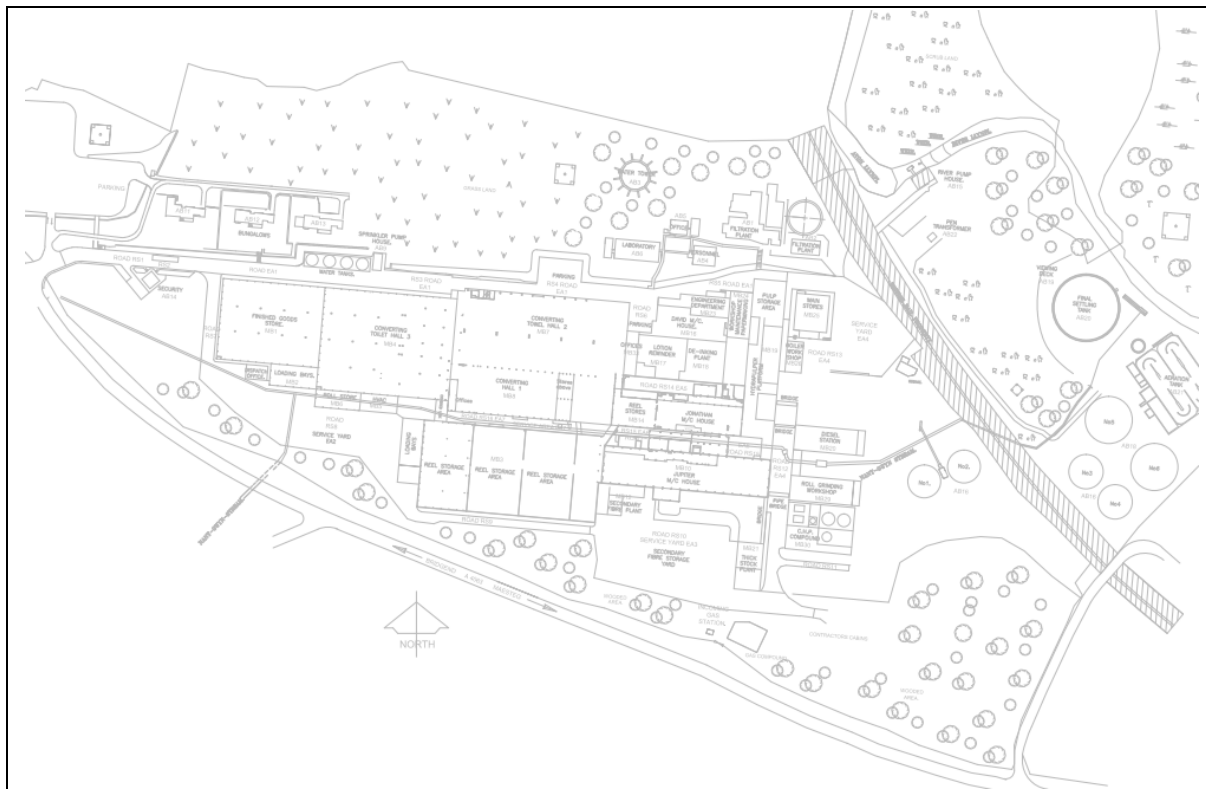
- 3.2.1 Prior to the acquisition of the Bridgend site, WEPA UK investigated several greenfield sites across the country as to their suitability for a new production site to increase its production capacity in the UK. However, all greenfield options were eliminated for a variety of reasons and the decision was taken to increase the production capacity at the existing production site in Bridgend.
- 3.2.2 The paper making process is linear and requires a large amount of space. Due to the site dimensions, existing equipment locations and site topography, space is very limited here. This means that there is only a limited number of different options to consider when deciding on the layout and design of the facility. With the existing facility design and layout being fixed, a straight forward design evolution took place which focused on ensuring that any impacts which resulted from the development were acceptable within the locality. This involved considering factors such as access, land contamination, ecology and landscaping.

Design Evolution

- 3.2.3 The scope for developing the design of the resulting scheme was limited by the nature of the Project and the size and layout of the site. A range of site layouts had been examined before culminating in the final design of the Project. Alternative design options for the Project are limited due to the existing physical site layout as well as the confined conditions of the WEPA premises and the underground/earth conditions in different parts of the site.

- 3.2.4 Moreover, there is the requirement of having the new paper machine and the new high bay warehouse located as close as possible to the existing production facilities.
- 3.2.5 Figure 3.2-1 displays the existing site of the Wepa UK Bridgend paper mill.

Figure 3.2-1: Current site plan



- 3.2.6 It was the intention of the Applicant to include the following new buildings:

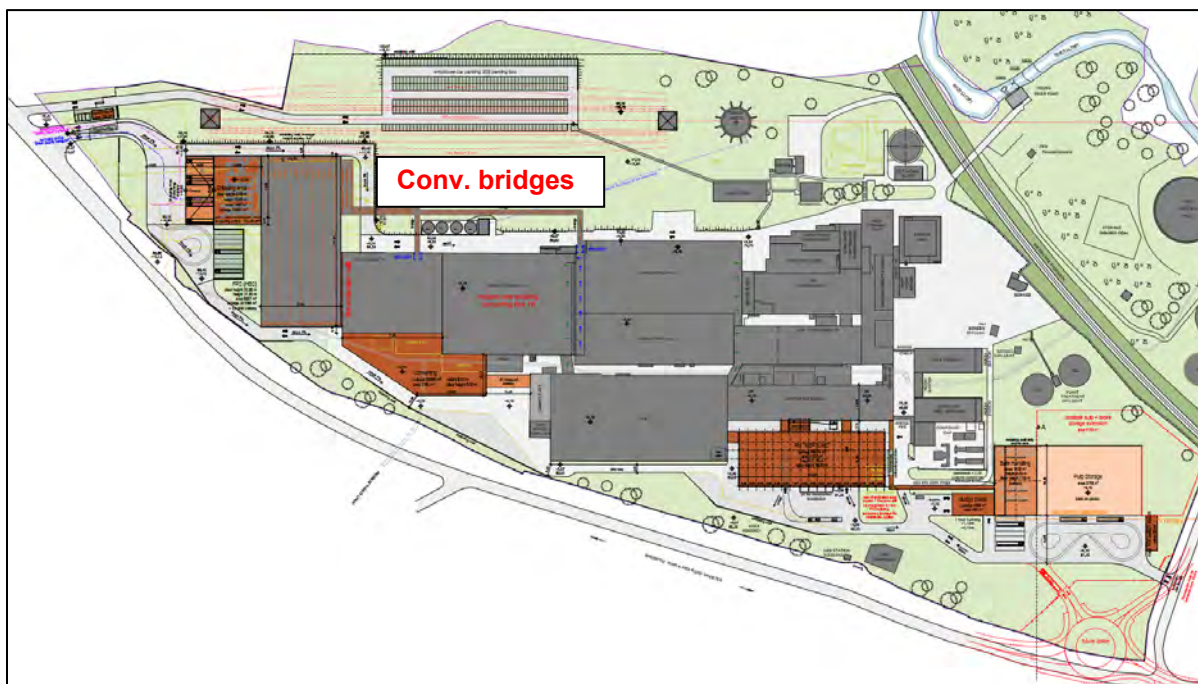
- A - Pulp Storage (south-east)
- B - Bale Handling (south-east)
- B1 - Sludge Press building (south-east)
- I - Pipe Bridge (south-east)
- C - Paper Machine Building (south)
- D - Converting Building (south-west)
- E - Shipping Area (north-west)
- J – New Jumbor Reel Storage (south-west)
- F - Finished Product Storage (north)
- G – New gate house (north-west)

- 3.2.7 The following section describes two options assessed in the design evolution process.

Option 1

- 3.2.8 Option 1 shows the Pulp Storage and the new Paper Machine building situated in the south-eastern part of the site.
- 3.2.9 The converting area is an extension of the existing converting lines.
- 3.2.10 The Finished Product Storage (High Bay Storage, HBS) is located in the western part of the site, directly attached to the existing Converting/Storage Building. The Conveyor Bridges ensure the continuous process flow from the Converting facilities into the storage building.
- 3.2.11 The delivery area and the Truck parking area are located on the most western side of the mill site, close to the main access and the nearby A4063.
- 3.2.12 As the shipping area and the location of the HBS did not facilitate an effective product delivery circulation, this option was not pursued any further. Additionally, the ground conditions were not favourable for the foundation requirements of the building.

Figure 3.2-2: Design Option 1



Option 2

- 3.2.13 Option 2 (displayed in Figure 3.2-3) would have included the demolition of various buildings such as warehouses, workshops, and maintenance rooms north of the existing Jupiter Paper Machine building. These buildings would have been replaced by a new Jumbo Reel storage building. This option would have provided sufficient space for a future third paper machine. However, the Converting extension on the south-west of the existing Converting facilities was not included in this option, and the High Bay Storage (HBS) again would have contributed to poor traffic circulation without enough truck-holding capacity as in the previous option. Additionally, ground conditions in the warehouse area are not suitable for the building foundations. Also, the size of the HBS would not have provided sufficient capacity to store the production of the new development. This option would have required the costly demolition and reconstruction of large parts of the existing mill without the ability to transfer the demolished activities to other areas of the site and, therefore, it was dismissed for economic reasons.

Figure 3.2-3: Design Option 2



3.3 Final Site Layout

- 3.3.1 The Final Site Layout includes the following buildings:

- A - Pulp Storage (south-east)
- B - Bale Handling (south-east)
- B1 - Sludge Press building (south-east)
- I - Pipe Bridge (south-east)
- C - Paper Machine Building (south)
- D - Converting Building (south-west)
- J – New Jumbo Reel Storage (south-west)
- E - Shipping Area (north-west)
- F - Finished Product Storage (north)
- G - Gate House (west)
- T - Storage Area

Figure 3.3-1: Final Design

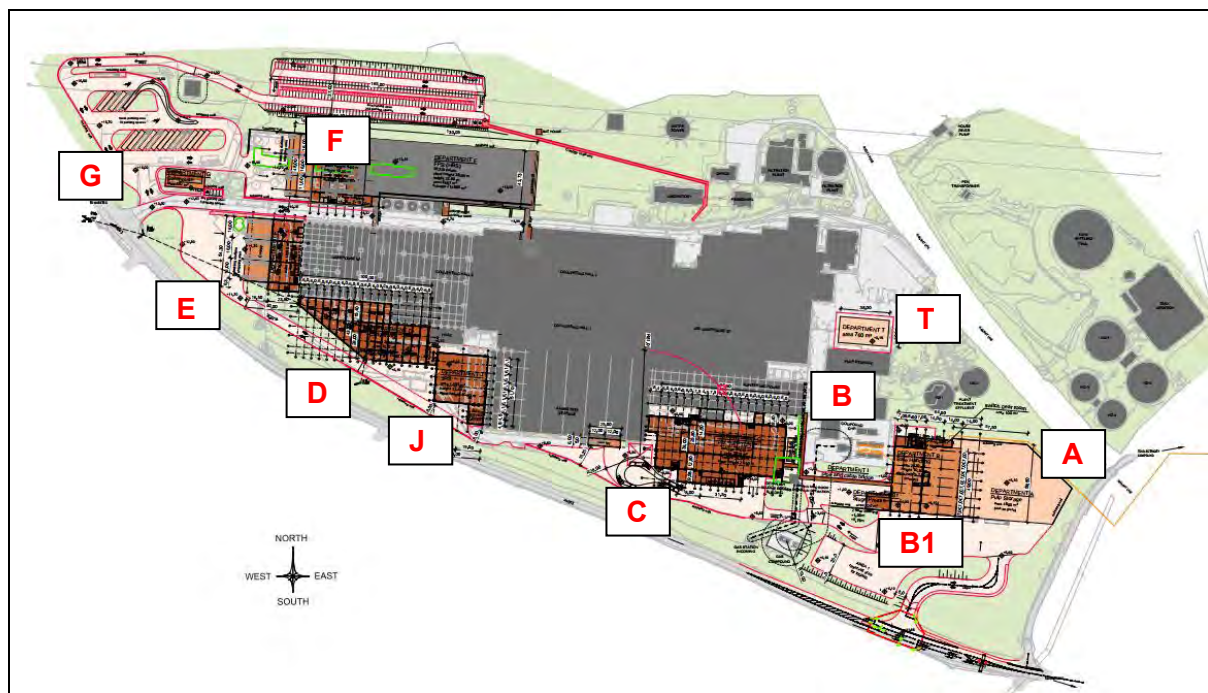


Table 3.3-1: Approximate building footprints and heights

Department	Footprint [m ²]	Height [m]	Constr. Phase
Dept. A - Pulp Storage	4,530 m ²	-	1
Dept. B - Bale Handling	2,935 m ²	10.3 – 15.5 m	1
Dept. B1 - Sludge Press	240 m ²	15.5 m	1
Dept. C - PM Hall	4,560 m ²	19.0 – 25.0 m	1
Dept. D - Converting	3,024 m ²	13.3 m	2
Dept. E - Shipping Area	1,384 m ²	11.5 m	2
Dept. F - High Bay Storage	5,780 m ²	42.0 m	3
Dept. F - Shipping Area	1,820 m ²	11.0 m	3
Dept. F - Office	340 m ²	15.0 -18.0 m	3
Depot G - Gatehouse	152 m ²	4.3 m	3
Depot I - Pipe Bridge	-	-	1
Depot J - JRS	1,680 m ²	13.5 m	2
Dept. T - Temp. Parent Reel St.	760 m ²	-	1
JRS Canopy	150 m ²	-	2
JR Transport Canopy	135 m ²	-	2
Canopy Shipping Area - Dept. E	929 m ²	-	2
Canopy Shipping Area - Dept. F	983 m ²	-	3
Parking + Canopy Walkway	-	-	3

- 3.3.2 The Pulp Storage (A) will be extended to increase storage capacity and make use of the surrounding available space. The south-east access road will be adapted to accommodate truck traffic leaving and arriving at the Pulp Storage dispatch area.
- 3.3.3 The New Jumbo Reel Storage (J) will be attached to the existing Jumbo Reel Storage building in order to increase the overall storage capacity.
- 3.3.4 Another small storage area (Department T) will added north of the existing pulp storage. This storage will consist of a concrete slab for a tent and it will be used for Parent Jumbo Reel Storage.
- 3.3.5 The Converting Extension (D) will be attached to the existing converting facility to minimize traffic between the departments. Existing loading docks will be demolished and replaced by those attached to the future finished product storage. The Finished Product Storage (F) is located in the northern part of the site and will have a separate access for shipping traffic.
- 3.3.6 Existing traffic routes and facilities have been considered to optimise the layout in the best possible way.
- 3.3.7 The new Gate House (G) will be located north of the existing gatehouse. A Pipe Bridge (I) will connect the Bale Handling with the Paper machine buildings and with the new Sludge Press building (B1). The existing mill site infrastructure will be used to maintain the operation of the new buildings. Most of the currently available utilities are sufficient to operate the mill after expansion.
- 3.3.8 Traffic arrives at the west main access as well as at a secondary access and it will be routed around the buildings to their final destination.
- 3.3.9 There will be two parking areas: One in the west of the site for HGV parking and one north of the Finished Product Storage for employees. The employee car parking area has been moved to the west in order to be located within the "Employment Site Designation" under the Current LDP.
- 3.3.10 The Phase 1 buildings will add more space and capacities for storing raw materials, pre-treatment of the stock and producing tissue paper (A, B, B1, C, I and T). Phase 2 buildings are considered to extend converting and distribution capacities (J, D, E). The future Phase 3 will provide the High Bay Storage (F) including the new Shipping department with its administration office, the gatehouse (G), and all parking (truck and car) and paved areas.
- 3.3.11 The final layout shows the most effective and a well-balanced solution to arrange the different new buildings and facilities on site. Moreover, it integrates existing structures in a way that avoids any disruption of current mill operations.

3.4 Detailed Layout and Design

(A) Pulp Storage and (B) Bale Handling, Broke and Chemical Storage

- 3.4.1 The raw material for the paper making process is based on virgin fibre. The pulp needed for the paper production will be delivered by trucks to the pulp storage. The pulp is delivered in bales, 100(120) x 80 x 60 cm. These bales will be unloaded by forklifts and will be stored in the pulp storage. The maximum storage height is 5.5m. The fuel of the forklifts in this area is gas. Per shift, one employee is operating the forklift in this area. The storage capacity of

the pulp storage is approximately 10 days storage for the consumption of the paper machine, in total 4,000 tons of pulp. Additionally, the waste "broke" paper from the trim removal system of the converting lines is stored as pressed bales in the pulp storage. This broke paper will be reused in the process. The Raw material storage area is located in the east of the WEPA UK Bridgend site. It will consist of a concrete base slab and a roof consisting of sheet metal covering the bale handling conveyors. The building is directly attached to the Bale Handling Building to the west.

- 3.4.2 The power for the new paper machine and other departments is controlled and distributed from the main substation in the annex building of the Pulp Storage area. The electrical power supply from the public grid will enter into the switchgear room and will be distributed to the transformers. After the transformers, the power will be fed to the MCCs in the MCC room. From the MCC room the power will be distributed to the different power consumers.
- 3.4.3 Broke Storage, Bale handling, Chemical storage (incl. technical + social rooms) are within one building department. Department B will be erected adjacent to the Pulp Storage and will cover an area of approximately 3,000m².
- 3.4.4 Bale units will be transported with forklifts to the bale conveyors, one for 'Jupiter' one for 'Neptune' and one for broke material. These conveyors will feed the hydropulpers, which are also located in the Bale Handling area. The pulpers break down the solid pulp bales into liquid paper stock to be used by the paper machine. Per shift, two employees work in the bale handling area (24/7 - continuously).

Figure 3.4-1: Layout of Pulp Storage (A) and Bale Handling (B)

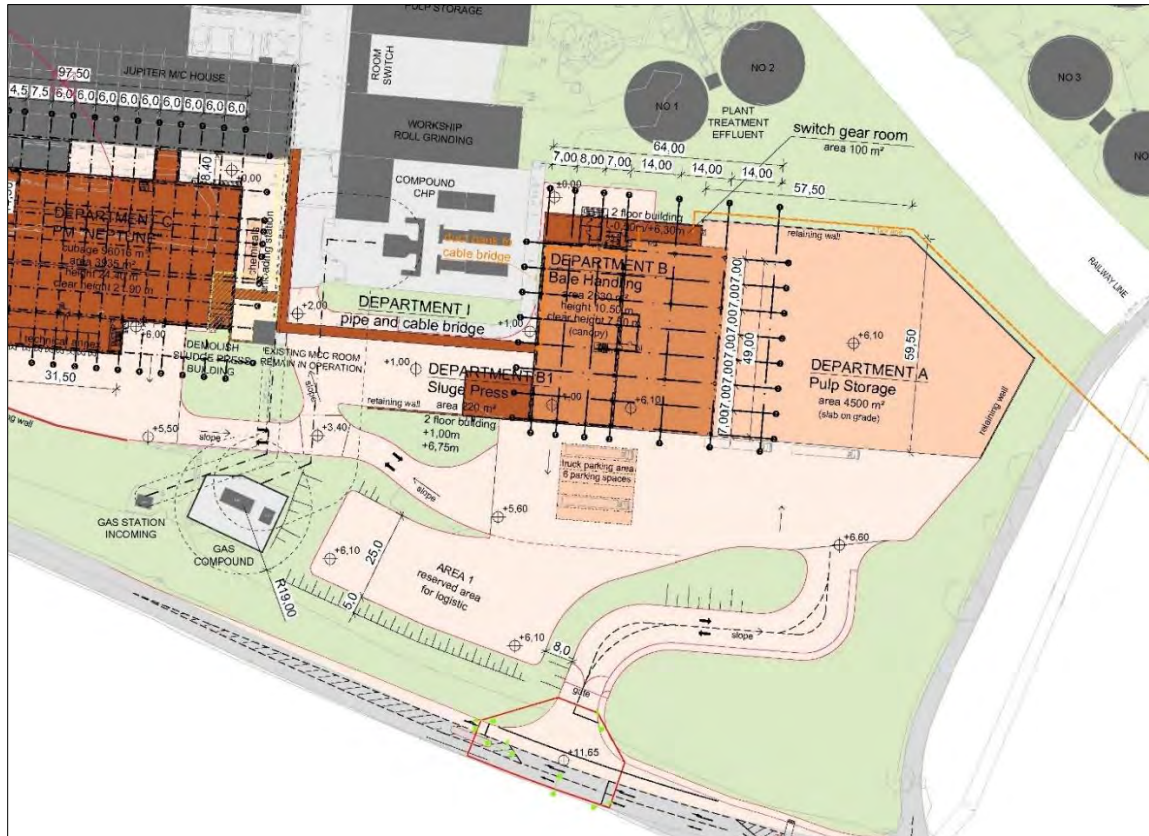
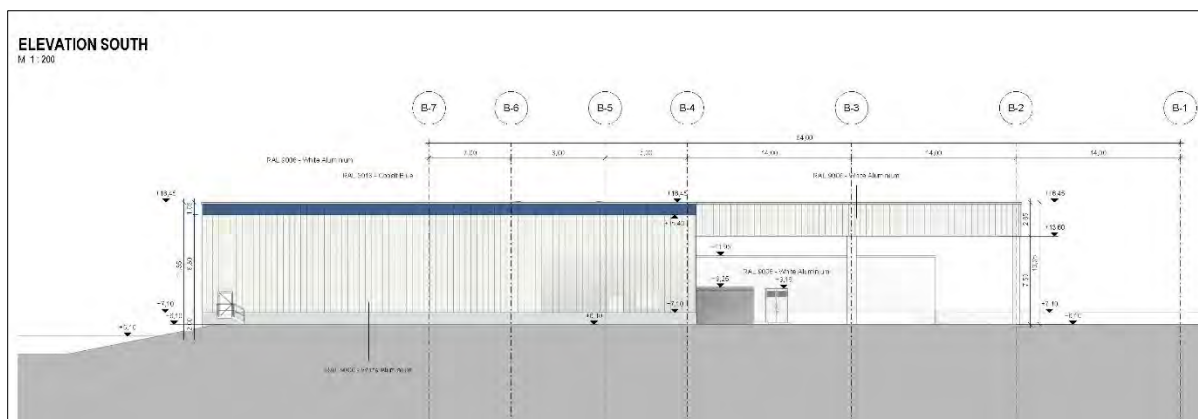


Figure 3.4-2: Design of Pulp Storage (A) and Bale Handling (B)



(C) Paper Machine 'Neptune'

- 3.4.5 The paper machine (PM) building will be attached to the building of the existing 'Jupiter' paper machine. It will be built of precast and/or in-situ concrete structures. That means that all columns, beams, girders and floors will be made of concrete. In addition, wall panels and roof slabs will be pre-fabricated in accordance with fire resistance classes and regional codes.
- 3.4.6 The whole paper machine and all related process equipment are controlled and monitored in the PM control room. A technical annex building will be attached to the south of the Paper Machine Building.
- 3.4.7 Within the paper machine hall the pulped fibre material is pumped to the heart of the paper production process, the paper machine. A highly diluted paper stock enters the forming and dewatering section in order to create the required quality properties for the jumbo reels. The paper machine is based on Best Available Technology (BAT) and is designed to produce a high quality product with low energy consumption and minimal environmental impact.
- 3.4.8 A combination of fabrics and felts at a speed of up to approximately 2,200m/min transfer the sheet from the forming section to the press section and into the drying section which consists of a big steam heated Yankee dryer (around 4,5m diameter) with gas fired high temperature hoods (500°C). At the end of the papermaking process, the sheet will be creped off the Yankee dryer and wound into a reel. The so-called jumbo reels have a diameter of around 3m and a width of 2.80m each (two parallel). Normally two employees per shift operate the paper machine.
- 3.4.9 The paper machine and all related process equipment are controlled from a central control room. Per shift, 10 employees work in this area at the same time. These people are also responsible for maintenance in the paper machine building. Two personnel permanently staff the control room.
- 3.4.10 The site currently has a combined heat and power plant (CHP) installed in 1995. This plant will generate approximately 40% of the total electricity required for the expanded site and produce all steam required for the new and existing paper machine. CHP is recognised at

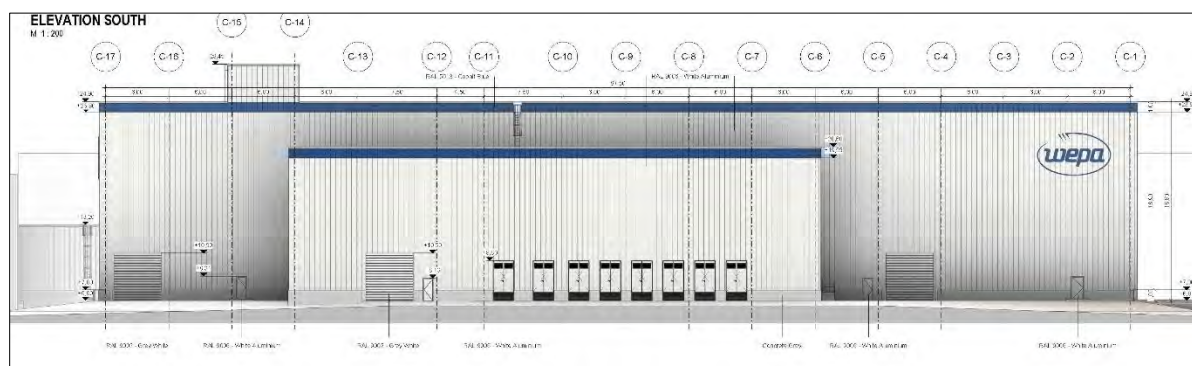
best available technology and is more efficient for the production of steam than conventional gas fired boilers.

- 3.4.11 A pipe bridge (M) connects the Bale Handling Building with the new 'Neptune' paper machine building and the existing 'Jupiter' machine building.

Figure 3.4-3: Layout of Paper Machine 'Neptune'



Figure 3.4-4: Design of Paper Machine 'Neptune'



3.4.12 Adjacent to the existing Jumbo Reel Storage an additional New Jumbo Reel Storage (Department J). Department J is designed as a single-story building.

3.4.13 The floor slab and foundations will be constructed out of reinforced in-situ concrete including single foundations in the area with load bearing columns and foundations at the outer edge of the department. The structural elements for this building are mainly structural steel columns and steel joist girders. The roof construction of the warehouse (JRS / department J) shall be a steel construction consisting out of joist girders, purlins and profiled decking. The columns are made out of structural steel. The design is similar to department D. The roof construction of the warehouse shall have a minimum slope as required by code. The roof drainage would be performed by using a siphoned roof drainage system. The sandwich wall socket shall have a height of approximately 1m above the finished floor level and would be constructed out of pre-casted concrete elements (including insulation in-between the two concrete shells). Above this level, an IMP siding will be installed. Generally, all steelwork elements have to be coated and/or treated in accordance with fire protection regulations as well as corrosion protection requirements according to UK codes.

This architectural site plan illustrates the layout of the JRS facility. Key components include:

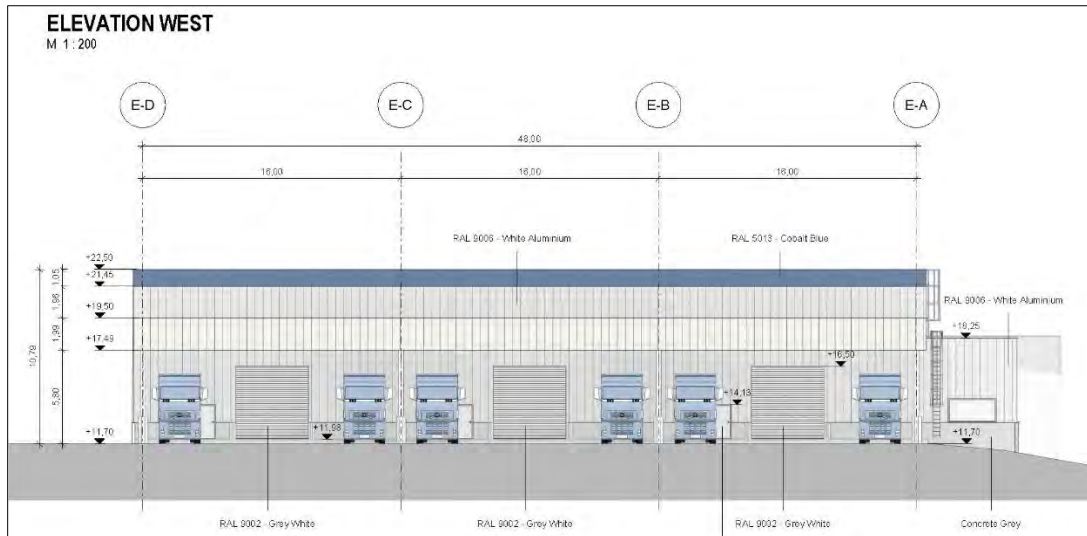
- Department D:** A large rectangular building with a curved boundary on the left. It has a curbage of 34,644 m², an area of 30,224 m², a height of 13.40 m, and a clear height of 10.00 m. It is situated on a +6.10 elevation.
- Department J:** A rectangular building with an area of 1,695 m², a height of 13.40 m, and a clear height of 10.00 m. It is also on a +6.10 elevation.
- Service Areas:** Located between the two main departments are the "BAY SERVICE" and "BAY SERVICE FORKLIFT" areas.
- Storage and Ancillary Structures:** To the right of Department J are the "JUMBO REEL STORAGE" area and a "Canopy" structure with a width of 12.00 m and a length of 25.00 m.
- Infrastructure:** The plan shows a "retaining wall" along the bottom edge, a "paved area" on the left, and various "CONVERTING HALL" areas (1, 2, and 3) at the top. Dimensions for setbacks and building footprints are provided throughout the plan.

(D) Converting and (E) Shipping

- 3.4.14 The converting hall (D) is located in the south-western part of the mill site attached to the existing Converting and “Warehouse A” Building.
- 3.4.15 The jumbo-reels will be transported from the jumbo-reel storage by AGV or forklift into the converting halls and directly to the converting line where it will be used. There are seven converting lines currently in operation: The new project will replace one of the older lines and add a new line (8 in total). When the forklift has placed the jumbo-reel in front of the converting line the jumbo-reel will be lifted with an overhead crane into the first section of the converting line which is an unwinder section.
- 3.4.16 After the unwinder section depending on whether the paper is already printed or not, there may be a printer. After the printer, there is the embossing section and the plybonding section, which is gluing the plies on the edges. Behind the gluing section, there is the rewinder that is fed from a coremaking machine with cardboard cores. At the end of the rewinder section there is an accumulator where all the rolls with kitchen towel/toilet paper are stored and then cut with a log-saw into the required length. After the production section, the toilet paper and kitchen tower rolls are transported by conveyor to the packing machine. In this machine, several rolls are wrapped with film to form packs. These packs are transported by conveyors to a bundler which are wrapping the packs to bundles which fit on pallets. The bundles will be transported then with a conveyor to a palletizer machine. This machine is a robot which takes empty pallets from a temporary pallets store and is piling up the wrapped finished products on this pallet.
- 3.4.17 It is intended that the pallets will be transported with an LGV (laser guided vehicle = automatic shuttle) to a stretch wrapping machine. This stretch wrapping machine wraps the pallets with a plastic film and also labels the pallets. After this section, an electrical forklift will pick up the pallet and transport it to the finish product storage.
- 3.4.18 The Converting operation requires several types of raw materials (coreboard, printed film, glues, inks, stretch wrap). These items are currently stored in several locations across the site. This project will centralise all converting raw materials in the former pulp store area.
- 3.4.19 The current warehouse A will be retained to enable production to continue while the new finished product storage warehouse is constructed. The existing laboratory and quality control department will remain untouched by this project.
- 3.4.20 In the shipping area (E), trucks will be loaded with finished products and empty pallets will be unloaded. The Shipping area will be operated with electrical forklifts. A small Shipping office will also be located within this area.

[illegible]

Figure 3.4-8: Design of (E) Shipping



(F) High Bay Warehouse, Shipping Area + Office

- 3.4.21 At the end of the production process, finished products will be stored and shipped. The Finished Product Storage (or High Bay Warehouse) is located north of the existing Converting building and will be connected to the Warehouse A and the Converting by bridges.
- 3.4.22 From the buffer conveyor after the stretch wrapping machines in the Converting, the pallets with the finished products will be transported by electrical forklifts into the high bay finished product storage. The maximum storage height of this storage building is 42m. The finished product storage will be fully automatic "state of the art" technology and it will be operated with automatic elevators, shuttles and conveyors.

Figure 3.4-9: Layout of (F) High Bay Warehouse

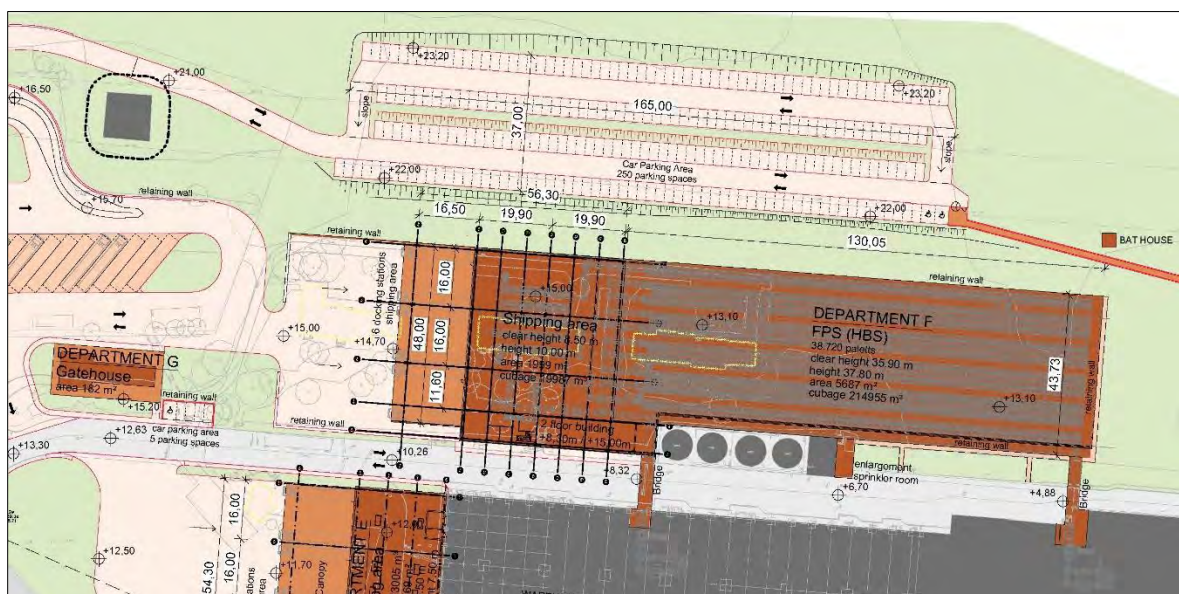


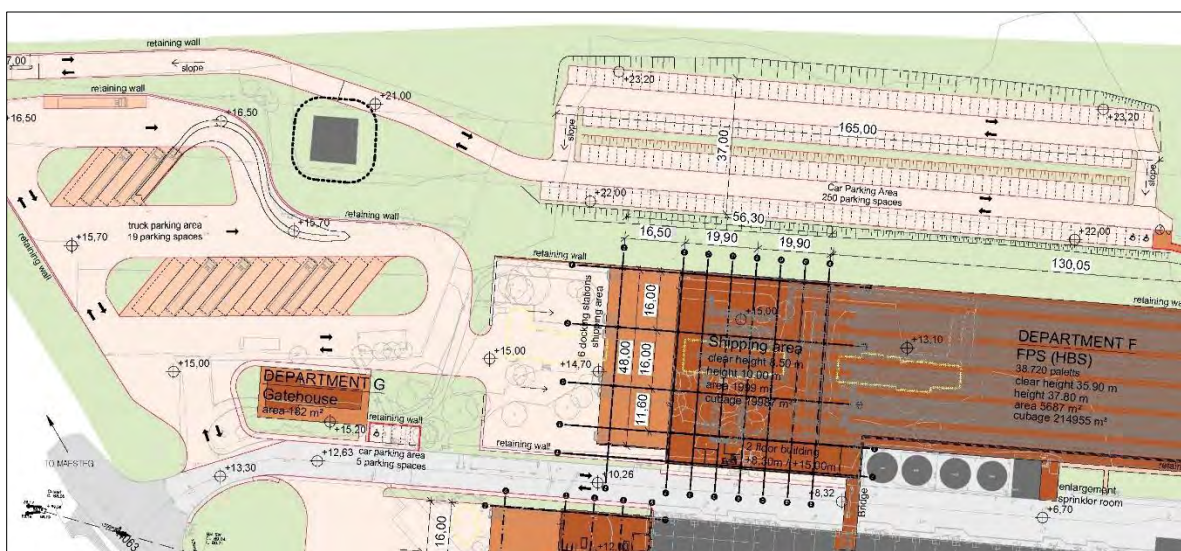
Figure 3.4-10: Design of (F) High Bay Warehouse



(G) Gatehouse

- 3.4.23 The gatehouse at the western access road of the site is a single-story building with a flat roof. The building consists of a gate office, toilets and building services. The Gatehouse will be staffed 24 hours / 7 days a week.
- 3.4.24 Cars and other vehicles will enter the mill site at the main gate at the west of the site.
- 3.4.25 In the event of trucks arriving too early for shipping or in case of all docking stations being occupied, they have to wait on the truck parking area in front of the Gate House.
- 3.4.26 Employees working in the production areas (paper machine, converting, storages, etc.) have a separate access from the main car park (north of the High Bay Storage), accessing the site via a footpath.
- 3.4.27 The car park will also have parking facilities for bicycles and motorbikes.

Figure 3.4-11: Layout of (G) Gatehouse and parking



3.5 Process Description and Technical Data

3.5.1 The key steps of the production process can be summarised as follows:

Creation of stock

3.5.2 The pulp is dissolved using water. The fibers in the pulp can be either fresh or derived from recycled paper. The fibers usually come from wood, although they can also originate from e.g. straw or sugar cane residue. When the stock enters the machine, it comprises more than 99 per cent of water and less than one per cent of fibers.



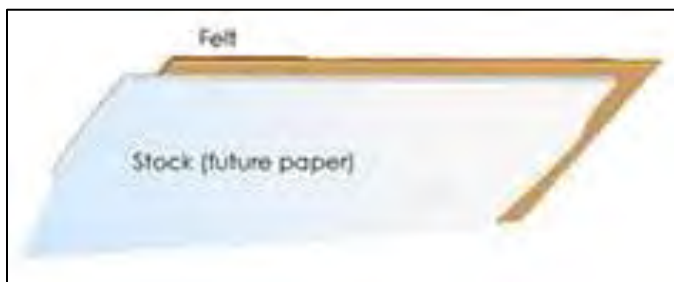
Headbox

3.5.3 In the headbox, stock is sprayed into the machine and spread along the entire width of the machine in the gap between two rolls. On one roll there is a wire (screen cloth) and on the other a felt.



Felt

- 3.5.4 The stock attaches to the felt and follows it on into the machine. The felt is made of a thick textile and absorbs some of the water.



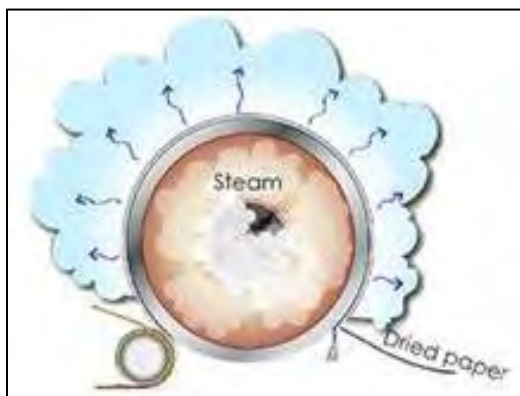
Pressing – press roll or so-called shoe press

- 3.5.5 In the press roll section, the paper web is pressed between a suction press roll or a so-called shoe press and the large Yankee dryer. The suction press roll is perforated and, together with the felt, removes the water from the paper web.



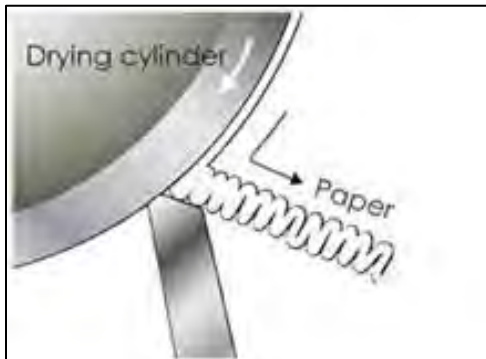
Drying cylinder – Yankee

- 3.5.6 The cylinder is heated up with steam under pressure. The paper web attaches to the hot surface of the drying cylinder. Water is now evaporated from the paper web.



Creping

- 3.5.7 The creped structure of the tissue paper is achieved when the paper web is scraped away from the drying cylinder using a steel blade.



Rolling up

- 3.5.8 The finished tissue paper is rolled up onto large jumbo reels. The paper is now ready for processing in other machines in order finally to be made into toilet rolls, kitchen rolls, paper tissues or paper towels

Materials Usage

Feed Stock Paper

- 3.5.9 For the operation of two paper machines, approximately 400 tonnes/day will be utilized.

Energy

- 3.5.10 Energy for the new plant will be supplied by the existing CHP power plant which uses natural gas only. The additional gas will be delivered via an existing below ground high-pressure gas pipeline.

- 3.5.11 The additional energy demand amounts to approximately:

558 KWh/ton @ 250 tpd = 5,812.5 kW/h @ 8,760h = 50.918 GWh per year.

Water Use (process water)

- 3.5.12 Paper mills commonly use freshwater in the production process for stock preparation and process water. The proposed development will produce 75,000 tonnes of paper per year. Based on a fresh water consumption of 6.5 m³ per tonne, the new development will require approximately 488,000 m³ of freshwater per year.

- 3.5.13 The increase in production will result in a change in the demand for water and a change in the effluent produced. At this stage, it is expected that any associated change in abstraction and discharge volumes will however be accommodated within existing permit allowances and the current on-site effluent treatment plant has sufficient capacity to receive and treat the projected flows.

Chemical Additives

- 3.5.14 To improve the product properties and the production efficiency various chemical additives are applied in the process. Generally, chemical usage can be classified according to the following categories:
- Process Aids: facilitate the operation of the paper production process in order to improve production efficiency and throughput.
 - Product Aids: are applied to optimise the specific properties of the paper according to the product requirements.

Waste Arisings

- 3.5.15 The principal waste arising from the operation of the plant include:
- Filters on air intakes will require changing periodically,
 - Lighting units replaced as required,
 - Waste from staff rooms etc.,
 - Oily sludge from cleaning of oil interceptors,
 - Waste oils and lubricants; oil residues arising from maintenance activities,
 - Packaging waste (timber, cardboard, plastic etc.).
- 3.5.16 Waste generated during annual outages varies according to the scope of the outage work, and consist mainly of oil residues and scrap metals. The quantities of waste generated are relatively low. Waste will be segregated and stored in labelled containers until disposal off-site by a qualified contractor. The sludge produced during the paper making process (as waste product) is collected, properly treated and reintroduced in the paper production process itself. The excess sludge that cannot be reintegrated is dried and used to make alternative agricultural products.

Waste Water Treatment Plant

- 3.5.17 The current effluent treatment system installed in 1991 has the capacity and capability to serve the new PM in addition to the current PM. A large part of the total amount of water needed for the tissue paper making process will be made available through intensive wastewater treatment, thus significantly reducing the total amount of fresh water taken from the River Llynfi. The treatment technology can be considered a suitable and well proven method. The plant uses the biological oxygen demand (BOD) process, which remains best available technology. For the biological process, the wastewater has to be conditioned, i.e. additional nutrition like nitrogen and phosphorus has to be added to the water coming from the production plant. Any excess water will be discharged to the River Llynfi via the existing effluent treatment plant.

Surface Water Drainage System

- 3.5.18 The surface water drainage system of the new development will be connected to the existing drainage system of the site.

3.6 Operational Releases

Emissions to Air

- 3.6.1 The main air emissions released to atmosphere will be carbon dioxide (CO₂), carbon monoxide (CO), and oxides of nitrogen (NO_x). In addition, the combustion of natural gas produces only trace amounts of sulphur oxides and particulate matter.
- 3.6.2 An Air Quality Assessment (Document Ref. 57100-0218) (including air dispersion modelling) has been carried out to evaluate the potential contribution of the plant to ambient levels of NO_x, CO, PM₁₀ and SO₂ in the surrounding area. The assessment took into account the combined effect of existing site operations and the proposed additional emissions from the proposed development.
- 3.6.3 None of the air emissions from the proposed plant will give rise to odours beyond the boundary of the sites.

Emissions to Water

- 3.6.4 All aqueous discharge will be discharged to the River Llynfi after treatment in the existing Effluent Treatment Plant complying with the existing Discharge Consent.

Releases to Land

- 3.6.5 Deposition to land of pollutants as a result of air emissions have been considered in the air quality assessment if relevant. There will be no solid residues formed that will be disposed of to land. All waste would be returned to the original supplier where possible or removed by a licensed contractor.

Noise and vibration

- 3.6.6 A complete and detailed noise assessment has been carried out for the site and its surrounding and this has been submitted to the Local Authority as part of the Planning Application as Document Ref.: 57100-0219.

3.7 Construction Phase

- 3.7.1 As part of the engineering design work, a detailed programme for the development will be determined. Subject to planning permission, construction work is planned to start in Q3 of 2020. The construction and commissioning phases of the proposed plant are expected to last approximately 63 months.
- 3.7.2 Standard construction techniques for buildings, roads and pavements, lighting, utility services and telecommunications will be adopted. The full details on all site construction activities are currently not available but would be provided as part of the final project design, depending on the equipment of the contractor selected.
- 3.7.3 The construction workforce peak is anticipated to be between 120 and 150 personnel, however average numbers would be of the order of 80 to 100.
- 3.7.4 In addition, equipment installation workforce for the Paper Machine building will involve an average of 150 staff members, with a peak of 200 staff members. For the equipment

installation of Bale Handling area, an average of 70-80 staff members will be involved, with a peak number of approximately 100.

3.7.5 Typical construction activities include

- Site preparation: Prior to the levelling of the site, top soil will be stripped and removed from the site. Excavations will be required to construct foundations, trenches, buried services and basement structures, and to create temporary construction facilities and working areas. On completion of the construction phase, the laydown area will be returned to an appropriate state.
- Foundation piling: It will be necessary to undertake piling for the foundations due to the heavy loading and the tight tolerance on settlement.
- Civil engineering works will be required to create further foundations, buildings, services, roads etc.
- Steel erection – of structural steel frameworks.
- Mechanical plant: Plant and equipment will be located on foundations in the main construction areas, using a range of cranes and mobile plant and includes the on-site assembly of any tanks, pipework and storage vessels.
- Electrical and Control: Electrical equipment, and control and instrumentation systems will be installed once the building enclosure has been completed.

3.7.6 For excavation works, several excavators and dump trucks will be in operation. After the main excavation works boring machines for pile foundations will be on site for a period of approximately 3 months for phase 1 and 3 months for phase 3. During the construction phase, several cranes and mobile cranes will be in operation. Mobile cranes will be mainly used for the erection of pre-cast elements and steel structures. Trucks with trailers will transport heavy pre-cast elements to the site.

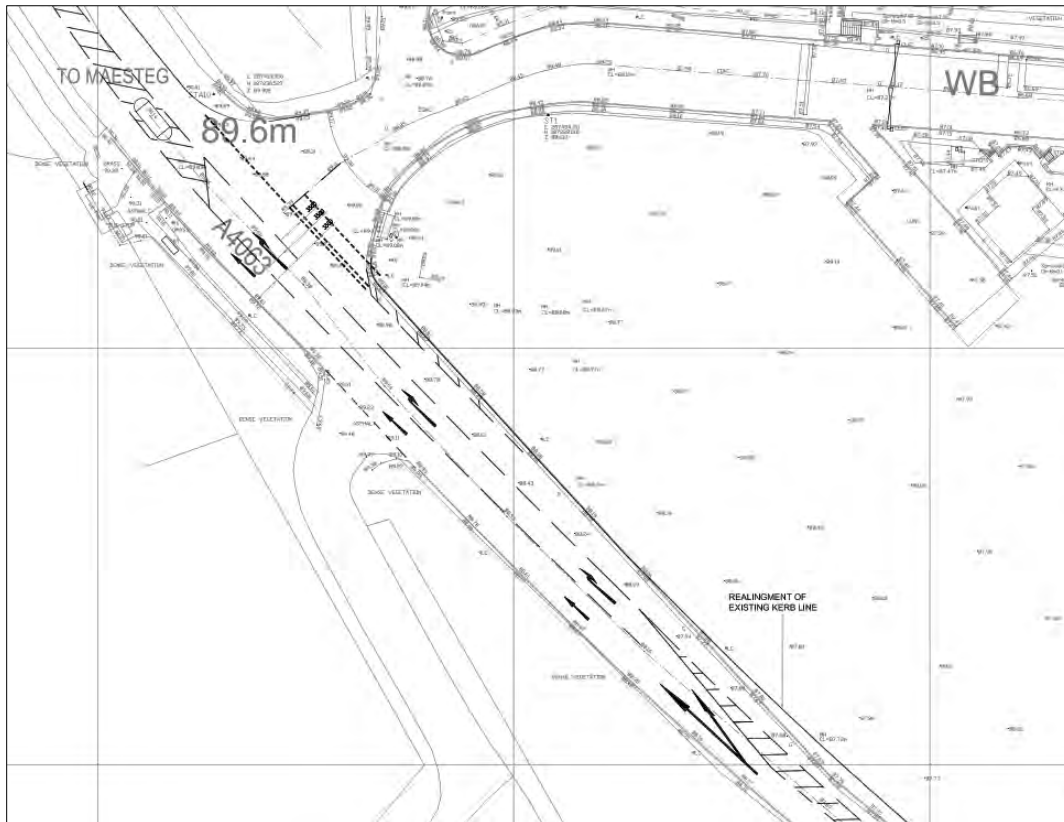
3.8 Access

3.8.1 The development site has a dedicated access off the A4063. The A4063 is rural in nature and it is the main road between Bridgend and Maesteg. It is generally of a reasonable alignment and width. It is a suitable route for HGVs and current traffic conditions on this route are considered satisfactory. The A4063 provides access to the M4 Junction 36 and Bridgend to the south. Access to Cardiff is provided by the M4, at Junction 32 located approximately 20 miles south east of the development site. The site is rurally located and as such is not considered highly accessible by walking/ cycling modes of transport.

Existing Access

3.8.2 The existing site has a single point access at the western end of the site which, through the redevelopment of this site will be upgraded and formally laid out with a right turn lane for a 60mph road.

Figure 3.8-1: Existing Site Access



Proposed New Southern Access

3.8.3 In order to facilitate the proposed expansion, a new all movements vehicle access is proposed to the south-eastern end of the development site primarily for the operation of HGV's. The proposed new secondary access can be described as an ALL movements signalised junction designed in accordance with Design Manual for Roads and Bridges 123 and will consist of the following:

- Simple 3 arm signalised junction;
- Signals called upon demand;
- Dedicated right turn lane with filter arrow;
- Minor Road (Access road) to be a minimum of 11m wide to cater for all HGV movements and for a HGV to pass another HGV unobstructed;
- Main junction to consist of 3.5m running carriageway widths and a 3.5m wide RT Lane;
- Junction radii at 15m;
- DMRB compliant inter-visibility shown at 2.5m back from each give way line;
- DMRD compliant tapers;
- An uncontrolled pedestrian crossing point to the west of the right-turn lane to include tactile paving;
- Transition gradient into the site at a minimum of 1:20 (to be confirmed as part of a detailed design package); and
- Permanent Traffic Restriction Order (TRO) to be implemented for a 50mph speed limit.

The site plan illustrates the layout of the Port of Maesteg. Key features include:

- Department G Gatehouse:** A central building with an area of 162 m² and an elevation of +15.20.
- Shipping area:** Located to the right, featuring a clear height of 8.50 m, a height of 10.00 m, an area of 1999 m², and a cubage of 1999 m³. It includes 6 docking stations and a shipping area.
- Warehouse A:** A large building at the bottom right with a height of 7.50 m and a cubage of 13005 m³.
- Parking areas:** A truck parking area with 19 parking spaces and a car parking area with 5 parking spaces.
- Retaining walls and slopes:** Several retaining walls and slopes are indicated throughout the site.
- Dimensions and Elevations:** Various dimensions (e.g., 54.30, 16.00, 6.30) and elevations (e.g., +17.00, +16.50, +15.00) are marked on the plan.
- Directional Arrow:** A red arrow points towards the 'TO MAESTEG' direction.

The site plan illustrates the layout of the Pulp Mill, including the following areas and features:

- DEPARTMENT A Pulp Storage:** 4500 m² (slab on grade).
- DEPARTMENT B Bale Handling:** 2800 m² (height 10.50 m, clear height 7.20 m (candy)).
- DEPARTMENT C PM NEPTUNE:** 3000 m² (height 12.50 m, clear height 2.50 m).
- DEPARTMENT I:** pipe and cable bridge.
- DEPARTMENT B1 Sluge Press:** 2 floor building +1.00m +6.75m.
- DEPARTMENT 2:** 2 floor building.
- Other buildings and structures:** JUPITER MC HOUSE, PULP STORAGE, WORKSHOP ROLL GRINDING, ROOM SWITCH, COMPOUND CHIP, DEMOLISH SLUDGE RESERVE BUILDING, EXISTING MC ROOM REMAIN IN OPERATION, GAS STATION INCOMING, GAS COMPOUND, PLANT TREATMENT EFFLUENT, switch gear room (area 100 m²).
- Open areas:** AREA 1 reserved area for logistic, truck parking area (6 parking spaces).
- Infrastructure:** retaining wall, existing wall, slope, R19.00, R4.00, R11.55, R4.00.
- Other features:** NO 1, NO 2, cable bridge, DEMOLISH SLUDGE RESERVE BUILDING, EXISTING MC ROOM REMAIN IN OPERATION, GAS STATION INCOMING, GAS COMPOUND, PLANT TREATMENT EFFLUENT, switch gear room (area 100 m²).

A red arrow points to a specific location on the plan, likely indicating a key feature or area of interest.

3.9 Predicted Operational Traffic

Table 3.9-1: Predicted operational traffic for Pulp, RM PM/CV, Pallets & FGs trucks

			Average day			Peak day		
FGs converting	PM tonnes	Year	Primary entrance	Secondary entrance	Total	Primary entrance	Secondary entrance	Total
81.525	50.000	Year 1 - 2019	90	0	90	122	0	122
92.146	50.000	Year 2 - 2020	101	0	101	137	0	137
97.795	60.000	Year 3 - 2021	83	27	110	116	33	149
114.499	105.000	Year 4 - 2022	104	30	134	145	36	181
114.499	120.000	Year 5 - 2023	108	29	137	150	35	185

Table 3.9-2: Predicted Employee Car Movements

Excludes any construction workers

		Shift Workers (07:00-19:00)					Day Staff (08:30-16:30)			
		Year	Cars into the site	Cars from the site	Total	increase vs now	Cars into the site	Cars from the site	Total	Increase vs now
FGs (t/a)	PM (t/a)									
81,525	50,000	Year 1 - 2019	82	82	164	0.0%	35	35	70	0.0%
95,146	50,000	Year 2 - 2020	82	82	164	0.0%	35	35	70	0.0%
109,915	60,000	Year 3 - 2021	98	98	196	19.5%	42	42	82	17.1%
114,345	105,000	Year 4 - 2022	108	108	216	31.7%	46	46	92	31.4%
114,345	120,000	Year 5 - 2023	110	110	220	34.1%	47	47	94	34.2%

Public Rights of Way

3.9.1 There are no Public Rights of Way across the WEPA site.

3.10 Construction Traffic

3.10.1 The traffic effect of construction of the proposed development is limited to a finite period (approx. 63 months) and will be along the traffic routes employed by haulage vehicles, construction vehicles and employees' vehicles (particularly Bridgend). The principal construction activities with transportation implications are:

- removal of excavated material,
- delivery of materials for new development, and
- movements of heavy plant.

3.10.2 The Developer anticipates there being an average of 80-100 construction staff on site over the construction phase of some 63 months, with a peak of around 150 construction staff present during the construction of the paper machine building and 80 staff for the Bale Handling building. For the equipment installation of the Bale Handling area, 70-100 staff members will be involved for a period of around 3-4 months. For the equipment installation of the Paper Machine, 150-200 staff members will be involved for a period of approximately 7 months.

3.10.3 A number of abnormal load deliveries will be required to route to the site at some stage of the construction phase to deliver large scale construction kit. Full routing agreement and delivery timeframe details will be sought from the Local Highways Authority once further details on abnormal loads are identified.

3.11 Parking

3.11.1 In the event of trucks arriving too early for shipping or in case of all docking stations being occupied, HGVs would have to wait on the truck parking area in front of the Gatehouse. 19 parking spaces for HGVs will be provided at the main entrance of the Site.

3.11.2 In respect of car parking, the proposed development will provide a total of 250 parking spaces for staff and visitors, including 8 bays for disabled users as required by Bridgend Council's Parking Standards. The parking scheme also comprises 15 cycle parking stands on site.

3.11.3 The HGV parking spaces are located off the main access road to the site. Employees working in the production areas (paper machine, converting, storages, etc.) have a separate access from the main car park (north of the High Bay Storage), accessing the site via a footpath.

4.0 Planning Policy Context

4.1 Introduction

- 4.1.1 This Chapter of the Environmental Statement (ES) sets out the current planning policy framework relevant to the proposed development. Rather than assessing the development against the policy framework, the intention of this Chapter is to provide a summary of the planning policy framework within which the development should be assessed at the European, national, regional, and local levels.
- 4.1.2 The planning policy context to the proposed development, and its performance against that context, has been addressed in detail in the standalone Planning Statement (Document Ref. 57100-0211) which accompanies this application.
- 4.1.3 This chapter only summarises the policy context to the EIA. For example, it identifies planning policies which help to determine the sensitivity of the environment and receptors. The individual chapters throughout this ES assess the development within the context of the relevant sector policies.
- 4.1.4 National and regional planning policy is contained within Planning Policy Wales (2018) which provides an overall strategic framework. Regard is also given to Technical Advice Notes (TANs), which are material considerations in the decision making process by Bridgend Council.
- 4.1.5 The local planning policy framework for the determination of this application is provided by the Existing Bridgend County Borough Council Local Development Plan (2013) and Supplementary Planning Guidance (SPG) covering the application site.

4.2 National Welsh Policies

- 4.2.1 Planning Policy Wales (PPW) is the Welsh Government's overarching national planning guidance as it identifies land use planning policy guidance for Wales. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.
- 4.2.2 Furthermore, the PPW sets out how the planning system at a national, regional and local level can assist in delivering these requirements through Strategic Development Plans (SDPs) and Local Development Plans (LDPs). This includes guidance for the appliance of national planning policy in LDPs to ensure that in the drafting stage, relevant policy statements are included.
- 4.2.3 PPW is supplemented by a series of 21 topic based Technical Advice Notes (TANs) which provide practical guidance relating to various forms of development and the role of the planning system in dealing with the determination of planning applications. Each relevant TAN is covered within its own subsection later in this document.
- 4.2.4 The following TANs are considered relevant to the determination of a future planning application on the development site:

TAN 5: Nature Conservation and Planning (2009)

- 4.2.5 TAN 5 provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. It seeks to demonstrate how local planning authorities, developers and key stakeholders in conservation can work together to deliver more sustainable development that does not result in losses from the natural heritage but instead takes every opportunity to enhance it.

TAN 11: Noise (1997)

- 4.2.6 TAN 11 provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.
- 4.2.7 Local planning authorities should consider whether proposals for new noise-sensitive development would be incompatible with existing activities, taking into account the likely level of noise exposure at the time of the application and any increase that may reasonably be expected in the foreseeable future.

TAN 12: Design (2016)

- 4.2.8 The Welsh Government is strongly committed to achieving the delivery of good design in the built and natural environment which is fit for purpose and delivers environmental sustainability, economic development and social inclusion, at every scale throughout Wales. 'Create places with the needs of people in mind, which are distinctive and respect local character';
- 4.2.9 The purpose of TAN 12 is to equip those involved in the design of development with advice on how 'Promoting sustainability through good design' and 'Planning for sustainable building' may be facilitated through the planning system. TAN 12 highlights a holistic approach to design and it requires a shift in emphasis away from total reliance on prescriptive standards, which can have the effect of stifling innovation and creativity. Instead, everyone involved in the design process should focus from the outset on meeting a series of objectives of good design.

TAN 18: Transport (2007)

- 4.2.10 This TAN sets out Government's aim to increase sustainable transport options, minimise the requirement to travel via private car and improve accessibility, helping to meet objectives for social inclusion in doing so. The TAN notes that planning authorities' development plan strategies should provide more choices of travel than a private car. In relation to rural areas, transport options are substantially restricted in comparison to larger settlements. The car is subsequently an important means of transportation and accessibility. Transportation, which is efficient and sustainable, is key for 'a modern, prosperous and inclusive society'. For this reason, accessibility is a key focus for reducing rural isolation

TAN 23: Economic Development (2014)

- 4.2.11 TAN 23 provides a framework of how development and its economic benefit should be positively sought, balancing social, economic and environmental considerations in doing so. This particular TAN directly focuses on B-class development.

- 4.2.12 Section 3 of the Note discusses 'Economic Development and the Rural Economy'. Paragraph 3.1.1 states that; *'A wide range of economic activities may be sustainably accommodated in rural areas, and this is recognised in PPW and other TANs, in particular TAN 6 Planning for Sustainable Rural Communities.'*
- 4.2.13 As part of the High Level Planning Objectives, Paragraph 1.2.1 notes that economic benefit of developments may be geographically widespread which should be captured and that in this instance, planning should be targeted towards communities particularly disadvantaged (Paragraph 1.2.4).
- 4.2.14 The guidance seeks to ensure that economic development is encouraged and advises Local Authorities to support the shift towards a low carbon economy.

4.3 Local Planning Policies

- 4.3.1 The existing planning framework for Bridgend Council is the Bridgend Local Development Plan (LDP), which was adopted in September 2013. It provides development strategy and spatial policy framework for the future development of Bridgend up until 2021. The LDP contains detailed policies which control the form of new development and set out what new development should look like. All planning applications have to be assessed against the Local Plan policies, which include a broad range of planning related matters.
- 4.3.2 The following local policies contained within the LDP are considered to be of relevance to the site and to the proposed development in general.
- 4.3.3 Strategic Policy SP2 (Design and Sustainable Place Making) states that all development should contribute to creating high quality, attractive, sustainable places which enhance the community in which they are located, whilst having full regard to the natural, historic and built environment. The supporting text to this policy advises that Policy SP2 demands a high quality of design incorporating equality of access in all development proposals and seeks to ensure that new built development is sensitive to its surrounding environment.
- 4.3.4 Strategic Policy SP3 – (Strategic Transport Planning Principles) states that all development proposals should promote safe, sustainable and healthy forms of transport through good design, enhanced walking and cycling provision, and improved public transport provision. Land-use transportation solutions will therefore be required to deliver a more effective, efficient and accessible transport system.
- 4.3.5 Strategic Policy SP4 – addresses issues regarding Conservation and Enhancement of the Natural Environment. Development which will conserve and, wherever possible, enhance the natural environment of the County Borough will be favoured. Development proposals will not be permitted where they will have an adverse impact upon the countryside of the County Borough, the character of its landscape, biodiversity, and the quality of its natural resources including water, air and soil. Areas having a high and/or unique environmental quality will be protected and the strategically important areas within the County Borough will specifically be protected from inappropriate development which directly or indirectly impacts upon them.
- 4.3.6 According to Strategic Policy SP14 – (Infrastructure), applications for development should include material proposals which deal with the fair and reasonable infrastructural requirements of the development, and which help to mitigate any negative impacts that may arise as a consequence of the development.

- 4.3.7 Policy ENV1 – (Development in the Countryside) states that development in the countryside of the County Borough will be strictly controlled. Where development is acceptable in principle in the countryside, it should where possible, utilise existing buildings and previously developed land and/or have an appropriate scale, form and detail for its context.
- 4.3.8 Policy ENV3 addresses Special Landscape Areas (SPAs) where development will only be permitted where:
- It retains or enhances the character and distinctiveness of the SLA;
 - The design of the development reflects the building traditions of the locality in its form, materials and details, and/or assimilates itself into the wider landscape; and
 - The proposed development is accompanied by a landscape assessment which takes into account the impact of the development and sets out proposals to mitigate any adverse effects.
- 4.3.9 Policy ENV4 – (Local/Regional Nature Conservation Sites) requires development within or adjacent to Local Nature Reserves (LNR), or Sites of Importance for Nature Conservation (SINC) to be compatible with the nature conservation or scientific interest of the area, whilst promoting their educational role.
- 4.3.10 Green infrastructure (Policy ENV5) will be provided through the protection and enhancement of existing natural assets and the creation of new multi-functional areas of green space. Green infrastructure corridors will connect locations of natural heritage, green space, biodiversity or other environmental interest.
- 4.3.11 Policy ENV6 considers Nature Conservation and it states that proposals for development or redevelopment will be required to retain, conserve, restore and enhance wherever possible natural features and habitats such as existing woodland, trees, hedgerows, watercourses. Where this is demonstrated not to be possible, suitable mitigation or compensatory measures will be required to secure biodiversity including future management programmes.
- 4.3.12 According to Policy ENV7 (Natural Resource Protection and Public Health), development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to Air pollution, Noise pollution, light pollution, water pollution, contamination (including invasive species), or land instability. Development in areas currently subject to the above will need to demonstrate mitigation measures to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level.
- 4.3.13 Policy ENV15 addresses Waste Management in New Developments and notes that all proposals for new built development should include provision for the proper design, location, storage and management of waste generated by the development, both during construction and operation of the site.

5.0 Environmental Impact Assessment

5.1 Overview

5.1.1 This Environmental Statement (ES) has been prepared under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 (S.I. 2017 No. 571), and it will document the findings of the EIA which was undertaken to determine any likely significant environmental impact with regard to the proposed development.

5.1.2 Article 18 (3) of Part 5 of the EIA 2017 Regulations sets out that an ES should include, as a minimum, the following information:

- a description of the proposed development comprising information on the site, design, size and other relevant features of the development;
- a description of the likely significant effects of the proposed development on the environment;
- a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- a non-technical summary of the information referred to in aforementioned sub-paragraphs; and
- any additional information specified in Schedule 4 of the 2017 Regulations relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

5.2 Scoping

Scoping Report and Scoping Opinion

5.2.1 Scoping is a non-compulsory preliminary task within the EIA process. A Scoping Report prepared by the applicant provides a mechanism for consulting on, and agreeing the scope and approach to, the EIA as well as the content and structure of the Environmental Statement.

5.2.2 A formal request for a Scoping Opinion from Bridgend County Borough Council (BCBC), along with a Scoping Report, has been made under Regulation 14 (1) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 for a Scoping Opinion prior to the preparation of this Environmental Statement to accompany an application for permission for the proposed development.

5.2.3 The Scoping Report, which was submitted on 9 August 2019, described the key anticipated environmental issues that would require detailed evaluation as part of the EIA process. A copy of this report can be found in Appendix 5-1 and on the BCBCs website at:

<http://planning.bridgend.gov.uk/Planning/Display?applicationNumber=P%2F19%2F661%2FESO>

- 5.2.4 The Scoping Opinion including responses from consultees, was received on 12 November 2019. The responses received as part of the statutory consultation process, along with the Applicant's comments on those responses, are reported upon within the Consultation Report (Document Ref. 57100-0111) submitted with the Planning Application.
- 5.2.5 The preparation of this ES was guided by those responses and by on-going consultations with the consultees.

5.3 Pre-Application Consultation

- 5.3.1 WEPA UK Limited has undertaken Statutory (Pre-Application) Consultation, under Article 4 of Part 1A of The Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016.
- 5.3.2 In addition, WEPA conducted a wider local non-statutory consultation exercise which allowed a wide variety of local residents, key community stakeholders and statutory consultees to give their feedback on the proposals.
- 5.3.3 WEPA provided residents, stakeholders and consultees with a variety of methods to provide feedback including a Freephone information line and a dedicated consultation webpage. This allowed interested parties and consultees to receive further information about the proposals as well as view and download the draft application documents before providing their feedback to the project team. Pre-application consultation also offered early one-to-one meetings with local representatives to discuss the proposals and ask any questions of the project team.
- 5.3.4 In order to ensure that WEPA engaged in a robust and inclusive manner two information events were also held on Monday 18th November 2019 and Wednesday 20th November 2019 which over 2,000 local resident and businesses were invited to attend. 52 local residents attended the events, which was also publicised via the project webpage.
- 5.3.5 As of Friday 20 December 2019, WEPA has received 115 pieces of feedback from the local community with 98 of those (85%) expressing support for the site's enhancement.
- 5.3.6 Constructive feedback was also received across the feedback methods WEPA provided for local residents in the form of comments, concerns and suggestions. Key positive comments from members of the local community related to the provision of new jobs and the generation of inward investment into the site. A number of residents did highlight that they were concerned about the impact of additional vehicles would have on the local highway network.
- 5.3.7 The Pre-Application Consultation Report (Document Ref. 57100-0111) records how WEPA undertook Statutory Consultation, the feedback received during this consultation, WEPA's response to this feedback and how its proposal and assessments have had regard to the feedback received pursuant to Article 2F of the aforementioned TCPA Order 2016.
- 5.3.8 It also describes how the design of the proposed development has been amended to reflect the views of, and outcome of discussions with the local community and other relevant stakeholders, as well as the outcome of further environmental and technical assessment.

5.4 EIA Assessment Methodology

- 5.4.1 The methodology described in this section is designed to ensure that the EIA process and the Environmental Statement is a valid and robust assessment of the likely effects of the development proposals on the environment having regard to its nature, size and location.
- 5.4.2 The methodologies used within each specialist section are made clear within the appropriate technical chapters (Sections 6 to 15) and, therefore, may differ slightly between chapters.
- 5.4.3 The significance of environmental impacts is formulated as a function of the receptor or resource environmental value (or sensitivity) and the magnitude of project impact (change). The principal stages in assessing the significance of environmental impacts were as follows:

Environmental baseline

- 5.4.4 The identification of the environmental baseline includes a discussion of the existing conditions, services, and physical environment of the site and its surroundings where appropriate. The aim is to establish the existing and future baseline conditions which may be changed by the development, including an indication of the sensitivity of the receptors where appropriate.
- 5.4.5 The baseline information obtained is included in each of the respective specialist sections of this ES to describe the aspects of the environment likely to be significantly affected by the proposed development.

Value / sensitivity of receptors

- 5.4.6 Criteria for the determination of the value of an environmental resource or the sensitivity of a receptor (as 'high', 'medium', or 'low') or of their importance (e.g. 'international', 'national', 'regional' or 'authority area') were established based on prescribed guidance, legislation, and statutory designation. Typical descriptors and criteria for the environmental value of an environmental resource or for the sensitivity of a receptor are listed in the table below.

Table 5.4-1: Environmental Value (or Sensitivity) and Typical Descriptors

Value / Sensitivity	Typical descriptors
Very high	Very high importance and rarity, international scale and very limited potential for substitution
High	high importance and rarity, national scale and limited potential for substitution
Medium	high or medium importance and rarity, regional scale and limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

Assigning the magnitude of impact

5.4.7 Typical descriptors and criteria which define the magnitude of an impact of a project are listed in Table 5.4-2.

Table 5.4-2: Magnitude of Impact and Typical Descriptors

Magnitude of impact	Typical Criteria Descriptor
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse)
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial)
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assigning the Significance of Impacts

5.4.8 The approach to assigning significance of impacts relies on reasoned argument, professional judgement and taking into account the advice and views of appropriate organisations. In some specialist chapters, predicted effects are compared with quantitative thresholds and scales in determining significance. However, for the purposes of undertaking this EIA, the significance of any impact, beneficial or adverse, is generally determined as set out in Table 5.4-3.

Table 5.4-3: Descriptors of the Significance of Impact Categories

Significance Category	Typical Descriptors of Effect
Very Large / Severe	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large / Major	These beneficial or adverse effects are considered to be very important considerations at a local or district scale but, if adverse, are potential concerns to the Project. These effects are likely to become key factors in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors in isolation. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effects on a particular resource or receptor.
Minor / slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project and consideration of mitigation measures.
Negligible / Insignificant	No effects or those that are beneath levels of protection, within normal bounds of variation or within the margin of forecasting error. Such effects should not be afforded weight in the decision-making process.

- 5.4.9 Impacts assessed to be **moderate** or above are considered to be **significant**.
- 5.4.10 Assigning each effect to one of the five significance categories enables different topic issues to be placed upon the same scale, in order to assist the decision-making process at whatever stage the project is at within that process.
- 5.4.11 Throughout the Environmental Statement, consideration of significant environmental impacts of the proposed development will be based on conservative assumptions to assess a worst case scenario.
- 5.4.12 Applying the formula presented in Table 5.4-4, the greater the environmental sensitivity or value of the receptor or resource, and the greater the magnitude of impact, the more significant the effect. The consequences of a highly valued environmental resource suffering a major detrimental impact would be a very significant adverse effect.

Table 5.5-4: Descriptors of the Significance of Impact Categories

VALUE / SENSITIVITY	Very High	Neutral	Slight	Moderate/ Large	Large or very Large	Very Large
	High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large / Very Large
	Medium	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
	Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate
	Negligible	Neutral	Neutral	Neutral/ Slight	Neutral/ Slight	Slight
		No change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT				

Consideration of mitigation measures

- 5.4.13 Where potentially significant effects have been identified during the assessment of likely significant environmental effects for both construction and operational stages, measures have been proposed to prevent, reduce and where possible offset these. Where complete prevention of environmental impacts was not feasible, mitigation measures have been proposed to reduce impacts. Potential mitigation techniques will be described, as appropriate, in each assessment Section.

Residual Effects

- 5.4.14 Mitigation measures developed as part of the design and assessment process have been included in each section. An assessment of the significance of any potential residual effect, namely that which remains after the implementation of recommended mitigation measures. A summary of the environmental impacts associated with the development proposals is provided within each specialist chapter and in the Non-technical Summary (NTS).

Cumulative Effects

- 5.4.15 The EIA Regulations 2017 require the EIA to include an impact assessment to identify, describe and evaluate the effects that are likely to result from the proposed development in combination with other projects and activities (not yet constructed or currently under construction) in the vicinity, acting together to generate elevated levels of impacts.
- 5.4.16 The site is located in a relatively remote location. Review of Bridgend Council Planning Application search for the area indicates that there are no planning applications within the last five years for any industrial developments that would result in cumulative effects with the proposed development.

Presentation of the Environmental Statement

5.4.17 The following chapters are presented in a grouped format structure with each environmental category being considered under the separate headings. Each of the following specialist impact assessment sections will typically include the following sub-sections, where appropriate:

- Introduction and Scope
- Legislation and Planning Context
- Assessment Methodology
- Baseline Conditions and Receptors;
- Assessment of Effects (construction and operational phase);
- Mitigation Measures;
- Residual Effects
- Summary and conclusion

5.4.18 The Non-technical summary is attached as Appendix 5-1.

6.0 Air Quality and Dust

6.1 Introduction and Scope

- 6.1.1 The proposed development has the potential to affect local air quality. As part of the Environmental Statement for the proposed development, it is therefore necessary to assess the impact of the atmospheric emissions of the plant on the air quality in the surrounding area. SLR Consulting Ltd (SLR) has been appointed on behalf of WEPA UK Limited to prepare an Air Quality Impact Assessment in support of plans for the extension of their existing paper mill site in Bridgend (the 'Application Site').
- 6.1.2 This Air Quality Impact Assessment considers the potential for the construction and operation of the proposed development to impact upon the air quality environment in the vicinity of the development. This chapter describes the scope, relevant legislation, assessment methodology, and the baseline conditions existing at the site and its surroundings. It considers any potential significant environmental effects the proposed development would have on this baseline environment; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.

6.2 Legislation and Planning Context

Air Quality Strategy

- 6.2.1 The United Kingdom Air Quality Strategy (UK AQS) 2007 for England, Scotland, Wales and Northern Ireland¹ sets out the Government's policies aimed at delivering cleaner air in the United Kingdom (UK). It sets out a comprehensive strategic framework within which air quality policy will be taken forward in the short to medium term, and the roles that Government, industry, the Environment Agency (EA), local government, business, individuals and transport have in protecting and improving air quality.

Air Quality Standards

- 6.2.2 The Air Quality Standards (Wales) Regulations 2010 (the regulations) transpose the Ambient Air Quality Directive (2008/50/EC), and transpose the Fourth Daughter Directive (2004/107/EC) within Welsh legislation. The regulations include Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed Air Quality Assessment Levels (AQAL) throughout this report). Those relevant to this Air Quality Assessment are presented within Table 6.2-1.

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA. July 2007.

Table 6.2-1: Relevant Air Quality Strategy Standards and Objectives

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As	Equivalent percentile
Nitrogen Dioxide (NO_2)	40	Annual Mean	-
	200	1-hour Mean	99.79 th percentile of 1-hour means (equivalent to 18 1-hour exceedences)
Particulate matter within an aerodynamic diameter of less than $10\mu\text{m}$ (PM_{10}) (gravimetric)	40	Annual Mean	-
	50	24-hour mean	90.41 th percentile of 24-hour means (equivalent to 35 24-hour exceedences)
Particulate matter within an aerodynamic diameter of less than $2.5\mu\text{m}$ ($\text{PM}_{2.5}$) (gravimetric)	25	Annual Mean	-
Sulphur dioxide (SO_2)	266	15-minute mean	99.9 (equivalent to 35 15-minute mean exceedences)
	350	1-hour mean	99.18 (equivalent to 24 1-hour mean exceedences)
	125	24-hour mean	99.8 (equivalent to 3 24-hour mean exceedences)
Carbon monoxide (CO)	10,000	Maximum daily running 8-hour mean	-

Applicable Public Exposure

6.2.3 In accordance with Department for Environment, Food and Rural Affairs' (DEFRA) technical guidance on Local Air Quality Management (LAQM.TG(16)) which is applied by the Welsh Assembly, the AQOs should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. A summary of relevant exposure for the objectives presented in 6.2-1 are shown below in Table 6.2-2.

Table 6.2-2: Relevant Public Exposure

Objective Averaging Period	Relevant Locations	Objectives should apply at	Objectives should not apply at
Annual Mean	Where individuals are exposed for a cumulative period of 6-months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

Local Air Quality Management

- 6.2.4 Section 82 of the Environment Act 1995 (Part IV) requires Local Authorities (LA) to periodically review and assess the quality of air within their administrative area. The reviews have to consider the present and future air quality and whether any AQALs prescribed in regulations are being achieved or are likely to be achieved in the future.
- 6.2.5 Where any of the prescribed AQALs are not likely to be achieved the authority concerned must designate an Air Quality Management Area (AQMA). For each AQMA the LA has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the AQAL. As such, LAs, have formal powers to control air quality through a combination of LAQM and by use of their wider planning policies.

Legislation for the Protection of Nature Conservation Sites

- 6.2.6 Sites of nature conservation importance at a European, national and local level, are provided environmental protection, including from atmospheric emissions by the legislation as indicated in Table 6.2-3.

Table 6.2-3: Legislation for the Protection of Nature Conservation Sites

Nature Conservation Sites	Legislation
European Sites Special Areas of Conservation (SAC) candidate Special Areas of Conservation (cSAC) Special Protection Areas (SPA) potential Special Protection Areas (pSPA) Ramsar sites Marine Protection Areas.	The Conservation of Habitats and Species Regulations (2010); known as the 'Habitats Regulations'
Sites of Special Scientific Interest (SSSI)	The Countryside and Rights of Way (CROW) Act 2000
National Nature Reserves (NNR) Local Nature Reserves (LNR) local wildlife sites (LWS) ancient woodland (AW)	The Environment Act 1995; and the Natural Environment and Rural Communities Act (NERC) 2006.

General Nuisance Legislation

- 6.2.7 Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.
- 6.2.8 Fractions of dust greater than 10µm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

Planning Policy

National Policy

6.2.9 Planning Policy Wales (10th Edition)² sets out the land use planning policies in Wales. Section 6.7 'Air Quality and Soundscape' includes air quality specific policies, including:

Paragraph 6.7.6 – In proposing new development, planning authorities and developers must, therefore:

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- *not create areas of poor air quality or inappropriate soundscape; and seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscape [...]*

Paragraph 6.7.10 –

"It will be important to identify wider mitigation solutions to reduce air and noise pollution and to avoid exacerbating problems in existing air quality management areas or noise hotspots through the provision of green infrastructure identified as part of Green Infrastructure Assessments, by the provision of electric vehicle charging infrastructure or through promoting the need to consider effective design solutions. Planning authorities should work closely with bodies such as the Public Service Boards in the preparation of their well-being plans and seek input from their own Environmental Health departments."

Paragraph 6.7.16 – Relevant considerations in making planning decisions for potentially polluting development are likely to include:

- *location, including the reasons for selecting the chosen site itself;*
- *impact on health and amenity;*
- *effect of pollution on the natural and built environment and the enjoyment of areas of landscape and historic and cultural value; [...]*
- *resilience, including where there may be cumulative impacts on air or water quality which may have adverse consequences for biodiversity and ecosystem resilience;*
- *the risk and impact of potential pollution from the development, insofar as this might lead to the creation of, or worsen the situation in, an air quality management area, a noise action planning priority area or an area where there are sensitive receptors; "*

6.2.10 The policies within Planning Policy Wales (10th Edition) in relation to air pollution are considered within this Air Quality Impact Assessment.

Local Policy

Existing Bridgend Local Development Plan (2013)

6.2.11 The existing Bridgend Local Development Plan (2006-2021) was adopted by Bridgend County Borough Council on 18th September 2013.

² Welsh Government (2018). Planning Policy Wales, Edition 10, December 2018

- 6.2.12 A review of the Existing Bridgend Local Development Plan (2013) indicates the following policies relating to air quality:

“Strategic Policy SP2 – Design and Sustainable Place Making

All development should contribute to creating high quality, attractive, sustainable places which enhance the community in which they are located, whilst having full regard to the natural, historic and built environment by:

8) Avoiding or minimising noise, air, soil and water pollution;”

“Strategic Policy SP4 – Conservation and Enhancement of the Natural Environment

Development which will conserve and, wherever possible, enhance the natural environment of the County Borough will be favoured.

Development proposals will not be permitted where they will have an adverse impact upon:

The quality of its natural resources including water, air and soil.”

“Policy ENV7 – Natural Resources Protection and Public Health

Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to:

1) Air Pollution;”

- 6.2.13 The above policies stated within the Existing Bridgend Local Development Plan (2013) in relation to air quality are considered within this Air Quality Impact Assessment.

Assessment Guidance

DEFRA ‘LAQM.TG(16)’

- 6.2.14 DEFRA Local Air Quality Management Technical Guidance³ (LAQM.TG(16)) was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

Environmental Protection UK and Institute of Air Quality Management Guidance

- 6.2.15 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance⁴ to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

³ DEFRA Local Air Quality Management Technical Guidance (2016).

⁴ Environmental Protection UK and Institute of Air Quality Management, ‘Land-Use Planning and Development Control: Planning for Air Quality’, v1.2 2017.

Design Manual for Roads and Bridges (DMRB)

6.2.16 The Design Manual for Roads and Bridges (DMRB) (LA 105) considers the following 'traffic scoping criterion' to determine where air quality impacts of a project require assessment:

1. annual average daily traffic (AADT) $\geq 1,000$; or
2. heavy duty vehicle (HDV) AADT ≥ 200 ; or
3. a change in speed band; or
4. a change in carriageway alignment by $\geq 5\text{m}$.

6.2.17 The above 'traffic scoping criterion' is required to be applied to all areas covered by the extent of traffic data, termed the 'traffic reliability area'. Where the above 'traffic scoping criterion' are met, there is a requirement to identify areas that are likely to be sensitive to changes in air quality identified as:

- monitored exceedances of air quality thresholds;
- air quality management areas (AQMA's);
- areas identified by the Department for Environment, Food and Rural Affairs (Defra) as exceeding EU limit values; and / or
- designated habitats.

6.2.18 The DMRB considers any of the above locations within 200m of a road source to be potentially affected by that operation and require assessment where the 'traffic scoping criterion' is met. Any roads which meet the above 'traffic scoping criteria' are defined as the 'affected road' network.

6.2.19 If none of the roads in the network meet any of the traffic / alignment criteria or there are no properties or relevant Designated Sites near the affected roads, then an air quality assessment can be 'scoped out'.

Construction and Demolition Dust Guidance

6.2.20 Guidance on the assessment of dust from demolition and construction has been published by the IAQM⁵. The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

⁵ Institute of Air Quality Management (IAQM), Guidance on the assessment dust from demolition and construction (2016).

6.3 Assessment Methodology

Scoping Opinion

- 6.3.1 A Scoping Opinion was sought from Bridgend County Borough Council (BCBC) by way of a Scoping Request Report submitted on 2nd September 2019. Table 6.3-1 outlines issues relating to air quality which were included within the ES Scoping Opinion.

Table 6.3-1: Scoping Opinion – Air Quality Considerations

Page & Paragraph No.	Scoping Opinion	Outcome	Reference within ES
12.9	<i>The applicant must look to examine current AADT (Annual Average Daily Traffic) flows and projected AADT following the completion of the development. Referring to Table 6.2 of the EPUK and IAQM guidance “Land- Use Planning and Development Control: Planning for Air Quality, January 2017” if calculated AADT flows increase from the baseline traffic levels by more than the set figures outlined in Table 6.2, the applicant is required to submit an Air Quality Assessment (AQA) which would examine the potential air quality impacts associated with traffic derived emissions (nitrogen dioxide & particulate matter) at locations of relevant exposure.</i>	Road traffic emissions have been ‘screened’ following the stated EPUK & IAQM ‘indicative criterion for assessment’. Additional development trips are predicted to be less than the screening criterion.	Section 6.5
13.4	<i>Applicant must confirm if there is an expected change to process emission outputs. If the applicant outlines that process emission outputs will vary as a result of the proposal then consideration for these changes will be necessary by conforming to the following; An assessment will need follow the Environment Agency online guidance (referenced by NRW) ‘Air emissions risk assessment for your environmental permit’ (the AERA guidance), available at https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit The AERA guidance requires assessment of potential short-term and long-term impacts on both human and ecological receptors (such as SSSIs within 2km and SACs/SPAs within 10km). Impacts will be assessed against relevant Environmental Assessment Levels (EALs) for the protection of human health and against Critical Loads (CLo) and Critical Levels (CLe) for the protection of vegetation and ecosystems.</i>	Change in combustion emissions from proposed new sources have been quantitatively assessed (at both human and ecological receptors).	Section 6.5

Additional Consultation

- 6.3.2 Pre-application discussion was undertaken with the Shared Regulatory Services department within BCBC in order to agree upon the detailed scope of the assessment methodology (i.e. beyond that level of detail provided as part of the Scoping Report)⁶. The scope of works was agreed by BCBC on 10/09/2019 and 24/09/2019.

Construction Phase Dust Assessment

- 6.3.3 The assessment has been undertaken with reference to IAQM '*Guidance on the assessment of dust from construction and demolition*'. The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:
- demolition;
 - earthworks;
 - construction; and
 - track-out.
- 6.3.4 The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:
- annoyance due to dust soiling;
 - the risk of health effects due to an increase in exposure to PM10; and
 - harm to ecological receptors.
- 6.3.5 The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme. No further assessment is required if there are no receptors within a certain distance of the works; 350m for human receptors and 50m for designated ecological receptors.
- 6.3.6 The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements
- 6.3.7 Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are as presented in Appendix A of the Air Quality Assessment (Document Ref. 57100-0218).

⁶ Email correspondence between Craig Lewis, Specialist Services Officer within the Shared Regulatory Services department of Bridgend County Borough Council, and SLR Consulting Ltd, dated 10/09/2019 and 24/09/2019.

Road Traffic Emissions Screening

6.3.8 A screening assessment has been undertaken to identify 'significant changes' in traffic on roads with relevant receptors by reference to EPUK & IAQM 'indicative criterion for assessment', i.e.:

- a change of light duty vehicle (LDV)⁷ flows of more than 500 annual average daily traffic (AADT) (outside an AQMA);
- a change of heavy duty vehicle (HDV)⁸ flows of more than 100 AADT (outside an AQMA);
- a change of LDV flows of more than 100 AADT (within an AQMA); and/or
- a change of HDV flows of more than 25 AADT (within an AQMA).

Assessment of Operational Phase Combustion Emissions

6.3.9 Detailed atmospheric dispersion modelling of the emissions of combustion pollutants from the existing and proposed stacks serving Application Site has been undertaken. Modelling and the assessment of potential impacts has been undertaken in accordance with Environment Agency (EA) *Air emissions risk assessment for your environmental permit*⁹ (the AERA guidance).

6.3.10 The following stages have been considered:

- identification of sensitive receptors;
- review of process design proposals and emission sources;
- compilation of the existing air quality baseline with due regard to Review and Assessments of local air quality; and
- calculation of process contribution to ground level concentrations for pollutants emitted from the process.

6.3.11 The potential effects on human health have been assessed within the detailed dispersion modelling assessment by comparison of predicted impacts against health based AQOs.

6.3.12 Reference should be made to Appendix B of the Air Quality Assessment (Document Ref. 57100-0218) for details of the modelling treatments and details for the assessment of impacts on vegetation and ecosystems (as Critical Loads and Critical Levels).

Air Quality Significance Criteria

6.3.13 The EIA Regulations require 'a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative

⁷ As defined by the design manual for roads and bridges (DMRB), and includes vehicles <3.5tonnes including cars and light duty vehicles.

⁸ As defined by the design manual for roads and bridges (DMRB), and includes vehicles ≥3.5tonnes and includes heavy duty vehicles and buses.

⁹ <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

effects of the development'. The approach to impact significance and judgements on effect is described below.

Assessment of Operational Phase Combustion Emissions, Human Receptors – Air Quality Significance Criteria

- 6.3.14 The significance of effects has been assessed on the basis of the EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), which presents a matrix to establish the magnitude of impact on individual receptors based upon the percentage change relative to the Air Quality Assessment Level (AQAL) / AQO.

Magnitude

- 6.3.15 Differing magnitude classifications are defined for long-term and short-term averaging periods, as presented in Table 6.3-2 and Table 6.3-3 respectively.

Table 6.3-2: Definition of Magnitude of Impact – Long-term Concentrations

Magnitude	Percentage Change in Long-term (Annual Mean) Concentrations (%)
High	>10
Moderate	6 – 10
Low	1 – 5
Negligible	<1

Table 6.3-3: Definition of Magnitude of Impact – Short-term Concentrations

Magnitude	Percentage Change in Short-term (Annual Mean) Concentrations (%)
High	>50
Moderate	20 – 50
Low	10 – 20
Negligible	<10

Sensitivity

- 6.3.16 Receptor sensitivity is defined based upon the EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017). Representative discrete human health receptor locations of relevant exposure have been included within the assessment of operational phase impacts. Each type of human health receptor is considered to be of equal value. However existing background concentrations are taken into account for long term averaging periods (i.e. annual mean concentrations).
- 6.3.17 Reference should be made to Table 6.3-4 for presentation of the sensitivity classifications used within the assessment of long-term concentrations.

Table 6.3-4: Definition of Receptor Sensitivity – Long-term Concentrations

Sensitivity	Percentage of Long-term (Annual Mean) AQO (%)
Very High	<110% of the AQO
High	103 – 110% of the AQO
Moderate	95 – 103% of the AQO
Low	75 – 95% of the AQO
Very Low	<75% of the AQO

6.3.18 As referenced within EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), short-term concentration receptor sensitivity does not reference background concentrations as they are of a much smaller quantity in comparison to the peak process contribution concentration, such as that from a combustion emission point source. Therefore, it is the process contribution concentration that is used as a measure of the effect, not the overall concentration at a receptor.

Determination of Overall Significance

6.3.19 The EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), provide a set method for establishing the impact significance at an individual receptor identified as 'negligible', 'slight', 'moderate' or 'substantial'. The impact significance can be either 'adverse' (due to concentration increase) or 'beneficial' (due to concentration decrease).

6.3.20 The impact significance at individual receptors is dependent upon the long-term average pollutant concentration at the receptor in the assessment year and the percentage change relative to the AQAL / AQO.

6.3.21 Reference should be made to Table 6.3-5 for presentation of the impact significance descriptors used within the assessment of long-term concentrations.

Table 6.3-5: Impact Significance Descriptors – Assessment of Long-term Concentrations

Sensitivity of Receptor / Long-term Average Concentration at Receptor in Assessment Year	Percentage Change in Long-term Concentration to AQAL			
	1	2 – 5	6 – 10	>10
<75% of the AQO (Very Low)	Negligible	Negligible	Slight	Moderate
75 – 95% of the AQO (Low)	Negligible	Slight	Moderate	Moderate
95 – 103% of the AQO (Moderate)	Slight	Moderate	Moderate	Substantial
103 – 110% of the AQO (High)	Moderate	Moderate	Substantial	Substantial
>110% of the AQO (Very High)	Moderate	Substantial	Substantial	Substantial

6.3.22 Reference should be made to Table 6.3-6 for presentation of the impact significance descriptors used within the assessment of short-term concentrations.

Table 6.3-6: Impact Significance Descriptors – Assessment of Short-term Concentrations

Impact Significance	Percentage Change in Short-term (Annual Mean) Concentrations (%)
Substantial	>50
Moderate	20 – 50
Slight	10 – 20
Negligible	<10

6.3.23 The predicted impacts will be used to determine the significance of the overall effect which is dependent on a number of factors. Therefore, professional judgement will be applied to determine the likely significance of effects, with the following factors considered:

- the existing and future air quality in the absence of the development, notably whether the AQOs are likely to be met or the scale of exceedences in the long-term and short-term mean concentrations;
- the extent of current and future population exposure to the predicted impacts, notably the number of properties and/or people present and the scale of impact (e.g. whether the majority of the local population is subject to substantial or slight magnitude impacts); and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts, such as establishing a worst-case scenario for sensitive receptors.

6.3.24 If the overall impact is described as ‘substantial’, or there is a predicted exceedence of any considered AQO at a location of relevant exposure, the predicted effect on air quality is considered as “significant” in terms of the EIA Regulations.

Assessment of Operational Phase Combustion Emissions, Ecological Receptors – Air Quality Significance Criteria

6.3.25 In addition to the AERA guidance, the EA’s Operational Instruction 66_12¹⁰ details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have ‘no likely significant effects (alone and in-combination)’ for European sites, ‘no likely damage’ for SSSIs.

- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for European sites and SSSIs;
- PC does not exceed 10% short-term CLe for NOx for European sites and SSSIs;

6.3.26 Where impacts cannot be classified as resulting in ‘no likely significant effect’, more detailed assessment may be required depending on the sensitivity of the feature in accordance with EAs Operational Instruction 67_12 (*Detailed assessment of the impact of aerial emissions*

¹⁰ EA Working Instruction 66_12 - Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation

from new or expanding IPPC regulated industry for impacts on nature conservation’). This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

6.3.27 The guidance provides the following further criteria:

- if the PEC does not exceed 100% of the appropriate limit it can be assumed there will be no adverse effect;
- if the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
- if the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
- if the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- if the background is currently above the limit and the additional PC is large - cannot conclude no adverse effect.

6.4 Baseline Conditions

Location

6.4.1 The Application Site is located on the site of the existing Bridgend mill site approximately 5km to the north of Bridgend town centre, in an area bound to the south and to the west by the A4063, to the east by the River Llynfi, and to the north by open farmland. The site is orientated along its long axis in an approximate west to east direction and it is accessed via the A 4063 (Bridgend Road) between Maesteg and Coytrahen, with traffic generally proceeding south towards the M4. The Application Site is centred at the approximate National Grid Reference (NGR): x287780, y187160.

Sensitive Receptors

Construction Dust Receptors

- 6.4.2 In terms of human receptors, the main receptors likely to be affected by the generation of construction dust are those existing receptors within approximately 350m of the development site boundary and/or within 50m of the route(s) used by vehicles on the public highway, up to 500m from the site entrance(s)¹¹. However, for those receptors sited in a downwind location from the development site boundary, potential dust impacts may be witnessed at a distance of greater than 350m on occasion under worst case conditions.
- 6.4.3 Reference should be made to Drawing AQ1 in the Air Quality Assessment (Document Ref. 57100-0218) for an illustration of buffer zones of all sensitive receptors with the potential to be impacted upon by construction phase dust in accordance with the stated IAQM assessment methodology.

¹¹ IAQM, Guidance on the assessment dust from demolition and construction v1.1, 2016.

- 6.4.4 In terms of ecological receptors, a review using the MAGIC web-based mapping service¹² was undertaken to identify any designated sites of ecological or nature conservation importance required for consideration within the assessment.
- 6.4.5 In relation to the construction phase dust assessment, this included consideration of any ecological designation within 50m of the Application Site boundary, or 50m of any road projected to witness construction phase road traffic movements, that could potentially be affected by dust from the construction phases of the proposed development.
- 6.4.6 A search within 50m of the development boundary / any road projected to witness construction phase road traffic movements identifies no receptors.

Combustion Emissions – Human Receptors

- 6.4.7 According to LAQM.TG(16), air quality standards should only apply to locations where members of the public may be reasonably likely to be exposed to air pollution for the duration of the relevant limit value. At such, receptors of relevant annual mean exposure have been considered. Furthermore, additional receptors were considered to inform the risk assessment in terms of relevant short-term (1-hour mean) exposure. Reference should be made to Figure 6.4-1 and Table 6.4-1 for presentation of modelled receptors.
- 6.4.8 The detailed dispersion modelling assessment has used a receptor grid across the study area to assess the potential impact of combustion emissions from the combustion processes / emission points on-site. This method allows the exposure at any location in the study area to be determined and presented graphically. The receptor grid spacing used was 20m and considered impacts up to 2km from the Application Site.
- 6.4.9 Further, the dispersion modelling has been completed using a receptor grid to allow potential short-term exposure to be assessed at all locations surrounding the Site.

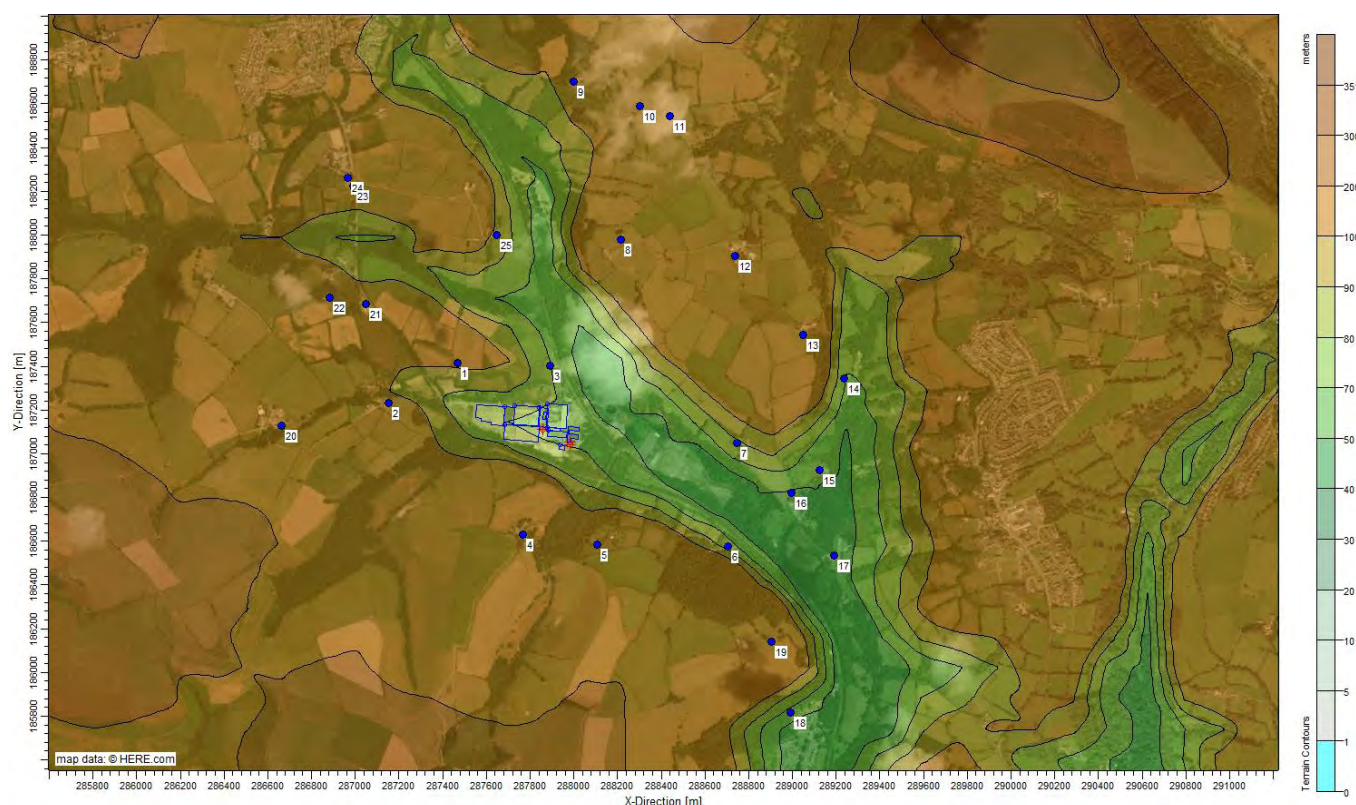
Table 6.4-1: Modelled Discrete Receptors – Human Receptors

ID	Description	Receptor Type	NGR (m)	
			X	Y
R1	Residential property off A4603 1 (Brynllwarch-Fach)	Residential	287469	187415.8
R2	Residential property off A4603 2 (Bryn-y-Fro Farm)	Residential	287152.3	187230.8
R3	Residential property off A4603 3 (Brynllwarch-Fawr)	Residential	287893.4	187404.1
R4	Residential property off A4603 4 (Cefn Ydfa)	Residential	287767.4	186630.6
R5	Residential property off A4603 5 (Gelli-Las Fawr)	Residential	288105.6	186585.1
R6	Residential property off A4603 6 (Llynfi Villa)	Residential	288705.6	186578.1

¹²www.magic.gov.uk, accessed January 2020.

ID	Description	Receptor Type	NGR (m)	
			X	Y
R7	Residential property off Green Field Terrace 1 (Ty Isaf)	Residential	288747.7	187049.4
R8	Residential property off Green Field Terrace 2 (Llwyn Brain)	Residential	288215.5	187979.1
R9	Residential property at The Brackens	Residential	288001.1	188702.1
R10	Residential property at Lletty Brongu 1	Residential	288302.5	188588.9
R11	Residential property at Lletty Brongu 2	Residential	288437.2	188541.6
R12	Residential property off Green Field Terrace 3 (Celfyddifan)	Residential	288736.7	187906.2
R13	Residential property off Green Field Terrace 4 (Tyle-Coch)	Residential	289049.7	187544.5
R14	Residential property off Green Field Terrace 5 (Nyth-Y-Cwm Farm)	Residential	289236.5	187344
R15	Residential property off Green Field Terrace 6	Residential	289125.9	186924.5
R16	Residential property at Shwt	Residential	288996.9	186819.7
R17	Residential property off A4603 7 (Nantmwrth Fach Farm)	Residential	289189.3	186534.1
R18	Residential property off Nicholls Road	Residential	288990	185816.5
R19	Residential property off A4603 8 (Pen-Twyn)	Residential	288905.4	186139.1
R20	Residential property off A4603 9 (Maes-Cadlawr)	Residential	286661.7	187126.1
R21	Residential property off A4603 10	Residential	287048	187684
R22	Residential property off A4603 11 (Greenmeadow Farm)	Residential	286880.5	187713
R23	Residential property off A4603 12	Residential	286989.2	188224.9
R24	Ysgol Gyfun Gymraeg Llangynwyd - School	School	286967.5	188263.3
R25	Residential property off A4603 13 (Gelli-Siriol Farmhouse)	Residential	287647.3	188001.4

Figure 6.4-1: Modelled Discrete Human Receptor Locations



Combustion Emissions – Ecological Receptors

6.4.10 The AERA Guidance Note requires that designated ecological sites should be screened against relevant standards if they are located within the following set distances from the facility:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the installation; and
- Sites of Special Scientific Interest (SSSIs) within 2km of the installation.

6.4.11 Details of the sites within these screening distances are presented in Table 6.4-1 and locations in Figure 6.4-2 based 10km site search radii. It is noted that there are no relevant designated ecological sites within a 2km site search radii.

Table 6.4-2: Designated Ecological Sites

Receptor	Site	Designation	Most sensitive APIS Habitat classification
R1	Kenfig / Cynffig	SAC	Coastal stable dune grasslands - acid type
R2	Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands	SAC	Non-Mediterranean dry acid and neutral closed grassland
R3	Blackmill Woodlands	SAC	Acidophilous Quercus-dominated woodland

Figure 6.4-2: Ecological Sites – 10km Site Search



Baseline Air Quality

Local Authority Review and Assessment

- 6.4.12 As required under Section 82 of the Environment Act (1995) (Part IV), BCBC has conducted an on-going exercise to review and assess air quality within their administrative area.
- 6.4.13 This process has indicated that annual mean NO₂ concentrations are above, and likely to remain above the AQO at locations of relevant public exposure within BCBC's administrative area. As such, a single AQMA has been declared within the Council's area known as the 'Park Street, Bridgend AQMA'. The AQMA is defined as:

"The area comprising the Bridgend County Borough Council Air Quality Management Area Order No. 1, Park Street is that contained within the following boundary:- The designated area borders the green space area prior to the rear entrance of properties located on Sunnyside Road. The designated area incorporates all north facing properties, including their open space areas between 39 Park Street and 105 Park Street. The boundaries' northern side borders the open space areas that front the south facing properties encapsulating the public access pathway."

- 6.4.14 The 'Park Street, Bridgend AQMA' is located approximately 7.6km south, south-east of the Application Site. Therefore, given the distance between the Application Site and the AQMA, the Application Site is not considered to impact upon air quality within the extent of the AQMA and no assessment is provided.

- 6.4.15 All other Air Quality Strategy pollutants were below the relevant AQOs at locations of relevant public exposure, and as such, no further AQMAs have been declared within the Council's administrative area.

Automatic Air Quality Monitoring

- 6.4.16 The UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of DEFRA. Monitoring data for AURN sites is available from the UK Air Information Resource (AIR) website.
- 6.4.17 The closest AURN monitor to the Application Site is the Port Talbot Margam AURN (NGR: x277406, y188719) located approximately 10.7km west of the Application Site. The Port Talbot Margam AURN is classified as an 'urban industrial' monitor, defined as: "*Site in an urban residential area downwind of specific industrial source*". Given the difference in site classification and distance between the Port Talbot Margam AURN and the Application Site, similar pollutant concentrations are not anticipated. Therefore, this source of data has not been considered as part of this assessment.
- 6.4.18 BCBC operates two automatic monitoring across its administrative area as part of their commitment to the LAQM. The closest automatic monitor to the Application Site is station 'CM1 Ewenny Cross Roundabout' (NGR: x290565, y178567) classified as a 'roadside' monitor, defined as: "*a site sampling typically within one to five metres of the kerb of a busy road*". The 'CM1 Ewenny Cross Roundabout' monitor is located approximately 9.1km south south-east of the Application Site. Given the difference in site classification and distance between the CM1 Ewenny Cross Roundabout' automatic monitor and the Application Site, similar pollutant concentrations are not anticipated. Therefore, this source of data has not been considered as part of this assessment.

Passive Diffusion Tube Monitoring

BCBC Monitoring

- 6.4.19 Passive diffusion tube monitoring is currently undertaken by BCBC at numerous locations throughout the Council's area as part of their commitment to LAQM. The diffusion tubes are located in areas which are deemed to require further assessment of NO₂ concentrations.
- 6.4.20 A review of BCBC's 2018 Air Quality Annual Status Report indicates that the closest NO₂ passive diffusion tube monitoring location to the Application Site currently operating are those located at 'Commercial Road, Maesteg' (NGR: x285299, y191136) and 'School property; Cwmfelin Primary School, Maesteg' (NGR: x286290, y189590), located approximately 4.7km north-west and 2.9km north-west of the Application Site, respectively. These monitoring locations were commissioned by BCBC and began data capture at the start of 2019. As such, annual mean monitoring datasets are not yet available at the time of assessment. As such, diffusion tube monitoring datasets from the BCBC network are not considered within this assessment.

DEFRA Mapped Background Concentrations

- 6.4.21 Background pollutant concentration data on a 1km x 1km spatial resolution is provided by DEFRA through the UK Air Information Resource (AIR) website and is routinely used to support LAQM and Air Quality Assessments.
- 6.4.22 Mapped background concentrations of NO₂, PM₁₀, SO₂ and CO were downloaded for the grid square containing the Application Site and human receptors presented within Table 6.4-1. Mapped background concentrations of NO₂ and PM₁₀ are based upon the 2017 base year DEFRA update (published in May 2019)¹³. Mapped background concentrations of SO₂ and CO are based upon a 2001 base year (the most up to date DEFRA mapping projections). Reference should be made to Table 6.4-3. for presentation of all mapped background concentrations.

Table 6.4-3: DEFRA Mapped Background Concentrations

Grid Square	NO ₂ Background Concentration (µg/m ³)	PM ₁₀ Background Concentration (µg/m ³)	SO ₂ Background Concentration (µg/m ³)	CO Background Concentration (µg/m ³)
x286500, y188500	6.96	9.75	2.88	199
x287500, y188500	7.34	9.77	2.91	203
x288500, y188500	6.96	9.65	2.64	204
x286500, y187500	6.52	9.79	2.61	194
x287500, y187500	9.46	10.0	2.69	199
x288500, y187500	7.05	9.71	2.63	203
x289500, y187500	6.60	9.75	3.04	204
x287500, y186500	6.65	10.0	2.25	200
x288500, y186500	7.21	9.77	2.26	206
x289500, y186500	6.95	10.0	2.44	210
x288500, y185500	6.70	9.77	2.29	210

Applied Background Concentration – Human Receptors

- 6.4.23 Concentrations for different averaging periods have been calculated in accordance with EA *Air Emissions Risk Assessment for Your Environmental Permit* (AERA) guidance, which indicates that annual background concentrations should be multiplied by a factor of 2 to derive 1-hour backgrounds and adjusted to other averaging periods as recommended. The conversion factors applied are illustrated in Table 6.4-4.

¹³ Background mapping data for local authorities – <http://uk-air.defra.gov.uk/data/laqm-background-home>, accessed January 2020.

Table 6.4-4: AERA Conversion Factors for Environmental Standards

From ↓ To →	24-hour	8-hour	15-minute
1-hour	Multiply by 0.59 ^(A)	Multiply by 0.7 ^(B)	Multiply by 1.34 ^(C)
Notes: (A) For example, to convert hourly data to 24-hour data, multiply the 1-hour value by 0.59. (B) For example, to convert hourly data to 8-hour data, multiply the 1-hour value by 0.7. (C) For example, to convert hourly data to 15-minute data, multiply the 1-hour value by 1.34.			

6.4.24 The background concentrations in Table 6.4-5 have been applied in this Air Quality Impact Assessment, these values are based on the predicted background concentrations detailed in the previous section. In general, a conservative approach has been applied with use of high background concentrations as a worst-case scenario.

Table 6.4-5: Calculated and Applied Background Concentrations

Pollutant	Averaging Period	Concentration (µg/m ³)	Data Source
NO ₂	Annual Mean	9.46	Maximum DEFRA Background Mapping in study area, 2017 (grid square x287500, y187500)
	1-hour Mean	18.9	As above, adjusted to 1-hour Mean (x2 factor applied)
PM ₁₀	Annual Mean	10.0	Maximum DEFRA Background Mapping in study area, 2017 (grid square x287500, y187500)
	24-hour Mean	11.8	As above, adjusted to 24-hour Mean (x2 and x0.59 factor applied)
SO ₂	1-hour Mean	6.08	Maximum DEFRA Background Mapping in study area, 2001 (grid square x289500, y185500). Adjusted to 1-hour Mean (x2 factor applied)
	24-hour Mean	3.59	As above, adjusted to 24-hour Mean (x0.59 factor applied)
	15-minute Mean	8.15	As 1-hour above, adjusted to 15-minute Mean (x1.34 factor applied)
CO	8-hour Mean	294	Maximum DEFRA Background Mapping in study area, 2001 (grid square x289500, y185500). Adjusted to 8-hour Mean (x2 factor applied, then x0.7 factor applied)

Baseline Conditions at Ecological Receptors

6.4.25 The APIS website¹⁴, a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology has been used to provide information on existing base NO_x and SO₂ concentrations (Table 6.4-7), current deposition rates and C_{Lo} for nutrient nitrogen (Table 6.4-8) and C_{Lo} functions for acidity (Table 6.4-8)

¹⁴ <http://www.apis.ac.uk/>.

Table 6.4-6: Baseline Concentrations and Levels – Ecological Receptors

ID	APIS Habitat Class (most sensitive)	NO _x (µg/m ³)	SO ₂ (µg/m ³)
ER1	Coastal stable dune grasslands - acid type	8.36	1.17
ER2	Non-Mediterranean dry acid and neutral closed grassland	14.37	1.78
ER3	Acidophilous Quercus-dominated woodland	10.72	1.64

Table 6.4-7: Nitrogen Critical Levels, Loads and Current Loads

ID	APIS Habitat Class (most sensitive)	Critical Load Range (kg N/ha/yr)	Critical Load Applied in Assessment (kg N/ha/yr)	Current Load (kg N/ha/yr)
ER1	Coastal stable dune grasslands - acid type	8 – 10	8	12.9
ER2	Non-Mediterranean dry acid and neutral closed grassland	10 – 15	10	13.6
ER3	Acidophilous Quercus-dominated woodland	10 – 15	10	25.1

Table 6.4-8: Acid Critical Load Functions and Current Loads

ID	APIS Critical Load Class (most sensitive)	Critical Load Function (k _{eq} /ha/yr)			Current Load (k _{eq} /ha/yr)
		CL _{maxS}	CL _{minN}	CL _{maxN}	N S Total Load
ER1	Coastal stable dune grasslands - acid type	4.08	0.223	4.303	0.9 0.4 1.3
ER2	Non-Mediterranean dry acid and neutral closed grassland	1.58	0.581	2.018	1 0.4 1.4
ER3	Acidophilous Quercus-dominated woodland	0.952	0.285	1.237	1.8 0.6 2.4

Meteorology

6.4.26 The generation, release and dispersion of emissions are particularly dependent upon weather conditions and the nature of the handled material. The prevailing meteorological conditions at any site would be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimatic conditions. The most important climatic parameters governing the emission and magnitude of impact of dust are:

- wind direction which determines the broad transport of the emission and the direction in which it is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission; it will also affect the potential for dust entrainment.

6.4.27 Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the

receptor. According to guidance, rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

Wind Speed and Direction Data

- 6.4.28 The most comparable observation station to the proposed development site is St Athan located approximately 22.5km south-east of the Application Site. Reference should be made to Appendix B of the Air Quality Assessment (Document Ref. 57100-0218) for the presentation of individual wind-roses for each year of the applied 2015 – 2019 dataset.

6.5 Assessment of Effects

Construction Phase Effects

- 6.5.1 This section presents the potential air quality impacts and effects associated with the construction of the development in terms of dust and vehicle emissions.

Construction Dust Assessment

- 6.5.2 Construction activities will include:

- material export and import;
- temporary stockpiling of materials;
- groundwork for foundations and services;
- construction of buildings;
- landscaping works; and
- vehicle movements (with the potential to track-out material from site).

- 6.5.3 The following subsections provide a consideration of potential construction dust and conclude with a determined emission class and risk category, from each of the categories identified by the IAQM Guidance.

Assessment Screening

- 6.5.4 As shown in Drawing AQ1 in the Air Quality Assessment (Document Ref. 57100-0218), there are 'human receptors' within 350m of the Application Site but no designated habitat sites within 50m of the Application Site boundary or within 50m of the Application Site entrance / 500m of the roads anticipated to witness construction traffic movements. Therefore, an assessment of construction dust on ecological receptors can be screened out from this assessment but an assessment of construction dust at human receptors is required.

Potential Dust Emissions Magnitude

- 6.5.5 The most significant potential source of dust emissions during construction would be the earthworks and trackout activities. Dust is potentially generated by the action of heavy vehicles (bulldozer, front-end loader, hydraulic excavator, and dump trucks), as well as by the movement of the vehicles on potentially dusty surfaces. Handling and storage of construction materials (aggregates / hard core), haulage across unsurfaced areas are also potential sources of dust generation.

6.5.6 The potential dust emission magnitude for each activity is described in Table 6.5-1.

Table 6.5-1: Potential Dust Emission Magnitude

Activity	Comments	Dust Emission Magnitude
Demolition	<p>Prior to construction of the new paper machine at the Application Site, some existing buildings and structures are required to be demolished. This includes buildings / structures to the north-west and south-east of the existing site layout, including an existing sludge press building, a concrete slab and asphalt / concrete areas associated with current roads and hard-standing. Concrete products to be demolished represent a high-potential for dust generation. All material generated during the demolition of these buildings / structures will be exported from site. Demolition activities are required on a total building volume of <20,000m³.</p> <p>Demolition works are currently projected to occur over a short period (<4-weeks). Demolition works are currently projected to occur in the summer of 2020. Therefore, some demolition activities will occur over 'summer' months, corresponding to lower periods of rainfall and reduced potential for natural dust suppression.</p> <p>Therefore, dust emission magnitude is calculated to be 'small'.</p>	Small
Earthworks	<p>The proposals comprise the development of a new paper machine and associated infrastructure / access at the Application Site. Site earthworks are required over an area greater than 10,000m² with assumed soil types representing a high-risk potential for suspension when dry due to small particle size.</p> <p>Given the size of the site, between 5 – 10 heavy earth moving vehicles are considered to be required on Application Site at once.</p> <p>Given the size of the site, it is estimated that construction phase activities will occur over a period of greater than one year. Therefore, some earthworks activities will occur over 'summer' months, corresponding to lower periods of rainfall and reduced potential for natural dust suppression. For the purpose of this assessment and to provide a worst-case assumption, it has been assumed that earthworks associated with site preparation and landscaping would run concurrently with construction works.</p> <p>Therefore, dust emission magnitude is calculated to be 'large'.</p>	Large
Construction	<p>The total building volume associated with the proposed new paper machine and associated infrastructure / access is predicted to be between 25,000m³ and 100,000m³.</p> <p>Foundations will be as both strip foundations and piling based upon geotechnical specifications.</p>	Large

Activity	Comments	Dust Emission Magnitude
	<p>Construction will be as pre-cast reinforced concrete wall panels, steel columns / girders / purlins, sheet steel roofing panels and concrete slabs. The majority of concrete products used on-site will arrive as pre-cast / pre-form. Concrete will additionally arrive on site as Readymix. However, a small portion of concrete may additionally be mixed on-site. Concrete has a high potential for dust generation.</p> <p>It is estimated that construction phase activities will occur over a period of greater than one year. Therefore, some earthworks activities will occur over 'summer' months, corresponding to lower periods of rainfall and reduced potential for natural dust suppression. For the purpose of this assessment and to provide a worst-case assumption, it has been assumed that earthworks associated with site preparation and landscaping would run concurrently with construction works.</p> <p>Therefore, dust emission magnitude is calculated to be 'large'.</p>	
Trackout	<p>Construction vehicles will most likely access the site via the existing highway network from the south (via A4063, ultimately in the direction of the M4). A new site access junction is to be created off the A4063.</p> <p>No details are available at the time of assessment on the number of additional HDV movements associated with construction works in each phase, however, given the scale and nature of works required, there is considered to be >50HDV outward movements in any worst-case day.</p> <p>Due to the size of the site the unpaved road length is considered to be >100m.</p> <p>Therefore, dust emission magnitude is calculated to be 'large'.</p>	Large

Sensitivity of the Area

6.5.7 The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM₁₀, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

6.5.8 The sensitivity of the area and the factors considered are presented in Table 6.5-2.

Table 6.5-2: Sensitivity of the Area

Sensitivity to:	Comments	Sensitivity
Dust Soiling Impacts	The surroundings predominantly comprise rural / agricultural land with sparsely populated associated residential dwellings. These residential dwellings are classified as of high sensitivity to dust soiling. There are between 1 – 10 high sensitivity receptors within 350m of the Application Site boundary.	Low
Human Health Impacts	The background PM ₁₀ concentration for the maximum 1km ² grid square containing the Application Site and surrounding receptors is estimated to be 10.0µg/m ³ , based upon 2017 mapped background estimates presented in Table 6.4-3 (i.e. falls into the <24µg/m ³ class) and there are between 1 – 10 high sensitivity receptors within 350m of the Application Site boundary.	Low

Risk of Impacts (Unmitigated)

6.5.9 The outcome of the assessment of the potential 'magnitude of dust emissions', and the 'sensitivity of the area' are combined in the table below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

Table 6.5-3: Risk of Dust Impacts

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling Impacts	Negligible Risk	Low Risk	Low Risk	Low Risk
Human Health Impacts	Negligible Risk	Low Risk	Low Risk	Low Risk
Ecological Impacts	n/a	n/a	n/a	n/a

Construction Phase – Vehicular Pollutants

6.5.10 Road traffic emissions associated with vehicle movements, particularly HDV movements, during the construction phase of the development have the potential to result in increased concentrations of combustion related pollutants, including NO₂ and PM₁₀ in the vicinity of the development site.

6.5.11 Guidance provided by EPUK and IAQM, states that a detailed assessment of potential air quality impacts should be undertaken if the following criteria are met on any link affected by a proposed development:

- change in 24-hour LDV flows of more than 100 AADT within or adjacent to an AQMA; or
- change in 24-hour HDV flows of more than 25 AADT within or adjacent to an AQMA.

6.5.12 The development quantum is not anticipated to result in a significant increase in movements or be above the EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the scheme *'can be considered to have insignificant effects'* on air quality.

Operational Phase Effects

Operational Phase – Vehicular Pollutants

- 6.5.13 Road traffic emissions associated with vehicle movements, particularly HDV movements, during the operational phase of the development have the potential to result in increased concentrations of combustion related pollutants, including NO₂ and PM₁₀ in the vicinity of the development site.
- 6.5.14 All additional vehicle movements associated with the Application Site will access via the new access to be created off the A4063 (located immediately to the south-east of the existing facility).
- 6.5.15 In comparison to the existing operation and use of the Site, the new access road / junction is predicted to generate an additional 80 two-way LDV movements and an additional 48 two-way HDV movements over a 24-hour AADT period.
- 6.5.16 Additional trips would all route / distribute as follows on the surrounding highway network:
- Additional LDV movements:
 - 60% south on the A4603 towards Bridgend (i.e. 48 two-way LDV movements); and
 - 40% north on the A4603 towards Maesteg (i.e. 32 two-way LDV movements).
 - Additional HDV movements:
 - 100% south on the A4603 towards Bridgend (i.e. 48 two-way LDV movements).
- 6.5.17 EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), states that a detailed assessment of potential air quality impacts should be undertaken if the following criteria are met on any link affected by a proposed development:
- change in 24-hour LDV flows of more than 100 AADT within or adjacent to an AQMA; or
 - change in 24-hour HDV flows of more than 25 AADT within or adjacent to an AQMA.
- 6.5.18 The Application Site is not located within or adjacent to an AQMA and therefore the higher screening criterion (i.e. 500LDVs or 100 HDV) would apply.
- 6.5.19 The predicted additional development trips are lower than the above indicative criterion for assessment. Therefore, in accordance with the criterion presented within EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), additional road vehicle trips during the operational phase of the scheme '*can be considered to have insignificant effects*' on air quality.
- 6.5.20 Reference should be made to Highways & Transportation Chapter for further details of the predicted operational phase development trips.

Operational Phase – Combustion Emissions

- 6.5.21 The detailed assessment of impact from the proposed additional combustion emissions at the Application Site process stack is set out in Appendix B of the Air Quality Assessment (Document Ref. 57100-0218).
- 6.5.22 It is noted that the assessment of the impact on air quality from combustion emissions at the Application Site has been undertaken based upon the incremental air pollutant /

concentration change associated with the Proposed Development (i.e. the proposed changes to the Application Site layout). Where relevant, the assessment of absolute concentration against the AQO / CLo / CLe has been undertaken cumulatively considering both existing and the Proposed Development combustion emissions at Application Site.

Maximum Predicted Long-term Impacts

- 6.5.23 A summary of the predicted long-term (annual mean) Process Contributions (PC) from relevant combustion emission sources of the Proposed Development at the Application Site are presented in Table 6.5-4.
- 6.5.24 These predicted long-term (annual mean) impacts relate to the highest predicted level of impact at any location on the receptor grid (outside of the site boundary) and impacts at all other locations will be lower. It is noted that in accordance with LAQM.TG(16), these locations of maximum predicted PC are not necessarily locations of relevant exposure to the annual mean AQO.

Table 6.5-4: Maximum Predicted Long-term Impacts: Combustion Emissions Assessment

Pollutant	Applied Standard	PC Change Max (A)	PC Max as a % of the AQAL	PEC	PEC as a % of the AQAL	Magnitude	Significance
NO ₂	40	8.22	20.6	24.5	61.3	- (B)	- (B)
PM ₁₀	40	0.12	0.31	10.2	25.5	- (B)	- (B)
Note: (A) Presented PCs are based upon an average of the modelled 5-year dataset. (B) Location not a location of relevant exposure, and therefore no corresponding magnitude / significance has been presented.							

- 6.5.25 Predicted impacts (as PC and PEC) at each considered discrete receptor have been considered further for annual mean NO₂ and PM₁₀ concentrations, as referenced within the following subsections.

Maximum Predicted Short-term Impacts

- 6.5.26 A summary of the predicted short-term (1-hour mean, 8-hour, 24-hour mean and 15-minute mean) PCs from relevant combustion emission sources of the Proposed Development are presented in Table 6.5-5.
- 6.5.27 These predicted short-term impacts relate to the highest predicted level of impact at any location on the receptor grid (outside of the site boundary) and impacts at all other locations and all other times, will be lower. It is noted that in accordance with LAQM.TG(16), these locations of maximum predicted PC are not necessarily locations of relevant exposure to the 1-hour mean, 8-hour, 24-hour mean and 15-minute mean AQOs.
- 6.5.28 The location of maximum predicted short-term NO₂ and PM₁₀, respectively, PCs is not a location of relevant exposure to the 1-hour mean and 24-hour mean, respectively, AQOs. Therefore, no associated 'magnitude' or 'significance' descriptors are presented.

Table 6.5-5: Maximum Predicted Short-term Impacts: Combustion Emissions Assessment

Pollutant	Applied Standard	Averaging Period	PC Max Change (A)	PC Max as a % of the AQAL	PEC	PEC as a % of the AQAL	Magnitude	Significance
NO ₂	200	1-hour mean 99.79%ile	48.34	24.17	109.63	54.82	– (B)	– (B)
PM ₁₀	50	24-hour 90.41 %ile	0.38	0.77	12.18	24.37	– (B)	– (B)
SO ₂	266	15-minute mean 99.9%ile	42.38	15.93	91.76	34.50	Medium	Moderate, adverse
SO ₂	350	1-hour mean 99.73%ile	22.85	6.53	50.89	14.54	Small	Slight, adverse
SO ₂	125	24-hour mean 99.18%ile	5.73	4.58	12.19	9.75	Negligible	Negligible
CO	10,000	8-hour rolling mean	29.95	0.30	352.54	3.53	Negligible	Negligible
Note: (A) Presented PCs are based upon an average of the modelled 5-year dataset. (B) Location not a location of relevant exposure, and therefore no corresponding magnitude / significance has been presented.								

6.5.29 Predicted impacts (as PC) at each considered discrete receptor have been considered further and presented for short-term (1-hour mean, 8-hour, 24-hour mean and 15-minute mean) NO₂, PM₁₀, SO₂ and CO concentrations as referenced within the following subsections.

Discrete Human Receptors – Annual Mean NO₂ Impact

6.5.30 Predicted impacts on annual mean NO₂ concentrations at discrete receptors are presented in Table 6.5-6.

Table 6.5-6: Predicted Annual Mean NO₂ Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC ^(A)	PC as a % of the AQAL	PEC	PEC as a % of the AQAL	Magnitude	Significance
R1	0.43	1.06	10.2	25.6	Small	Negligible
R2	0.42	1.05	10.2	25.5	Small	Negligible
R3	0.63	1.58	10.6	26.6	Small	Negligible
R4	0.42	1.05	10.4	26.0	Small	Negligible
R5	0.58	1.45	10.7	26.6	Small	Negligible
R6	0.55	1.38	10.5	26.2	Small	Negligible
R7	0.71	1.76	10.9	27.4	Small	Negligible
R8	0.15	0.37	9.8	24.4	Negligible	Negligible
R9	0.06	0.16	9.6	24.0	Negligible	Negligible
R10	0.07	0.18	9.6	24.0	Negligible	Negligible
R11	0.07	0.18	9.6	24.0	Negligible	Negligible
R12	0.15	0.38	9.8	24.4	Negligible	Negligible
R13	0.26	0.64	10.0	24.9	Negligible	Negligible
R14	0.28	0.70	10.0	25.0	Negligible	Negligible
R15	0.44	1.10	10.4	25.9	Negligible	Negligible
R16	0.53	1.33	10.5	26.3	Negligible	Negligible
R17	0.35	0.88	10.1	25.4	Negligible	Negligible
R18	0.17	0.43	9.7	24.4	Negligible	Negligible
R19	0.33	0.82	10.1	25.3	Negligible	Negligible
R20	0.20	0.51	9.9	24.6	Negligible	Negligible
R21	0.17	0.43	9.8	24.5	Negligible	Negligible
R22	0.16	0.40	9.8	24.4	Negligible	Negligible
R23	0.09	0.23	9.6	24.1	Negligible	Negligible
R24	0.09	0.22	9.6	24.1	Negligible	Negligible
R25	0.19	0.47	9.8	24.5	Negligible	Negligible
Note: (A) Presented PCs are based upon an average of the modelled 5-year dataset.						

6.5.31 Table 6.5-6 indicates that there is predicted to be a 'negligible' impact on annual mean NO₂ concentrations at all considered receptors. There are no predicted exceedences of the annual mean NO₂ AQO as a result of the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – Annual Mean PM₁₀ Impact

6.5.32 Predicted impacts on annual mean PM₁₀ concentrations at discrete receptors are presented in Table 6.5-7.

**Table 6.5-7: Predicted Annual Mean PM₁₀ Impacts at Discrete Receptors:
Combustion Emissions Assessment**

Receptor	PC ^(A)	PC as a % of the AQAL	PEC	PEC as a % of the AQAL	Magnitude	Significance
R1	0.01	0.03	10.0	25.1	Negligible	Negligible
R2	0.01	0.03	10.0	25.1	Negligible	Negligible
R3	0.02	0.06	10.0	25.1	Negligible	Negligible
R4	0.01	0.01	10.0	25.0	Negligible	Negligible
R5	0.03	0.07	10.0	25.1	Negligible	Negligible
R6	0.01	0.03	10.0	25.1	Negligible	Negligible
R7	0.04	0.10	10.1	25.1	Negligible	Negligible
R8	<0.01	<0.01	10.0	25.0	Negligible	Negligible
R9	0.01	0.02	10.0	25.0	Negligible	Negligible
R10	0.01	0.02	10.0	25.0	Negligible	Negligible
R11	0.01	0.02	10.0	25.0	Negligible	Negligible
R12	<0.01	<0.01	10.0	25.0	Negligible	Negligible
R13	0.01	0.02	10.0	25.0	Negligible	Negligible
R14	0.01	0.03	10.0	25.1	Negligible	Negligible
R15	0.02	0.05	10.0	25.1	Negligible	Negligible
R16	0.02	0.05	10.0	25.1	Negligible	Negligible
R17	0.01	0.02	10.0	25.0	Negligible	Negligible
R18	<0.01	0.01	10.0	25.0	Negligible	Negligible
R19	0.01	0.02	10.0	25.0	Negligible	Negligible
R20	<0.01	<0.01	10.0	25.0	Negligible	Negligible
R21	<0.01	<0.01	10.0	25.0	Negligible	Negligible
R22	<0.01	<0.01	10.0	25.0	Negligible	Negligible
R23	<0.01	0.01	10.0	25.0	Negligible	Negligible
R24	<0.01	0.01	10.0	25.0	Negligible	Negligible
R25	<0.01	<0.01	10.0	25.0	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.						

6.5.33 Table 6.5-7 indicates that there is predicted to be a 'negligible' impact on annual mean PM₁₀ concentrations at all considered receptors. There are no predicted exceedences of the annual mean PM₁₀ AQO as a result of the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 1-hour Mean NO₂ Impact

6.5.34 Predicted impacts on 1-hour mean 99.79 percentile NO₂ concentrations at discrete receptors are presented in Table 6.5-8.

Table 6.5-8: Predicted 1-hour Mean NO₂ Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC ^(A)	PC as a % of the AQAL	Magnitude	Significance
R1	12.2	6.10	Negligible	Negligible
R2	15.7	7.83	Negligible	Negligible
R3	14.6	7.28	Negligible	Negligible
R4	21.9	10.9	Small	Slight, adverse
R5	32.2	16.1	Small	Slight, adverse
R6	15.2	7.61	Negligible	Negligible
R7	6.87	3.44	Negligible	Negligible
R8	5.53	2.76	Negligible	Negligible
R9	2.83	1.41	Negligible	Negligible
R10	3.12	1.56	Negligible	Negligible
R11	3.14	1.57	Negligible	Negligible
R12	4.73	2.36	Negligible	Negligible
R13	4.02	2.01	Negligible	Negligible
R14	3.31	1.66	Negligible	Negligible
R15	7.88	3.94	Negligible	Negligible
R16	8.39	4.19	Negligible	Negligible
R17	8.43	4.21	Negligible	Negligible
R18	11.1	5.56	Negligible	Negligible
R19	19.4	9.71	Negligible	Negligible
R20	13.0	6.48	Negligible	Negligible
R21	6.00	3.00	Negligible	Negligible
R22	6.33	3.16	Negligible	Negligible
R23	3.94	1.97	Negligible	Negligible
R24	3.73	1.86	Negligible	Negligible
R25	8.31	4.16	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.35 Table 6.5-8 indicates that there is predicted to be a 'slight, adverse' impact on 1-hour mean 99.79 percentile NO₂ concentrations at 2 considered receptors (R4 and R5). At all other considered receptors, there is predicted to be a 'negligible' impact on 1-hour mean 99.79 percentile NO₂ concentrations. There are no predicted exceedences of the 1-hour mean 99.79 percentile NO₂ AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 24-hour Mean PM₁₀ Impact

6.5.36 Predicted impacts on 24-hour mean 90.41 percentile PM₁₀ concentrations at discrete receptors are presented in Table 6.5-9.

**Table 6.5-9: Predicted 24-hour Mean PM₁₀ Impacts at Discrete Receptors:
Combustion Emissions Assessment**

Receptor	PC ^(A)	PC as a % of the AQAL	Magnitude	Significance
R1	0.08	0.15	Negligible	Negligible
R2	0.07	0.15	Negligible	Negligible
R3	0.10	0.20	Negligible	Negligible
R4	0.05	0.11	Negligible	Negligible
R5	0.14	0.28	Negligible	Negligible
R6	0.07	0.14	Negligible	Negligible
R7	0.14	0.27	Negligible	Negligible
R8	0.03	0.05	Negligible	Negligible
R9	0.01	0.02	Negligible	Negligible
R10	0.01	0.03	Negligible	Negligible
R11	0.01	0.03	Negligible	Negligible
R12	0.04	0.07	Negligible	Negligible
R13	0.05	0.11	Negligible	Negligible
R14	0.06	0.11	Negligible	Negligible
R15	0.08	0.15	Negligible	Negligible
R16	0.08	0.17	Negligible	Negligible
R17	0.05	0.09	Negligible	Negligible
R18	0.02	0.04	Negligible	Negligible
R19	0.07	0.15	Negligible	Negligible
R20	0.04	0.09	Negligible	Negligible
R21	0.03	0.07	Negligible	Negligible
R22	0.03	0.07	Negligible	Negligible
R23	0.02	0.04	Negligible	Negligible
R24	0.02	0.04	Negligible	Negligible
R25	0.04	0.07	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.37 Table 6.5-9 indicates that there is predicted to be a 'negligible' impact on 24-hour mean 90.41 percentile PM₁₀ concentrations at all considered receptors. There are no predicted exceedences of the 24-hour mean 90.41 percentile PM₁₀ AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 24-hour Mean SO₂ Impact

6.5.38 Predicted impacts on 24-hour mean 99.18 percentile SO₂ concentrations at discrete receptors are presented in Table 6.5-10.

Table 6.5-10: Predicted 24-hour Mean SO₂ Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC ^(A)	PC as a % of the AQAL	Magnitude	Significance
R1	1.17	0.94	Negligible	Negligible
R2	1.44	1.15	Negligible	Negligible
R3	1.91	1.53	Negligible	Negligible
R4	0.86	0.69	Negligible	Negligible
R5	2.07	1.65	Negligible	Negligible
R6	0.96	0.77	Negligible	Negligible
R7	1.21	0.96	Negligible	Negligible
R8	0.52	0.42	Negligible	Negligible
R9	0.29	0.23	Negligible	Negligible
R10	0.28	0.23	Negligible	Negligible
R11	0.29	0.23	Negligible	Negligible
R12	0.45	0.36	Negligible	Negligible
R13	0.61	0.49	Negligible	Negligible
R14	0.52	0.42	Negligible	Negligible
R15	0.69	0.55	Negligible	Negligible
R16	0.78	0.62	Negligible	Negligible
R17	0.71	0.57	Negligible	Negligible
R18	0.31	0.25	Negligible	Negligible
R19	0.88	0.70	Negligible	Negligible
R20	0.69	0.55	Negligible	Negligible
R21	0.54	0.43	Negligible	Negligible
R22	0.58	0.47	Negligible	Negligible
R23	0.30	0.24	Negligible	Negligible
R24	0.28	0.23	Negligible	Negligible
R25	0.56	0.44	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.39 Table 6.5-10 indicates that there is predicted to be a 'negligible' impact on 24-hour mean 99.18 percentile SO₂ concentrations at all considered receptors. There are no predicted exceedences of the 24-hour mean 99.18 percentile SO₂ AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 1-hour Mean SO₂ Impact

6.5.40 Predicted impacts on 1-hour mean 99.73 percentile SO₂ concentrations at discrete receptors are presented in Table 6.5-11.

Table 6.5-11: Predicted 1-hour Mean SO₂ Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC ^(A)	PC as a % of the AQAL	Magnitude	Significance
R1	3.64	1.04	Negligible	Negligible
R2	4.77	1.36	Negligible	Negligible
R3	6.38	1.82	Negligible	Negligible
R4	4.81	1.37	Negligible	Negligible
R5	14.6	4.18	Negligible	Negligible
R6	2.61	0.74	Negligible	Negligible
R7	2.36	0.68	Negligible	Negligible
R8	1.89	0.54	Negligible	Negligible
R9	1.02	0.29	Negligible	Negligible
R10	1.12	0.32	Negligible	Negligible
R11	1.09	0.31	Negligible	Negligible
R12	1.67	0.48	Negligible	Negligible
R13	1.53	0.44	Negligible	Negligible
R14	1.29	0.37	Negligible	Negligible
R15	1.61	0.46	Negligible	Negligible
R16	1.73	0.49	Negligible	Negligible
R17	1.53	0.44	Negligible	Negligible
R18	2.26	0.65	Negligible	Negligible
R19	6.68	1.91	Negligible	Negligible
R20	3.69	1.05	Negligible	Negligible
R21	1.93	0.55	Negligible	Negligible
R22	1.86	0.53	Negligible	Negligible
R23	1.39	0.40	Negligible	Negligible
R24	1.31	0.37	Negligible	Negligible
R25	2.67	0.76	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.41 Table 6.5-11 indicates that there is predicted to be a 'negligible' impact on 1-hour mean 99.73 percentile SO₂ concentrations at all considered receptors. There are no predicted exceedences of the on 1-hour mean 99.73 percentile SO₂ AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 15-minute Mean SO₂ Impact

6.5.42 Predicted impacts on 15-minute mean 99.9 percentile SO₂ concentrations at discrete receptors are presented in Table 6.5-12.

Table 6.5-12: Predicted 15-minute Mean SO₂ Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC (A)	PC as a % of the AQAL	Magnitude	Significance
R1	5.45	4.36	Negligible	Negligible
R2	8.14	6.51	Negligible	Negligible
R3	9.34	7.47	Negligible	Negligible
R4	7.30	5.84	Negligible	Negligible
R5	22.3	17.8	Small	Slight, adverse
R6	4.34	3.47	Negligible	Negligible
R7	3.25	2.60	Negligible	Negligible
R8	3.03	2.42	Negligible	Negligible
R9	1.51	1.21	Negligible	Negligible
R10	1.67	1.34	Negligible	Negligible
R11	1.68	1.34	Negligible	Negligible
R12	3.22	2.58	Negligible	Negligible
R13	2.19	1.75	Negligible	Negligible
R14	1.86	1.49	Negligible	Negligible
R15	2.34	1.87	Negligible	Negligible
R16	2.49	1.99	Negligible	Negligible
R17	2.17	1.73	Negligible	Negligible
R18	4.04	3.23	Negligible	Negligible
R19	10.8	8.68	Negligible	Negligible
R20	7.94	6.35	Negligible	Negligible
R21	2.92	2.33	Negligible	Negligible
R22	4.02	3.22	Negligible	Negligible
R23	2.79	2.23	Negligible	Negligible
R24	2.75	2.20	Negligible	Negligible
R25	4.42	3.54	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.43 Table 6.5-12 indicates that there is predicted to be a 'slight, adverse' impact on 15-minute mean 99.9 percentile SO₂ concentrations at all considered receptors. There are no predicted exceedences of the 15-minute mean 99.9 percentile SO₂ AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Discrete Human Receptors – 8-hour Mean CO Impact

6.5.44 Predicted impacts on 8-hour rolling mean CO concentrations at discrete receptors are presented in Table 6.5-13.

Table 6.5-13: Predicted 8-hour Rolling Mean Impacts at Discrete Receptors: Combustion Emissions Assessment

Receptor	PC ^(A)	PC as a % of the AQAL	Magnitude	Significance
R1	8.10	0.08	Negligible	Negligible
R2	8.83	0.09	Negligible	Negligible
R3	11.7	0.12	Negligible	Negligible
R4	6.81	0.07	Negligible	Negligible
R5	20.9	0.21	Negligible	Negligible
R6	5.40	0.05	Negligible	Negligible
R7	5.32	0.05	Negligible	Negligible
R8	4.21	0.04	Negligible	Negligible
R9	1.95	0.02	Negligible	Negligible
R10	2.41	0.02	Negligible	Negligible
R11	2.33	0.02	Negligible	Negligible
R12	3.39	0.03	Negligible	Negligible
R13	3.47	0.03	Negligible	Negligible
R14	3.09	0.03	Negligible	Negligible
R15	3.37	0.03	Negligible	Negligible
R16	4.49	0.04	Negligible	Negligible
R17	4.17	0.04	Negligible	Negligible
R18	2.70	0.03	Negligible	Negligible
R19	8.42	0.08	Negligible	Negligible
R20	5.50	0.06	Negligible	Negligible
R21	3.87	0.04	Negligible	Negligible
R22	3.90	0.04	Negligible	Negligible
R23	2.90	0.03	Negligible	Negligible
R24	2.84	0.03	Negligible	Negligible
R25	4.80	0.05	Negligible	Negligible
Note: Presented PCs are based upon an average of the modelled 5-year dataset.				

6.5.45 Table 6.5-13 indicates that there is predicted to be a 'negligible' impact on 8-hour rolling mean concentrations at all considered receptors. There are no predicted exceedences of the 8-hour rolling mean CO AQO as a result of the PCs from the operation of combustion emission point sources associated with the Proposed Development at the Application Site.

Combustion Emissions – Summary of Predicted Impacts at Human Receptors.

6.5.46 The EPUK & IAQM guidance '*Land-use planning and development control planning for air quality*' (v1.2, 2017), considers a number of factors for the determination of significance of predicted air quality impacts. Such factors include:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts; and
- the worst-case assumptions adopted when undertaking the prediction of impacts.

6.5.47 In relation to combustion emission point sources associated with the Proposed Development, the unmitigated impact significance has been predicted in accordance with the stated assessment methodology. The following factors have been taken into account:

- there are predicted to be a 'negligible' impact on annual mean NO₂ and PM₁₀ concentrations at all considered receptor locations of relevant exposure. There are no predicted exceedences of the annual mean NO₂ or PM₁₀ AQOs at any location within the study domain;
- there are predicted to be 'slight, adverse' impacts on 1-hour mean 99.79 percentile NO₂ concentrations at 2 considered receptor locations. At all other receptor locations, impacts on 1-hour mean 99.79 percentile NO₂ concentrations are predicted to be 'negligible'. There are no predicted exceedences of the 1-hour mean 99.79 percentile NO₂ AQO at any location within the study area;
- there is predicted to be 'slight, adverse' impacts on 15-minute mean 99.9 percentile SO₂ concentrations at 1 considered receptor location. At all other receptor locations, impacts on 15-minute mean 99.9 percentile SO₂ concentrations are predicted to be 'negligible'. There are no predicted exceedences of the 15-minute mean 99.9 percentile SO₂ AQO at any location within the study area;
- there is predicted to be a 'negligible' impact on 24-hour mean 90.41 percentile PM₁₀ concentrations at all considered receptors. There are no predicted exceedences of the 24-hour mean 90.41 percentile PM₁₀ AQO at any location within the study area;
- there is predicted to be a 'negligible' impact on 24-hour mean 99.18 percentile SO₂ concentrations at all considered receptors. There are no predicted exceedences of the 24-hour mean 99.18 percentile SO₂ AQO at any location within the study area;
- there is predicted to be a 'negligible' impact on 1-hour mean 99.73 percentile SO₂ concentrations at all considered receptors. There are no predicted exceedences of the 1-hour mean 99.73 percentile SO₂ AQO at any location within the study area; and
- there is predicted to be a 'negligible' impact on 8-hour rolling mean CO concentrations at all considered receptors. There are no predicted exceedences of the 8-hour rolling mean CO AQO at any location within the study area.

6.5.48 As such, the overall effect of the operation of combustion emission point sources associated with the Proposed Development at the Application Site is considered to be 'not significant'.

Impacts on Ecological Receptors – Critical Levels

6.5.49 The results of the assessment of impacts on CLe are presented in Table 6.5-14 below.

Table 6.5-14: Impact on Critical Levels

Receptor ID	NOx Annual PC ($\mu\text{g}/\text{m}^3$)	PC as % of CLe	NOx 24-hour PC ($\mu\text{g}/\text{m}^3$)	PC as % of CLe	SO ₂ Annual PC ($\mu\text{g}/\text{m}^3$)	PC as % of CLe
ER1	0.11	0.38	1.78	2.37	0.02	0.17
ER2	0.02	0.07	0.35	0.47	<0.01	0.02
ER3	0.04	0.12	1.23	1.63	<0.01	0.01

6.5.50 Table 6.5-14 illustrates that the additional annual mean NOx and SO₂ PC does not exceed 1% of the annual mean NOx or SO₂ CLe at any considered ecological receptor.

6.5.51 Table 6.5-14 further illustrates that the additional 24-hour mean NOx PC does not exceed 10% of the 24-hour mean NOx CLe at any considered ecological receptor.

6.5.52 Following the stated 'EA's Operational Instruction 66_12', impacts on the annual mean NOx, 24-hour mean NOx and annual mean SO₂ CLe are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

Impacts on Ecological Receptors – Critical Loads, Nutrient Nitrogen

6.5.53 The results of the assessment of impacts on the nutrient nitrogen CLo are presented in Table 6.5-15 below.

Table 6.5-15: Impact on Nitrogen Critical Load

Site	Applied CLo (kg N/ha/yr)	PC (kg N/ha/yr)	PC as % of CLo
R1	8	0.02	0.20
R2	10	<0.01	0.03
R3	10	0.01	0.10

6.5.54 Table 6.5-15 illustrates that the additional PC to nutrient nitrogen does not exceed 1% of the applied nutrient nitrogen CLo at any considered ecological receptor.

6.5.55 Following the stated 'EA's Operational Instruction 66_12', impacts on nutrient nitrogen CLo are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

Impacts on Ecological Receptors – Critical Loads, Acidification

6.5.56 The results of the assessment of impacts on the acid CLo are presented in Table 6.5-16 below. It is noted that, as presented in Table 6.4-8, the total current N load is greater than the CLminN at all considered ecological receptors. Therefore, the assessment of additional NO₂ and SO₂ contributions to acid deposition has been undertaken against the CLmaxN CLo.

Table 6.5-16: Impact on Acid Critical Load

Site	Applied C _{Lo} (kg _{eq} /ha/yr)	PC (kg _{eq} /ha/yr)	PC as % of C _{Lo}
R1	4.303	<0.01	0.07
R2	2.018	<0.01	0.02
R3	1.237	<0.01	0.08

6.5.57 Table 6.5-15 illustrates that the additional PC to acidification does not exceed 1% of the applied acid CLo at any considered ecological receptor.

6.5.58 Following the stated 'EA's Operational Instruction 66_12', impacts on acid CLoS are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

6.6 Mitigation Measures

Construction Phase Dust

6.6.1 An assessment of the significance of impacts associated with construction phase dust has been undertaken in accordance with the IAQM methodology. A summary of the risk category associated with each identified source of construction phase dust is presented within Table 6.6-1, for the purposes of identifying mitigation requirements.

6.6.2 Potential dust effects during the construction phase considered to be temporary in nature. The impacts are determined to be temporary as they will only potentially occur throughout the construction phase and short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine.

6.6.3 The risk of dust soiling effects is assessed as 'negligible risk' from demolition, and 'low risk' from earthworks, construction and trackout activities. The risk of human health effects from PM₁₀ is assessed as 'negligible risk' from demolition, and 'low risk' from earthworks, construction activities and trackout activities.

6.6.4 In order to control potential impacts, the mitigation measures presented within Table 6.6-1 are proposed for the scheme. These mitigation measures should be secured by planning condition.

Table 6.6-1: Construction Dust Mitigation Measures

Site Application	Mitigation Measures
General Dust Management	Record all dust and air quality complaints and take appropriate measures to reduce emissions
	Record any exceptional; incidents that cause dust off site.
	Undertake daily visual inspection of dust soiling and dust generation and record in site log (available for the local authority if requested)
	Ensure an adequate supply of water is available onsite for effective dust suppression. The site manager will be present during all working hours to manage the activity of dust suppression
	Use enclosed chutes and conveyors and cover skips
	Minimise drop heights from conveyors, loading shovels and other material handling equipment
	Impose a site speed limit of 10mph on unpaved haul roads
	Ensure all vehicles engines are switched off when stationary
	Plan site layout so machinery is located away from receptors as far as possible
	Enclose specific operations where there is a high potential for dust production
	Avoid site runoff of water or mud
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove material that have the potential to produce dust from the site as soon as possible
	Install construction warning signage either side of the site entrance warning of 'mud on the road'
	Safety, Health & Environmental Briefings (SHEB's) will be provided to site operatives at least monthly and will reflect the actual work being undertaken on site. Records must be maintained of the briefings
	All operatives/visitors on site receive an Induction prior to commencing work on site
	Environmental Incidents and complaints will be recorded in the incident book on site and records forwarded to the divisional office and Group SHE department as required. Complaints will be dealt with locally by the Division and confirmation of action provided on or attached to the incident report form
	A power washing area will be installed behind the main compound alongside the delivery access road so that any vehicles leaving the site that require it can clean their tyres and undercarriage to wash off mud and debris before they exit
	All site managers attend the Site Management Safety Training Scheme (SMSTS) course on site safety. Part of this course covers protection against fugitive dust
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust)
	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives
	Bag and remove any biological debris or damp down such material before demolition.

Site Application	Mitigation Measures
Earthworks	Re-vegetate earthworks and soil stockpiles to stabilise surfaces as soon as practicable
	Cover stockpiles if not vegetated and only remove in small areas during work
	Avoid Double Handling of material
	Cease operations during high winds in the direction of sensitive receptors
Construction	Avoid scabbling (roughing of concrete surfaces) if possible
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	Use water assisted dust sweepers on the access and local roads to removed tracked out material is necessary. A road sweeper vehicle will be employed to visit site and clean the site roads each day to prevent a build-up of mud, grit and dirt. This will take place every afternoon prior to the close of site and will also be on call as necessary through each day should there be a need for its services
	Avoid dry sweeping large areas
	Ensure vehicles entering and leaving site are covered to prevent escape of materials during transport
	A power washing area will be installed on the main site road near the site entrance so that other construction vehicles exiting can also be cleaned down before entering the public highway
	Access gates to be located at least 10m from receptors where possible
	All vehicles will be inspected prior to leaving site to ensure limited mud will be placed on the carriage way

Cumulative Impacts

- 6.6.5 There is the potential for cumulative construction phase dust impacts to occur, arising during the construction of both the proposed Application Site and any other surrounding developments which occur within a combined 350m site buffer radii.
- 6.6.6 For a potential cumulative construction phase dust impact to occur, the Application Site and any adjacent developments would need to be demolished / constructed either concurrently or sequentially. However, it is noted that both the Application Site and any adjacent developments to be demolished / constructed would be required to implement construction phase dust mitigation measures as stated within the IAQM guidance and as detailed above in Table 6.6-1. Therefore, the application of the above mitigation measures would produce a negligible effect and be considered to be 'not significant'.
- 6.6.7 Cumulative effects are therefore considered to be 'not significant'.

Construction Phase Road Traffic Emissions

- 6.6.8 Potential air quality impacts associated with construction phase road traffic emissions (principally HDV movements) have been screened out for further assessment with associated impacts on air quality predicted to result in an 'insignificant' effect. Therefore, mitigation measures are not considered to be required.

Construction Phase NRMM Emissions

- 6.6.9 LAQM.TG(16) guidance states that with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are *"unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed"*.
- 6.6.10 The following controls would apply to NRMM:
- all NRMM should use fuel equivalent to ultralow sulphur diesel;
 - all NRMM should comply with either the current or previous EU Directive Staged Emission Standards;
 - all NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
 - the on-going conformity of plant retrofitted with DPF, to a defined performance standard; and
 - implementation of fuel conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient fuel consumption.
- 6.6.11 Successful implementation of the above mitigation measures, which should be secured by planning condition, would ensure that emissions from the construction phase and NRMM used during construction are 'not significant'.

Operational Phase Road Traffic Emissions

- 6.6.12 Potential air quality impacts associated with construction phase road traffic emissions (principally HDV movements) have been screened out for further assessment with associated impacts on air quality predicted to result in an 'insignificant' effect. Therefore, mitigation measures are not considered to be required.

Operational Phase Combustion Emissions

- 6.6.13 In accordance with the stated EPUK & IAQM assessment methodology, the impact on air quality associated with the operational phase combustion emission assessment is considered to be 'not significant'. There are no predicted exceedences of any considered AQO at any location of relevant exposure. Therefore, no supplementary mitigation is considered to be required.

6.7 Residual Effects

Construction Phase Dust

- 6.7.1 On the basis that the mitigation measures outlined in Table 6.6-1 are implemented, the residual effects from activities generating construction phase dust are predicted to be 'not significant' in accordance with the stated IAQM guidance.

Construction Phase NRMM Emissions

- 6.7.2 On the basis that the mitigation measures outlined in Section 0 are implemented, the residual effects from activities generating construction phase dust are predicted to be 'not significant' in accordance with the stated LAQM.TG(16) guidance.

Construction Phase Road Traffic Emissions

- 6.7.3 The predicted residual effects of road traffic emissions arising from the construction phase of the scheme on existing sensitive receptors are predicted to be 'not significant' without the inclusion of mitigation measures.

Operational Phase Road Traffic Emissions

- 6.7.4 The predicted residual effects of road traffic emissions arising from the operational phase of the scheme on existing sensitive receptors are predicted to be 'not significant' without the inclusion of mitigation measures.

Operational Phase Combustion Emissions

- 6.7.5 The residual impact on air quality from combustion emission point sources associated with the Proposed Development is considered to be 'not significant' for all considered receptors without the inclusion of mitigation measures.

6.8 Summary and Conclusion

6.8.1 The overall effects of the Proposed Development on air quality are summarised in Table 6.8-1.

Table 6.8-1: Summary of Assessment

Description of Significant Effects	Receptor	Significance of Effects				Mitigation	Significance of Residual Effect s			
		Risk	Po/N	T/Pe	I/D		Risk	Po/N	T/Pe	I/D
Construction Phase										
Dust Soiling	Human	Low Risk	N	T	D	Dust Control Measures	Negligible	N	T	D
Human Health	Human	Low Risk	N	T	D	Dust Control Measures	Negligible	N	T	D
Construction Traffic Emissions	Human	Negligible	N	T	D	Construction Environmental Management Plan / Construction Logistics Plan	Negligible	N	T	D
Construction Plant (NRMM) Emissions	Human	Negligible	N	T	D	Construction Environmental Management Plan	Negligible	N	T	D
Operational Phase										
Traffic Emissions	Human Receptors	Negligible	N	Pe	D	Travel Plan	Negligible	N	Pe	D
Combustion Emissions	Human Receptors	Negligible	N	Pe	D	-	Negligible	N	Pe	D
	Ecological Receptors	Negligible	N	Pe	D	-	Negligible	N	Pe	D
Note: Po = Positive N= Negative T = Temporary Pe = Permeant I = Indirect D = Direct										

Conclusion

- 6.8.2 The assessment has considered the significance of potential effects on the local air quality and amenity as a result of the proposed development of the Application Site. The proposed development incorporates an extension to the existing paper mill, including an expansion to the existing energy centre.
- 6.8.3 A qualitative assessment of the potential dust impacts during the construction of the development has been undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated, with resulting impacts considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.
- 6.8.4 Due to the low additional number of HDV trips anticipated during the construction phase of the development, these are predicted to result in an 'insignificant' effect on air quality from road vehicle emissions. Furthermore, emissions from plant / NRMM on-site is predicted to result in a 'not significant' impact on air quality.
- 6.8.5 Due to the low additional number of HDV and LDVs trips predicted to be generated during the operational phase of the development, there is predicted to be an 'insignificant' effect on air quality from road vehicle emissions.
- 6.8.6 A dispersion modelling assessment has been undertaken to quantify potential impacts on air quality, at both human and ecological receptors, arising from increased combustion emissions generated during the operational phase of the Proposed Development. In accordance with the stated EPUK & IAQM assessment methodology, the operational phase impact on air quality arising from combustion plant emissions is considered to be 'not significant' at all considered human receptor locations.
- 6.8.7 Impacts on Critical Levels at considered ecological designations are less than 1% of the annual mean NO_x and SO₂ Critical Levels and less than 10% of the 24-hour mean NO_x level. Furthermore, impacts on Critical Loads at considered ecological designations are less than 1% of the relevant nutrient nitrogen and acidification Critical Loads. Therefore, impacts on are predicted to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.
- 6.8.8 As such, it is not considered that air quality represents a material constraint to the development proposals, which conform to the principles of Planning Policy Wales, and the Bridgend County Borough Council Local Plan.

7.0 Noise and Vibration

7.1 Introduction and Scope

Noise

- 7.1.1 This chapter of the Environmental Statement (ES) considers the impact of the proposed development upon the noise environment at identified sensitive receptor locations. This chapter describes the scope, relevant legislation, assessment methodology, and the baseline conditions existing at the site and its surroundings. It considers any potential significant effects the proposed development would have on this baseline environment; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.
- 7.1.2 The impact of the proposed development during its construction has been considered and this has been referenced to the guidance of BS5228-1:2009+A1:2014, *Code of practice for noise and vibration control on construction and open sites* – Part 1: Noise. The impact of construction road traffic has been considered with reference to the Design Manual for Roads and Bridges (DMRB) *Noise and Vibration*.
- 7.1.3 The assessment has also considered the noise impact of the proposed development on the surrounding residential area with reference to BS4142:2014+A1:2019, *Methods for rating and assessing industrial and commercial sound* in relation to the operation of fixed plant.
- 7.1.4 Where considered necessary, mitigation measures have been recommended to ensure that identified impacts are kept to a minimum.
- 7.1.5 Whilst reasonable effort has been made to ensure that this Chapter is easy to understand, it is necessarily technical in nature. To assist the reader, a glossary of terminology is provided in Appendix 7-1.

Vibration

- 7.1.6 Compaction, breaking and piling operations can cause some degree of ground vibration. Vibration can cause annoyance to the residents of affected buildings and high levels of vibration can cause damage to buildings. Vibration arising from construction and operation of the proposed development will be controlled following best practice.

7.2 Legislation and Planning Context

National Policy Framework

- 7.2.1 The NPPF sets out the Government's planning policies for England and Wales and how these are to be expected to be applied. It provides a framework within locally prepared plans for housing and other development can be produced. The NPPF must be considered in the preparation of local development plans and is a material consideration in planning decisions.
- 7.2.2 Paragraph 170 of the NPPF advises that, with respect to noise, planning policies and decisions should contribute to and enhance the natural and local environment by, "...preventing new and existing development from contributing to, being put at unacceptable

risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution...”

7.2.3 Paragraph 180 of the NPPF advises that:

7.2.4 *“Planning policies and decisions should also ensure that new development is appropriate for its location considering the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life...”

Noise Policy Statement for England

7.2.5 The *Noise Policy Statement for England* (NPSE), published by the Department for Environment, Food and Rural Affairs (DEFRA) in March 2010, sets out the UK Government’s long-term policy for noise and noise management. It aims to promote *“good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”*.

7.2.6 Paragraph 1.7 of the NPSE provides more detail on the aims of the policy:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life: and
- Where possible, contribute to the improvement of health and quality of life.”

7.2.7 The NPSE Explanatory Note provides guidance on the levels of effect of environmental noise and gives three levels of effect, namely:

- **No Observed Effect Level (NOEL)** – this is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to noise;
- **Lowest Observed Effect Level (LOAEL)** – this is the level which adverse effects on health and quality of life can be detected; and
- **Significant Observed Adverse Effect Level (SOAEL)** – this is the level above which significant adverse effects on health and quality of life occur.

7.2.8 There are no defined ‘noise-based measures’ for these terms and, with reference to the SOAEL, the NPSE goes on to state (at paragraph 2.22):

“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times...not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”

Bridgend County Borough Council Local Development Plan 2006-2021

7.2.9 BCBC's Local Development Plan includes the following policies, relevant to noise and development:

- Policy ENV7 Natural Resources and Public Health:

"Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to: ...

2) Noise pollution;.....

Development in areas currently subject to the above will need to demonstrate mitigation measures to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level."

Scoping Opinion

7.2.10 A Scoping Opinion, dated 12 November 2019, has been received from BCBC's Public Protection Team (Noise) – Shared Regulatory Services. Within the Scoping Opinion, BCBC confirmed that, *"A noise assessment must be undertaken to assess all noise sources to determine the impact of the development. This must include:*

1. A baseline noise survey in accordance with BS4142 - locations and scope of the assessment should be agreed with by this Department.

2. A BS4142 assessment to determine the predicted noise levels at residential receptors from all new noise sources (including the application of any acoustic penalties where warranted) and including increased traffic movements on site. The assessment shall include the cumulative impact from the new and existing development and ensure that the resulting noise rating levels will be 10dB below background. Mitigation measure should be included where these levels are indicated to be exceeded.

3. The noise report shall also include the predicted vibration levels to be experienced at any residential receptor and any low frequency vibration noise itself as I understand that one of the machines is to be connected to the bedrock.

4. Predicted on site construction noise levels at the closest residential receptors and predicted off site.

noise at the properties fronting onto the A4063 at Coytrahen from the substantial number of construction vehicles that will be travelling up and down the A4063 as they pass (the report should include proposed hours of operation for construction noise and proposed hours for the movement of construction vehicles entering and leaving the site).

5. Predicted increase in vehicular noise at the properties fronting onto the A4063 at Coytrahen and at the closest residential receptor to the entrance/exit to the papermills from the increased number of HGV's associated with the development when it will be in full operation, particularly the increase in noise between 23.00 and 07.00 hours if HGV's will be entering and leaving at night and travelling up and down the valley at night.

It is noted that the results of the construction noise and operational noise assessments, including any required mitigation measures, will be included within the Noise Chapter of the ES for the development.”

- 7.2.11 With regard to item number 3 and the requirement to consider vibration levels, the Vibration Assessment is contained within Chapter 7.4.

7.3 Assessment Methodology

BS5228-1:2009+A1:2014

- 7.3.1 This standard sets out a methodology for predicting noise levels arising from a wide variety of construction activities and contains tables of sound power levels generated by fixed and mobile plant. Compliance with BS5228-1:2009+A1:2014 is expected as a minimum standard when assessing the impact of construction noise upon the existing noise environment at the closest noise sensitive receptors.
- 7.3.2 Noise levels generated by construction activities and experienced at local receptors will depend on a number of variables, the most significant of which are likely to be:
- the amount of noise generated by plant and equipment being used, generally expressed as a sound power level;
 - the periods of operation of the plant and equipment, known as the ‘on-time’;
 - the distance between the noise source(s) and the closest receptor(s);
 - the attenuation due to ground absorption or barrier screening effects; and
 - reflection of noise due to the presence of hard vertical surfaces, such as walls.
- 7.3.3 There is currently no specific EIA assessment criteria for construction site noise; however, BS5228-1:2009 + A1:2014 does provide advice on acceptable noise levels. The ‘ABC’ method (as detailed in Annex E (E.32) of the standard) is used to determine the appropriate threshold value at the closest receptors. The ABC method is described as follows:
- 7.3.4 a threshold value noise level is determined by establishing the existing ambient noise level at each receptor;
- the measured ambient noise level is rounded to the nearest 5dB; and
 - the threshold noise value for each receptor is then established from Table E.1 of the standard.
- 7.3.5 Table E.1 of the standard is reproduced as Table 7.3-1.

Table 7.3-1: Example Threshold Values for Construction Noise

Assessment Category and Threshold Value	Threshold Value, in		
	Category A ^(A)	Category B ^(B)	Category C ^(C)
Night-time (23.00 – 07.00)	45	50	55
Evenings and weekends ^(D)	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00)	65	70	75
<p>NOTE 1: A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the category appropriate to the ambient noise level.</p> <p>NOTE 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3dB due to construction activity.</p> <p>NOTE 3: Applied to residential receptors only.</p>			
<p>^(A) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.</p> <p>^(B) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.</p> <p>^(C) Category C: Threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.</p> <p>^(D) 19.00 – 23.00 weekdays, 13.00 – 23.00 Saturdays and 07.00 – 23.00 Sundays.</p>			

- 7.3.6 For the purposes of this assessment, a daytime threshold value of 65dB L_{Aeq} has been adopted. This is the lowest threshold value for the daytime period and is the L_{Aeq} noise level that should not be exceeded at the closest receptors due to construction activities.
- 7.3.7 If the threshold value is exceeded, then the effect of construction noise upon the closest receptors may be significant. However, BS5228-1:2009+A1:2014 states that the significance of the effect will depend on, *“other project-specific factors, such as the number of receptors affected and the duration and character of the impact”*.

BS4142:2014+A1:2019

- 7.3.8 BS4142:2014+A1:2019 is used to assess the potential adverse impact of operational sound, of an industrial nature, at the closest receptors within the context of the existing sound environment. The assessment of impacts contained in BS4142:2014 is undertaken by comparing the rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level outside the receptor(s).
- 7.3.9 In accordance with BS4142:2014+A1:2019, the significance of an industrial sound source depends on both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. It is therefore essential to place the sound in context.
- 7.3.10 BS4142:2014+A1:2019 (Section 3) provides the following definitions:
- **Ambient Sound:** Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.

- **Ambient Sound Level, $L_a = L_{Aeq,T}$:** Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
- **Background Sound Level, $L_{A90,T}$:** A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given interval, T, measured using the time weighting F and quoted to the nearest whole number of decibels.
- **Rating Level, $L_{A,Tr}$:** Specific sound level plus any adjustment for the characteristic features of the sound.
- **Specific Sound Level, $L_s = L_{Aeq,T}$:** Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T.
- **Specific Sound Source:** Sound source being assessed.
- To account for the acoustic character of sound sources, BS4142:2014+A1:2019 provides the following guidance with respect to the application of penalties to account for, *“the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention”*.
- **Tonality** – “For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in the sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and
- **Other Sound Characteristics** – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.”
- BS4142:2014+A1:2019 defines the impact of the specific sound by subtracting the measured background sound level from the rating level. Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:
 - typically, the greater the difference, the greater the magnitude of the impact;

- a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact, depending on the context.

7.3.11 In addition, BS4142:2014+A1:2019 states:

“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”.

7.3.12 BS4142:2014+A1:2019 also notes that, “adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”.

7.3.13 Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

Calculation of Road Traffic Noise 1988

7.3.14 To undertake a quantitative analysis of the changes in sound levels at existing sensitive receptors as a result of construction-related road traffic, baseline noise levels (BNLs) for ‘do nothing’ and ‘do nothing’ construction scenarios have been calculated, with reference to procedures contained within the *Calculation of Road Traffic Noise* (CRTN) 1988.

7.3.15 The CRTN describes procedures for measuring and predicting noise levels from road traffic in terms of the $LA_{10,1\text{hour}}$ or $LA_{10,18\text{ hour}}$. The $LA_{10,T}$ is the A-weighted sound level exceeded for 10% of the time, which in this case is the 18 hour period between 06:00 and 24:00 hours. This noise index has been shown to correlate best with resident’s expressed dissatisfaction with traffic noise over a wide range of exposures.

7.3.16 The calculation method takes into account a number of variables to calculate the BNL at a reference distance of 10m from the nearside carriageway edge, at 0.5m above the ground. Factors include Annual Average Weekday Traffic 18-hour traffic flow (AAWT), speed, percentage of heavy vehicles, road surface and gradient. The procedures also allow for the calculation of noise levels at specific receptors up to 300m from a road.

7.3.17 The expected changes in sound levels at existing receptors along the A4603 at Coytrahen (the route the majority of construction traffic will use) that will result from construction traffic have been determined, by comparing ‘without construction’ and ‘with construction’ BNLs.

Design Manual for Roads and Bridges – Noise and Vibration

- 7.3.18 The DMRB provides advice on the magnitude of impacts associated with increases in construction and operational traffic flows and associated noise levels. Tables 3.54a and 3.54b of the DMRB provide guidance for defining the magnitude of road traffic noise change, and Tables 3.58 and 3.60 provide guidance on the assessment of likely significant effects.

Vibrations during Construction Phase

- 7.3.19 It is considered that the main source of vibration during construction works relates to piling operations
- 7.3.20 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228: Part 4, which includes a methodology relating to percussive or vibratory piling only.
- 7.3.21 However, it is generally accepted that for the majority of people, vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity are just perceptible. **Fehler! Verweisquelle konnte nicht gefunden werden.** below details the distances at which certain construction activities relevant to the proposed development give rise to a just perceptible level of vibration. These figures are based upon historical field measurements at various similar construction sites.

Table 7.3-2: Approximate distances at which vibration may just be perceptible

Construction Activity	Distance from activity when vibration may just be perceptible
Heavy Vehicles (e.g. dump trucks)	5-10 m
Excavation	10-15 m
Vibratory compaction	10-15 m
Hydraulic breaker	15-20 m
Rotary bored piling	20-30 m
Auger piling	15-20 m

Operational Vibration

- 7.3.22 As the vibration levels from the proposed development will be controlled by applying good engineering practice, it is highly unlikely that disturbance in public, residential or sensitive ecological areas will arise due to ground vibration.
- 7.3.23 However, as a precautionary measure, the impacts of machinery operations on residents near the paper mill have been assessed in order to prevent annoyance and disturbance generated by vibrations and ground-borne noise.

Study Area

- 7.3.24 The study area encompasses the four nearest sensitive receptors to the proposed development (for the assessment of construction and operation phases), and receptors located along the A4063 at Coytrahen (for the assessment of construction traffic).

Sensitivity Criteria

Guidelines for Environmental Noise Impact Assessment

- 7.3.25 The *Guidelines for Environmental Noise Impact Assessment*, produced by the Institute of Environmental Management and Assessment (IEMA), address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur.
- 7.3.26 The guidelines state that “*noise measurement and quantification is concerned with the effect of noise which varies significantly with time*”.
- 7.3.27 The guidelines go on to state:
“Measuring in decibels means that a 3dB change is a doubling of the sound energy and a 10dB change is a tenfold increase. For sounds which are very similar in all but magnitude, a change or difference of 1dB is just perceptible under laboratory conditions, 3dB is perceptible under most normal conditions and a 10dB increase appears to be twice as loud”.
- 7.3.28 The IEMA guidelines provide specific support on how noise impact assessment fits within the EIA process. They cover:
- how to scope a noise assessment;
 - issues to be considered when defining the baseline noise environment;
 - prediction of changes in noise levels as a result of implementing development proposals; and
 - definition and evaluation of the significance of the effects of changes in noise levels.
- 7.3.29 The IEMA guidelines also offer advice on how to establish the baseline noise level and suggest that “it is good practice to measure over short time periods even though the required assessment indicator is to be averaged over a longer period”. The guidelines go on to state that monitoring should be avoided when the wind speed exceeds 5m/s, during unusual temperature conditions or when there is significant precipitation – unless these are normal conditions for the area.
- 7.3.30 In terms of cumulative effects, these are defined within the IEMA guidelines as “those that result from additive impacts caused by other past, present or reasonably foreseeable actions together with the plan, programme or project itself and synergistic effects (in combination) which arise from the reaction between impacts of a development plan, programme or project on different aspects of the environment”.
- 7.3.31 The key terms within this assessment, which are relevant to the EIA process, are Sensitivity, Magnitude and Significance. In accordance with the guidelines, the noise impact, the noise effect and the significance of the effect must be determined.

Magnitude of Change (Impact)

- 7.3.32 In accordance with the IEMA guidelines, noise impact may be determined by comparing the predicted noise level with an absolute noise limit value and/or by calculating the change in the noise level.
- 7.3.33 The impact magnitude of construction noise is determined with reference to the guidance within BS5228-1:2009+A1:2014, as shown in Table 7.3-3.

Table 7.3-3: Construction Noise – Impact Magnitude

Magnitude	Definition
Major	Threshold value exceeded by more than 5dB
Moderate	Threshold value exceeded by a value between 3,0 and 4,9dB
Minor	Threshold value exceeded by a value between 1,0 and 2,9dB
Negligible	Threshold value exceeded by a value between 0,1 and 0,9dB
None	Threshold value not exceeded

- 7.3.34 The impact magnitude of noise associated with the operation of fixed plant is determined with reference to BS4142:2014+A1:2019, as shown in Table 7.3-4.

Table 7.3-4: Operational Noise – Impact Magnitude

Magnitude	Definition
Major	Rating level is 10dB or more above the background sound level
Moderate	Rating level is between 5,5 and 9,9dB above the background sound level
Minor	Rating level is between 0,1 and 5,4dB above the background sound level
Negligible	Rating level is between 0 and 9,9dB below the background sound level
None	Rating level is 10dB or more below the background sound level

- 7.3.35 The impact magnitude of noise associated with construction and development-related traffic is determined with reference to the guidance of DMRB, as shown in Table 7.3-5.

Table 7.3-5: Traffic Noise – Impact Magnitude

Magnitude	Definition
Major	Change in $LA_{10,18hr}$ noise level of 5dB or more
Moderate	Change in $LA_{10,18hr}$ noise level between 3,0 and 4,9dB
Minor	Change in $LA_{10,18hr}$ noise level between 1,0 and 2,9dB
Negligible	Change in $LA_{10,18hr}$ noise level between 0,1 and 0,9dB
None	No change in $LA_{10,18hr}$ noise level

Significance of Effect

7.3.36 Generic noise effects are detailed in Table 7-7 of the IEMA guidelines. Where an adverse impact is identified, the IEMA guidelines present the following generic relationship between noise impact and noise effect:

- **Negligible Impact Noise Effect** – “Noise impacts can be heard but do not cause any change in behaviour or attitude, e.g. turning up volume on television, speaking more loudly, closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life”;
- **Minor Impact Noise Effect** – “Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume on television, speaking more loudly, closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life”;
- **Moderate Impact Noise Effect** – “Causes a material change in behaviour and/or attitude. e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting back to sleep. Quality of life diminished due to a change in character of the area”; and
- **Major Impact Noise Effect** – “Significant changes in behaviour and/or inability to mitigate the effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant medically definable harm, e.g. auditory and non-auditory”.

7.3.37 The significance of the noise effect will depend on the receptor type and its sensitivity to the noise impact. The sensitivity of the receptor is shown in Table 7.3-6.

Table 7.3-6: Significance of Noise Effects

Magnitude	Sensitivity Very high	Sensitivity High	Sensitivity Medium	Sensitivity Low
Major	Major	Major	Major	Moderate
Moderate	Major	Moderate	Moderate	Minor
Minor	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible
None	None	None	None	None

Calculation of Construction and Operational Sound Levels

7.3.38 To predict noise levels from the construction and operation of proposed development, the calculation algorithms presented in BS5228:2009+A1:2014 and ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General Methods of calculation* will be adhered to.

7.3.39 The sound level predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA, which implements the full range of UK calculation methods including the two methods detailed above. The models assume:

- A ground absorption factor of 0.5 (mixed ground);
- Contour Data to include OS terrain data;
- A reflection factor of 2; and
- A daytime receiver height of 1.5m and a night-time receiver height of 4.0m (Noise Sensitive Receptor 2 is a bungalow; consequently daytime and night-time levels have predicted to 1.5m)

Construction Phase

7.3.40 A development of this nature has the potential to generate noise during the construction phase, should appropriate mitigation not be employed. However, disruption due to construction noise is a localised phenomenon, and is both temporary and intermittent in nature.

7.3.41 The techniques available to predict the likely noise effects from construction are necessarily based on information on the type and number of plant that will be used, their location within the site and the length of time they are in operation. At the time of writing, a detailed programme of construction works, hours and likely plant is not available; therefore, the assessment of construction noise has been based on information and data from experience with similar developments.

7.3.42 It is assumed that construction within the site would be restricted between the daytime hours of 07.00 and 19.00 Monday to Friday, and between the hours of 07.00 and 16.00 on Saturdays.

7.3.43 Construction is anticipated to be undertaken in three phases. Units A Pulp Storage, B Bale Handling, B1 Sludge Press, G Gate House H HV Substation/SWGR and M Pipe Bridge will be constructed first, followed by D Converting and E Shipping, and finally F High Bay Storage and Shipping Area, Paved Areas and Parking.

7.3.44 For the purposes of this construction noise assessment, noise levels during four typical construction activities have been determined. The following tables outline the items of plant which are anticipated to be utilised during each activity, the equipment sound power levels (determined from BS 5228:2009+A1:2014), and the expected percentage on-time of each plant item.

- Activity 1: Site Clearance and Enabling Works
- Activity 2: Groundworks
- Activity 3: Substructure Works
- Activity 4: Superstructure Works

7.3.45 It is accepted that the construction activities may vary from the activities presented, but as it would not be feasible to assess all construction configurations, the assessments undertaken in this section of the report are considered a robust representation of anticipated construction noise levels.

7.3.46 **Activity 1 - Site Clearance and enabling works:** Site clearance and enabling works typically include the installation of site offices, and levelling of the site. Table 7.3-7 details plant that is typically utilised during site clearance and enabling works.

Table 7.3-7: Site Clearance and Enabling Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use
Large Excavator Mounted Breaker	2	110	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	15%
Spreading Fill	2	109	25%
Vibratory Roller	2	102	30%
Lorry (Unloading)	3	108	40%
Concrete Truck Mixer	1	103	5%
Concrete Crusher	2	110	40%
Road Sweeper	1	104	5%

7.3.47 **Activity 2 – Groundworks:** Table 7.3-8 details plant that is typically utilised during groundworks.

Table 7.3-8: Groundworks – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use
Concrete Truck Mixer	3	103	25%
Piling Rig	1	111	90%
Mewp - Cherry Picker Genie	1	95	30%
Small Breaker	2	110	20%
Compressor	2	106	50%
Poker Vibrator	3	97	15%
Lorry Mounted Concrete Pump	1	109	80%
Concrete Agitator	3	103	80%
Lorry (Unloading)	2	108	40%
Petrol Saw	3	109	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	35%
Dumper Trucks	2	106	25%
Diesel Jet Washer	1	108	25%
Mobile Crane	1	103	90%
Vibratory Roller	2	102	30%

7.3.48 **Activity 3** - Substructure Works: Table 7.3-9 details plant that is typically utilised during substructure works.

Table 7.3-9: Substructure Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use
Concrete Truck Mixer	2	103	25%
Small Breaker	2	110	20%
Compressor	2	106	70%
Lorry (Unloading)	2	108	40%
Petrol Saw	2	109	40%
Tracked Excavator (Rubber Tracks)	2	107	80%
Dumper Trucks	2	106	25%
Vibratory Roller	2	102	30%
Poker Vibrator	2	97	40%
Mobile Crane	1	103	100%
Telescopic Forklift (17m) JCB 540	2	107	80%
Hand Tools (Hammers)	8	98	80%

7.3.49 **Activity 4** - Superstructure Works: It is envisaged that this phase would include the erection of buildings. Table 7.3-10 details the plant that is typically utilised during this phase.

Table 7.3-10: Superstructure Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use
Concrete Truck Mixer	2	103	25%
Mewp-Cherry Picker Genie	2	95	60%
Lorry (unloading)	3	108	20%
Petrol Saw	2	109	40%
Tracked Excavator (rubber tracks)	2	107	70%
Dumper Trucks	2	106	25%
Poker Vibrator	2	97	40%
Mobile Crane Operation	2	103	90%
Telescopic Forklift (17m) JCB 540	1	107	80%
Hand Tools (hammers)	8	98	40%
Concrete Pump (pumping)	2	112	70%

7.3.50 In order to model barrier attenuation from local topography, topographical data has been incorporated into the CadnaA noise model. Barrier attenuation from existing buildings within the site has also been considered.

Operational Phase

7.3.51 Proposed noise sources proposed as part of the development are shown in Table 7.3-11, together with sound level data.

Table 7.3-11: Operational Plant Sound Levels

Noise Source	dB										Data Source
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	
Paper Machine (Dept C)	112.6	102.5	100.2	103.7	109.0	100.0	102.0	98.9	100.8	98.1	Measured on site by SLR (internal)
Dept C Roof Exhausts (8no.)	80.0	-	-	-	-	-	-	-	-	-	Provided by Client
Dept C Vacuum Exhaust (2no.)	85.0	-	-	-	-	-	-	-	-	-	
HGV	89.8	89.7	88.4	87.5	81.7	83.0	85.6	84.4	78.7	70.6	Measured on site by SLR
Car Passby (Access, Internal Road and Carpark)	73.7	-	-	-	-	-	-	-	-	-	SLR historically measured
Car Door Slam (Car Park)	88.5	-	-	-	-	-	-	-	-	-	
Bin Drag (Dept B)	103.7	101.4	110.4	102.9	99.9	99.8	97.0	98.5	92.4	83.0	Measured on site by SLR
Loading	91.0	84.7	80.6	81.8	77.1	78.5	72.5	71.5	68.1	59.0	
Clamp Truck	99.2	109.1	103.4	98.1	92.1	97.6	94.2	91.2	87.4	81.7	
Baler	84.7	100.2	87.0	89.8	89.0	81.0	76.6	74.6	69.9	65.8	
Forklift	78.3	83.0	88.4	81.5	76.3	76.7	71.8	69.9	66.9	59.4	
Conveyor	78.4	79.1	80.2	81.7	77.7	75.8	73.4	70.4	63.0	53.7	SLR historically measured

7.3.52 Internal HGV and additional car movements have been informed by information provided by the Client. For the daytime one-hour reference period, peak hour flows have been used. To account for the 15-minute reference period and the potential for traffic flows to occur unevenly throughout one hour, HGV flows within the model have been increased by 50%.

7.3.53 Internal HGV movements are shown in Table 7.3-12. It is noted that only 'Finished Goods' and 'Pallets' HGV movements will occur during the night-time period.

Table 7.3-12: Internal HGV Movements

Area	Incoming HGV	Outcoming HGV	Internal Movement for Finished Goods Delivery	Total Daily Movement	Hourly Movement	Hourly for Model (round up)	Night time Hourly = Hourly Movements + 50%
Cellulose Pulp	21	15	6	35	1,47	2	
Cellulose Pulp- Internal Movements for FG Delivery				6	0,24	1	
Raw material PM	2	2	0	2	0,08	1	
Jumbo reel purchase	0	0	0	0		0	
Raw material CV	5	5	0	10	0,42	1	
Pallets	8	0	8	8	0,33	1	1
Pallets- Internal Movements for FG Delivery				8	0,33	1	
Dept. E							
Finished Goods (Dept. F)	56	71		127	5.29	6	8

7.4 Baseline Conditions

Baseline Noise Survey

- 7.4.1 Noise-sensitive receptors are detailed in Table 7.4-1 and are shown on the plan in Appendix 7-1. All receptors are identified as residential properties.

Table 7.4-1: Noise Sensitive Receptors

NSR ID	NSR Name	Direction from Red Line Boundary	Approximate Distance from Red Line Boundary	Assessment Phase / Activity
NSR01	Brynllwarch Farm	North	65m	Construction Operation
NSR02	Brynsiriol Farm	Northwest	75m	Construction Operation
NSR03	Cefn Ydfa Farm	South	400m	Construction Operation
NSR04	Ty Isaf	Northeast	490m	Construction Operation
NSR05	Coytrahen	Southeast	1600m	Construction Traffic

- 7.4.2 A baseline noise survey was undertaken during January 2020, to measure the prevailing acoustic environment at the receptor locations shown in Table 7.4-1. The survey locations are described as follows and are shown in Document Ref. 57100-0.

- Location NSR01 – within the garden of the residential property at Brynllwarch Farm.
- Location NSR02 – within the garden of the residential property at Brynsiriol Farm.
- Location NSR04 – within the garden of the residential property at Ty Isaf.
- Location NSR05- representative of residential properties along the A4063 at Coytrahen.

- 7.4.3 It is noted that it was agreed with BCBC to include a noise survey location at NSR03. However, at the time of the survey, access to this receptor and other nearby representative receptors was not available. For the purposes of the assessment, baseline noise levels measured at Location NSR04 have been considered as representative of NSR03.
- 7.4.4 The equipment used for the baseline noise survey is detailed in Appendix 7-1. All sound level meters were calibrated before and after the measurements using an acoustic calibrator and no significant drifts were observed. The calibration chain is traceable via the United Kingdom Accreditation Service to national standards held at the National Physical Laboratory.
- 7.4.5 The survey was largely unattended; however, weather conditions were noted to be conducive for noise monitoring, being dry with wind speeds below 5m/s during the whole survey period except for the morning of Monday 6 January when heavy rain occurred.
- 7.4.6 Observations of the prevailing soundscape and context were made during the installation and removal of the sound level meter at each survey location, and these are described as follows:
- **Location NSR01** – Audible sound sources included distant road traffic, bird song, sound from existing site operations (stack), train passbys and high-altitude aircraft.
 - **Location NSR02** – Audible sound sources included distant road traffic, sound from existing operations at the site during absence of road traffic and birdsong.
 - **Location NSR04** – Audible sound sources included distant road traffic, bird song, sound from existing site operations (stack) and high-altitude aircraft.
 - **Location NSR05** – Audible sound sources included road traffic and bird song.
- 7.4.7 Measurements at each survey location were logged every 15-minutes and included both weekday and weekend periods. Each microphone was placed 1.5m above the ground in free-field conditions, i.e. at least 3.5m from the nearest vertical reflecting surface.
- 7.4.8 The following noise level indices were recorded during the survey, which was undertaken from approximately 10:15 on Friday 3 January to approximately 12:00 on Monday 6 January 2020.
- **L_{Aeq}** – the A-weighted equivalent continuous noise level over the measurement period, T;
 - **L_{A90}** – the A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise;
 - **L_{A10}** – the A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise; and
 - **L_{AFmax}** – the maximum A-weighted noise level during the measurement period.
- 7.4.9 Based on the observations made, it is considered that the measured noise levels are representative of the prevailing noise climate at locations representative of the closest receptors and have therefore been considered as such for the purposes of the assessment.

7.4.10 A summary of the measured noise levels for Locations NSR01, NSR02, NSR04 and NSR05 is provided in Table 7.4-2. The table shows the prevailing daytime and night-time ambient noise levels (L_{Aeq}), and the median L_{A10} , median L_{A90} and the highest L_{AFmax} values are also shown. As rain occurred on the 6 January, these results have been stricken from Table 7.4-3 and have not been used within the assessment.

Table 7.4-2: Summary of Measured Noise Levels, dB

Receptor	Date	Period	$L_{Aeq,T}$	Median L_{A90}	Mode L_{A90}	Average L_{A90}
NSR01	03/01/20	Daytime	46,6	43,1	43,9	43,4
	03/01/20- 04/01/20	Night-time	42,7	40,8	40,8	40,9
	04/01/20	Daytime	45,3	42,6	42,6	42,7
	04/01/20- 05/01/20	Night-time	43	41,5	41,6	41,5
	05/01/20	Daytime	45,6	43,1	42,8	43,3
	05/01/20- 06/01/20	Night-time	44,2	42,7	42,7	44,2
	06/01/20	Daytime	47,2	45,1	45,3	45,1
NSR02	03/01/20	Daytime	55,8	50,3	49	49,5
	03/01/20- 04/01/20	Night-time	47,3	35,9	36,3	36,6
	04/01/20	Daytime	54,4	48,7	52	47,9
	04/01/20- 05/01/20	Night-time	48,5	37,4	37,8	37,2
	05/01/20	Daytime	54,6	48,5	50,4	47,3
	05/01/20- 06/01/20	Night-time	48,5	41,3	41,3	42,9
	06/01/20	Daytime	56	51,3	53,5	51,8
NSR04	03/01/20	Daytime	50,9	45,6	45,7	45,4
	03/01/20- 04/01/20	Night-time	44,2	41,5	41,9	41,4
	04/01/20	Daytime	49,2	45,6	45,8	45,1
	04/01/20- 05/01/20	Night-time	44,5	41,4	42,4	41,4
	05/01/20	Daytime	50,9	45,9	44,2	44,8
	05/01/20- 06/01/20	Night-time	42,1	36,5	35,5	38,3
	06/01/20	Daytime	42,1	36,5	35,5	38,3
NSR05	03/01/20	Daytime	55,5	46,4	38	44,4
	03/01/20- 04/01/20	Night-time	48,8	34,3	34,2	34,6
	04/01/20	Daytime	55	44,1	46,3	43
	04/01/20- 05/01/20	Night-time	49,2	34,5	33,8	34,6
	05/01/20	Daytime	56,2	43,8	43,8	43,9
	05/01/20- 06/01/20	Night-time	50,5	36,2	35,8	37,8
	06/01/20	Daytime	57,4	47,7	46,1	48,2

Baseline Levels to be Utilised

- 7.4.11 Measured baseline sound levels used within the assessment of noise from construction and operational phases of the development are shown in Table 7.4-3.
- 7.4.12 Daytime $L_{Aeq,T}$ sound levels are the measured average weekday $L_{Aeq,T}$ levels, for use within noise assessment.
- 7.4.13 Daytime and night-time $L_{A90,T}$ sound levels are the measured average median weekend levels, for use within the operational noise assessment.

Table 7.4-3: Baseline Sound Levels, dB

NSR ID	NSR Name	Period	$L_{A90,T}$	$L_{Aeq,T}$
NSR01	Brynlywarch Farm	Daytime	43	46,6
		Night-time	41,1	-
NSR02	Brynsiriol Farm	Daytime	49	55,8
		Night-time	36,6	-
NSR03	Cefn Ydfa Farm	Daytime	46	50,9
		Night-time	41,4	-
NSR04	Ty Isaf	Daytime	46	50,9
		Night-time	41,4	-
NSR05	Coytrahen	Daytime	-	55,5
		Night-time	-	-

7.5 Assessments of Effects

Noise Effects during Construction Phase

- 7.5.1 Construction noise levels have been calculated for the nearest development phase to receptors NSR01, NSR02, NSR03 and NSR04. Table 7.5-1 presents the highest daytime noise levels expected from the simultaneous operation of all anticipated plant during all assumed phases of the construction programme.

Table 7.5-1: Predicted Construction Noise Levels, dB L_{Aeq}

NSR ID	NSR Name	Site Clearance	Groundworks	Substructure	Superstructure
NSR01	Brynlywarch Farm	58,5	58,4	57,7	58,9
NSR02	Brynsiriol Farm	62,9	61,7	60,9	62,8
NSR03	Cefn Ydfa Farm	57	58	57	56,9
NSR04	Ty Isaf	53,5	54,7	55,3	54,9

- 7.5.2 The predicted construction noise levels in Table 7.5-1 are shown to be below the adopted daytime criterion of 65dB L_{Aeq} for all receptors. This criterion has been determined with reference to the ABC method contained in BS5228:2014 as shown in Table 7.3-1 of this report.
- 7.5.3 With reference to Table 7.3-2, this results in no noise impact since the adopted daytime threshold value of 65dB L_{Aeq} is not predicted to be exceeded. For daytime operations, the

sensitivity of the receptors is defined as high, resulting in a significance of noise effects of 'None', with reference to Table 7.3-6.

- 7.5.4 Specific mitigation measures to reduce noise from construction activities are therefore not required.

Construction Traffic Noise

- 7.5.5 The construction traffic assessment is based on a worst-case scenario construction traffic flow of a maximum of 40 hourly HGV movements along the A4063 at Coytrahen, between 7am and 7pm. It is anticipated that construction traffic movements will occur for a maximum period of 3 months. Baseline road traffic flows have been derived from traffic count data contained within the Transport Assessment (Chapter 13).
- 7.5.6 Traffic flows along the A4063 at Coytrahen, for 'do nothing' (DN) and 'do something' (DS) construction scenarios are shown in Table 7.5-2, together with the predicted BNLs at 10m from the carriageway.

Table 7.5-2: Predicted Construction Noise Levels, dB L_{Aeq}

Road Link	AAWT 18-hour		% HGV		Speed (kph)	BNL (dB)		Change (dB)
	DN	DS	DN	DS		DN	DS	
A 4063 Coytrahen	14,767	15,247	6%	9.1%	74	72.2	72.9	0.7

- 7.5.7 The results in Table 7.5-2 show that the difference in BNLs between DN and DS scenarios (L_{A10 18hour}) is predicted to result in an increase in sound levels of 0.7 dB adjacent to the A4063, and therefore at NSR05 and receptors along the A4063.
- 7.5.8 With reference to Tables 7.3-3, the magnitude of noise impacts from construction traffic at NSR05 and other receptors along the A4063 at Coytrahen is predicted to be 'Negligible'. With reference to Table 7.3-6, the significance of noise effects associated with construction traffic is therefore 'Negligible'.
- 7.5.9 Specific mitigation measures to reduce noise from construction traffic are therefore not required.

Noise Effects during Operational Phase

- 7.5.10 The predicted sound levels from the operational phase, without mitigation, at the noise sensitive receptor locations are shown in Table 7.5-3 below. Screen shots from the daytime and night-time noise models are provided in the full Noise Assessment (Document Ref. 57100-0219).
- 7.5.11 Daytime sound levels have been predicted to 1.5m above ground level, the approximate height of a ground floor window. Night-time sound levels have been predicted to 4.0m above ground level, the approximate height of a first-floor window, except for NSR02 where night-time sound levels have been predicted at 1.5m as the dwelling is a bungalow.

7.5.12 The predictions have also assumed and taken into account the following;

- The internal sound level from the existing paper machine as measured within the existing Jupiter building has been applied to the whole proposed Department C building, i.e. the measured sound level has been applied to area (roof) and vertical (wall) sources within the model.
- The front section of the Department C building which does not house the paper machine will have an internal reverberant noise level of 85dB (A), in-line with the upper action value contained in the Control of Noise at Work Regulations 2005 produced by the HSE.
- The Department B baler will be fully enclosed. The enclosure will provide a sound insulation value R_w of 40dB(A) (as stated within information provided by the Client).
- Three conveyors will be located externally within the canopied area of Department B.
- The conveyors would be screened by a 10m high steel sheet on the northern and southern boundaries of the canopied area.
- All elements of the walls and roof of Department C will provide a sound insulation value R_w of 50dB(A) (as stated within information provided by the Client).
- The walls and roof of Department F will provide a sound insulation value R_w of 40dB(A) (as stated within information provided by the Client).
- Any 'bin dragging' (as observed on-site) as part of the pulp storage/bale handling extension will take place for 30 seconds in any one hour, during daytime hours only (as observed on-site).
- One electric clamp truck (60 movements per hour), one diesel clamp truck for unloading (20 movements per hour) and one baler will operate within Department B at any one time, during the daytime.
- One electric clamp truck (60 movements per hour) and one baler will operate within Department B at any one time, during the night-time.
- One forklift will be operating within the Department F warehouse building.
- One forklift will be operating within the Department F shipping building.
- Roof extract heights and sound levels as per information provided by the Client.
- Roof extracts will operate for 100% of the time.

Table 7.5-3: Predicted Operational Specific Sound Levels, Free-Field dB

Location	Period	Predicted Sound Level, L
NSR01	Daytime	31.2
	Night-Time	27.6
NSR02	Daytime	26.5
	Night-Time	27.4
NSR03	Daytime	32.4
	Night-Time	30.5
NSR04	Daytime	30.8
	Night-Time	29.2

7.5.13 With the inclusion of the following penalties the rating level of the proposed development at the noise sensitive receptors assessed are detailed in Table 7.5-4. In accordance with BS4142:2014+A1:2019 the noise levels have been rounded to the nearest whole number.

- Tonal Penalty: 2dB; Tonal sound from the proposed development is expected to be just perceptible, based on observations of existing operations at site and at all the receptor locations during the daytime and night-time.
- Impulsive Penalty: 0dB. It is anticipated that none of the proposed sound sources would be impulsive. No impulsivity penalty is required.
- Intermittency: 3dB. Over the reference time of 1-hour during the day, and 15-minutes during the night, if the site is operating it is expected that noise could be intermittent at receptors NSR02 due to nearby proposed HGV and loading operations. No adjustment has been made for intermittency at receptors NSR01, NSR03 and NSR 04 due to distance and screening by the intervening buildings.
- Other sound characteristics: 0dB. It is anticipated that none of the noise sources would have any sound characteristics that differ to those already existing at the site.
- **Total penalty:** 5dB at NSR02 and 2dB at NSR's 01, 03 and 04.

7.5.14 The penalties described above have been added to the predicted sound levels shown in Table 7.5-3 to derive the rating levels at each of the nearest noise-sensitive receptors.

7.5.15 The rating levels have then been compared to the derived background sound levels to calculate the assessment levels, and then assessed accordingly.

7.5.16 The results of the BS4142:2014+A1:2019 assessment are shown in Table 7.5-4. It is noted that rating levels and the background sound levels have been rounded to the nearest decibel.

Table 7.5-4: BS4142 Assessment without Mitigation, dB

Receptor	Period	Predicted Specific Sound Level, LAeq,T	Predicted Rating Level, LAr,T	Derived Background Sound Level LA90	Predicted Rating Level, LAr,T - Background Sound Level LA90 Difference (Assessment Level)
NSR01	Daytime	26	28	43	-10
	Night-Time	26	28	41	-11
NSR02	Daytime	26	31	49	-17
	Night-Time	27	32	37	-5
NSR03	Daytime	24	26	46	-12
	Night-Time	27	29	41	-8
NSR04	Daytime	19	21	46	-13
	Night-Time	19	21	41	-10

- 7.5.17 The results in Table 7.5-4 show that the magnitude of noise impacts associated with the operation of the proposed development is predicted to be:
- 'None' at all assessed Receptors during the daytime;
 - 'None' at Receptors NSR01 and NSR04 during the night-time; and
 - 'Negligible' at Receptors NSR02 and NSR03 during the night-time.
- 7.5.18 With reference to Tables 7.3-4 and 7.3-6, the results in Table 7.5-4 also show that the significance of noise effects associated with the operation of the proposed development is predicted to be:
- 'None' at all assessed Receptors during the daytime;
 - 'None' at Receptors NSR01 and NSR04 during the night-time; and
 - 'Negligible' at Receptors NSR02 and NSR03 during the night-time.
- 7.5.19 With reference to the Scoping Opinion, the Local Planning Authority requires noise rating levels to be 10dB below the background sound level. The results in Table 4-4 show that the daytime noise rating levels at all receptors are predicted to be at least 10dB below the background level during the daytime. Predicted rating levels therefore comply with the LPA criteria, and mitigation is not required to reduce sound levels further during the daytime period.
- 7.5.20 The noise rating levels at Receptors NSR01 and NSR04 are predicted to be at least 10dB below the background level during the night-time. Predicted rating levels at these receptors therefore comply with the LPA criteria.
- 7.5.21 The noise rating level at Receptor NSR03 is predicted to be 8dB below the background level during the night-time. At NSR03, the Department C building contributes significantly to the specific sound level. Within the sound predictions, the internal sound level from the existing paper machine as measured within the existing Jupiter building has been applied to the whole proposed Department C building, leading to likely over prediction of sound levels. As the sound contribution from Department C can be expected to be lower in actuality, the rating level is predicted to be 8dB below the background level and impact significance has been determined as 'Negligible', it is considered that mitigation measures to reduce sound levels further at receptor NSR03 are not necessary.
- 7.5.22 The noise rating level at Receptor NSR02 is predicted to be 5dB below the background level during the night-time. As the difference between the rating level and the background level is 5dB, mitigation will be required to reduce the rating level sufficiently to satisfy the requirement. Mitigation measures are outlined in the next section of this assessment
- 7.5.23 With reference to Tables 7.3-4 and 7.3-6, the impact magnitude and significance of operational noise effects during the daytime and night-time periods, at each receptor, are shown in Table 7.5-5.

Table 7.5-5: Operational Noise Effect Impact Magnitude and Significance

Receptor	Period	Predicted Specific Sound Level, LAeq,T - Derived Background Sound Level LA90	Impact Magnitude	Significance of Effect
NSR01	Daytime	-15	None	None
	Night-Time	-13	None	None
NSR02	Daytime	-18	None	None
	Night-Time	-5	Negligible	Minor adverse
NSR03	Daytime	-20	None	None
	Night-Time	-12	None	None
NSR04	Daytime	-25	None	None
	Night-Time	-20	None	None

7.5.24 The results in Table 7.5-5 show that the magnitude of noise impacts associated with the operation of the proposed development is predicted to be:

- 'None' at all assessed Receptors during the daytime;
- 'None' at Receptors NSR01, NSR03 and NSR04 during the night-time; and
- 'Negligible' at Receptor NSR02 during the night-time.

7.5.25 The results in Table 7.5-5 also show that the significance of noise effects associated with the operation of the proposed development is predicted to be:

- 'None' at all assessed Receptors during the daytime;
- 'None' at Receptors NSR01, NSR03 and NSR04 during the night-time; and
- 'Minor adverse' at Receptor NSR02 during the night-time.

7.5.26 With reference to Section 2.3, the LPA requires noise rating levels to be 10dB below the background sound level. The results in Table 4-4 show that the daytime noise rating levels at all receptors are predicted to be at least 10dB below the background level during the daytime. Predicted rating levels therefore comply with the LPA criteria, and mitigation is not required to reduce sound levels further during the daytime period.

7.5.27 The noise rating levels at Receptors NSR01 and NSR04 are predicted to be at least 10dB below the background level during the night-time. Predicted rating levels at these receptors therefore comply with the LPA criteria.

7.5.28 The noise rating level at Receptor NSR03 is predicted to be 8dB below the background level during the night-time. At NSR03, the Department C building contributes significantly to the specific sound level. Within the sound predictions, the internal sound level from the existing paper machine as measured within the existing Jupiter building has been applied to the whole proposed Department C building, leading to likely over prediction of sound levels. As the sound contribution from Department C can be expected to be lower in actuality, the rating level is predicted to be 8dB below the background level and impact significance has been

determined as 'Negligible', it is considered that mitigation measures to reduce sound levels further at receptor NSR03 are not necessary.

- 7.5.29 The noise rating level at Receptor NSR02 is predicted to be 5dB below the background level during the night-time. As the difference between the rating level and the background level is 5dB, mitigation will be required to reduce the rating level sufficiently to satisfy the requirement. Mitigation measures are outlined in the next section of this assessment

Vibration Effects during Construction Phase

- 7.5.30 The closest vibration-sensitive residential properties to the proposed development are Brynllwarch Farm (NSR01) and Brynsiriol Farm (NSR02) at a distance of 65m and 70m respectively.
- 7.5.31 On the basis of these figures, it is highly unlikely that vibration from construction operations would be perceptible and mitigation measures are considered unnecessary.
- 7.5.32 Vibration will also be controlled such as to not interfere with the operation of the existing paper machine which is highly sensitive in terms of vibrations.
- 7.5.33 Another potential source of vibration related to the operation of the development would be vehicles on the road network in particular trucks serving the proposed facility. However, these sources already exist, and there would be no significant increase in traffic and consequently in vibration magnitude, simply a small increase in event numbers during the construction phase. Hence, any impact from vibration related to additional traffic would be temporary and insignificant.

Vibration Effects during Operational Phase

- 7.5.34 The assessment divides the whole mechanical system into the subsystems emission of vibrations by machine operation (A), transmission by wave propagation in machine foundations and subsoil (B) as well as emission of vibration and secondary noise in residential buildings (C).

(A) Machine Operation

- 7.5.35 Tissue machinery induces continuous machine vibrations from rotating equipment within a frequency range from 3-25 Hz as turning frequencies as well as multiples thereof from harmonics.
- 7.5.36 The amplitudes mainly from residual unbalances are limited due to high product quality requirements like basis weight fluctuations. This implicates the necessity for precision balancing with grades of G 1.0-2.5 according to ISO 1940 and a machine installation on rigid and heavy concrete foundations. Furthermore, machine vibrations have to be limited for maintenance, operational safety, energy consumption, and noise emissions. Guidelines for machine vibrations are provided in ISO 10816 (e.g. 4.5mm/s for permanent operating machinery) and/or machine suppliers. The machine foundations have to be designed according to dynamic principles in order to provide enough mass inertia, structural stiffness and damping. Therefore, concrete framework structures with beams, columns, walls and raft foundations are constructed to diminish machine vibrations at machine footplates to 1.0mm/s. A massive raft foundation with ground support or piles cause further vibration

reductions at ground level close to the human perception threshold of 0.1 mm/s (vibration velocity according to DIN 4150-2) or 15 mm/s' (vibration acceleration according to ISO 2631-1).

(B) Transmission by wave propagation in machine foundations and subsoil

- 7.5.37 Structural vibrations are transmitted to the soil and propagate as body or surface waves. This wave propagation combined with material damping attenuates the amplitudes further. For a distance of 340m between the closest residential property and the new tissue machine and wet clay an amplitude of 0.004 mm/s can be calculated (DIN 4150-1). A possible transmission path for body waves in piles and bedrock in a depth of 6-15 m is not given for residential buildings without pilings connected to the same bedrock layer. Therefore, a direct structure born noise generation with subsequent secondary low frequency noise emission do not occur.

(C) Emission of vibration and secondary noise in residential buildings

- 7.5.38 Due to resonance effects in buildings especially floor slabs, the predicted amplitudes must be increased by a resonance factor of 5.0-10.0 yielding not more than $0.004 \times 10 = 0.04\text{mm/s}$, which is well below the perception threshold.
- 7.5.39 Consequently, vibrations from the paper machine results in vibration levels which are well below the human perception threshold. They are therefore considered not significant.

7.6 Mitigation Measures

Construction Noise Mitigation

- 7.6.1 The assessment has shown that specific mitigation measures to reduce sound levels during the construction phase are not required.
- 7.6.2 Notwithstanding the above, several safeguards exist in order to control and minimise the effects of construction noise, and these would apply during the construction phase. These include:
- European Commission (EC) Directives and United Kingdom (UK) Statutory Instruments of control noise emissions from construction plant;
 - The guidance within BS5228-1:2009+A1:2014 on the control of noise from construction sites; and
 - Section 60 of the Control of Pollution Act 1974, which gives local authorities the power to control noise from construction sites
- 7.6.3 The adoption of Best Practicable Means is usually the most effective means of controlling noise from construction sites. Experience has shown that by implementing these measures, typical noise levels from construction activities could be reduced by 5dB or more. Furthermore, problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach with local residents.
- 7.6.4 As construction activities would be temporary in nature, and noise levels have been predicted for a worst-case scenario, no specific mitigation measures are considered necessary.

Operational Noise Mitigation

- 7.6.5 The assessment has shown that predicted noise rating levels for the operation of the development are expected to exceed the LPA criteria of 10dB below the background sound level at Receptor NSR02 during the night-time. Mitigation measures will therefore be required to achieve acceptable sound levels at this location.
- 7.6.6 To identify a suitable mitigation strategy, Cadna-A noise modelling has been used to test and identify suitable mitigation measures to be implemented, as follows:
- Installation of a 6m high acoustically sound barrier to provide screening between the proposed Department E Shipping Area and HGV parking area.
 - A reduction of 50% in HGV movements during the night-time period (as in Table 7.3-12 shown within the 'Hourly for Model' column in Table) during the night-time period.
 - External loading of no more than one vehicle at a time, i.e. although more than one vehicle may be parked for loading, external noise sources used for the loading of multiple vehicles must not operate concurrently.
- 7.6.7 The predicted night-time sound levels of the operational phase at the noise sensitive receptor locations, with mitigation measures in place, are shown in Table 7.6-1 below. Screen shots from the night-time noise model are shown in Appendix 7-1.

Table 7.6-1: BS4142 Assessment with Mitigation, dB

Receptor	Period	Predicted Specific Sound Level, LAeq,T	Predicted Rating Level, LAr,T	Derived Background Sound Level LA90	Predicted Rating Level, LAr,T - Background Sound Level LA90 Difference (Assessment Level)
NSR01	Night-Time	28	30	41	-11
NSR02		21	26	37	-11
NSR03		31	33	41	-8
NSR04		29	31	41	-10

- 7.6.8 The results in Table 7.6-1 show that, with reference to Table 2-6, with the implementation of the proposed mitigation strategy, the significance of noise effects associated with the operation of the proposed development is predicted to be 'None' at Receptors NSR01, NSR02 and NSR04, and 'Negligible' at NSR03.

7.7 Residual Effects

- 7.7.1 The results in Table 7.6-1 show that, with the implementation of the proposed mitigation strategy to attenuate operational sound, the significance of effects will be 'Negligible' or 'None'.
- 7.7.2 No residual effects are therefore expected to result. A summary of the construction and operational noise effects is shown in Table 7.8-1.

7.8 Summary and Conclusion

Table 7.8-1: Summary of Effects

Receptor	Characterisation of the Impact	Sensitivity of Receptors	Worst Case Impact Magnitude	Worst Case Potential Significance and Nature of Effect	Additional Mitigation	Worst Case Residual Impact Magnitude	Worst Case Residual Significance and Nature of Effect
NSR01 Brynllwarch Farm	Construction	High day Very high night	None	None	No	None	None
	Operational – Fixed Plant & On-site Traffic		None	None	No	None	None
	Operational – Off Site Traffic		N/A	N/A	N/A	N/A	N/A
NSR02 Brynsiriol Farm	Construction	High day Very high night	None	None	No	None	None
	Operational – Fixed Plant & On-site Traffic		Negligible	Negligible	Yes	None	None
	Operational – Off Site Traffic		N/A	N/A	N/A	N/A	N/A
NSR03 Cefn Ydfa Farm	Construction	High day Very high night	None	None	No	None	None
	Operational – Fixed Plant & On-site Traffic		Negligible	Negligible	No	Negligible	Negligible
	Operational – Off Site Traffic		N/A	N/A	N/A	N/A	N/A
NSR04 Ty Isaf	Construction	High day Very high night	None	None	No	None	None
	Operational – Fixed Plant & On-site Traffic		None	None	No	None	None
	Operational – Off Site Traffic		N/A	N/A	N/A	N/A	N/A
NSR05 Coytrahen	Construction	High day Very high night	Negligible	Negligible	No	Negligible	Negligible
	Operational – Fixed Plant & On-site Traffic		N/A	N/A	N/A	N/A	N/A
	Operational – Off Site Traffic		N/A	N/A	N/A	N/A	N/A

Conclusions

Noise

- 7.8.1 SLR Consulting Ltd (SLR) has been appointed on behalf of WEPA UK Limited to prepare this Noise Impact Assessment in support of plans for the extension of their existing paper mill site in Bridgend.
- 7.8.2 This report has considered the impact of the proposed development upon the noise environment at identified sensitive receptor locations.
- 7.8.3 This report has described the scope, relevant legislation, assessment methodology, and the baseline conditions existing at the site and its surroundings. It considers any potential significant effects the proposed development would have on this baseline environment; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.
- 7.8.4 The impact of the proposed development during its construction has been considered and this has been referenced to the guidance of BS5228-1:2009+A1:2014 and the DMRB. The predicted noise levels from the assumed construction plant for the construction of the development are shown to be below the adopted daytime criterion of 65dB L_{Aeq} at the closest receptors. This is also the case for the total daytime construction noise level, if all construction phases are assumed to be operating concurrently.
- 7.8.5 As this is unlikely to be the case, the total predicted noise levels are therefore the highest noise levels predicted for the construction phase. The predicted noise levels from the assumed construction traffic are shown to lead to no impact at the closest receptors.
- 7.8.6 The significance of effects during the construction phase at all receptors are predicted to be 'None'. The significance of effects due to construction traffic are predicted to be 'Negligible'. Specific mitigation measures to reduce sound levels during construction are therefore not required.
- 7.8.7 The assessment has also considered the noise impact of the proposed development on the surrounding residential area with reference to BS4142:2014+A1:2019 for the operation of fixed plant and on-site vehicle movements.
- 7.8.8 The significance of effects during the operational phase during the daytime are predicted to be 'None' at all receptors. The significance of effects during the operational phase during the night-time the are predicted to be 'Negligible' at two receptors.
- 7.8.9 Suitable mitigation measures have therefore been tested and specified where necessary. With the implementation of the recommended mitigation strategy, the significance of effects is reduced to 'Negligible' at one receptor and 'None' at all other receptors.
- 7.8.10 It is therefore considered that, with the implementation of the mitigation measures, noise should not pose a material constraint to the proposed development.

Vibration

- 7.8.11 Vibrations from the paper machine would result in vibration levels which are well below the human perception threshold. The effects are considered not significant.

8.0 Landscape and Visual Amenity

8.1 Introduction and Scope

Technical Scope

- 8.1.1 This report presents the assessment of landscape and visual effects arising from the proposed development. It describes and assesses the existing landscape and visual resources of the Development Site and its vicinity.
- 8.1.2 This includes identification of the character and features of the landscape and consideration of the changes that will result as a consequence of the extension of the WEPA paper mill (Landscape Character Assessment).
- 8.1.3 In addition, it considers the potential visual effects arising as a result of the proposed development (Visual Amenity Assessment).
- 8.1.4 The assessments are considered separate, although linked, processes.

Landscape Character Assessment

- 8.1.5 Landscape character and resources are considered to be of importance in their own right and are valued for their intrinsic qualities irrespective of whether they are seen by people. Effects on the landscape include physical changes to the landscape as well as changes to landscape character. It may also include effects on areas designated for their scenic or landscape qualities.

Visual Amenity Assessment

- 8.1.6 In relation to 'visual effects', visual amenity is defined as the pleasantness of the view or outlook of an identified receptor or group of receptors. Visual amenity effects are perceived by people and are therefore clearly distinguished from, although closely linked to, effects on landscape character.
- 8.1.7 The visual assessment determines the degree of anticipated change to visual amenity that would occur as a result of the proposed development, considering buildings and roads.

Study Area

- 8.1.8 For this assessment, the potential visual influence within the wider landscape of the proposed development has been obtained through field survey aided by the presence of existing tall structures such as the existing 40m high stack of the WEPA power plant, and a number of pylons of overhead high voltage cables. These existing structures have been used as locational and height reference points to assist with the likely visibility of the proposed development, selection of viewpoints and assessment of effects.
- 8.1.9 Using the existing paper mill and the pylons as a guide, it was observed that at distances greater than approximately 4 km a development of the scale proposed will not be visible to the naked eye. The existing paper mill is visible at distances approximately 3 km from the site, but it has little impact on the view. Therefore, for this assessment, the study area for both the landscape and visual impact assessment includes the area within a 2 km radius around the development site. (Figure 8.1-1).

Land use in the study area

- 8.1.10 The WEPA mill site is bordered to the south and west by the A4063. The River Llynfi runs to the east of the site. To the north of the site, there are open fields and farmland. In the immediate surrounding of the site, sheep farming is the predominant land use. Woodland cover in the area is generally sparse, mainly confined to lining roads, around villages and along small streams and rivers such as the River Llynfi and its tributaries.

Figure 8.1-1: Study area



Source: Bing Maps

Objectives of this Assessment

- 8.1.11 This section presents the results of the Landscape Statement that assesses the potential landscape and visual impacts of the proposed development (Document Ref.: 57100-0212).
- 8.1.12 Specifically, the LVIA addresses the following:
- landscape planning context for the development including a review assessment of the relevant landscape designations and the planning policies;
 - landscape character and condition of the site and its relationship with the surrounding area;
 - visual prominence of the proposed development within the surrounding landscape and the identification of representative visual receptors;

- the significance of the impacts arising from the new development on landscape character and landscape elements and features within the development site boundary; and
- the significance of the impacts arising from the development on representative visual receptors from locations within the short, middle and long distance.

8.2 Legislation and Planning Context

Planning Policies

- 8.2.1 Legislation and the key planning policies relating to landscape and visual issues are summarised below.

Table 8.2-1 Planning Policies for Landscape

Policy	Summary of Policy
National	
Planning Policy Wales (PPW)	Chapter 6.3.3 states that “All the landscapes of Wales are valued for their intrinsic contribution to a sense of place, and local authorities should protect and enhance their special characteristics, whilst paying due regard to the social, economic, environmental and cultural benefits they provide, and to their role in creating valued places.”
	Referring to the non-designated landscape as “Common Land” Chapter 6.3.17 of PPW states that Common land is a finite resource and should not be developed unnecessarily. It is important in agricultural terms and valued for its leisure and environmental interests, particularly its significant role in habitat conservation.”
County and Local	
Policy ENV3 – Special Landscape Areas	Development in Special Landscape Areas (SLAs) will only be permitted where: <ol style="list-style-type: none"> 1) It retains or enhances the character and distinctiveness of the SLA; 2) The design of the development reflects the building traditions of the locality in its form, materials and details, and/or assimilates itself into the wider landscape; and 3) The proposed development is accompanied by a landscape assessment, which takes into account the impact of the development and sets out proposals to mitigate any adverse effects.
Strategic Policy SP4 – Conservation and Enhancement of the Natural Environment	Development which will conserve and, wherever possible, enhance the natural environment of the County Borough will be favoured. Development proposals will not be permitted where they will have an adverse impact upon: <ul style="list-style-type: none"> • The integrity of the County Borough's countryside; • The character of its landscape; • Its biodiversity and habitats; and • The quality of its natural resources including water, air and soil.

Policy	Summary of Policy
	Areas having a high and/or unique environmental quality will be protected and the following strategically important areas within the County Borough will specifically be protected from inappropriate development, which directly or indirectly impacts upon them.
SPG19: Biodiversity and Development: A Green Infrastructure Report	<p>This guidance outlines how the Council will expect habitats to be considered as part of development proposals within the County Borough of Bridgend. It also introduces the concept of adopting a Green Infrastructure Approach to development.</p> <p>All major and sensitive developments will be expected to make a positive contribution toward enhancing green infrastructure. For all major development, it is recommended that planning, landscape, arboricultural and ecological consultants should be used to provide guidance on the type and location of green infrastructure appropriate within the proposal. As part of the information gathering phase process specific surveys may need to be undertaken such as:</p> <ul style="list-style-type: none"> • Extended Phase I Habitat Survey, • Protected Species Survey • Tree Survey • Landscape Character and Visual Impact Appraisals

Landscape Designations

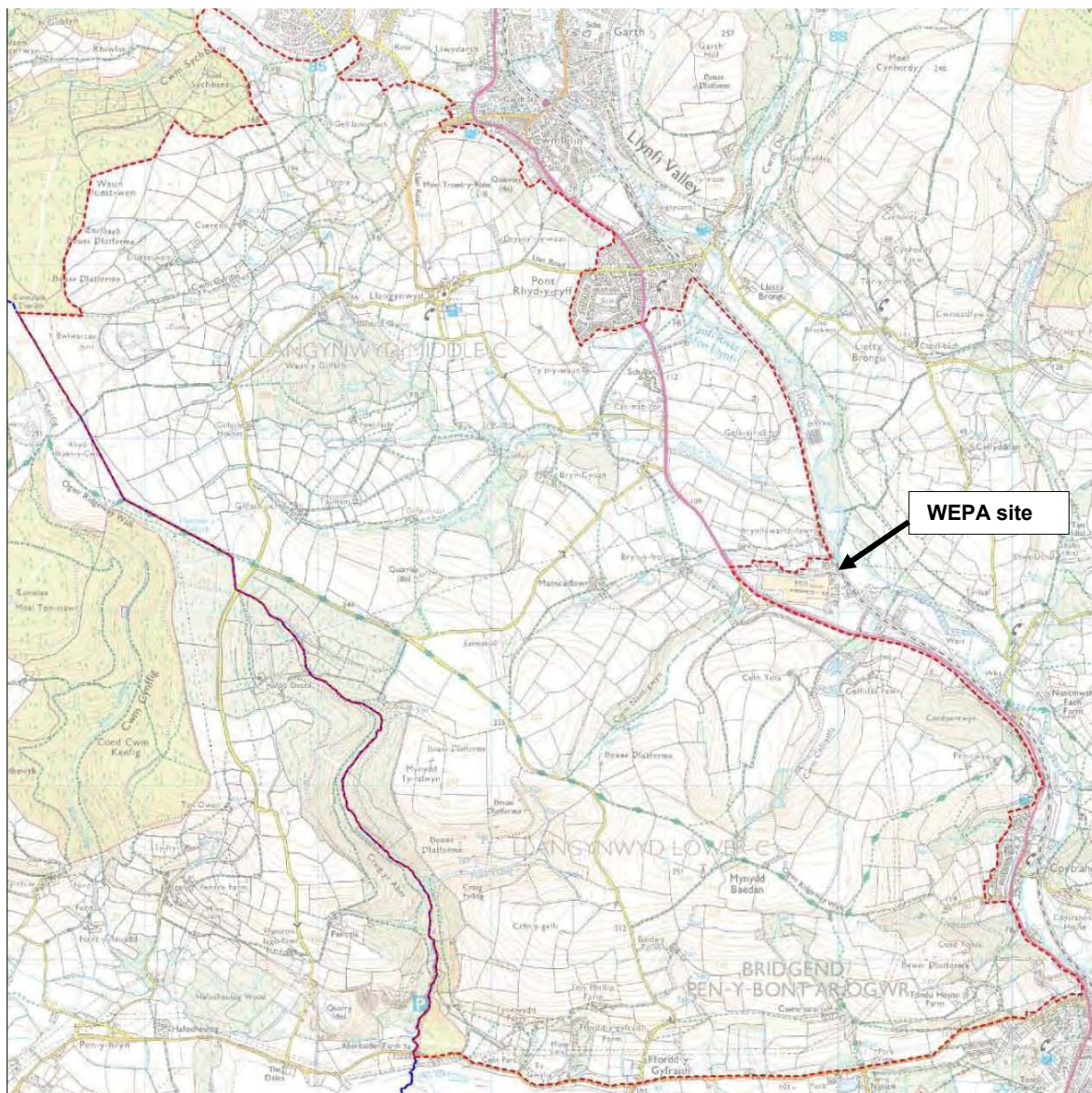
- 8.2.2 The designation of landscapes indicates a recognised value placed by society on a landscape. Whilst there are no statutory landscape designations in the vicinity of the application site, the non-statutorily designated Special Landscape Area SLA 3 is intervisible with the development site.

Special Landscape Area SLA 3

- 8.2.3 Special Landscape Areas (SLAs) are non- statutory designations used by local planning authorities as a means of protecting sensitive landscapes and in developing an understanding and awareness of those features and characteristics that give local areas a sense of place.
- 8.2.4 The development site is located at the boundary of SLA 3 Western Uplands, which is characterised by a distinctive agricultural landscape on the western flank of the County Borough between Maesteg and Aberkenfig rising up to 200m AOD. It has a historically and culturally important landscape. It comprises a series of north eastern facing slopes, ranging from 120m to 350m AOD, typically dominated by rough grazing. It has a number of plantations and small woodlands that contribute to the overall character and quality of the area. The geography of the landscape of this SLA is typical of much of the area, showing evidence of glaciation - classic u-shaped valley with truncated side valleys. Despite the presence of coal measures and other stone quarrying, the area retains a largely rural, agricultural character.

8.2.5 The important historic and cultural associations are reflected in landscape archaeology including the settlement of Llangynwyd and its hinterland. Despite the proximity of industrial towns, it retains a distinct rural form and character.

Figure 8.2-1: Location Plan of SLA 3: Western Uplands

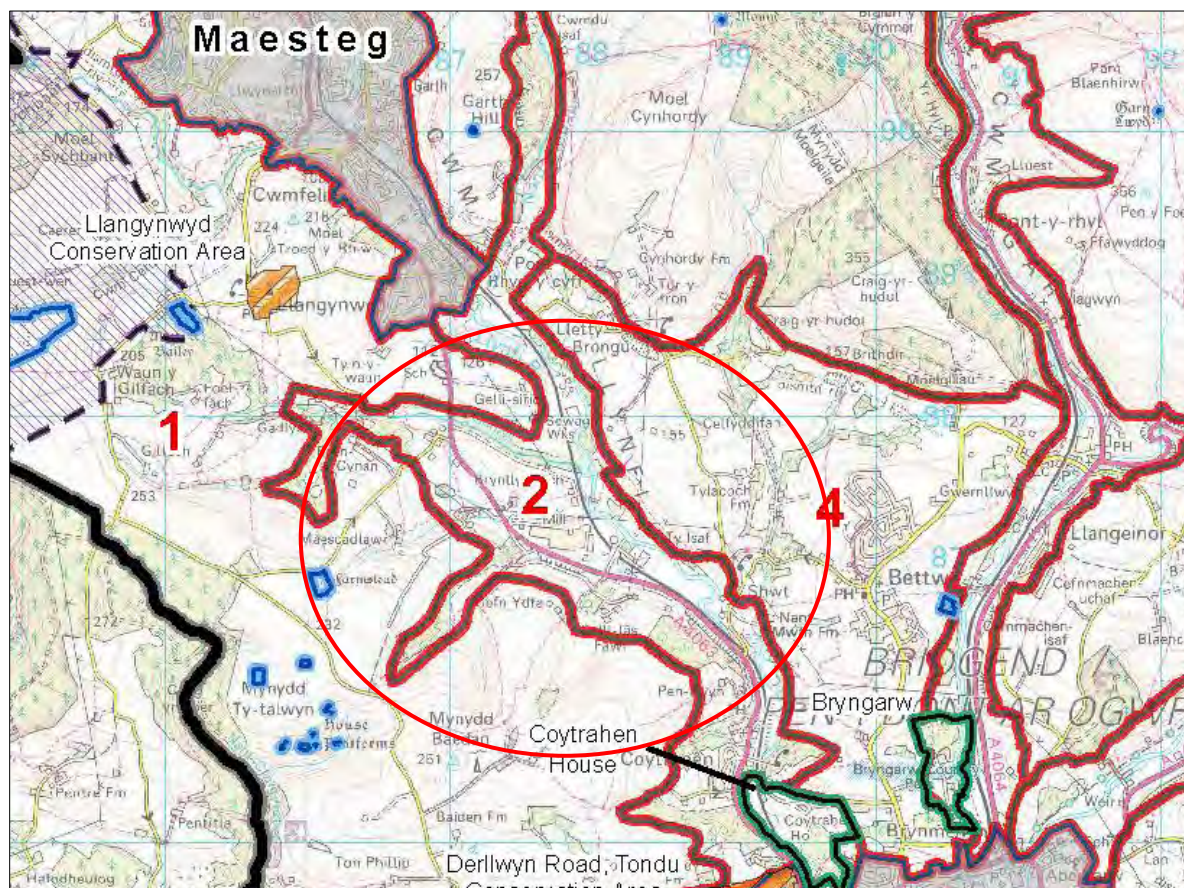


Reference: Bridgend County Borough Council, Designation of Special Landscape Areas, March 2010

Historic Designations

- 8.2.6 There are no registered 'Areas of Landscapes of Historic Interest' nor 'Parks and Gardens of Historic Interest' within the Study Area or intervisible (which could affect setting) with the Development.
- 8.2.7 There are no registered Conservation Areas within the Study Area or intervisible (which could affect setting) with the Development.

Figure 8.2-2: Historic Designations in Bridgend County Borough



Reference: LCA for Bridgend County Borough (2013); red circle = 2km radius study area

8.3 Assessment Methodology

Guidance

8.3.1 The landscape and visual impact assessment (LVIA) has been undertaken in accordance with relevant guidance provided in the following publications:

- Guidelines for Landscape and Visual Impact Assessment (Landscape Institute and Institute of Environmental Management and Assessment, 3rd Edition, 2013;
- Countryside Council for Wales / CADW (2007) 'Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process'; and
- Advice Note 01/11: Photography and Photomontage in Landscape and Visual Impact Assessment, Landscape Institute (2011).

Desk Study

8.3.2 As part of the desk study the baseline landscape and visual resource was defined within a 2.0 km radius study area and the main users of the area, key viewpoints and key features were identified.

8.3.3 Existing data such as Ordnance Survey Maps, detailed ordnance survey map data for the site, the Local Development Plan, plans, elevations and cross-sections of the proposed development were reviewed in order to identify suitable viewpoints. The size of the study area has been based on the scale and the likely visibility of the proposed development.

Field Survey / Assessment

8.3.4 The assessment of potential effects has used information gathered from site visits, and site photographs. Photomontage impressions have been generated from a selection of these photographs to indicate the potential changes in views from selected locations.

Photographs and Panoramas

8.3.5 Using computer aided design and visualisation software, a 3D model of the proposed development and of the topography of the surrounding area was created. Views of the proposed development were generated, to correspond to the photographic panorama. The photomontages were prepared by combining the computer-generated views with the photographic image, using graphics software to create the final image.

8.3.6 All photographs have been taken with a digital camera, with 70mm focal length lens, mounted on a level panoramic head tripod. They seek to illustrate the full extent of the proposals within the local landscape that would be experienced at each viewpoint.

8.3.7 The criteria for selection were that they are:

- representative of the dominant aspects of the proposed development from different directions,
- from publicly accessible viewpoints where numbers of people might be expected to linger, or, if travelling, where the same view was held for some distance

8.3.8 In each case, the direction of view from the viewpoint is that towards the proposed development. The photomontages indicate the location, scale and massing profile, without showing architectural details. The location, scale and massing relate directly to the information illustrated in the plans and drawings accompanying the planning application documents.

8.4 Assessment Criteria

8.4.1 In order to provide a level of consistency to the assessment, the prediction of magnitude and assessment of significance of visual effects will be on the following pre-defined criteria.

Sensitivity of the Landscape Characters to Change

8.4.2 The capacity of the landscape to accept change of the type and scale proposed has to be assessed based on the vulnerability of each landscape character area to degradation through the introduction of new features, or through the loss of existing features. The sensitivity to change for various areas is illustrated within Table 8.4-1. A three-point scale has been adopted which broadly defines landscape areas relative to their quality and their capacity to accept changes arising from the Proposed Development. The degree of sensitivity to change relates to existing land use; the pattern and scale of the landscape, visual enclosure/openness of views and location of visual receptors, the scope for mitigation and the value placed on the landscape. The scale is as follows:

Table 8.4-1: Sensitivity to Change Rating (Landscape Character)

Sensitivity Rating	Criteria Description
High sensitivity to change	<p>A landscape of particularly distinctive character and scenic quality where any development would greatly affect landscape character and 'sense of place'. Where mitigation would be required but effective mitigation would be difficult to achieve.</p> <p>This would include:</p> <ul style="list-style-type: none"> Nationally and regionally designated landscape for its scenic quality and character; Iconic landscape of national significance; Contains features or sites of national importance; and Landscape characteristics very highly sensitive to development
Medium sensitivity to change	<p>A landscape of moderately valued characteristics and scenic quality where some types of development would have an effect on landscape character and 'sense of place'. Where mitigation would be required but effective mitigation results may take time to be effective.</p> <p>This would include:</p> <ul style="list-style-type: none"> Locally designated landscape for its scenic quality and character, contains some features of interest; The landscape is relatively intact, with a distinctive character; The landscape is reasonably tolerant of change;

Sensitivity Rating	Criteria Description
	<ul style="list-style-type: none"> Undesignated landscape which may be valued locally - for example an important open space; and Landscape with relatively ordinary characteristics, some detractors.
Low sensitivity to change	<p>A landscape of no distinctive character and scenic quality where most types of development would be accommodated without affecting landscape character and 'sense of place'. Where effective mitigation would be readily achievable.</p> <p>This would include:</p> <ul style="list-style-type: none"> Relatively degraded or low value landscape with no designations; Landscape in poor condition and a degraded character; No designations present; Extensive detractors overwhelm sense of place No features of interest; and Characteristics not affected by development.

Sensitivity of Visual Receptors

8.4.3 Visual receptors are those who will potentially see the proposed development from particular locations or viewpoints. They typically include the users of public footpaths, cycle routes and published walks; visitors to tourist attractions, residents; users of recreation and amenity open spaces; users of public roads, railways, navigable waterways; and workers (in their workplace). The sensitivity of visual receptors depends upon the location of the viewpoint, the activity of the receptors, and their expectations in relation to the view. The criteria for the assessment of visual receptor sensitivity are provided in Table 8.4-2. Sensitivity of the visual receptors is classified as high, medium or low.

Table 8.4-2: Definition of Visual Receptor Sensitivity

High	<p>Viewers' attention likely to be focused on the landscape or have high interest in their everyday visual environment and/or with prolonged and regular viewing opportunities.</p> <p>Such receptors would include:</p> <ul style="list-style-type: none"> Occupiers of residential properties; Visitors to tourist attractions; Recreational receptors using recreational facilities such as National Cycle Routes, National Trails, and designated long distance footpaths; Recreational receptors using public rights of way or viewpoints in nationally or locally designated landscapes; People experiencing views from important landscape features of physical, cultural or historic interest, beauty spots and picnic areas; Large number of viewers and/or location in highly valued landscape could elevate viewer sensitivity to highest.
-------------	---

Moderate	<p>Viewers with moderate interest in their environment, and discontinuous and/or irregular viewing periods.</p> <p>Such receptors would include:</p> <ul style="list-style-type: none"> • Users of schools; • Local viewpoints; • Road or rail users – travellers and passengers of moving vehicles. • Users engaged in outdoor sport or recreation other than appreciation of the landscape (i.e., hunting, shooting, golf, water-based activities) • Users of secondary footpaths or footpaths that may be already impacted by intrusive features
Low	<p>Viewers with a passing interest in their surroundings and momentary viewing periods.</p> <p>Such receptors include:</p> <ul style="list-style-type: none"> • People engaged in outdoor sports or recreation where enjoyment of the landscape is incidental rather than the main interest; • people in commercial buildings or commercially engaged pedestrians, whose attention may be focused on their work or activity rather than the wider landscape; • Drivers/travellers and/or passengers of moving vehicles including trains. • People at their place of work, including agricultural workers and other non-motorised users on most roads or those already impacted by intrusive features.

Magnitude of Impacts

- 8.4.4 According to Guidelines for Landscape and Visual Impact Assessment (GLVIA 3) (IEMA 2013), the magnitude of impacts is described as a “combination of the scale, extent and duration of an effect. The magnitude of landscape and visual impacts are judged using the criteria set out below.

Magnitude of Landscape Impacts

- 8.4.5 The magnitude of landscape impacts is defined as high, medium, low, or negligible depending on the following factors:
- Scale and degree of change to the existing landscape resource;
 - Nature and duration of the change caused by the proposed development (e.g. beneficial or adverse)
 - Timescale or phasing of the proposed development

Magnitude of Visual Impacts

- 8.4.6 The magnitude of visual impacts is defined as high, medium, low or negligible depending on the following factors:
- The scale of change in the view with respect to the loss and/ or addition of new features;

- The degree of contrast, or integration of / compatibility with any new features with existing features in the view;
- The duration of the effect (temporary or permanent, intermittent or continuous). Temporary effects are considered to be less significant than longer term or permanent effects;
- The distance of the receptor from the source of the effect;
- The angle of view and presence of intervening vegetation or features;
- The dominance of the impact feature in the view.

8.4.7 It is assumed that the visual effects of the Project will reduce as viewing distance increases. The magnitude of visual effects at any given distance will vary according to a range of factors. They include the extent of the new buildings and structures that would be visible; their position in the view; the presence of other conspicuous features; and the extent to which views of the Project would be screened or filtered by intervening landform or by landscape elements such as trees, woodlands, hedgerows, or built structures; and the extent of mitigation planting.

Assessment Criteria for Magnitude of Impacts

8.4.8 Criteria used to assess the magnitude of predicted landscape and visual amenity effects are set out the Table below.

Table 8.4-3: Definition of Magnitude of Effects

Magnitude	Landscape Effects	Visual Effects
High	Total permanent/ long term loss or major change to key landscape features or elements of the baseline that is important to character.	Total permanent/ long term loss or major change in the existing view, change very apparent involving high level of change in character and composition of baseline, i.e. pre-development view
Medium	Notable partial/ long term loss or alteration to one or more key landscape features or elements of the baseline that is important to character.	Notable partial/ long term loss or alteration to the existing view, change apparent involving change in character and composition of baseline, i.e. pre-development view
Low	Minor permanent/ long-term loss or alteration to one or more key landscape features or elements of the baseline that is important to character.	Minor permanent/ long term loss or alteration in baseline, i.e. pre-development view, change will be distinguishable from the surroundings whilst composition and character of view, although altered will be broadly similar to pre-change circumstances
Negligible	Very minor permanent/ long term loss or change to one or more key landscape features or elements of the baseline that are important to character.	Very minor permanent/ long term loss or change in the existing view, change barely distinguishable from surroundings. Character and composition of view substantially unaltered

Evaluating the significance of Landscape / Visual effects

8.4.9 The significance of effects combines the **sensitivity** of the receptor and the degree to which the receptor would be affected (i.e. **magnitude** of effect). The significance of effect is expressed on the following scale:

- Large;
- Moderate;
- Slight;
- Neutral.

Table 8.4-4: Assessing the Significance of Landscape / Visual Effects

VISUAL SENSITIVITY	High	Very Large / Large	Large / Moderate	Moderate	Slight
	Medium	Large	Moderate	Slight / Moderate	Slight / Neutral
	Low	Moderate	Moderate / Slight	Slight / Neutral	Slight / Neutral
		High	Medium	Low	Negligible
		MAGNITUDE OF EFFECT			

8.4.10 Where visual effects have been identified as **large** or **large / moderate**, this is considered a significant effect. It should be noted that significant impacts need not be unacceptable, or necessarily negative, and may be reversible.

8.4.11 Judgements on the overall significance of effect need to be determined using informed and well-reasoned professional judgement. To help guide the judgements the following scale of significance and associated descriptions will be used in the assessment – refer to Table 8.4-5.

Table 8.4-5: Definition of Significance of Landscape / Visual Effects

Significance	Landscape Effects	Visual Effects
Very large	<p>The Project would result in effects that:</p> <ul style="list-style-type: none"> • Are at a complete variance with the landform, scale and pattern of the landscape; • Would permanently degrade, diminish or destroy the integrity of valued characteristic features, elements and/or their setting; • Would cause a very high quality landscape to be permanently changed and its quality diminished; and 	<p>The Project would cause a very significant deterioration in the existing view.</p> <p>The view would be completely lost on a permanent/ very long-term basis.</p> <p>The visual, aesthetic and perceptual qualities would be very substantial altered in detriment to the special qualities/ key characteristics of the landscape and its amenity.</p>

Significance	Landscape Effects	Visual Effects
	<ul style="list-style-type: none"> Will be substantially damaging to a high quality landscape. 	
Large	<p>The Project would:</p> <ul style="list-style-type: none"> Be out of scale with the landscape or at odds with the local pattern and landform; and Will leave an adverse impact on a landscape of nationally recognised quality. 	<p>The Project would cause a significant deterioration in the existing view.</p> <p>The view would be partially lost on a permanent/ very long term basis.</p> <p>The visual, aesthetic and perceptual qualities would be significantly altered in detriment to the special qualities/ key characteristics of the landscape and its amenity.</p>
Moderate	<p>The Project would: affect the character of the designated landscape or reason for which it was designated;</p> <p>Be out of scale and/ or out of context with the receiving landscape;</p>	<p>The Project would cause a noticeable deterioration in the existing view.</p> <p>The view would be partially impacted upon.</p> <p>The visual, aesthetic and perceptual qualities would be changed/ altered affecting the special qualities/ key characteristics of the landscape and its amenity.</p>
Slight	Slight or minor change affecting the character of the landscape or the elements therein.	The Project would cause a barely perceptible deterioration in the existing view.
Neutral	No perceptible change affecting the character of the landscape or the elements therein. Includes, 'no effect'.	No discernible deterioration or change in the existing view. Includes, 'no effect'

8.5 Baseline Conditions and Receptors

Site history

- 8.5.1 Prior to development of the mill site most of the land in the area was undeveloped farmland with woodland in the bottom of the Nant Gwyn Valley. The two farmsteads of Brynllwarch-fach and Brynllwarch-fawr were established by 1877, as was the Bridgend to Maesteg railway. Aerial photographs indicate that earthworks were in progress at the mill site by 1947 and Wiggins Teape started production there in 1950 using water from the Afon Llynfi and power and steam from the adjacent Llynfi Power Station. By 1960, the mill was producing tissue from four paper machines. Expansion took place in the early 1960s. By this time, the Nant Gwyn had been culverted, the filtration plant and sludge ponds had been extended and further settling tanks constructed. It was at this time that the three bungalows on the site were constructed. The current "Jupiter" paper machine was installed in 1969.
- 8.5.2 The mill has continued to expand since the 1960s. Parts of the mill site have been used for the tipping of ash from the power station and unsuitable wastes from construction have been deposited to the east of the railway line. Land in the vicinity of the development site has remained undeveloped with only a few buildings being constructed at the surrounding farmsteads.

The Site and the Surrounding Area

- 8.5.3 The development site is situated in a rural area approximately 5km to the south-east of the town of Maesteg, and areas of farmland and woodland lie in all directions. The WEPA mill site is bordered to the south and west by the A4063. The River Llynfi runs to the east of the site. To the north and to the east of the site there are open fields and farmland. In the immediate surrounding of the site, sheep farming is the predominant land use. The wider landscape is made up of open countryside, small agricultural landholdings and open grazing land with small patches of woodland on nearby hills. In the wider countryside, field hedgerows are varied. Around the large grazing fields, they are often gappy, with single old stunted hawthorns or the occasional oak tree. Some boundaries having been grubbed up to form large field sizes, leaving ditches and the occasional solitary tree.
- 8.5.4 The paper mill site occupies a less elevated position (80 - 90m AOD) at the mouth of the Nant Gwyn valley. Currently the paper mill is relatively well hidden due to tree screening along the A4063 and as a result of a dip in the topography; the principal markers approaching from the south are a vent stack and steam plumes. It is, however, highly visible from the road and from elevated vantage points around.

Figure 8.5-1: Development site and surrounding



Reference: Bing Maps; red circle = 2km radius study area

- 8.5.5 There are numerous areas of woodland located within 2km of the proposed development site, the nearest of which lies approximately 20m to the south-west of the site, just beyond the A4063.

Figure 8.5-2: Woodland sites near the development site and in the surrounding

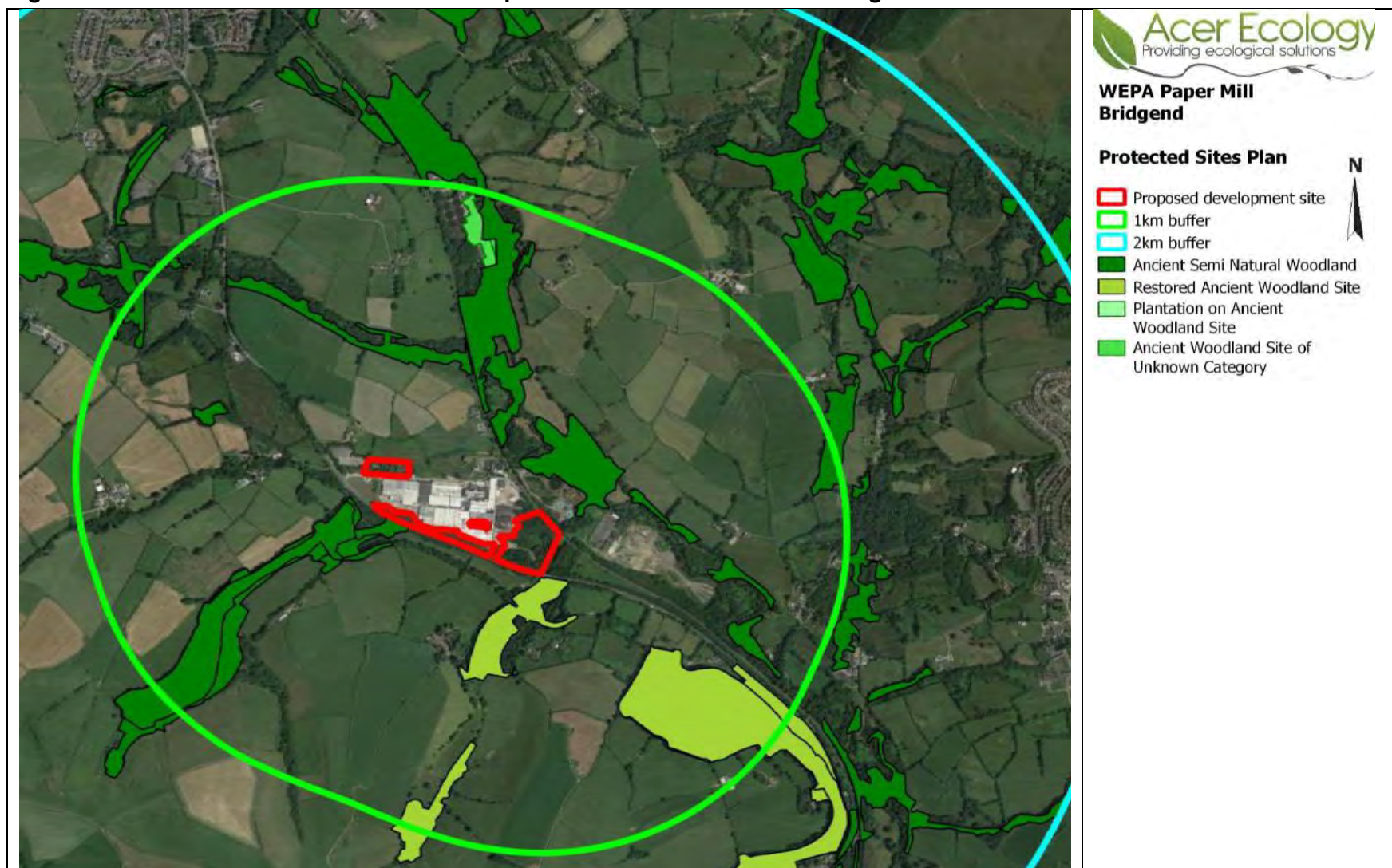


Figure 8.5-3: Habitats and Vegetation



Reference: Acer Ecology 2019

Landscape Character Areas

- 8.5.6 Several studies are of relevance to understanding the character of the landscape in the vicinity of Bridgend mill. The national and local scale assessments provide an important overview of landscape character to understand the site and its wider setting.

National Landscape Character Area (NLCA)

- 8.5.7 At the national scale, the proposed development falls within National Character Area 37 – South Wales Valleys. The landscape of the South Wales Valleys is one of Wales' more widely known images, combining the wilder and often inclement upland setting with the heavily industrialised valleys. Active mines and industry are now generally an image of the past, however the legacy remains extensively apparent today and together with the steep topography of the valley sides, has a defining influence on landscape character.
- 8.5.8 Levels and old railway alignments, the generally reclaimed but sometimes still perceptible physical footprints of mine spoil heaps, the often intensively urbanised valley floors with old industrial buildings, and lower valley sides with their distinctive long rows of workers terraces, retain the traditional image.
- 8.5.9 It is a landscape of contrasts. The valleys contain the extensive ribbon development, which snakes along the valley floors and lower valley sides, and sometimes with settlements precariously extending over intervening slopes and spurs. Devoid of settlement, the open upland plateaux afford extensive views across the valleys, southwards to the Severn Estuary and northwards to the Brecon Beacons. At times, views from plateau to plateau conceal the intervening valleys and thus visually connect more with the wider uplands of Wales. The sense of openness and remoteness is compromised by proximity to industry and people, for example reclaimed spoil heaps, fly tipping, pressure of people accessing the area for recreation in an unmanaged way, and occasional pylon lines, telecommunications masts and occasional wind turbine developments.

Local Landscape Character Areas

Application Site

- 8.5.10 The proposed development is located entirely on the WEPA UK premises, which is heavily industrial and developed land. The development will be viewed in the context of the existing paper mill. The value (sensitivity to change) of the landscape character of the application site is **low**.

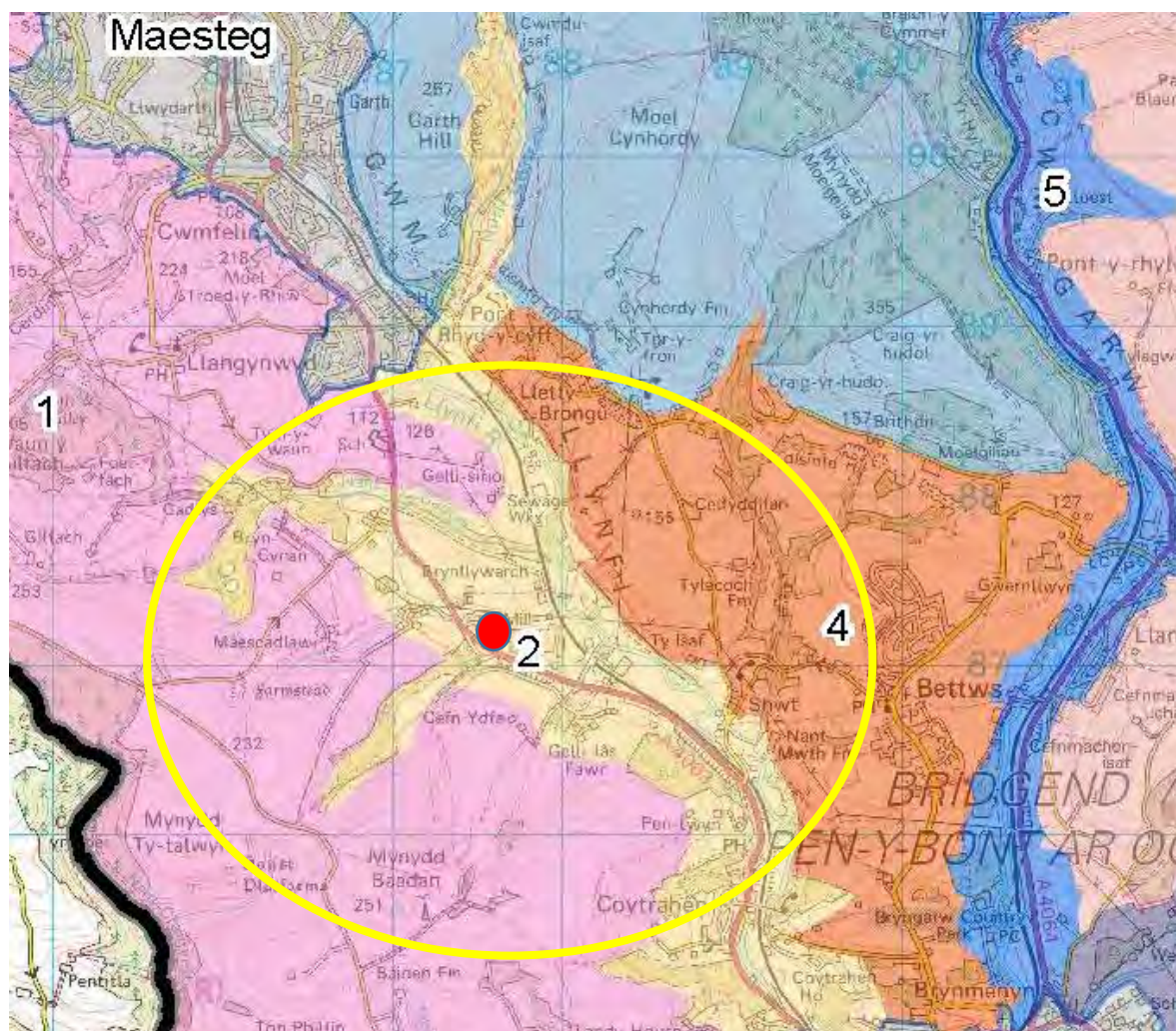
Study Area

- 8.5.11 The Landscape Assessment for the Study Area takes into account the "Landscape Character Assessment for Bridgend County Borough" (BCB 2013), which was designed to provide a sound evidence base for planners and developers to consider the character and sensitivity of the different landscapes of the County Borough when considering new developments. The primary aim of the Bridgend LCA is to ensure the area's distinctive, varied and dynamic landscapes are considered in the planning of any new development or land uses, and opportunities to enhance and strengthen character are pursued wherever possible.

8.5.12 The County Borough's Landscape Character Assessment classifies the development site and its surrounding area as part of three different Landscape Character Areas (Figure 8.5-1):

- Landscape Character Area 1 (LCA 1): Llangynwyd Rolling Uplands and Forestry;
- Landscape Character Area 2 (LCA 2): Llynfi Valley Floor and Lower Slopes; and
- Landscape Character Area 4 (LCA 4): Bettws Settled Farmland.

Figure 8.5-4: Landscape Character Areas in the Study Area



Reference: LCA for Bridgend County Borough (2013); yellow circle = 2km radius study area; red circle = Development Site

Landscape Character Area 1: Llangynwyd Rolling Uplands and Forestry

8.5.13 This Landscape Character Area is located along the north-western fringes of the County Borough, to the west of Maesteg. All of the landscape is defined as 'Upland' in LANDMAP's Visual & Sensory aspect (Level 2). The southern half of this LCA overlaps with the 'Western Uplands' Special Landscape Area SLA 3.

Landscape

- 8.5.14 LCA 1 is described as a strongly undulating upland landscape with a series of north-east facing slopes and hill summits ranging from 120 to 365 metres AOD. The distinctive topography is influenced by the heavily dissected Upper Coal Measures plateau greatly modified by the effects of glaciation. The landscape is crossed by a number of fast-flowing springs and streams, flowing into the Llynfi Valley to the east of this LCA.

Land use

- 8.5.15 This highly attractive rural area contains a network of irregular and small-scale pasture fields. Agricultural land use is dominated by rough sheep and pony grazing on higher ground with a strong pattern of irregular fields enclosed by hedgerows, tree belts and stone walls.
- 8.5.16 The landscape is well wooded, with broadleaved woodland and scrub on the valley sides, particularly along the streams. Hedges are common throughout and comprise mainly hawthorn with hedgerow trees. The more elevated areas contain commercial plantations, which often extend up onto the upland plateau. The dark, straight plantation edges provide a stark contrast to the adjacent muted grasslands on rounded slopes.
- 8.5.17 The settlement pattern is characterised by small groups of dwellings thinly dispersed in the open countryside. A small number of minor roads, tracks and footpaths cross through the landscape.

Views and perceptual qualities

- 8.5.18 Despite the close proximity of nearby development and settlements, the landscape is characterised as strongly rural and tranquil. Tranquil qualities are eroded by the presence of pylons, telecommunications masts, urban fringe land uses close to Maesteg, and the established Bridgend paper mill. Ridgelines facing east afford panoramic views across the development site on distant skylines. Intervisibility with the paper mill is a strong feature of the eastern half of the LCA.

Evaluation and Sensitivity of the Landscape

- 8.5.19 The landscape is of **medium** value. The part of this LCA, which is a designated SLA, is considered of being of **high** value.
- 8.5.20 Its sensitivity to change is **medium** as a consequence of its undulating and generally well wooded character, which provides visual enclosure. However, open views across and out of the valley are important in places.

Landscape Character Area 2 “Llynfi Valley Floor and Lower Slopes”

- 8.5.21 This Landscape Character Area comprises the valley floor and lower slopes of the Llynfi Valley between Bridgend and Maesteg. All of the LCA is classed as ‘Lowland Valley’ in LANDMAP’s Visual & Sensory aspect (Level 2).

Landscape

- 8.5.22 The landscape is described as an attractive rural area containing a network of irregular and small-scale pasture fields on land that gently rolls towards the River Llynfi with valley sides dissected by frequent tributaries creating a landform of rounded spurs between incised valleys. It is largely a landscape of farmed valley sides, open topped hills and watercourses flanked by woodland. Hedges are common throughout and comprise mainly hawthorn with hedgerow trees. The more elevated areas contain commercial plantations, which often extend up onto the upland plateau.

Land use

- 8.5.23 Two dwellings look across to the site. Bryn-y-fro, which lies at a distance of less than 400m to the west, has an open aspect towards the site. The nearest dwelling, Brynllwarch-fawr, has a southerly aspect, with a view directly across the existing mill site, the boundary of which is about 150m away; it is about 250m from the proposed high bay warehouse.
- 8.5.24 Urban influences are generally limited. Settlement in the immediate vicinity of the paper mill is characterised by scattered dwellings and farmsteads. The central valley landscape is dominated by the large form of the Bridgend Paper Mills with landmark chimneys, along with pylons and other smaller industrial developments and sewage works dotted along the valley floor.
- 8.5.25 The valley floor of the River Llynfi is crossed by the snaking forms of the railway line and A4063 linking Bridgend and Maesteg.

Views and perceptual qualities

- 8.5.26 There are views to prominent hill summits either side – rising to over 350 metres at Craig-yr-hudol in the east, and overlooked by the hill summit of Mynydd Baedan (251 metres) in the west.
- 8.5.27 Other prominent features are the pylons of the 400kV overhead power line, which crosses the site east-west.

Evaluation and Sensitivity of the Landscape

- 8.5.28 This LCA is intimate in scale and enclosed both by dramatic, rolling landforms and broadleaved woodland and scrub. The river is highly attractive and forms a linear central feature; however, it is inaccessible for a large proportion of its length. Pasture fields are present in places and are small in scale with boundaries defined by mainly hawthorn hedges.
- 8.5.29 Views within this area are limited due to the visual enclosure. Detractors include the railway, sewage works, derelict land on the former site of the power station and Bridgend Paper Mill, although these are all well integrated and enclosed by woodland and landform.
- 8.5.30 This landscape is of medium value. Its sensitivity to change is low due to the extensive tree cover.

Landscape Character Area 4: Bettws Settled Farmland

- 8.5.31 This Landscape Character Area is centred on the hilltop village of Bettws, east of the development site and sandwiched between the Llynfi and Garw valleys. All of the LCA is classified as 'Lowland' in LANDMAP's Visual & Sensory aspect (Level 2).

Landscape

- 8.5.32 The landscape is strongly undulating with generally southerly facing slopes, with the elevated hill summit at Bettws rising up to 160 metres AOD.

Land use

- 8.5.33 Bands of broadleaved semi-natural woodland follow stream courses, linking with mature hedgerbanks and in-field trees to produce a well-wooded character.
- 8.5.34 Agricultural land use consists of medium-scale irregular semi-improved grassland fields, with some rush pastures along streams. Mature hedgerbanks and lines of trees form traditional field boundaries, with regular wooden-fenced horse paddocks a feature around Bettws.
- 8.5.35 Settlement is concentrated at Bettws, whose historic core is surrounded by post-war housing estates spreading along the hillside and sitting prominently on the elevated hill summit. Elsewhere scattered farmsteads and hamlets west of Bettws are linked by quiet rural lanes and occasional rights of way, including the Ogwr Ridgeway Walk.

Views and perceptual qualities

- 8.5.36 A largely peaceful, rural landscape is eroded locally by prominent housing development at Bettws (occupying a high hill summit). There are views to the urban edge of Bridgend in the south and the development site in the west.

Evaluation and Sensitivity of the Landscape

- 8.5.37 Views within this area towards the development site are limited due to the visual enclosure and the distance to the paper mill. Detractors include the presence of pylons, telecommunications masts, and the established Bridgend paper mill, although this is well integrated and enclosed by woodland and landform.
- 8.5.38 This landscape is of **medium** value. Its sensitivity to change is assessed as medium as a consequence of its visual enclosure and the distance to the development site. However, open views across and out of the settlement of Bettws are important in places.

National Cycle Network (NCN)

- 8.5.39 There is one proposed national cycle way routed through the study area as shown on Figure 8.1-1. Route 885 of the National Cycle Network connects Maesteg and Bridgend (Tondy). The route lies to the east of the development site and follows the River Llynfi. The route follows Public Rights of Way, tracks and minor roads, and links with other long distance routes in Bridgend. National Cycle Routes are considered of **high** value. As the route has not been officially designated as part of the NCN, the value is assessed as being **medium / high**.

8.6 Assessment of Effects

- 8.6.1 This section assesses the potential landscape and visual impacts, which would result from the construction and operational activities relating to the proposed development taking into account the implementation of mitigation measures.
- 8.6.2 Mitigation measures embodied in the project have been addressed from the earliest stages of the project design and benefitted from the input of stakeholders. Mitigation measures, whether they take the form of landscape proposals and the selection of materials for buildings, are embodied in the application proposals and as such are regarded as being inherent to the scheme.

Visual receptors and key views

Selection of viewpoints

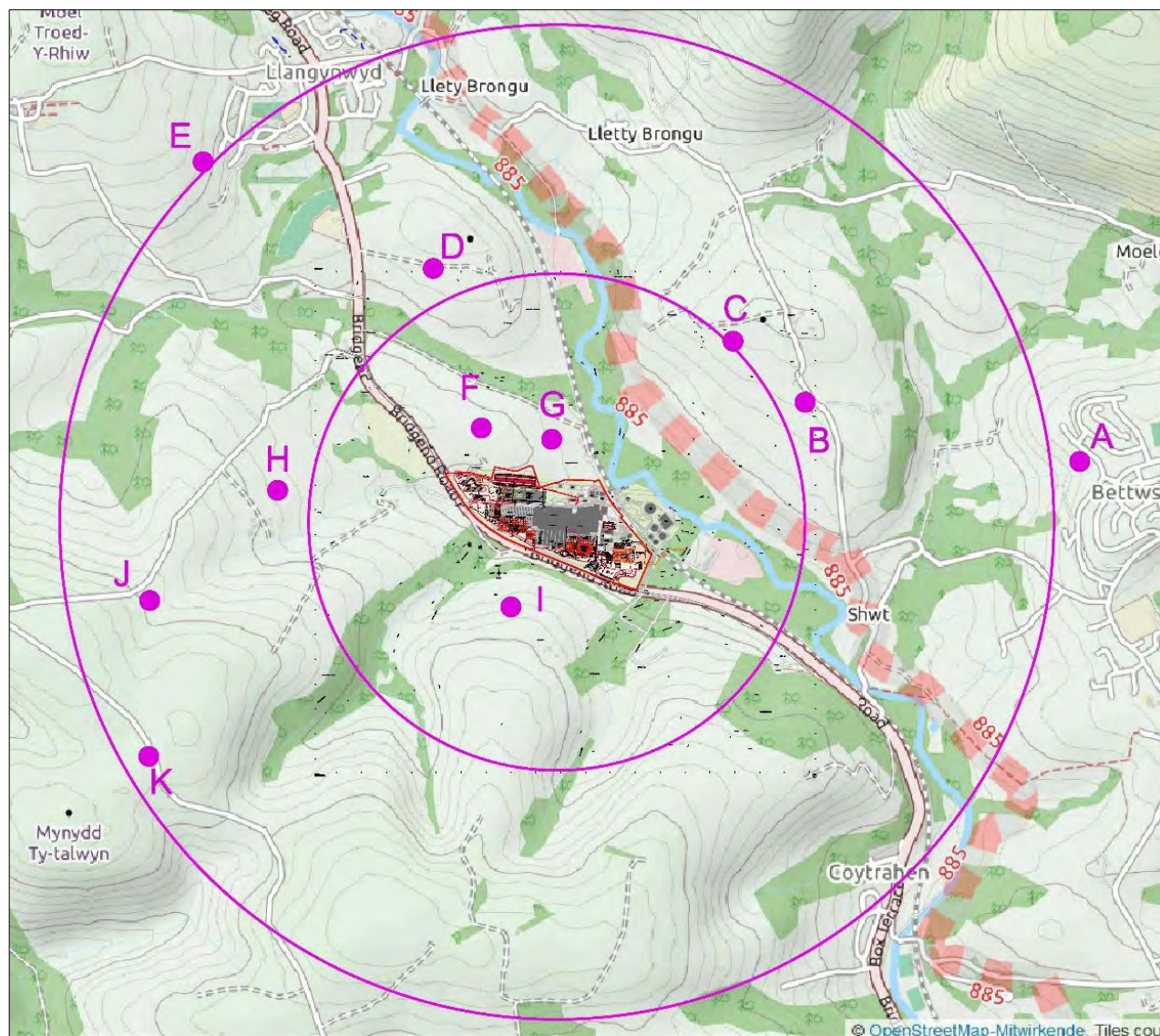
- 8.6.3 Representative viewpoints have been selected from key visual receptors within the study area in agreement with Bridgend County Borough Council. These representative viewpoints have been photographed to provide an indication of the view experienced at the selected locations and the existing visual character within the landscape character areas surrounding the development site. They provide a sound base to assess the effects of the proposed development on the landscape as well as the visual amenity of the study area.
- 8.6.4 The viewpoints described below were selected to illustrate typical views of the proposed project that will be available to representative viewer / user groups from the major landscape similarity zones and sensitive sites within the study area. The selected viewpoints also include a variety of viewer distances to illustrate the range of visual change that will occur with the project in place.
- 8.6.5 No viewpoints that required viewing the proposed development through tree branches and tree tops were selected, thus minimizing potential concerns regarding the need to conduct this study during the "leaves-off" season. The locations of the selected viewpoints in relation to the development are indicated in Figure 8.6-1. The direction of each view from the viewpoint is that towards the new facility including the existing paper mill in its entirety.
- 8.6.6 From the photo documentation conducted during field verification, eleven viewpoints have been selected to be included in the Landscape and Visual Assessment (LVIA).

Table 8.6-1: Schedule of viewpoints

Viewpoint location		Receptor type	Approx. distance to site (and range *)	Grid reference	Height AOD	LCA
A	Bettws	Residents	1,800m (lr)	289880, 187395	150m	4
B	Road north of Shwt	Residents, hikers, cyclists	870m (mr)	288782, 187632	135m	4
C	Celfyddifan	Residents	800m (mr)	288493, 187879	143m	4
D	East of Ysgol Gyfun, Gymraeg	Hikers, cyclists	850m (mr)	287286, 188167	118m	2
E	Pont Rhyd-Y-Cyff, Llangynwyd	Residents	1,700m (lr)	286364, 188598	152m	1
F	Brynsiriol and Brynllwarch-fâch	Residents	150m (sr)	287480, 187527	107m	2
G	Brynllwarch-fawr	Residents	140m (sr)	287764, 187483	93m	2
H	Maescadlaw Farm	Residents	730m (mr)	286663, 187276	136m	1
I	Cefn Ydfa Farm	Residents	250m (rs)	287598, 186809	134m	1
J	Open landscape, west of Cym Nant-gwyn	Hikers, cyclists	1,300m (lr)	286147, 186843	190m	1
K	Open landscape, east of Mynydd Ty-talwyn	Hikers, cyclists	1,620m (lr)	286144, 186210	216m	1

* sr = short range, mr = medium range, lr = long range

Figure 8.6-1: Viewpoint Locations



Inner circle = 1km radius, outer circle = 2.0km radius; 885 = proposed NCN route

Viewpoint Assessment

- 8.6.7 The assessment of magnitude and significance of impacts has been undertaken in line with the criteria set out in section 4.4 and includes consideration of mitigation measures embodied in the design of the proposed development. The assessment of impacts is also influenced by the professional judgement of the assessor, which is informed by a number of factors including the quality of design, understanding of landscape context and perceptual factors associated with the architectural design.
- 8.6.8 The viewpoint assessment is based on photographic simulations for 11 key views that were developed by constructing a three-dimensional computer model based on facility specifications provided by the project developer, and the survey coordinates of the proposed facilities.

- 8.6.9 Locational details and the reasons for selection of each key viewpoint are also described in the table below. Photomontages displaying the existing view as well as the proposed development are illustrated in Figures 8.6-1 to 8.6-11 of Appendix 1.

Viewpoint A: Bettws

Existing view

- 8.6.10 This long distance viewpoint was chosen to represent views potentially gained from residential properties along the western edge of Bettws, east of the development site. It should be noted that residential properties are set behind this viewpoint, and roadside vegetation (e.g. mature trees) and fencing partially obscure the view seen by these residents during certain times of the year.
- 8.6.11 The foreground comprises rough grazing land and patches of woodland. The existing mill is hardly noticeable as it is located behind and considerably masked by woodland. Only the office building and the stack of the CHP power plant are clearly visible.

Photomontage

- 8.6.12 It is anticipated that the main buildings of the proposed development will be screened by existing vegetation. Due to the presence of existing buildings of the paper mill, all new buildings will be perceived in the context of the existing industrial installations. However, the new High Bay Storage (HBS) will be visible, but the degree of change in the view will be negligible from this distance.

Assessment of Effects

- 8.6.13 The sensitivity of the view to change is **high** as it is located in a residential area. The magnitude of change will be **negligible** mainly due to long distance. The effect caused by the proposed development is anticipated to be **slight**.

Viewpoint B: Road north of Shwt

Existing view

- 8.6.14 The location was chosen to reflect views of pedestrians and cyclists using the proposed NCN cycle way 885 along the River Llynfi. It also provides a typical view from the open countryside of Landscape Character Area 4. The foreground comprises rough grazing land. The existing mill is clearly visible.

Photomontage

- 8.6.15 All new buildings, but the HBS building, will only be perceived in the context of established installations of the existing paper mill. The change in the view caused by these new buildings will hardly be noticed by users of the countryside. Only the new HBS will be clearly perceived as a new element in this view and this would represent a moderate intrusion and degree of change in the view.

Assessment of Effects

- 8.6.16 The sensitivity of the view to change is **medium** as it is located in an open landscape area which is experienced only by a small number of users.

8.6.17 The magnitude of change will be **low** as change will be distinguishable from the surroundings whilst the composition and the character of the view will be broadly similar to the current view.

8.6.18 The significance of the effect caused by the proposed development is anticipated to be **slight to moderate**.

Viewpoint C: Celfyddifan

Existing view

8.6.19 This is a view gained by residents of the small farmstead Celfyddifan as well as by visitors using the open countryside for recreational purposes such as hiking and cycling. From this elevated viewpoint only the upper stories of the office building and the stacks of the power plant are visible. All other installation are well hidden due to the topography of the plateau in the foreground of this view.

Photomontage

8.6.20 Only the upper parts of the new buildings would be visible above the vegetated ridge of the plateau. The new HBS is partly screened by vegetation along the ridge of the plateau but it will still be clearly noticeable as an intrusive element in this view. The addition of new structures would result in a noticeable change of this view.

Assessment of Effects

8.6.21 The sensitivity of the view to change is **high** for a small number of residents and **medium** for users of the open landscape.

8.6.22 The magnitude of change will be **medium** for all receptors as the change in view will be apparent involving a noticeable change in the composition of baseline.

8.6.23 For residents the significance of the effect caused by the proposed development is anticipated to be **moderate to large**. The significance of effect on users of the landscape is considered **moderate** as there is only a very small number using the area for recreation.

Viewpoint D: East of Ysgol Gyfun, Gymraeg

Existing view

8.6.24 This is a view gained by visitors using the open countryside of Landscape Character Area 2 for recreational purposes such as hiking and cycling. From this viewpoint, only the upper part of existing buildings and the stacks of the power plant are visible. All other installations are well hidden due to the topography of the plateau in the foreground of this view.

Photomontage

8.6.25 The photomontage shows that only the upper half of the new HBS will be perceived as the topography of the area screens all other parts of the development. The new building is situated along the ridge of the plateau and it will form a new prominent, intrusive element in this view.

Assessment of Effects

- 8.6.26 The sensitivity of the view to change is **medium** for a small number of visitors of the open landscape. The magnitude of change will be **medium** as there will be a notable alteration to the existing view. In particular, the new HBS will cause an apparent change in the composition of the baseline.
- 8.6.27 For users of the open landscape, the significance of the effect caused by the proposed development is anticipated to be **moderate**.

Viewpoint E Pont Rhyd-Y-Cyff, Llanggynydd

Existing view

- 8.6.28 In this long distance view from residential properties of Llanggynydd, buildings of the existing Bridgend paper mill are not visible. The presence of the mill is only visible due to water vapour emissions from the paper machine.

Photomontage

- 8.6.29 From this location, the upper parts of the proposed HBS would be visible along the ridge of the plateau north of the mill. It would only be partially screened by vegetation.

Assessment of Effects

- 8.6.30 The sensitivity of the view to change is **high** for residents in Llanggynydd.
- 8.6.31 The magnitude of change will be **medium** as there will be a notable alteration to the existing view in the long distance. In particular, the new HBS will cause an apparent change in the baseline view.
- 8.6.32 The significance of effect on recreational users is considered **moderate**.

Viewpoint F Residential area near Brynsiriol and Brynllwarch-fâch

Existing view

- 8.6.33 This viewpoint illustrates an unobstructed view from the area near the residential property situated closest to the development site.

Photomontage

- 8.6.34 From this location, the proposed development would be noticeable behind the vegetated ridge, which is too small to effectively screen the new buildings. The new development would be relatively prominent, especially as the new HBS would be a skyline feature with daily, prolonged and sustained views from the residential property.

Assessment of Effects

- 8.6.35 The sensitivity of the view to change is **high** for occupiers of this residential property.
- 8.6.36 The magnitude of change will be **high** due to the small distance. There will be a major change in the existing view and the change will involve a high level of change in the composition of the baseline. In particular, the new HBS will cause an apparent change in the baseline view. The predicted significance of effect will be **large**. However, it should be noted that only a small number of residents would be affected by the view of the new development.

Viewpoint G Brynllwarch-fawr

Existing view

- 8.6.37 The view experienced from residential properties north east of the site is similar to the view of viewpoint F. The existing structures of the paper mill are well hidden behind the vegetated ridge in the foreground. Only the stacks of the power station are visible.

Photomontage

- 8.6.38 From this location, the upper half of the new HBS would be clearly noticeable behind the vegetated ridge, which is too small to effectively screen the new building. The new development would be relatively prominent and the new HBS would be a skyline feature with daily, prolonged and sustained views from this location.

Assessment of Effects

- 8.6.39 The sensitivity of the view to change is **high** for residents near this viewpoint.
- 8.6.40 The magnitude of change will be **high** due to the small distance. There will be a major change in the existing view and the change will involve a high level of change in the composition of the baseline. In particular, the new HBS will cause an apparent change in the baseline view.
- 8.6.41 The predicted significance of effect will be **large**. However, it should be noted that only a small number of residents would be affected by the view of the new development.

Viewpoint H Maescadlaw Farm

Existing view

- 8.6.42 This viewpoint provides a middle range view from small farmsteads scattered in the western part of the study area. The existing paper mill is clearly visible but it forms only a small part of the landscape.

Photomontage

- 8.6.43 The photomontage illustrates that the new development will introduce new elements to this view. The proposed structures would be viewed within the context of the existing mill and other vertical elements including pylons. From this elevated viewpoint, the new HBS with its loading bays as well as the new paper machine building will be small but clearly visible features of the landscape.

Assessment of Effects

- 8.6.44 The sensitivity of the view to change is **high** for a small number of residents living near this viewpoint.
- 8.6.45 The magnitude of change will be **medium** as there will be a notable alteration to the existing view in this middle range view. In particular, the new HBS and the paper machine building will cause an apparent change in the baseline view.
- 8.6.46 The predicted significance of effect will be **moderate** and it should be noted that only a small number of residents would be affected by the view of the new development.

Viewpoint I Cefn Ydfa Farm

- 8.6.47 This short range viewpoint was chosen to represent views potentially gained from residential properties south of the A 4063. The foreground comprises rough grazing land. The existing mill is hardly noticeable as it is located behind and considerably masked by the line of trees and the woodland along the A 4063. Only the upper stories of the office building as well as the stacks of the CHP power plant are visible.

Photomontage

- 8.6.48 It is anticipated that the main buildings of the proposed development will be screened by existing vegetation. However, the new High Bay Storage (HBS) will be visible as it towers above the existing tree line. The HBS would form a new element in this view although seen in the context of other vertical structures such as pylons.

Assessment of Effects

- 8.6.49 The sensitivity of the view to change is **high** as it is located near a farmstead with a small number of residents.
- 8.6.50 The magnitude of change will be **medium** as there will be a notable alteration to the existing view in this short range view. In particular, the new HBS would cause an apparent change in the baseline view.
- 8.6.51 The predicted significance of effect will be **moderate** and it should be noted that only a small number of residents would be affected by the view of the new development.

Viewpoint J: Open landscape, west of Cym Nant-gwyn

Existing view

- 8.6.52 This viewpoint illustrates the view from the open landscape, some 1,200m west of the A4063. The location was chosen to reflect views from footpath users and cyclists from within the Special Landscape Area SLA 3: Western Uplands.
- 8.6.53 The foreground comprises rough grazing land. The existing mill is hardly noticeable as it is located behind and effectively masked by the woodland along the A 4063. Only the office building and the stack of the CHP power plant are clearly visible.

Photomontage

- 8.6.54 The photomontage shows the predicted view towards the proposed development. The new High Bay Storage building is clearly visible from this viewpoint in the centre of the photomontage. The modelling predicts that only the new High Bay Storage building will form a prominent element in this view.

Assessment of Effects

- 8.6.55 The sensitivity of the view to change is **medium to high** as it is located within the Special Landscape Area (SLA 3).
- 8.6.56 The magnitude of change will be **medium**.
- 8.6.57 The significance of effect caused by the proposed development is, therefore, considered between **moderate to large**.

Viewpoint K Open landscape, east of Mynydd Ty-talwyn

Existing view

- 8.6.58 This viewpoint was chosen because it provides a long range view similar to viewpoint J. It is also located within the Special Landscape Area (SLA 3). The existing paper mill in the centre of this view is hardly visible as it is well screened behind vegetation.

Photomontage

- 8.6.59 The new High Bay Storage building would be clearly visible from this long range viewpoint. It would form a small, but noticeably new structure above the existing tree line.

Assessment of Effects

- 8.6.60 The sensitivity of the view to change is **medium** to **high** as it is located within the Special Landscape Area (SLA 3).
- 8.6.61 The magnitude of change will be **medium** due to distance.
- 8.6.62 The significance of effect caused by the proposed development is considered **moderate** due to distance.

Assessment of Effects on Landscape Character Areas

Effects during construction (including demolition)

- 8.6.63 Potential adverse temporary landscape and visual effects will arise during demolition/construction from the following activities:
- Site clearance, removal of vegetation and topsoil stripping from the application site;
 - Earthworks to construct platforms and excavate foundations;
 - Construction of internal road for access to the buildings and storage area;
 - Movement of construction related traffic including delivery and removal of materials to and from site, off-site road traffic including workers travelling to and from site;
 - General construction activities including the movement of large scale construction equipment; site compounds and temporary buildings required for construction and parking on site materials stockpiles; presence of temporary traffic signage;
 - Construction site lighting, in particular during the winter months; and
 - Construction of the main buildings and any other ancillary structures.
- 8.6.64 The effect of the construction activities of the proposed development on landscape character will be contained to the locality around the Application Site within the existing industrial estate. As a result, there will be no significant adverse effects on key landscape character receptors within the locality, whether associated with the Special Landscape Area 3 or sensitive aspects identified through the visual assessment
- 8.6.65 All the viewpoints surveyed that have views of the High Bay Storage building (HBS) will only experience an effect once the HBS is constructed and in some situations, the upper parts of

the paper machine building. For most of the construction period the activity will be at lower levels and will be generally well screened from key visual receptors. The exception would be any tower cranes that are brought on site.

- 8.6.66 The magnitude of change will be **low to medium** and therefore even in situations where the visual receptors have high sensitivity, the significance of effect is going to be **moderate**. Therefore, during construction of the development the landscape effects will not be significant.

Effects during Operation

- 8.6.67 The following operational actions will contribute to the landscape effects from the proposed development:
- the introduction of new buildings, including the HBS and the paper machine building and associated built structures;
 - the creation of new hard and soft landscape elements associated with the development;
 - operational traffic; and
 - lighting.

Effects on Landscape Character Area 1: Llangynwyd Rolling Uplands and Forestry

- 8.6.68 The southern half of this LCA overlaps with the SLA 3 “Western Uplands”. LCA 1 is described as a strongly undulating upland landscape with a series of north-east facing slopes and hill summits ranging from 120 to 365 metres AOD.
- 8.6.69 This highly attractive rural area contains a network of irregular and small-scale pasture fields. The landscape is well wooded, with broadleaved woodland and scrub on the valley sides, particularly along the streams. The settlement pattern is characterised by small groups of dwellings thinly dispersed in the open countryside.
- 8.6.70 The landscape is of **medium value**. The part of the LCA that is a designated SLA, is considered being of **high value**.
- 8.6.71 Its sensitivity to change is **medium** as a consequence of its undulating and generally well wooded character, which provides visual enclosure.
- 8.6.72 Based on the visual assessments for the viewpoints E, H, I, J and K, where the development causes an **medium** magnitude of change, the significance of effects on the landscape character is considered **moderate**.
- 8.6.73 This overall assessment of landscape effects is based on the assessment methodology described in Table 8.4-4 and 8.4-5. The new HBS would affect the character of the designated landscape and it would be out of scale with the receiving landscape.

Effects on Landscape Character Area 2: Llynfi Valley Floor and Lower Slopes

- 8.6.74 The landscape of this LCA is described as an attractive rural area containing a network of irregular and small-scale pasture fields on land that gently rolls towards the River Llynfi with valley sides dissected by frequent tributaries creating a landform of rounded spurs between

incised valleys. Two dwellings look across to the site. Bryn-y-fro, which lies at a distance of less than 400m to the west, has an open aspect towards the site. The nearest dwelling, Brynllwarch-fawr, has a southerly aspect, with a view directly across the existing mill site.

- 8.6.75 This landscape is of **medium value**. Its sensitivity to change is **low** due to the extensive tree cover. The visual assessment of viewpoint D provides an indication of the effects experienced in this LCA. The magnitude of change is assessed as being **medium**. Consequently, the significance of effects on the landscape character is considered **moderate**.
- 8.6.76 This overall assessment as a moderate landscape effect is in accordance with the assessment methodology described in Table 8.4-4 and 8.4-5 as the new HBS would affect the character of this landscape character area and it would be out of scale with the receiving landscape.

Landscape Character Area 4: Bettws Settled Farmland

- 8.6.77 This LCA is centred on the hilltop village of Bettws and it covers the eastern part of the study area. The landscape is strongly undulating with generally southerly facing slopes, with the elevated hill summit at Bettws rising up to 160 metres AOD. Bands of broadleaved semi-natural woodland and in-field trees produce a well-wooded character. Settlement is concentrated at Bettws. Scattered farmsteads and hamlets lie west of Bettws. There are views to the urban edge of Bridgend in the south and the development site in the west.
- 8.6.78 Views within this area towards the development site are limited due to the visual enclosure and the distance to the paper mill.
- 8.6.79 The landscape is of **medium value**. Its sensitivity to change is assessed as **medium**.
- 8.6.80 The viewpoint assessment for viewpoints A and B indicate a **negligible** to **low** magnitude of effects as a consequence of its visual enclosure and the distance to the development site.
- 8.6.81 Based on the assessment methodology described in Table 8.4-4 and 8.4-5, the HBS would cause a **slight** or **minor** change affecting the character of LCA 4 and the elements therein.

Effects on Local landscape character of the application site

- 8.6.82 The operation of new development will be in keeping with the industrial use in the local landscape character. The sensitivity of the application site is assessed as being **low**. The magnitude of change will be **medium**. As a result, there will be only **slightly** adverse effects on the landscape character within the locality.

Effects on National Cycle Network (NCN)

- 8.6.83 There is one proposed national cycle way routed through the eastern study area. The effects of the proposed development on Route 885 of the National Cycle Network are represented by viewpoints A and B, which conclude that the landscape effects are considered **negligible** to **low**.
- 8.6.84 The impacts on the proposed National Cycle Route, which is considered of **moderate** to **high** value, are of **slight** to **moderate** significance.

8.7 Mitigation Measures

8.7.1 Mitigation of adverse environmental impacts can be achieved by avoidance, reduction, remedying of, or compensation.

8.7.2 There are two forms of mitigation that have been considered.

Primary Mitigation

8.7.3 The first form includes the broad scale planning of design elements of the development in order to mitigate potential significant effects (Primary Mitigation). In order to minimise landscape and visual impacts the Applicant has given consideration to potential landscape and visual impacts that could arise from the development. Alterations to the layout have been made wherever appropriate. This has been an iterative process whereby significant adverse effects were, as far as possible, 'designed out' of the scheme.

Secondary Mitigation

8.7.4 In landscape and visual terms, the secondary mitigation included the design of elements that would help, for example, to screen views, reduce apparent heights of elements, and manipulate the skyline to a less adverse effect.

8.7.5 Due to the lack of space within the application site and its surrounding, earth bunds to provide high screening vegetation would in itself result in unacceptable impacts on the landscape character and ecological feature and were therefore, not put forward. Taking into account the height of 42m for the proposed HBS, planting of tall trees would not result in effective screening of this building.

8.7.6 However, a limited number of solutions to reduce visual impact has been adopted:

Colour

8.7.7 The proposed colours would not unduly contrast with the surrounding landscape colours or industrial structures. All treatments would be in non-reflective colours.

Lighting

8.7.8 The proposed development will not generate excessive levels of sky glow, light spill or glare, and therefore not significantly affect the existing surrounding area or sensitive receptors. The lighting installed at the development site, both during construction and operational phases, will accord with current best practice and design guidance to ensure that the residual effects on sensitive receptors will be within acceptable levels.

8.7.9 Except as required by security and worker safety requirements, night-time lighting will be hooded to direct illumination downward and inward toward the areas to be illuminated in order to minimize light spillage and glare, backscatter to the night-time sky, and visibility of lighting to motorists on the A 4063 and the adjacent residential areas.

Construction Environmental Management Plan (CEMP)

8.7.10 In order to minimise the impacts of the Project during construction a CEMP would be implemented. The CEMP would include a number of measures to mitigate the landscape

and visual impact in accordance with Local Policies, including: tree retention and protection, temporary storage of topsoil to screen construction works, agreed site access points, maintenance of site compound, lighting provision in accordance with an outline Lighting Strategy, and reseeded and planting within the Development Site.

- 8.7.11 An outline CEMP (Document Ref.: 57100-0222) has been prepared and should be read in conjunction with this report.

8.8 Residual Effects

- 8.8.1 Indirect impacts upon the landscape character are of importance as the new High Bay Storage (HBS) building will be seen from Special Landscape Area SLA 3 (Western Uplands) west of the development site.
- 8.8.2 Although the development will always be seen within the context of the existing mill, the proposed HBS will extend development above the ground level of the existing mill site, and on to the more open and undeveloped landscape.
- 8.8.3 It will extend the swathe of industrial development and interrupt views from the open landscape. The scale of development will affect the rural character and reduce the quality of the landscape in its environs. Landscape impacts of moderate to large significance will be experienced by the users of the open landscape west and north of the Site.
- 8.8.4 The development is large in scale and it will be difficult to mitigate the impacts for some views. These include close range views e.g. from the dwellings at Brynsiriol, Brynllwarch-fâch, and Brynllwarch-fawr but also the middle range views from the valley slopes to the northeast at Celfyddifan. Within these views, the development will represent a considerable intrusion into the rural landscape.
- 8.8.5 Due to the height of the HBS, planting or earthworks as mitigation would not effectively screen or filter these views. All landscape and visual mitigation is embedded in the design and it is described in Chapter 3. All effects identified in the table below are therefore residual.

8.9 Summary and Conclusion

- 8.9.1 In accordance with Local Policies ENV3 and SPG19, an assessment of the likely visual impact associated with the Proposed Development has been undertaken as part of the Planning Application.
- 8.9.2 Where visual effects have been identified as **large** or **large / moderate**, this is considered a significant effect. It should be noted that significant impacts need not be unacceptable, or necessarily negative, and may be reversible.

Viewpoint Assessment

- 8.9.3 The findings of the assessment of 11 representative viewpoints anticipate a slight adverse impact on views from residential areas east of the development site including Bettws and Shwt, and medium to high impacts from views gained from residential properties in the vicinity of the Application Site. In this assessment, in most cases the severity of effect is exclusively caused by the new HBS.

Table 8.8-1: Summary of Viewpoint assessment

Viewpoint		Receptors	Sensitivity of receptor	Change and effect	Magnitude of effect	Significance of effect
A	Bettws	Residents	High	main new buildings will be screened by existing vegetation, HBS will be visible, but degree of change negligible from long distance	Negligible	Slight
B	Road north of Shwt	Residents, hikers, cyclists	High / medium	only HBS clearly visible, moderate intrusion and degree of change in the view	Low	Slight / moderate
C	Celfyddifan	Residents Hikers, cyclists	High Medium	only the upper parts of the new buildings visible, new HBS is partly screened by vegetation but clearly noticeable	Medium	Moderate / large
D	East of Ysgol Gyfun, Gymraeg Llangynwyd	Hikers, cyclists	Medium	only upper half of HBS visible	Medium	Moderate
E	Pont Rhyd-Y-Cyff, Llangynwyd	Residents	High	only upper half of HBS visible	Medium	Moderate
F	Open landscape north of Brynsiriol and Brynllwarch-fâch	Residents	High	major change in view, high level of change due to close distance to new HBS	High	Large
G	Brynllwarch-fawr	Residents	High	major change in view, high level of change due to close distance to HBS	High	Large
H	Maescadlaw Farm	Residents	High	HBS and new paper machine building clearly visible	Medium	Moderate
I	Cefn Ydfa Farm	Residents	High	HBS partly screened by vegetation but clearly noticeable	Medium	Moderate
J	Open landscape, west of Cym Nant-gwyn (in SLA 3)	Hikers, cyclists	Medium / high	HBS clearly visible	Medium	Moderate / large
K	Open landscape, east of Mynydd Ty-talwyn (in SLA 3)	Hikers, cyclists	Medium / high	HBS visible from long distance	Medium	Moderate

Landscape Assessment

- 8.9.4 In terms of landscape character, the development will not have a significant effect on landscape character areas within the Study Area. However, the part of this LCA that is designated as Special Landscape Area SLA 3: Western Uplands” would experience a **moderate / large** effect.
- 8.9.5 However, it should be noted that the fact that a proposed project will be visible from within a Special Landscape Area should not in itself be a reason for refusing consent. It is considered that the proposed (embodied) mitigation measures will reduce the visual intrusion and impact of the Project on visual amenity as far as reasonably practicable.

Table 8.8-2: Summary of Landscape Assessment

Landscape Character	Receptor sensitivity to change	Magnitude of effect	Significance of effect
Landscape Character Area 1 Llangynwyd Rolling Uplands and Forestry	Medium	Medium	Moderate
Special Landscape Area SLA 3 Western uplands	High / medium	Medium	Moderate / large
Landscape Character Area 2: Llynfi Valley Floor and Lower Slopes	Medium / Low	Medium	Moderate
Landscape Character Area 4: Bettws Settled Farmland	Medium	Negligible / low	Slight
Local Landscape Character (Application site)	Low	Medium	Slight
Proposed National Cycle Route 885	High / medium	Negligible / low	Slight / moderate

- 8.9.6 In determining proposals, a judgement is to be made as to whether the visual effects on sensitive receptors outweigh the benefits of the project.

9.0 Ecology and Nature Conservation

9.1 Introduction and Scope

- 9.1.1 This chapter presents information on baseline conditions and the nature conservation value of the application site and identifies the potential ecological effects associated with the proposed development. It also summarises the findings of the Ecological Appraisal (Acer Ecology 11/2019) which is submitted as a separate report as part of this application (Document Ref. 57100-0100).
- 9.1.2 It goes on to provide an assessment of the significance of potential ecological impacts on the existing ecologically sensitive receptors within the site and surrounding areas after mitigation and compensation has been taken into consideration.
- 9.1.3 A Habitat Regulations Assessment (HRA) has been prepared for the proposed development to accompany the Planning Application and this is provided as the Non-Significant-Effects NSE report (Document Ref. 57100-0224).
- 9.1.4 This Chapter is not intended to be read as a standalone assessment and reference should also be made to the information provided in other chapters of this ES, in particular Chapter 6 – Air Quality.
- 9.1.5 Full details of the development proposed are presented in Chapter 3 which sets the basis against which this assessment has been conducted.

9.2 Legislation and Planning Context

- 9.2.1 Legislation and the key planning policies relating to ecology and nature conservation issues are summarised below. This summary is organised according to present relevant international, national and regional / local laws and policies.
- 9.2.2 Information on the statutory designations, directives and legislation was obtained from the Joint Nature Conservation Committee (JNCC) website (www.jncc.gov.uk).

International

Habitats Directive

- 9.2.3 The EU Directive 92/43/EEC Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) is otherwise known as the EC 'Habitats Directive'. In the UK the Directive has been transposed into national laws by means of the Conservation (Natural Habitats, & c.) Regulations 1994, but it has been amended and updated by the Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007 and the Conservation of Habitats and Species Regulations 2010.
- 9.2.4 Under the legislation, protection is afforded to 189 habitats listed in Annex I and 788 species listed in Annex II of the Directive. This protection is implemented through a series of protected sites, known in the UK as Special Areas of Conservation (SACs) and contributes to a European network of Sites of Community Importance (SCIs). The Directive also introduced the precautionary principle, which means that all developments have to be assessed in terms of their ability to affect the integrity of a designated site in the most conservative/protective manner.

Birds Directive

- 9.2.5 The EU Council Directive 79/409/EEC on the conservation of wild birds is otherwise known as the 'Birds Directive'. The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. The main provisions of the Directive include:
- The maintenance of the favourable conservation status of all wild bird species across their distributional range (Article 2).
 - The identification and classification of Special Protection Areas (SPA) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance (Article 4).
 - The establishment of a general scheme of protection for all wild birds (Article 5).
- 9.2.6 In the UK, the provisions of the Birds Directive were implemented through the Wildlife & Countryside Act 1981 (as amended) and The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

National

Wildlife and Countryside Act 1981 (WCA 1981)

- 9.2.7 The WCA 1981 sets the general framework for habitats and species protection. Sites of Special Scientific Interest (SSSI) receive statutory protection under the WCA 1981. These sites are also used to underpin other national and international nature conservation designations.
- 9.2.8 Nesting birds are protected under the WCA 1981, which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the WCA 1981), it is an offence to intentionally or recklessly disturb them while they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird. Other species likely to be encountered on potential development sites are afforded protection by the 1981 Act (as amended), for example, dormice, otter, and all British species of bats (all under Schedule 5). The WCA also protects all native British amphibians and reptiles from intentional killing, injuring and sale.

Countryside and Rights of Way Act 2000

- 9.2.9 The WCA 1981 has been amended and reinforced in England and Wales by the Countryside Rights of Way Act 2000 (as amended) (the CRoW Act). The CRoW Act increases protection for Sites of Special Scientific Interest (SSSIs) as well as strengthening wildlife enforcement legislation. Schedule 12 of the CROW Act amends the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species. The provisions of Schedule 12 of the CRoW Act make certain offences 'arrestable' and create a new offence of reckless disturbance.

The UK Biodiversity Action Plan (UK BAP)

- 9.2.10 The UK Biodiversity Action Plan (UK BAP) was originally published in 1994, and was the UK Government's response to the Convention on Biological Diversity (CBD), which the UK signed up to in 1992 in Rio de Janeiro. The UK was the first country to produce a national biodiversity action plan, and the UK BAP described the biological resources of the UK and provided detailed plans for conservation of these resources.
- 9.2.11 Action plans for the most threatened species and habitats were set out to aid recovery, and national reports, produced every three- to five years, show how the UK BAP is contributing to the UK's progress towards the significant reduction of biodiversity loss called for by the CBD. This has established a detailed approach for the protection of biological resources and is comprised of linked Habitat Action Plans (HAPs), Species Action Plans (SAPs) and Local Biodiversity Action Plans (LBAPs).

Regional / Local

Bridgend Local Biodiversity Action Plan (LBAP)

- 9.2.12 Local Biodiversity Action Plans (BAPs) infer local priorities to meet National BAP targets. Although BAPs are non-statutory, they can have significant influence on local planning policy. As the study area falls within the BCBC administrative area, the objectives of the Bridgend LBAP are relevant, including the BAP's list of priority habitats and species.

Sites of Importance for Nature Conservation (SINC)

- 9.2.13 Local nature conservation sites, such as SINC's, are identified by local partnerships as sites of local importance for wildlife, geology, landscape or recreation. These sites may be of importance locally for the delivery of BAP targets and some may be of SSSI quality. Detailed guidance on the identification, selection and management of local sites is available (Defra 2006a).

Tree Preservation Orders (TPO)

- 9.2.14 At the local level, areas of woodland or individual trees may be the subject of Tree Preservation Orders (TPOs) and thus have a formally recognised value. TPOs can be applied to all types of trees, including hedgerow trees, and can be applied to one or more trees, an area of trees, or woodland. TPOs are used by local planning authorities to protect selected trees and woodlands if their removal would have a significant impact on the local environment and its enjoyment by the public.

9.3 Assessment Methodology

Relevant Guidance

- 9.3.1 The ecological assessment of the study area follows established guidelines. Throughout the investigation, the approach adopted has been based upon recognised techniques of ecological survey and impact assessment (e.g. Institute of Environmental Assessment (IEA), 1995; and guidance developed by the Institute of Ecology and Environmental Management (IEEM, 2006).

- 9.3.2 The species surveys were undertaken following standard methods as described in the Chartered Institute of Ecology and Environmental Management (CIEEM) Preliminary Ecological Appraisal 2016 guidelines, and the Phase 1 Habitat Survey followed the methodology provided by the Joint Nature Conservation Committee (JNCC 2010).

Desk Study and field surveys

- 9.3.3 To inform the ecological evaluation of the development site and to determine what impacts the proposed development may have on the ecological value of the Site and its surroundings, a desk study and series of site surveys were undertaken by Acer Ecology between March and October 2019.

Desk study

Protected Sites, Habitats and Species

- 9.3.4 Existing baseline data has been collated to identify the presence of any statutorily designated sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) or National Nature Reserves (NNRs) within a maximum radius of 10 km of the Application Site. This 10 km study area is necessary for air quality purposes.
- 9.3.5 The information on designated sites and protected species was obtained from the following sources:

Source	Data	Radius of search
NRW Geographical Information Systems (GIS) Layers	Statutory and non-statutory nature conservation designated sites	
	RAMSAR/ Special Areas of Conservation (SACs)/ Special Protection Areas (SPAs)/ Sites of Special Scientific Interest (SSSIs)/ National Nature Reserves (NNRs)/ Local Nature Reserves (LNRs)–	2km
	SACs (designated for bats)	10km
	Ancient semi-natural woodland (ASNW)	2km
South East Wales Biological Records Centre (SEWBRc)	Protected species records	2km
	Sites of Importance for Nature Conservation (SINCs)	1km

- 9.3.6 All available records of bat roosts were considered. For other species, only records collected within the last 10 years were considered relevant.

Landscape Context

- 9.3.7 The site and wider landscape were assessed and characterised using aerial images, Ordnance Survey maps and South East Wales Biodiversity Records Centre (SEWBRc).

The presence of off-site features and habitats, which add to the ecological value within the wider area (for example, ponds within 500m of the site) were identified. Where appropriate, such features were scoped into the detailed assessment of impacts presented in Section 9.5 below.

Ancient Woodland

- 9.3.8 Although ancient woodland is not a designated site as such, it is often listed as a designated site due to its ecological significance and associated protection. Ancient woodland has therefore been included within the non-statutory designated site section of this report.

Planning Authority

- 9.3.9 The Bridgend Council Planning Portal was consulted to determine if any previous survey information was available for the site, or immediate surroundings.
- 9.3.10 An internet-based search of the Bridgend Local Biodiversity Action Plan (BAP) was undertaken.

Site History

- 9.3.11 An NRW GIS Phase 1 habitat survey of Wales layer was searched containing survey information obtained by the former Nature Conservancy Council (NCC) during the period 1992-96. This information was reviewed to identify any change in habitat or management of the site and the surrounding area.

Field Survey

Vegetation and Habitats

- 9.3.12 The vegetation and habitat types present within the survey area were categorised and mapped in accordance with the standard Phase 1 Habitat assessment methodology (Joint Nature Conservation Committee, 2010), dominant and conspicuous plant species were recorded for each habitat. Target notes were used to record information on features of ecological interest, such as evidence of, or habitats with potential to support, protected species. Following the completion of the survey, a colour-coded habitat plan was digitised using Corel Draw to show the extent and distribution of the different habitat types present within the site (Figure 9.4-1).
- 9.3.13 The presence of invasive plant species listed on Schedule 96 of the Wildlife and Countryside Act 1981 (as amended), such as Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*) and Japanese knotweed (*Fallopia japonica*) were also noted during the survey, if present.

Protected and Notable Species

- 9.3.14 During the survey, emphasis was placed on searching for evidence of, and habitats with, potential to support protected or notable species, especially species meeting any of the following criteria:
- Listed under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended);

- Listed under Section 7 of the Environment (Wales) Act 2016 as being of principal importance for maintaining and enhancing biodiversity in Wales;
- Listed as a local priority for conservation, for example in the relevant local Biodiversity Action Plan (BAP);
- Red Listed using International Union for the Conservation of Nature (IUCN) criteria (e.g. in one of the UK Species Status Project⁷ reviews, in the Species of Conservation Concern Red, Amber or Near Threatened List⁸, Birds of Conservation Concern in Wales⁹, or, where a more recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book);
- Listed as a Nationally Rare or Nationally Scarce species (e.g. in one of the Species Status Project reviews) or listed as a Nationally Notable species where a more recent assessment of the taxonomic group has not yet been undertaken; and/or
- Endemic to a country or geographic location (it is appropriate to recognise endemic sub-species, phenotypes, or cultural behaviours of a population that are unique to a particular place).

9.3.15 It should be noted that only those species with potential to be present on site are mentioned within this assessment.

9.3.16 The methodologies used were as follows:

Birds

9.3.17 Any birds observed during the field survey were recorded, in addition to features capable of supporting nesting birds (e.g. trees, hedgerows, buildings, bramble, ruderal vegetation and rough grassland etc.). The site was also assessed for its actual and potential suitability to support Wildlife and Countryside Act 1981 (as amended) Schedule 1 species.

9.3.18 A comprehensive bird survey, such as a breeding bird survey, was not undertaken as this was beyond the scope of the assessment.

9.3.19 Full details of the breeding bird survey methodology can be found in Document Ref. 57100-0100.

Bats

Preliminary Ground-level Roost Assessment

9.3.20 A preliminary ground-level roost assessment of the trees within the survey area was undertaken looking for features that bats could use for roosting (Potential Roost Features¹⁰ (PRF) and evidence of bats (i.e. droppings in, around or below a PRF; odour emanating from a PRF; audible squeaking at dusk or during warm weather; or staining below the PRF). A systematic inspection was carried out around all accessible aspects of the tree, from both close to the trunk and further away.

9.3.21 The trees were assessed for their suitability to support roosting and hibernating bats in accordance with Table 4.1 of the Bat Conservation Trusts Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016). A high-powered torch (Clulite), an

endoscope (Snake vision) binoculars and a ladder were used as appropriate during the survey.

- 9.3.22 None of the trees within the proposed development footprints were considered to have anything greater than low bat roost potential. They are therefore not mentioned further in this context in this report. However, the avoidance, further surveys and precautionary measures set out in Section 9.6 will be implemented before any works to trees commence.

Daytime Internal and External Building Inspection

- 9.3.23 A systematic search was made of the exterior and interior of the three bungalows in the north-west of the wider paper mill site (Area A), looking for features that bats could use for entry/ exit and roosting and to search for the presence of bats or evidence of bat use, such as droppings, feeding remains, urine staining, scratch marks and the remains of dead bats. The survey was undertaken on the 21st March 2019 by Acer Ecology. A high-powered torch (Clulite), an endoscope (Snake vision), binoculars and a ladder were used as appropriate during the survey. The internal reaches of the bungalow 2 and 3 were inaccessible at the time of survey.

- 9.3.24 The location of the buildings are shown on Figure 9.4-1.

Dusk Emergence and Dawn Re-Entry Surveys of Bungalows 1, 2 and 3

- 9.3.25 Full details of the dusk emergence and dawn re-entry survey methodology can be found in Document Ref. 57100-0100.

Bat Activity Transects and Remote Detector Surveys

- 9.3.26 Full details of the bat activity transect and remote detector survey methodologies can be found in Document Ref. 57100-0100.

Terrestrial Habitat Assessment

- 9.3.27 A preliminary assessment of the value of the site for bats (and any potential roost sites therein) was made in accordance with Table 4.1 of the Bat Surveys for Professional Ecologists (Collins, 2016). The assessment was based on the relative abundance and quality of habitat features within the site, and surrounding landscape, suitable for roosting, foraging and commuting bats.

Dormice

- 9.3.28 The hedgerows, woodland and scrub were assessed for their suitability to support dormice (*Muscardinus avellanarius*) with reference to guidance such as The Dormouse Conservation Handbook (Bright, Morris & Mitchell-Jones, 2006). The structure and composition of these habitats within the site were assessed with respect to the presence of flower, fruit or nut-bearing food-plants such as hazel (*Corylus avellana*) (a favoured food-plant of dormice), oak (*Quercus* sp.), honeysuckle (*Lonicera periclymenum*), bramble (*Rubus fruticosus* agg.), sycamore (*Acer pseudoplatanus*), as well as other trees and shrubs listed in Bright, Morris & Mitchell-Jones (2006) as being of value to dormice. In addition, connectivity to other areas of suitable habitat in the wider landscape, such as hedgerows and woodland, was assessed.
- 9.3.29 A search for hazelnuts opened by dormice was undertaken to aid determination of their presence.

Great Crested Newts

- 9.3.30 The survey area was appraised for its suitability to support great crested newts (*Triturus cristatus*). The assessment was based on guidance outlined in the Herpetofauna Workers' Manual (Joint Nature Conservation Committee, 2003) and the Great Crested Newt Conservation Handbook (Langton, Beckett & Foster, 2001).
- 9.3.31 Ordnance Survey maps and aerial images of the land surrounding the site were consulted to determine if any water bodies were present within the site or within 500m of it. Six potentially suitable water bodies were identified within the study area. However, water bodies two and three proved to comprise flowing channels, which are considered wholly unsuitable for use by breeding great crested newts. Likewise, the River Llynfi was deemed unsuitable for use by newts. Flowing water is considered to act as a barrier to great crested newt migration (English Nature, 2001). Flowing water bodies and standing water bodies within 500m of the site but separated from the site by hard barriers, therefore, are considered unlikely to support great crested newts and were not included in this assessment. Water bodies one, four, five and six were not present. Any such water bodies appear to have long-since dried up, as no indicative aquatic or riparian vegetation was recorded in proximity to any of these locations. The Habitat Suitability Index (HSI) (Oldham et al., 2000) was applied to these water bodies (where access permitted). All of the water bodies identified within the desk study were therefore scoped out of the assessment.

Otters

- 9.3.32 A preliminary assessment for signs of otter (*Lutra lutra*) was undertaken following the advice provided by Strachan & Jefferies (1996) and Chanin (2003). Where access was available, the banks of the River Llynfi were searched for evidence of otter activity within 10m of the bank. Field signs of otter were recorded if present including spraints (faeces showing food remains), footprints, feeding remains and couches (above ground resting sites normally in thick vegetation cover), as well as potential or actual breeding sites and resting places (i.e. holts or natal dens) which are usually found under roots of bank side trees or in rock piles.

Reptiles

- 9.3.33 An assessment of the suitability of on-site habitats to support reptiles was made. Reptiles require a diverse range of habitats to meet their needs such as hedgerows, scrub, rough grassland, wood piles, rubble, banks and compost heaps. The potential of the site to provide hibernation opportunities and spring/ summer/autumn habitat was also assessed, with reference to guidance provided in the Herpetofauna Workers' Manual (Joint Nature Conservation Committee, 2003), the Reptile Management Handbook (Edgar, Foster & Baker, 2011) and the Reptile Mitigation Guidelines Technical Note TIN 102 (Natural England, 2013). The following factors were considered: vegetation type and structure; insolation (sun exposure); slope aspect; topography; surface geology; habitat connectivity; habitat size; prey abundance; refuge opportunity; hibernation opportunity; egg-laying potential for grass snake (*Natrix natrix*); public pressure; percentage of shade; levels of disturbance and management regime.

Reptile Survey

- 9.3.34 Full details of the reptile survey methodology and translocation exercise can be found in Document Ref. 57100-0100.

Badgers

- 9.3.35 Earth embankments, wooded copses, hedgerows and dense bramble beds are habitat features that often contain evidence of badger (*Meles meles*). Where present on site and within a 30m buffer adjacent to the site these and other suitable habitat features were searched for such evidence. Where present, the location of badger signs such as setts, runs, dung pits or latrines, prints, hair and foraging snuffle holes were recorded.

Static Camera Trap Badger Survey

- 9.3.36 Full details of the static camera trap badger survey methodology can be found in Document Ref. 57100-0100.

Other Species

- 9.3.37 General habitat suitability and incidental sightings of other animal species were also noted.

Constraints and Limitations

- 9.3.38 General Temporal Constraints
- 9.3.39 Any ecological survey can only identify what was present on site at the time the survey was conducted and habitat usage by species can change over time.

Seasonality of Survey

- 9.3.40 The present survey was undertaken outside of the optimal survey period for certain species of flora and fauna, with many species having died back or having become inconspicuous at the time of the survey. The survey can be considered as providing a reasonable, though not exhaustive or full, plant list. The survey noted the habitat types present on site and the dominant vegetation at the time of the survey, which is likely to be constant and a fair reflection of the habitat quality present.

Access

- 9.3.41 Not all parts of the bungalows could be inspected, such as gaps between roof tiles and felt lining and voids within the soffit boxes. Also, the interiors of Bungalows 2 and 3 could not be inspected during the current study. Evidence of roosting bats was recorded within the loft void of Bungalow 3 during the previous preliminary roost assessment of the building. The lack of access into this building during the current study is therefore not considered to act as a significant constraint to the study. Furthermore, an asbestos report of all three bungalows has highlighted high concentrations of the materials throughout all three buildings, thus making further internal inspection hazardous.

Static Detector Survey

- 9.3.42 During the static detector survey, two Anabat Express detectors failed in June and October. In these instances, two additional detectors were returned to the positions which failed and recorded for 5 nights. One detector also failed during the September survey, but due to unfavourable weather conditions, it was not possible to compensate during this month.

9.4 Assessment Criteria

- 9.4.1 In order to provide a level of consistency to the assessment, the prediction of magnitude and assessment of significance of ecological effects will be on the following pre-defined criteria.

Determining the value (relative sensitivity) of ecological receptors

- 9.4.2 The value of the habitats and features of the site have been evaluated and graded in accordance with a geographical frame of reference as detailed in Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (CIEEM, 2018). The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county, district, local and, lastly, within the immediate zone of influence of the site only.
- 9.4.3 The categories of ecological value used in this assessment are as listed below in Table 9.4-1.

Table 9.4-1: Criteria for assessing the value (relative sensitivity) of Ecological Receptors

Level of Value	Criteria Description
Very high (International)	Internationally designated or proposed sites such as Ramsar Sites, Special Protection Areas (SPA), Biosphere Reserves and Special Areas of Conservation (SAC), or non-designated sites meeting criteria for international designation. Sites supporting populations of internationally important species or habitats.
High (National)	Nationally designated sites such as Sites of Special Scientific Interest (SSSIs), or non-designated sites meeting SSSI selection criteria (NCC 1989), National Nature Reserves (NNRs) or Nature Conservancy Review (NCR) Grade 1 sites, viable areas of key habitats within the UK Biodiversity Action Plan. Sites supporting viable breeding populations of Red Data Book (RDB) species (excluding scarce species), or supplying critical elements of their habitat requirements.
Medium (Regional)	Sites containing viable areas of threatened habitats listed in a regional Biodiversity Action Plan, comfortably exceeding Site of Importance for Nature Conservation (SINC) criteria, but not meeting SSSI selection criteria. Sites supporting regionally significant areas of BAP habitats or large and viable populations Nationally Scarce species, or those included in the Regional Biodiversity Action Plan on account of their rarity, or supplying critical elements of their habitat requirements.
Medium (County / District)	Site identified as a Site of Importance to Nature Conservation (SINC) at the district level; meeting South Wales Wildlife Sites Partnership (SWWSP) 2004 published designation criteria, but falling short of SSSI designation criteria, whether designated as a SINC or not. Ancient

	woodlands and sites supporting regionally significant areas of UK BAP habitat. Large scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/ LBAP or threatened species (other than badger).
Medium / Low (High Local)	Habitats which just fail to meet Regional value criteria, but which appreciably enrich the ecological resource of the locality. Sites supporting species which are notable or uncommon in the county; or species which are uncommon, local or habitat-restricted nationally, and which might not otherwise be present in the area. Moderate scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/ LBAP or threatened species.
Low (Local)	Old hedges, woodlands, ponds, significant areas of species-rich grassland, small scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/LBAP or threatened species. Undesignated sites or features which appreciably enrich the habitat resource in the context of their immediate surroundings, parish or neighbourhood (e.g. a species-rich hedgerow). Rare or uncommon species may occur but are not restricted to the site or critically dependent upon it for their survival in the area.
Low (Site value, low local)	Low-grade and widespread habitats. Woodland plantations, structured planting, small areas of species-rich grassland and other species-rich habitats not included in the UK or Local BAP
Negligible	No intrinsic nature conservation value associated with habitat. Generally these are areas of hard standing or buildings with no nature conservation interest

Determining the value (relative sensitivity) of a site for bats

- 9.4.4 Table 9.4-2 outlines the value of a development site for bats. The value is assigned based on the value of the identified population, rather than the scarcity or legal protection of the species as a whole, and therefore individual occurrences within the site of a nationally scarce species are not necessarily valued at the National level.

Table 9.4-2: Criteria for assessing potential suitability of a site for bats

Suitability	Commuting and Foraging Habitat
High	<p><u>Commuting Habitat</u> Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p><u>Foraging Habitat</u> High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Proximity to Known Bat Roosts Site is close to and connected to known roosts</p>
Medium	<p><u>Commuting Habitat</u> Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p>

	<u>Foraging Habitat</u> Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
Low	<u>Commuting Habitat</u> Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. <u>Foraging Habitat</u> Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible	Negligible habitat features on-site likely to be used by commuting and foraging bats.
Suitability	Description of Roosting Habitat
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Medium	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status ⁴² (with respect to roost type only) the assessments in this table are made irrespective of conservation status, which is established after presence is confirmed.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection appropriate conditions ⁴⁰ and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity) or hibernation.
Negligible	Negligible habitat features on site likely to be used by roosting bats.

Identifying Impacts and Determining Magnitude

- 9.4.5 In assessing the effects of the proposed development upon ecological receptors, it is necessary to consider the value of the receptor, as well as the magnitude of any impact.
- 9.4.6 The magnitude of the potential effect on the conservation status of the particular valued ecological receptor and on the integrity of the habitats that support them as a result of the proposed development, is determined using the criteria as described in Table 9.4-3.
- 9.4.7 The scale of the magnitude of impacts is:
- Major;
 - Moderate;
 - Minor;
 - Negligible;
 - No Change.

9.4.8 The magnitude of an effect is independent of the value of the receptor. Effects can be permanent or temporary, of various duration, direct or indirect, adverse or beneficial and can be cumulative.

9.4.9 In terms of timescales the following definitions have been applied:

- 'immediate' within approximately 12 months;
- 'short-term' within approximately 1 to 5 years;
- 'medium-term' within approximately 6 to 15 years;
- 'long-term' more than 15 years.

Table 9.4-3: Criteria Determining Magnitude of Impact

Magnitude	Examples
Major	Significant effect on the nature conservation status of the site, habitat or species; likely to threaten the sustainability and long-term integrity of the ecosystem, Not replaceable or reversible. Will be detectable in short-, medium and long-term.
Moderate	Noticeable effect on the nature conservation status of the site, habitat or species population, but would not threaten sustainability or the long-term integrity of the system. Replaceable or reversible given time. Effect on nature conservation status likely to be detectable in short and medium-term.
Minor	Some measurable change in attributes or quality, a short-term, reversible impact on the extent or size or integrity of a site, habitat, species population, no material effect on the conservation status of the site, habitat or species population
Negligible	Very minor change but reversible within 12 months, within normal bounds of variation, Not expected to affect the conservation status of the site, habitat or species population
No change	No detectable effects on the ecological resource, even in the immediate term.

Determining Significance

9.4.10 The significance of an effect is largely a product of the interaction between the value of the ecological receptor and the magnitude of the effect on it, moderated by professional judgement, to determine whether the integrity of the receptor will be affected. An ecologically significant effect is defined in the IEEM Guidelines as: 'effect (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area.' Within this assessment a significant effect therefore means that the predicted effects are considered likely to affect the integrity of a receptor.

9.4.11 The significance of effects is defined using a matrix in which ecological value and magnitude of impact are combined to determine different grades of significance. The significance of effect is expressed on the following scale:

- Very Large;
- Large;
- Moderate;
- Slight;
- Neutral.

9.4.12 In line with IEEM Guidelines the following matrix is used to define the significance of an impact.

Table 9.4-4: Assessing the Significance of Effects

VALUE / SENSITIVITY	Very high (International)	Neutral	Slight	Moderate	Large / Very Large	Very Large
	High (National)	Neutral	Slight	Moderate	Large	Large / Very Large
	Medium (Regional, County, District)	Neutral	Neutral/ Slight	Slight	Moderate	Large
	Medium / Low (High Local)	Neutral	Neutral	Slight	Slight	Moderate
	Low (Local)	Neutral	Neutral	Neutral/ Slight	Slight	Moderate
	Low (Site value)	Neutral	Neutral	Neutral	Neutral	Slight
	Negligible	Neutral	Neutral	Neutral	Neutral	Neutral
		No change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT				

9.4.13 The IEEM guidelines define an ecologically significant impact as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area.

9.4.14 Effects are unlikely to be significant where features of low importance are subject to small-scale or short-term impacts. However, where there are a number of small-scale effects that are not significant alone, the assessor may determine that, cumulatively, these may result in an overall significant effect.

9.4.15 Effects defined in Table 9.4-4 as **large** or **moderate** are considered significant.

Assessment of Operational Phase Combustion Emissions, Ecological Receptors – Air Quality Significance Criteria

- 9.4.16 In addition to the AERA guidance, the EA's Operational Instruction 66_12¹⁵ details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for European sites, 'no likely damage' for SSSIs.
- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for European sites and SSSIs;
 - PC does not exceed 10% short-term CLe for NOx for European sites and SSSIs;
- 9.4.17 Where impacts cannot be classified as resulting in 'no likely significant effect', more detailed assessment may be required depending on the sensitivity of the feature in accordance with EAs Operational Instruction 67_12 (*Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation*). This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).
- 9.4.18 The guidance provides the following further criteria:
- if the PEC does not exceed 100% of the appropriate limit it can be assumed there will be no adverse effect;
 - if the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
 - if the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
 - if the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
 - if the background is currently above the limit and the additional PC is large - cannot conclude no adverse effect.

Inherent Mitigation

- 9.4.19 The assessment incorporates inherent mitigation that is considered integral to the design of the Project. The prescribed inherent mitigation has been taken into account in the assessment of the significance of the effects of the impacts and has been incorporated into the design of the Project. In addition to measures required to mitigate adverse effects on ecological features, further biodiversity enhancement measures have been identified in the landscape design of the proposed development (Document Ref.: 57100-0166).

¹⁵ EA Working Instruction 66_12 - Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation

9.5 Baseline Conditions and Receptors

- 9.5.1 This section describes the biodiversity baseline of the study area, which includes desk study information obtained for a 10km radius around the development site, and field survey results from within the development site and the immediate surrounding. The detailed results of each survey as well as a list of records of notable species is contained within the Ecological Appraisal (Document Ref.: 57100-0166).

Desk Study

Statutory Nature Conservation Designated Sites

- 9.5.2 The Application Site does not lie within, or overlap any designated statutory or non-statutory nature conservation sites. A number of statutory sites and other sites of conservation importance were identified within a 10 km radius of the Application Site.
- 9.5.3 The locations of these designated sites are displayed in Document Ref: 57100-0216 and 57100-0217.

Table 9.5-1: Summary of Designated Site Abbreviation

Abbreviation	Designated Site
SAC	Special Areas of Conservation
SSSI	Site of Special Scientific Interest
NNR	National Nature Reserve
LNR	Local Nature Reserve
SINC	Site of Importance for Nature Conservation
ASNW	Ancient Semi-Natural Woodland
RAWS	Restored Ancient Woodland Site

Statutory Sites (SACs or SSSIs) within 10km of Site

- 9.5.4 There are 15 statutory sites within a 10km radius of the Application Site of which 7 are internationally designated sites. A brief summary of each designated area within 10km of the site is given in Table 9.5-2. Detailed descriptions of the Natura2000-Sites are provided in the Habitat Regulation Assessment (Document Ref. 57100-0225).

Table 9.5-2: Designated sites of ecological importance within 10km of the site

	Designation	Name	Distance from site
1	SSSI	MYNYDD TY-ISAF, RHONDDA	9.1km
2	SSSI	CWM DU WOODLANDS	1.9km
3	SSSI	CWM CYFFOG	4.9km
4	SSSI;	DAREN Y DIMBATH	7.5km
5	SSSI; SAC	BLACKMILL WOODLANDS	4.2km
6	SSSI	CWM RISCA MEADOW	2.4km
7	SSSI, SAC	BRYN - BACH, CEFN CRIBWR	3.7km
8	SSSI, SAC	CAEAU CEFN CRIBWR	4.0km
9	SSSI	WAUN CIMLA	4.6km
10	SSSI, SAC	WAUN-FAWR, CEFN CRIBWR	5.4km
11	SSSI, SAC	PENYCASTELL, CEFN CRIBWR	5.8km
12	SSSI; NNR, SAC	MERTHYR MAWR	9.0km
13	SSSI, NNR, SAC	CYNFFIG/ KENFIG	7.7km
14	SSSI	EGLWYS NUNYDD RESERVOIR	7.8km
15	SSSI	MARGAM MOORS	9.0km

Statutory Sites (SACs or SSSIs) Designated for Bats within 10km of Site

9.5.5 No SACs or SSSIs specially designated for bats lie within 10km of the site.

SACS and SSSIs within 2km of Site

9.5.6 There are no SACs or SSSIs within 2km of the proposed development site.

NNRs, LNRs and other protected sites

9.5.7 No NNRs, LNRs, or other protected sites are present within 2km of the site.

Non-Statutory Nature Conservation Designated Sites

SINCs

9.5.8 Multiple SINCs were recorded within 1km of the study area. These were:

- Bettws West;
- Coed Coytrahen;
- Coed Pentwyn;
- Coed Tondu;
- Cwm Cefnydfa;
- Cwm Nant Gwyn;
- Moelgilau-fawr;
- Nant Bryncynan Woods;
- Nant Cwm-bach;
- Nant Mwrth;
- North Bettws Woodland;
- Rifle Range Wood;

- Drysity'n-y-waun;
- Gelliheblig;
- Lletty Brongu;
- Llety Woods;
- Llywn-y-Brian;
- Tylacoch North;
- Tylacoch South;
- Ty'n-y-Waun; and
- Waun-y-Gilfach woods.

Ancient Woodland

- 9.5.9 There are 57 areas of ASNW located within 2km of the proposed development site, the nearest of which lies approximately 10m to the south-west of the site, just beyond the A4063. In addition, 10 RAWs and two Ancient Woodland Sites of Unknown Category are present within the same search radius.
- 9.5.10 Considering the scale and location of the works, none of these woodlands are anticipated to be affected by works. Although an area of Unknown Category Ancient Woodland lies only 10m from the south-eastern corner of the site, it is separated from the proposed development site by the A4063. Ancient woodlands are therefore not mentioned further in this report.

Birds

- 9.5.11 SEWBRc provided numerous records for birds within 2km of the site. The following table shows nesting birds associated with the habitats present on site and their conservation status

Table 9.5-3: SEWBRc Nesting Birds

Species		Schedule 1	Section 7 list Environment Act Wales	Red list	Amber list
Barn owl	Tyto albo	Yes			
Bullfinch	Pyrrhula pyrrhula		Yes		
Dunnock	Prunella modularis		Yes		Yes
Goshawk	Accipiter gentilis	Yes			
House sparrow	Passer domesticus		Yes	Yes	
Kestrel	Falco tinnunculus		Yes		Yes
Lesser spotted woodpecker	Dendrocopos minor		Yes	Yes	
Linnet	Linaria cannabina		Yes	Yes	
Pied flycatcher	Ficedula hypoleuca		Yes		
Red kite	Milvus milvus	Yes			
Skylark	Alauda arvensis		Yes	Yes	
Song thrush	Turdus philomelos		Yes	Yes	
Spotted flycatcher	Muscicapa striata		Yes	Yes	
Starling	Sturnus vulgaris		Yes	Yes	
Tree pipit	Anthus trivialis		Yes	Yes	
Willow tit	Poecile montanus		Yes	Yes	
Wood warbler	Phylloscopus sibilatrix		Yes	Yes	

Bats

9.5.12 The data search returned a total of 16 records of bat roosts within 2km of the site. Records of roost sites were as follows:

- Four records of unspecified bat species, the nearest of which lies approximately 550m from the study area;
- Two brown long-eared (*Plecotus auritus*) roosts, the closest of which was recorded approximately 550m from the study area;
- A single lesser horseshoe (*Rhinolophus hipposideros*) roost, comprising droppings recorded at a site approximately 550m from the study site;
- A single common pipistrelle (*Pipistrellus pipistrellus*) bat roost approximately 1km from the study area; and
- Eight unspecified *Pipistrellus* sp., roosts, the closest of which lies approximately 1.2km from the study area.

9.5.13 In addition to the roost records, SEWBrEC returned 47 records of bats foraging or commuting within 2km of the site. These included common pipistrelle, noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), lesser horseshoe (*Rhinolophus hipposideros*), serotine (*Eptesicus serotinus*) and brown long-eared.

Dormice

9.5.14 SEWBrEC did not return any published records of dormice from within 2km of the site. A targeted dormouse survey undertaken in 2003 found no evidence of dormice (Ove ARUP and Partners Ltd., 2003).

Great Crested Newts

9.5.15 SEWBrEC did not return any records of great crested newt from within 2km of the site. Additionally, no records of common amphibians were received from within this search radius.

Otter

9.5.16 The data search returned a single record of otter within 2km, comprising a spraint on a river bank approximately 550m from the study site.

Reptiles

9.5.17 The data search returned four records of reptiles within 1km of the site:

- A single record of slow-worm (*Anguis fragilis*), approximately 1.2km from the study area;
- Two records of adder (*Vipera berus*), approximately 1.6km from the study area; and
- A single record of grass snake (*Natrix natrix*) approximately 1.8km from the study site.

Badgers

9.5.18 SEWBrEC returned three records of badger from within 2km of the site, the most recent of which was located approximately 550m from the study area.

- 9.5.19 Three badger setts were recorded, along with various field signs in 2003. Of particular relevance to the current study, a record of a badger sett within Area C was identified as part of the ARUP desk study (Pryce Consultant Ecologists, 1999). However, the sett could not be identified. The historic sett was assessed as likely comprising an occasionally used outlier sett – unlikely to be important to the badger population (Ove ARUP and Partners Ltd., 2003).

Other Mammals

- 9.5.20 Several records of common hedgehog (*Erinaceus europaeus*) were returned within the study area.

Field Survey

Habitats and Vegetation

- 9.5.21 The results of the general survey of habitats and vegetation are shown on Figure 9.5-1. A botanical species list is provided in the Ecological Appraisal (Document Ref.: 57100-0100).

Summary of Habitats Present within the Site

- 9.5.22 The site consists of ten elements which are described in detail below. These comprise:
- Broadleaved Semi-Natural Woodland (A1.1.1);
 - Dense Scrub (A2.1);
 - Scattered Broadleaved Trees (A3.1);
 - Scattered Coniferous Trees (A3.2);
 - Poor Semi-Improved Grassland (B6);
 - Ephemeral/ Tall Ruderal Mosaic (C3.1/ J1.3);
 - Introduced Shrub (J1.4);
 - Intact Species-Poor Hedgerow (J2.1.2);
 - Building (J.3.6); and
 - Hard Standing (no alphanumerical code provided).

Notable Plant Species

Data Trawl Results

- 9.5.23 SEWBRReC provided no records of protected plant species or species of principal importance listed under the Environment (Wales) Act 2016, either within or directly adjacent to the proposed development site.

Field Survey Results

- 9.5.24 No plant species, which individually are considered to be of either of national, regional or local significance were recorded on the site.

Habitat Descriptions

Broadleaved Semi-Natural Woodland (A1.1.1)

- 9.5.25 Semi-natural broadleaved woodland constitutes the entirety of survey area D. It comprises secondary woodland, with typical DBH ranges from approximately 10-40cm. Alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*), sycamore and sessile oak form the dominant components of the canopy, while species such as hazel, holly (*Ilex aquifolium*) and spindle (*Euonymus europaeus*) are occasional in the understorey.
- 9.5.26 The ground flora is dominated by nettle (*Urtica dioica*), great willowherb (*Epilobium hirsutum*), cleavers (*Galium aparine*), bramble, ivy (*Hedera helix*), creeping buttercup (*Ranunculus repens*), herb Robert (*Geranium robertianum*), perennial rye grass (*Holcus lanatus*), Yorkshire fog (*Holcus lanatus*), annual meadow grass (*Poa annua*), hart's tongue fern (*Asplenium scolopendrium*), bracken (*Pteridium aquilinum*) and *Polypodium* sp. Other frequently recorded species include rosebay willowherb (*Epilobium angustifolium*), broad-buckler fern (*Dryopteris dilatata*), tufted hair grass (*Deschampsia cespitosa*) and bluebell (*Hyacinthoides non-scripta*).
- 9.5.27 A smaller stand of semi-natural broadleaved woodland also comprises the southern portion of survey area A. Again, it is relatively young in nature, with hawthorn and dogwood (*Cornus sanguinea*) being frequently recorded, along with sycamore, sessile oak and alder.
- 9.5.28 A large area of wet scrub woodland constitutes a large portion of survey area C. Alder, grey willow and sessile oak dominate the canopy, while hawthorn, field rose (*Rosa arvensis* agg), bramble and hazel are rare to occasional. The fairly sparsely vegetated ground flora consists of nettle, herb Robert, bluebell, broad buckler fern, hart's tongue fern, scaly male fern (*Dryopteris affinis* agg), bracken and Himalayan balsam (*Impatiens glandulifera*), which was recorded in clusters towards the northern portion of the survey area.

Dense Scrub (A2.1)

- 9.5.29 Dense scrub has established around areas of the three buildings in survey area A. Bramble, bracken, hawthorn, *Salix* sp., and dogwood form the most abundant components, while the understorey consists of cleavers, nettle, herb Robert, primrose (*Primula vulgaris*), bluebell, creeping buttercup (*Ranunculus repens*), perennial rye grass, Yorkshire fog and red fescue (*Festuca rubra*). Himalayan balsam was recorded throughout this area, as was Rhododendron. Dense scrub also forms the entirety of survey area B. Buddleia (*Buddleja davidii*), bramble and grey willow (*Salix cinerea*) are abundant, while goat willow (*Salix caprea*) and dogwood are abundant.

Scattered Broadleaved Trees (A3.1)

- 9.5.30 Several semi-mature sycamore, alder, ash and sessile oak trees are present within the dense scrub towards the south-western corner of survey area A.

Scattered Coniferous Trees (A3.2)

- 9.5.31 A conifer was recorded adjacent to Bungalow 2 in survey area A.

Poor Semi-Improved Grassland (B6)

- 9.5.32 Poor semi-improved grassland forms the lawns that encircle the three buildings within survey area A. The sward is typically short, though certain rank areas are present. Graminoid species dominate the sward, including Yorkshire fog, red fescue, perennial rye grass and annual meadow grass. Herbaceous species recorded included creeping thistle (*Cirsium arvense*), ribwort plantain (*Plantago lanceolata*), yarrow (*Achillea millefolium*), daisy (*Bellis perennis*), ivy, cowslip (*Primula veris*), barren strawberry (*Potentilla sterilis*), common sorrel (*Rumex acetosa*), common mouse ear (*Cerastium fontanum*), garden daffodil (*Narcissus* sp), great willowherb, lesser celandine (*Ficaria verna*) and creeping buttercup. Himalayan balsam [TN 1] was again recorded throughout his habitat.

Ephemeral/ Tall Ruderal Mosaic (C3.1/ J1.3)

- 9.5.33 An area of bare ground/ hard standing at the centre of survey are C has become colonised in ephemeral vegetation, with patches of tall ruderal vegetation beginning to establish. Herbaceous species include creeping cinquefoil (*Potentilla reptans*), barren strawberry, creeping thistle, chickweed (*Stellaria media*), ragwort (*Senecio jacobaea*) and evening primrose (*Oenothera biennis*). Other species included glaucous sedge (*Carex flacca*), hairy sedge (*Carex hirta*) and hard rush (*Juncus inflexus*). Alder saplings are also beginning to establish.

Introduced Shrub (J1.4)

- 9.5.34 Ornamental shrubbery is present around the buildings in survey area A.

Intact Species-Poor Hedgerow (J2.1.2)

- 9.5.35 Several sections of intact species-poor hedgerow form the old garden boundaries to the north of the buildings in survey area A. They are composed of garden privet (*Ligustrum ovalifolium*), hawthorn, holly and sessile oak. The understory is dominated by cleavers and nettle, although species such as primrose, bluebell and ivy were also recorded.

Building (J3.6) and Hard Standing (no alphanumerical code provided)

- 9.5.36 Buildings and Hard standing roads are present throughout the wider site.

Birds

- 9.5.37 A high number of birds were recorded on site during the original preliminary ecological appraisal, including: willow warbler (*Phylloscopus trochilus*), great tit (*Parus major*), chiffchaff (*Phylloscopus collybita*), wood pigeon (*Columba palumbus*), dunnoek, great-spotted woodpecker (*Dendrocopos major*), blue tit (*Cyanistes caeruleus*), nuthatch (*Sitta europaea*), jackdaw (*Corvus monedula*), blackbird (*Turdus merula*), carrion crow (*Corvus corone*), tree creeper (*Certhia familiaris*), blackcap (*Sylvia atricapilla*), robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*), tree pipit, sparrowhawk (*Accipiter nisus*), chaffinch (*Fringilla coelebs*), kestrel (*Falco tinnunculus*), coal tit (*Periparus ater*), song thrush (*Turdus philomelos*), long-tailed tit (*Aegithalos caudatus*), buzzard (*Buteo buteo*), raven (*Corvus corax*), goldcrest (*Regulus regulus*), greenfinch (*Chloris chloris*), jay (*Garrulus glandarius*) and goldfinch (*Carduelis carduelis*).

Breeding Bird Survey

- 9.5.38 A total of 26 breeding bird species have been recorded within the anticipated zone of influence: blackbird; blackcap; blue tit; bullfinch; chaffinch; chiffchaff; coal tit; dunnock; goldfinch; goldcrest; great tit; linnet; long-tailed tit; nuthatch; pied wagtail; robin; sedge warbler; stonechat; spotted flycatcher; swallow; song thrush; swift; whitethroat; wood pigeon; wren; and willow warbler. Of these, a total of 14 active nests were recorded (primarily blue tit and swallow, along with goldfinch spotted flycatcher, wood pigeon and wren).
- 9.5.39 A maximum of 68 territories were recorded across the site: a maximum of 19 territories were recorded within survey Area A (including a wren and spotted flycatcher nest in Bungalow 1 and a wren nest in Bungalow 2); 1 within survey Area B; 25 within survey Area C; and 14 within survey Area D.
- 9.5.40 A maximum of five swallow and two blue tit nests were also recorded within the fabric of the large industrial buildings adjacent survey Areas C and D (outside of the actual survey areas. A total of 2 pied wagtail territories were recorded in the same area.
- 9.5.41 Full details of the breeding bird survey results are presented in Document Ref.: 57100-0100.

Bats

Buildings and Other Structures

- 9.5.42 The key features of each building is provided in the Ecological Appraisal (Document Ref.: 57100-0100).

Dusk Emergence and Dawn Re-Entry Surveys of Bungalows 1, 2 and 3

- 9.5.43 Bungalow 3 has been confirmed as supporting occasional day roosts of individual common pipistrelle, soprano pipistrelle, an unidentified *Myotis* sp. (likely whiskered [*Myotis mystacinus*]) and a single bat that was either not echolocating or could not be picked up by the detector. The flight pattern and outline was suggestive of brown long-eared bat, though identification was not definitive.
- 9.5.44 The dusk emergence and dawn re-entry surveys found no evidence of bats roosting within Bungalow 1 or 2. No bats were noted flying close to either building (i.e. within 5m) and the bat activity around the site was generally low throughout the entirety of the suite of surveys. Therefore, it is unlikely that Bungalow 1 or 2 support bat roosts.
- 9.5.45 Full details of the dusk emergence and dawn re-entry survey results for Bungalows 1, 2 and 3 are presented in the Ecological Appraisal (Document Ref.: 57100-0100).

Bat Activity Transects and Remote Detector Surveys

- 9.5.46 Full details of the bat activity transects and remote detectors survey results are presented in the Ecological Appraisal (Document Ref.: 57100-0100).

Terrestrial Habitat

- 9.5.47 The site is collectively considered to provide moderate quality foraging habitat for bats. The semi-natural broadleaved woodland, wet scrub woodland, dese scrub and grassland interfaces high-quality foraging habitat, while the well-vegetated perimeter of the site and connecting woodland provide optimal commuting routes for bats into the wider landscape,

which includes other high-quality habitat features such as ancient woodland and rough marshy pasture. However, the high degree of artificial lighting associated to the wider paper mill complex serves to limit the quality of habitat over much of the survey area.

Dormice

- 9.5.48 No signs or evidence of dormice were recorded on site. The woodland and scrub in survey areas A and C is generally structurally unsuitable for dormice, though it contains relatively several of the food-plants known to form part of the dormouse diet (hazel, sessile oak, sycamore, bramble, hawthorn, silver birch and holly). These habitats contain a relatively sparse understorey layer that is considered to be unsuitable for dormice. Furthermore, the waterlogged nature of the wet woodland in survey area C makes this area wholly unsuitable for use by hibernating dormice.
- 9.5.49 The semi-natural broadleaved woodland within surgery area D is structurally more suitable. However, when considering the absence of historic records of this species within the study area (SEWBRc, 2018) and the historic work undertaken on site, the likelihood of dormice being present on site is considered to be low. This species is therefore not mentioned further in this report. No further surveys are recommended.

Great Crested Newt

- 9.5.50 No direct evidence of great crested newts was recorded on site.
- 9.5.51 The terrestrial habitats themselves provide optimal habitat for great crested newts – included a mosaic of wet woodland, rank vegetation and potential refugia/ hibernacula. However, as a general rule, suitable habitats within 250m of a breeding pond are likely to be used most frequently by great crested newts (English Nature 2001). The lack of suitable breeding ponds within 500m of the site, and the somewhat restricted ecological connectivity of the site (partially encircled by the A4063 and Llynfi River mean that their presence on site is considered to be very unlikely. Considered in addition to the absence of records of this species, the likelihood of adverse impacts to this species associated to the development is considered to be negligible. They are therefore not mentioned further in this report. No further surveys were recommended.

Otter

- 9.5.52 No holts, couches or evidence of otter was recorded along the inspection section of bank of the Llynfi River. However, it is considered likely that otters will utilise this stretch of watercourse for foraging and/ or commuting. It is therefore feasible that they may venture into the adjacent area of woodland in survey area C.

Reptiles

- 9.5.53 A single common lizard was recorded within survey Area 1, along with a maximum of six slow-worms. A maximum of four slow-worms were recorded within survey Area C. Full details of the reptile survey results are presented in the Ecological Appraisal (Document Ref.: 57100-0100).

Reptile Translocation

- 9.5.54 The translocation commenced for 28 consecutive days, until five clear days of trapping were achieved after the minimum 15 days. A total of 12 slow-worms, 11 common lizards and a single grass snake were captured from survey Area A. A total of five slow-worm were captures from survey Area C. Full details of the reptile survey results are presented in the Ecological Appraisal (Document Ref.: 57100-0100).

Badgers

- 9.5.55 No setts were recorded on site. An old rabbit warren in survey area C appears to have been partially exposed by bank failure, and judging by the size and shape of the existing entrance, a fox appears to have colonised some of the larger exposed tunnels [TN 3]. No evidence of badger was recorded throughout the wider area of woodland. Furthermore, the wet scrub woodland that constitutes survey area C is generally considered to be too wet to be of high suitability for use by setting badgers. However, the presence of badgers cannot be ruled out completely.

Static Camera Trap Badger Survey

- 9.5.56 No badgers were recorded over the ten nights of observation in proximity to the potential badger sett. Likewise, no evidence of fox habitation was recorded either.
- 9.5.57 Full details of the static camera trap badger survey results are presented in the Ecological Appraisal (Document Ref.: 57100-0100).

Other Mammals

- 9.5.58 No incidental sightings of other mammals were recorded on site. However, is likely that a range of common small mammals are present on the site, including shrews (*Sorex* sp.), voles, mice (*Apodemus* sp.) and hedgehog etc., occurring either as resident species or whilst foraging and/ or commuting. Hedgehogs are afforded partial protection under the Wildlife and Countryside Act (1981) and are now a priority species under the UK BAP in light of dramatic population declines. The areas of dense scrub and woodland are considered to provide highly optimal refugia for day-resting hedgehogs, and hibernacula during the winter months.

Assessment of Ecological Value of On-site Section 7, LBAP and SINC Habitats

Wet Woodland

- 9.5.59 The scrub woodland that constitutes the majority of survey Area C may qualify as 'Wet Woodland', a UK BAP and Section 7 habitat.
- 9.5.60 The trees are likely to be of significant value to fauna such as nesting birds and invertebrates.
- 9.5.61 The areas of scrub woodland within survey Area C area may therefore be of **district (or medium)** ecological value.

Assessment of Ecological Value of On-site Habitats Which Do Not Qualify as Section 7, LBAP and SINC Habitat

- 9.5.62 The semi-natural broadleaved woodland within survey Area D, though secondary in nature, is considered to be of **local (or low)** ecological value, due to its extensive nature and likely value for nesting birds and foraging/ commuting bats.
- 9.5.63 The three bungalows in survey Area A are also considered likely to be of **local (or low)** ecological value. Bungalow has been confirmed as a bat roost and is therefore considered to be of local ecological value.
- 9.5.64 The remaining habitats within the survey area are considered to be of no greater than **site (or low)** ecological value

Assessment of Ecological Value of Site for Birds

- 9.5.65 The semi-natural broadleaved woodland, scrub woodland and scrub habitats within the proposed development site provide high quality nesting and foraging habitats for a range of species. Furthermore, the nearby areas of ASNW also provide high quality nesting and foraging habitat. It is therefore anticipated that nesting activity within the site during the breeding season would be high. Furthermore, three Schedule 1 bird species have been recorded in proximity to the site (goshawk, barn owl and red kite [SEWBRReC, 2019]), together with numerous Section 7 species which could breed within the site.
- 9.5.66 The results of the breeding bird survey indicate that no Schedule 1 species are nesting within the anticipated zone of influence. However, several Section 7, UK BAP and UK Red List species were recorded.
- 9.5.67 Overall, 26 breeding species were recorded on site. A maximum of 68 territories were recorded across the site. Survey Areas C and A support the highest concentration of species, with 25 and 19 territories recorded respectively, including a wren and spotted flycatcher nest in Bungalow 1 and a wren nest in Bungalow 2. A maximum of 14 territories were recorded within survey Area D. A single dunnock territory was recorded within survey Area B.
- 9.5.68 A maximum of 5 swallow and 2 blue tit nests were also recorded within the fabric of the large industrial buildings adjacent survey Areas C and D (outside of the actual survey areas). A total of 2 pied wagtail territories were also recorded in this area.
- 9.5.69 All wild British birds (while nesting, building nests and sitting on eggs), their nests and eggs (with certain limited exceptions) are protected by law under Section 1 of the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000. Included in this protection are all nests (at whatever stage of construction or use) and all dependent young until the nest is abandoned and the young have fledged and become independent. Particularly rare species such as barn owl are listed on Schedule 1 which gives them additional protection from disturbance whilst nest building, whilst near a nest with eggs or young, or from disturbing the dependant young.
- 9.5.70 The value of the site for birds is considered of **local (or low)** value.

Assessment of Ecological Value of Site for Bats

Confirmed Building Roosts

- 9.5.71 Bungalows 1, 2 and 3 are considered to be in the same condition as that recorded previously (Acer Ecology, 2016). The results of the dusk emergence and dawn re-entry surveys indicate the Bungalow 3 supports occasional day roosts of individual common pipistrelle, soprano pipistrelle and Myotis (likely whiskered). Considering the optimal nature of the dusk emergence and dawn re-entry surveys, there is a high degree of confidence that these roosts have been accurately characterised. A single brown long-eared bat was also recorded roosting within Bungalow 3. However, the presence of approximately 200 droppings predominantly under the central ridge beam of the loft void of Bungalow 3 (Acer Ecology Ltd., 2016) somewhat contradicts the findings of the current survey. It is therefore considered likely that Bungalow 3 previously comprised a larger roost, and may have indeed comprised a maternity roost for brown long-eared bats. Consequently, the roost of Bungalow 3 has been assessed as being of **medium** nature conservation significance as defined in the Guidelines for proportionate mitigation, Figure 4 of the Bat Mitigation Guidelines (2004) (see Table 9.4-2).
- 9.5.72 The results of the preliminary roost assessment, dusk emergence and dawn re-entry surveys found no evidence of bats roosting within Bungalows 1 and 2. No bats were noted flying close to the building (i.e. within 5m) and the bat activity around the site was very low. Therefore, it is unlikely that either Bungalow 1 or 2 support a bat roost.
- 9.5.73 Consequently, roosting potential for bats of Bungalow 1 and 2 is assessed as being of **low** value.

Potential Hibernacula

- 9.5.74 Bungalows 1, 2 and 3 have been assessed as having some potential for use by hibernating bats, due to the following factors:
- The fact that large portions of the fabric of the bungalows is exposed to the elements, and is likely to be subject to sub-zero conditions in winter;
 - The internal and external walls of the bungalows are generally well-mortared lacking deep penetrating crevices suitable for entry by bats, and the walls themselves are relatively thin; and
 - The absence of any subterranean features.

Potential Foraging and Commuting Habitat

- 9.5.75 The site is collectively considered to provide **medium** quality foraging habitat for bats. The semi-natural broadleaved woodland, wet scrub woodland, dense scrub and grassland interfaces high-quality foraging habitat, while the well-vegetated perimeter of the site and connecting woodland provide optimal commuting routes for bats into the wider landscape, which includes other high-quality habitat features such as ancient woodland and rough marshy pasture. However, the high degree of artificial lighting associated to the wider paper mill complex serves to limit the quality of habitat over much of the survey area.

- 9.5.76 However, the results of the activity transects and remote detector surveys have demonstrated a low level of use across the site. Indeed, several key observations were made during the transect surveys: bat activity was consistently low throughout all of the transect surveys; bat activity was greatest within survey Area C; common and soprano pipistrelles were the most frequently recorded species; most recordings comprised multiple observations of the same low number of individuals, repeatedly foraging; and light sensitive species such as brown long-eared and lesser horseshoe bats occurred infrequently.
- 9.5.77 A maximum of eight species have been recorded on site over the 35 nights of remote detector surveys undertaken to date: common pipistrelle, soprano pipistrelle; noctule; serotine; *Myotis* spp.; brown long-eared; and lesser horseshoe. Again, survey Area C produced by far the highest amounts of activity, with detector 5 recording 599 contacts in June (1158 contacts in total across all detectors during this month). The observations noted during the activity transects indicate that this level of activity is attributed to relatively low numbers of individual bats foraging continuously along the wooden edge. Common and soprano pipistrelles were again the most frequently recorded species, appearing consistently earlier than other species. Common and soprano pipistrelles accounting for 76% of all recordings over the duration of the remote detector surveys. Conversely, light sensitive species on site (lesser horseshoe and brown long-eared) accounted for a mere 0.1% of all recordings over the duration of the remote detector surveys.
- 9.5.78 All species of bats and their roosting sites are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. All species of UK bats are designated as 'European protected species'. Seven species of bat (soprano pipistrelle (*Pipistrellus pygmaeus*), barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), brown long-eared (*Plecotus auritus*), lesser horseshoe and greater horseshoe bats (*Rhinolophus ferrumequinum*)) are listed under Section 7 of the Environment (Wales) Act 2016 as being of principal importance for maintaining and enhancing biodiversity in Wales.
- 9.5.79 Based on the assessment criteria of Table 9.4-2 the suitability of the site as commuting and foraging habitat for bats are assessed as being **medium**.

Assessment of Ecological Value of Site for Otters

- 9.5.80 No holts, couches or evidence of otter was recorded on site. However, it is considered likely that otters will utilise the peripheral areas of woodland to the Llynfi River.
- 9.5.81 Otters are designated as 'European Protected Species'. Their breeding sites or resting places are fully protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. Otter is a priority species in Wales under Section 7 of the Environment (Wales) Act 2016. Works affecting otter are subject to licensing procedures by NRW.
- 9.5.82 The value of the site for otters is considered **low**.

Assessment of Ecological Value of Site for Badgers

- 9.5.83 No setts were confirmed on site. However, an old rabbit warren in survey area C appears to have been partially exposed by bank failure, and judging by the size and shape of the

existing entrance, a fox appears to have colonised some of the larger exposed tunnels [TN 3]. No evidence of badger was recorded throughout the wider area of woodland. Therefore, although the wet scrub woodland that constitutes survey area C is generally considered too wet to be of high suitability for use by setting badgers, their presence cannot be ruled out completely. It is considered likely that badgers commute and forage across the wider site sporadically.

9.5.84 The results of the remote camera trap badger survey indicate that the old rabbit warren does not comprise a badger sett. Badgers are protected under the Protection of Badgers Act 1992. Protection applies both to the animal itself and to its nesting burrows (setts), and current interpretation of the Act also confers some protection to key foraging areas.

9.5.85 The value of the site for badgers is considered **low**.

Assessment of Ecological Value of Site for Reptiles

9.5.86 Reptile populations can be classified into three classes, based on the maximum number of adult reptiles seen on any one survey visit, as shown in the table below (Froglife 1999 and Natural England (TN102)). It should be noted that Froglife's guidance (1999) recommends that around 20 visits may be required to assess population size.

Table 9.5-4: Assessment criteria for evaluation of reptile populations

Reptile Species	Natural England Guidance (TN102)			Froglife Guidance (1999)		
	Small population	Medium population	Large population	Low population	Good population	Exceptional population
Adder	<5	5-10	>10	<5	5-10	>10
Common Grass snake	<5	5-10	>10	<5	5-10	>10
Common lizard	<5	5-20	>20	<5	5-20	>20
Slow-worm	<10	10-40	>40	<5	5-20	>20

9.5.87 The results of the reptile survey indicated that survey Area A supports a Small/ Good20 population of common lizard and slow worm, while survey Area C supports a Small/ Low population of slow worm.

9.5.88 With the exception of smooth snake (*Coronella austriaca*) and sand lizard (*Lacerta agilis*) (which are afforded greater protection), common reptiles are protected under Schedule 5 the Wildlife and Countryside Act 1981 (as amended). They are given so-called 'partial protection', which prohibits the deliberate killing or injury of individuals. The habitats of common reptiles are not specifically protected. These species are listed as priority species in Wales under Section 7 of the Environment (Wales) Act 2016.

9.5.89 The value of the site for reptiles is considered **low**.

Assessment of Ecological Value of Site for Hedgehogs

9.5.90 Survey Areas A, C and D and are considered to provide high quality foraging, commuting, resting and nesting habitats for hedgehogs. The site also contains numerous hibernacula for hedgehogs. Hedgehogs are afforded partial protection under the Wildlife and Countryside Act (1981) and are listed as priority species under Section 7 of the Environment (Wales) Act

2016. They are also listed in the Bridgend County Borough Council LBAP in light of dramatic population declines. The legislation afforded to hedgehogs in the Environment Wales Act (2016) requires all public bodies including Local Authorities to have regard for biodiversity conservation²¹ when carrying out their functions.

9.5.91 The value of the site for reptiles is considered medium / **low**.

9.6 Assessment of Effects

Effects on Designated sites

9.6.1 The Special Areas of Conservation (SACs) described above are all considered to be of **international** importance / value due to their level of designation.

9.6.2 As part of the Air Quality Assessment, the impacts of the development on sensitive environmental receptors were considered separately in chapter 6 (Air Quality) of this report. The full Air Quality assessment is provided as Document Ref. 57100-0218. The results of this assessment are summarised below.

Impacts on Ecological Receptors – Critical Levels

9.6.3 The results of the assessment of impacts on CLe are presented in Table 9.6-1 below.

Table 9.6-1: Impact on Critical Levels

Receptor ID	NOx Annual PC ($\mu\text{g}/\text{m}^3$)	PC as % of C _{Le}	NOx 24-hour PC ($\mu\text{g}/\text{m}^3$)	PC as % of C _{Le}	SO ₂ Annual PC ($\mu\text{g}/\text{m}^3$)	PC as % of C _{Le}
ER1	0.11	0.38	1.78	2.37	0.02	0.17
ER2	0.02	0.07	0.35	0.47	<0.01	0.02
ER3	0.04	0.12	1.23	1.63	<0.01	0.01

9.6.4 Table 9.6-1 illustrates that the additional annual mean NOx and SO₂ PC does not exceed 1% of the annual mean NOx or SO₂ CLe at any considered ecological receptor.

9.6.5 Table 9.6-1 further illustrates that the additional 24-hour mean NOx PC does not exceed 10% of the 24-hour mean NOx CLe at any considered ecological receptor.

9.6.6 Following the stated 'EA's Operational Instruction 66_12', impacts on the annual mean NOx, 24-hour mean NOx and annual mean SO₂ CLe are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

Impacts on Ecological Receptors – Critical Loads, Nutrient Nitrogen

- 9.6.7 The results of the assessment of impacts on the nutrient nitrogen CLo are presented in Table 9.6-2 below.

Table 9.6-2: Impact on Nitrogen Critical Load

Site	Applied C _{Lo} (kg N/ha/yr)	PC (kg N/ha/yr)	PC as % of C _{Lo}
R1	8	0.02	0.20
R2	10	<0.01	0.03
R3	10	0.01	0.10

- 9.6.8 Table 9.6-2 illustrates that the additional PC to nutrient nitrogen does not exceed 1% of the applied nutrient nitrogen CLo at any considered ecological receptor.
- 9.6.9 Following the stated 'EA's Operational Instruction 66_12', impacts on nutrient nitrogen CLo are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

Impacts on Ecological Receptors – Critical Loads, Acidification

- 9.6.10 The results of the assessment of impacts on the acid CLo are presented in Table 9.6-3 below. It is noted that, as presented in Table 6.4-8, the total current N load is greater than the CL_{min}N at all considered ecological receptors. Therefore, the assessment of additional NO₂ and SO₂ contributions to acid deposition has been undertaken against the CL_{max}N CLo.

Table 6.5-16: Impact on Acid Critical Load

Site	Applied C _{Lo} (kg eq/ha/yr)	PC (kg eq/ha/yr)	PC as % of C _{Lo}
R1	4.303	<0.01	0.07
R2	2.018	<0.01	0.02
R3	1.237	<0.01	0.08

- 9.6.11 Table 9.6-3 illustrates that the additional PC to acidification does not exceed 1% of the applied acid CLo at any considered ecological receptor.
- 9.6.12 Following the stated 'EA's Operational Instruction 66_12', impacts on acid CLo are all considered to result in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

Habitats

Wet woodland

- 9.6.13 A large portion of the scrub woodland within survey Area C will require clearance to facilitate construction works. Adverse impacts to this habitat would therefore be of high magnitude

and would be difficult to mitigate for, requiring mitigation and/ or compensation measures to render an outcome which is acceptable in environmental and ecological terms. As such, any losses to this habitat should be minimised as far as is practically possible. It is unlikely considering the extent of the woodland habitats on site that sufficient like-for-like compensation could be achieved on site. However, retention of an ecological buffer around the perimeter of the woodland, ecological enhancement of retained areas of woodland, and the creation of alternative high-value ecological features in other retained areas of the site and in the proposed receptor site adjacent to the north-east could help to ensure that the overall ecological value of the site is maintained.

- 9.6.14 The magnitude of impact, after implementation of mitigation measures, is assessed as being **moderate** as a noticeable effect on the nature conservation status of the site would occur but this would not threaten the sustainability or the long-term integrity of the system. The effect of woodland losses would be reversible given time for enhancement measures to develop
- 9.6.15 A receptor site has been identified adjacent to the north-east of the proposed development site. The receptor site will serve to significantly offset losses to the proposed development site. Full details of compensatory and enhancement measures are ecological mitigation and enhancement report (Document Ref.: 57100-0166), which must be read in conjunction with this report.

On-site Habitats Which Do Not Qualify as Section 7, LBAP and SINC Habitat

- 9.6.16 Large portions of the semi natural broadleaved woodland within survey Areas C and D will be permanently lost to development, to facilitate the construction of the secondary access road. However, an ecological corridor of retained woodland around the perimeter of these areas (measuring approximately 10m with an additional 1m buffer) has been agreed, with the exception of the new access road and visibility splays.
- 9.6.17 The majority of the remaining habitats on site will also be lost to development. The habitat loss would therefore be of high magnitude without mitigation and enhancement measures. However, the implementation of mitigation and enhancement measures will reduce the magnitude of impacts to a **moderate** level.

Protected and Notable Species

Birds

- 9.6.18 The proposed works will result in the loss of relatively large areas of semi-natural broadleaved woodland, wet woodland, scrub and buildings.
- 9.6.19 The loss of these would result in the loss of confirmed nesting and foraging habitat for a range of bird species, several of which comprise UK BAP, Section 7, or UK Red List species (bullfinch, dunnoek, linnet, song thrush and spotted flycatcher). Furthermore, nesting birds could be killed, injured or disturbed if works commence during the nesting bird season. Indirect impacts associated to disturbance during the construction phase of the development would also likely occur, although it is anticipated that these would be temporary in nature and could be avoided if undertaken outside of the nesting season.

- 9.6.20 Therefore, the impact upon nesting bird species is anticipated to be high at the site level, though unlikely to be significant at the local level. However, it is considered that the implementation of adequate avoidance, mitigation and enhancement measures on site and in the adjacent receptor site can render an outcome which maintains the long-term viability of nesting bird species on site. Full details of compensatory and enhancement measures within the receptor site are specified in a dedicated Landscaping and Mitigation Scheme (Document Ref.: 57100-0166), which must be read in conjunction with this report.
- 9.6.21 Based on the criteria described in Table 9.4-3, the magnitude of impact is considered **moderate** as there would be a noticeable effect on the nature conservation status of the bird population of the site, but the proposed development would not threaten sustainability or the long-term integrity of the system. Compensatory and enhancement measures are suitable to replace the loss of ecological value.

Bats

Roosts Bungalow 3

- 9.6.22 Bungalow 3 has been confirmed as a bat roost. Demolition will result in the loss of the occasional day roosts of individual common pipistrelle, soprano pipistrelle, and an unidentified *Myotis* sp. (likely whiskered). In addition, Bungalow 3 is considered likely to comprise an old brown long-eared maternity roost. Permanent mitigation in the form of a standalone bat house with incorporated bat loft would be in place before any works to the existing Bungalow commence, to ensure the bats have somewhere to roost on their return from hibernation.
- 9.6.23 Without mitigation, the magnitude of effects would be considered moderate as there would be a noticeable effect on the bat population, i.e. the roosting potential of the site.
- 9.6.24 After implementation of mitigation and compensatory measures, the magnitude of impact is assessed as being **minor** as there would be only a short-term and reversible impact on the bat population of the site and its surrounding.

Roosts Bungalow 1 and 2

- 9.6.25 Though initially assessed as having high bat roost potential, the results of the dusk emergence and dawn re-entry surveys indicate that Bungalows 1 and 2 are unlikely to support bat roosts, and the magnitude of impacts is therefore anticipated to be **negligible**.

Foraging and commuting

- 9.6.26 A large portion of the semi-natural broadleaved woodland in survey areas A and D, and all of the scrub woodland in survey area C will be lost to development under current proposals. The proposed works will therefore result in the permanent loss of a large area of moderate quality foraging habitat. The development proposals are of a type listed within Box 1 of section 1.2.3.2 of the Bat Survey Guidance (Collins, 2016).
- 9.6.27 Indirect impacts associated to artificial lighting are anticipated to be relatively minimal. This is largely due to the fact that the site currently supports high levels of artificial lighting at night, and over the full duration of remote detector survey, light sensitive species (lesser horseshoe and brown long-eared) accounted for only 0.1% of all recordings. However, most

UK bat species are sensitive to light pollution which can create a barrier to roost use, foraging and dispersal. A lighting strategy around the perimeter of the developed site (which will encompass the compensatory and enhancement measures set out in Document Ref.: 57100-0166) and the receptor site adjacent to the north-east strategy has been designed to ensure that the increase in light pollution will be negligible.

- 9.6.28 After implementation of mitigation measures, the magnitude of impact is considered **minor** as there would be only a short-term and reversible impact on the foraging and commuting potential of the site and its surroundings.

Otters

- 9.6.29 Although no evidence of otters was recorded on site, the proposed clearance of the wet woodland in survey area C will result in the loss of potential otter habitat, and may result in the direct death or injury of any otters present at the time of clearance works.
- 9.6.30 Indirect impacts during the construction phase could occur through pollution events into the watercourse, increases in sedimentation (affecting otter foraging), or disturbance through increases in artificial lighting at night. It is therefore considered that an update inspection for otters will be required immediately prior to any clearance works.
- 9.6.31 The implementation of mitigation measures described in the Outline CEMP ensures that adverse impacts during the construction phase can be prevented. The magnitude of impacts would therefore be assessed as being **negligible**.

Badgers

- 9.6.32 No direct impacts to badgers are anticipated as a result of the development. However, badgers may pass through the site occasionally when foraging or commuting. As badgers are nocturnal, the risk of encountering badgers on site during the works is considered to be negligible. However, certain construction methods are recommended in Section 9.7 to ensure no badgers moving through the site are injured during the construction phase of the development.
- 9.6.33 The implementation of mitigation measures described in the Outline CEMP ensures that adverse impacts during the construction phase can be prevented. The magnitude of impacts would therefore be assessed as being **negligible**.

Reptiles

- 9.6.34 The development has the potential to result in the following direct impacts:
- population isolation through habitat fragmentation - habitat loss through land-take and the removal of reptile habitat - The proposed works will result in the loss of relatively large areas of potential reptile habitat in survey areas A and C;
 - Population isolation through habitat fragmentation;
 - Reduction in quality of reptile habitat; and
 - Direct mortality of individual reptiles harmed during the works - clearance of the vegetation may result in the accidental killing or injury of reptiles.
- 9.6.35 The development also has the potential to indirectly result in disturbance.

- 9.6.36 The maximum number of adult reptiles recorded across the site was six adult slow worms in survey Area A (three adults and three juveniles) and four slow worms in survey Area C (two adults and two juveniles), which falls into the small (NE Guidance) or good (Froglife Guidance) population category. A single common lizard was also recorded in survey Area A.
- 9.6.37 There was considered to be a high risk of encountering reptiles while undertaking the proposed works. Due to the proximity of adjacent optimal reptile habitat to the north of survey Area A, it is considered that species deterrence measures can be employed to encourage individuals to migrate off site voluntarily in that area.
- 9.6.38 However, survey Area C's isolated nature means that species deterrence measures (i.e. encouraging the reptiles to move away from the development area voluntarily) are not possible. Therefore, mitigation to prevent harm to slow worms from construction and clearance works through a capture and translocation exercise is considered an appropriate action (see Section 9.7). However, it is considered that reptile fencing will not be required to prevent reptiles from re-entering the site due to the poor connectivity surrounding the site.
- 9.6.39 Due to the small size of the site it is not considered to be a viable option to retain a large enough area of habitat on site that would ensure that a viable population size of slow-worm could be maintained, and achieve a viable development.
- 9.6.40 A receptor site for the reptiles was therefore identified at the southern end of the wider receptor site. This location is situated locally to the existing population of reptiles proposed development site, lying approximately 400m east of survey Area A and 190m north of survey Area C. The receptor site comprises a series of vegetated banks, with adjoining scrub and areas of bare ground. Two reptile hibernacula were created within the reptile receptor area, in order to provide additional artificial habitat assemblages and to increase the carrying capacity of the site.
- 9.6.41 Over the 28 consecutive days of trapping, a total of 17 slow-worms, 11 common lizards and a single grass snake were captured from survey Areas A and C. However, the presence of additional reptiles that have not be picked up cannot be ruled out completely. It is therefore recommended that precautionary measures are implemented immediately prior to site clearance to further reduce the risk of adversely affecting any reptiles that may not have been picked up during the translocation exercise.
- 9.6.42 It is considered that with precautionary, mitigation and enhancement measures, the impacts on reptiles will be **minor** (i.e. short term and reversible) and that the development will not be detrimental to the maintenance of a viable population of reptiles. The ongoing favourable conservation status of the reptile population present within the survey area can be maintained.
- 9.6.43 Full details of compensatory and enhancement measures within the receptor site are ecological mitigation and enhancement report (Document Ref.: 57100-0166), which must be read in conjunction with this report.

Hedgehog

- 9.6.44 The clearance of any woodland and scrub may result in the accidental killing or injury of hedgehogs, while wholesale habitat clearance will result in net habitat loss. Mitigation measures to avoid such impacts are provided in Section 9.7. Mitigation and enhancement

measures for hedgehogs are also recommended to enable the requirements of the local planning authority to be met, namely the restoration or enhancement of hedgehog habitat.

- 9.6.45 It is considered that with precautionary, mitigation and enhancement measures, the impacts on the hedgehog population will be **minor** (i.e. short term and reversible) and that the development will not be detrimental to the maintenance of a viable population of hedgehogs. The proposed development would have no material effect on the conservation status of the species population.

9.7 Mitigation Measures

- 9.7.1 The implementation of mitigation measures described in this section will ensure compliance with the Planning Policy Wales (Welsh Government, 2016) and help to avoid or minimise adverse impacts on the environment and protected species, mitigate and compensate for losses where damage is unavoidable and promote opportunities to enhance biodiversity.
- 9.7.2 Full details of compensatory and enhancement measures within the receptor site are detailed in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166), which should be read in conjunction with this report. An indicative ecological mitigation and enhancement plan is provided in Figure 9.7-1.

Figure 9.7-1: Mitigation and Enhancement Plan



Inherent Mitigation (Avoidance)

- 9.7.3 Current development proposals will result in the partial loss of a potential UKBAP and Section 7 habitat, along with large areas of semi-natural broadleaved woodland, considered to be of local ecological value. Furthermore, works may potentially have direct and indirect effects upon nesting birds, roosting bats, foraging bats, reptiles and otters. The proposed development would therefore be of relatively high magnitude and potentially significant at the district level.
- 9.7.4 The development would require mitigation, compensation and enhancement measures to render an outcome which is acceptable in environmental and ecological terms.
- 9.7.5 It has therefore been agreed that an ecological corridor of retained woodland around the perimeter areas of woodland to be cleared will be established, measuring approximately 10m with an additional 1m buffer). The ecological buffer will be partially breached in the southern corner of survey Area C, where a new site access is required (see Figure 9.7-1).
- 9.7.6 In addition, ecological enhancement of retained areas of woodland, and the creation of alternative high-value ecological features in other retained areas of the site will help to ensure that the overall ecological value of the site is maintained. Details of appropriate mitigation, compensation and enhancement measures are set out in the Ecology Appraisal (Document Ref.: 57100-0100). Full details of compensatory and enhancement measures within the receptor site are detailed in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166) which should be read in conjunction with this report.

Further Survey Work

- 9.7.7 An updated otter inspection of banks of the Llynfi River and the adjacent woodland/ scrub understorey, will be required immediately prior to the commencement of site clearance works and any necessary vegetation clearance.

Precautionary Measures

Timing of Works for Nesting Birds, Bats, Otters, Reptiles and Hedgehogs

Nesting Birds

- 9.7.8 Vegetation clearance and works to buildings will be undertaken from September to February, outside the bird breeding season (March to August inclusive). Alternatively, works can commence between March to August inclusive, provided an update nesting bird check is undertaken by a suitably qualified ecologist no more than 24 hours before the commencement of works. If any nests are identified, a 50m buffer must be established around the nest, and works postponed in that area until the nesting has completed, and the young have become independent.

Bats

- 9.7.9 As Bungalow 3 has been confirmed as supporting an old maternity roost of brown long-eared bats, building works will take place from 1st October to 31st March. Permanent mitigation in the form of a standalone bat house with incorporated bat loft (see section 9.6)

will need to be in place before any demolition works to the existing Bungalow commence, to ensure the bats have somewhere to roost on their return from hibernation.

- 9.7.10 Due to the hibernation potential for bat species on site, building works should take place either during the spring months (i.e. March to April inclusive) or the autumn months (i.e. mid-September to October inclusive), thus reducing the probability of encountering winter hibernating bats. Alternatively, works could proceed over winter following the inspection of crevices with an endoscope by a licensed ecologist immediately prior to works begin.

Otters

- 9.7.11 Timing of works in proximity to the watercourse will be determined after the completion of the update otter inspection detailed in Section 9.7.7.

Reptiles

- 9.7.12 Enhancement measures were implemented within the reptile receptor site, prior to the commencement of the translocation exercise.
- 9.7.13 Clearance works within survey Areas A and C will be undertaken from March to September (ideally before August) which is within the active period for reptiles. If the season is mild (i.e. overnight temperatures remain relatively warm), it may be possible for clearance works to continue into October but such works would have to be undertaken in agreement with the Local Authority ecologist. This timescale will avoid the risk of encountering and hibernating individuals.

Badgers

- 9.7.14 In accordance with good practice, any excavations associated with the development should either be closed at night or fitted with escape ramps to help any badgers escape. It should be noted that patterns of badger activity and site use can be subject to sudden and dynamic changes over very short time periods. If there is a significant delay to development of the site (i.e. more than 12 months) an updated badger survey will be required.

Outline Construction and Environmental Management Plan (Outline CEMP)

- 9.7.15 Considering the potential for impacts to the various habitats and water courses, via mediums such as pollution, noise and air, either during the construction or operational phases, a CEMP has been produced. The CEMP identifies the responsibilities of various organisations and people to comply with legislation and ensure that mitigation measures are implemented as proposed. Full details of pollution prevention measures are detailed within the Outline CEMP (Document Ref.: 57100-0222).

Bat Mitigation

Provision for Bats Displaced During Works (for Common Pipistrelle, Soprano Pipistrelle and Myotis spec.)

- 9.7.16 In advance of the works, three Schwegler 2F (or suitable alternative) bat boxes will be erected on a suitable large tree within the grounds of the site. This will provide compensatory alternative roosting habitats during the construction period for any bats which may be displaced as a result of the work.

- 9.7.17 The boxes will be located on a mature tree in a secluded location. They will be located on one of the mature trees retained at the perimeter of survey Area A. The location will be determined on-site, by a suitably qualified ecologist. In addition to this, the construction of the standalone bat house detailed below will be completed before the demolition of the Bungalows. Integrated mitigation measures within this feature will provide further alternative roosting provision.
- 9.7.18 The bat boxes will be retained on site after completion of the works in perpetuity as a biodiversity enhancement.

Permanent Standalone Roost Structure (for Brown Long-Eared)

- 9.7.19 Provision for the old brown long-eared maternity roost on site can be achieved by the construction of a standalone bat house structure, which will incorporate various elements of bat mitigation and will be located in high quality bat habitat in the adjacent receptor site, approximately 40m east of the existing location of Bungalow 3 (see Option 1 on Figure 9.7-1). This option will increase the likely success of the bat mitigation on site by reducing the potential for adverse impacts associated to lighting, general disturbance and ecological connectivity. Full details of the proposed mitigation scheme and ecological enhancement measures within the receptor site are provided in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166).
- 9.7.20 The standalone bat house will be in place before any works to Bungalow 3, to ensure that brown long-eared bats will have somewhere to roost on their return from hibernation. The standalone bat house mitigation would be installed prior to commencement of any demolition works to allow maximum uptake time, therefore increasing the chances of utilisation by brown long-eared bats. Further design details of the standalone roost structure are provided in the Ecological Appraisal (Document Ref.: 57100-0100).

Timing of Works

- 9.7.21 Due to the hibernation potential for bat species within the bungalows, demolition works will take place either during the spring months (i.e. March to April inclusive) or the autumn months (i.e. mid-September to October inclusive), thus reducing the probability of encountering winter hibernating bats.

Inspection of Bungalow 3 prior commencement of works

- 9.7.22 Immediately prior to commencing works to Bungalow 3, a licensed bat worker will make a careful internal inspection of all the external and internal reaches of the building (where Health and Safety considerations relating to asbestos allow), with an endoscope where necessary, to ensure that there are no bats present in any crevices or the loft void. If any are found, where necessary, they will be captured by hand or with a hand-net and safely removed for temporary safekeeping and later released or transferred to a temporary roost in accordance with the protocol set out below. Alternatively, works in the affected area may be re-scheduled for a more appropriate time.

Site Induction and Toolbox Talk

- 9.7.23 A suitably qualified bat ecologist will give a 'tool-box talk' to all contractors involved with works that could affect bats before the commencement of works. All site workers will be briefed on the legal status of bats, the likely places to find them, the working practices required to minimise and avoid harming or disturbing bats (e.g. the procedure required for removing tiles etc.) and the action to be taken if bats are encountered during the works. All site workers will be made aware that in the event of any bats (or occupied birds' nests) being found or suspected when the ecologist is not on site, all works must cease in the affected area until appropriate expert advice has been sought from an ecological professional qualified to deal with bats or NRW.
- 9.7.24 A copy of the NRW licence and the Bat Licence Method Statement will remain available on site at all times and a summary sheet of guidance will be given to the builders and contractors working on the site.

Bat Discovery Action Plan

- 9.7.25 In the event that bats are encountered during supervised works, the licensed bat handler will capture the bat/s with gloved hands or hand-held net, conduct a health check and place the bat/s in a drawstring cloth bag. Removed bats will be temporarily transferred to a day holding facility (a well-insulated specially designed bat box) and will then be transferred into a bat box that will be pre-fixed at a suitable location on the site. This will allow the bat/s to settle in a safe place for the remainder of the day, and to emerge safely in the evening. Any injured bats or bats requiring supplementary feeding would be immediately taken into care.
- 9.7.26 If a bat is discovered at other unsupervised times when the ecologist is not present, works will cease immediately and the bat ecologist will be consulted for advice or attendance at the site. The bat/s will be rescued by the licensed bat handler, using the methodology described above, or allowed to move of its/ their own accord. If it is not possible to contact the bat worker, the NRW Species Protection Officer must be contacted immediately and their advice sought. Builders, contractors and other unlicensed personnel are explicitly forbidden to handle bats.

Installation of temporary artificial lighting

- 9.7.27 Seven days prior to works commencing artificial lighting will be installed in the roosting areas of Bungalow 3 in order to brightly illuminate the buildings and the roosting locations to deter roosting by brown long-eared bats, which are known to be particularly photophobic species.

Supervision of Works/ 'Soft Strip'

- 9.7.28 The supervision work will be dependent on Health and Safety considerations in relation to the presence of asbestos within Bungalow 3. It will be necessary for a licensed bat worker to be in attendance when works are undertaken on the ridge tiles, slates, bargeboards and window lintels/ door frames. They will supervise a 'soft strip' during which all features offering known or likely roosting opportunities will be exposed and removed. The ridge tiles and any associated timbers must be lifted off vertically rather than rolled, and checked on their

underside to ensure that no bats are clinging to the underside. This will minimise the chance of bats being killed/injured.

Scaffolding

- 9.7.29 If external scaffolding needs to be erected as part of the works and will remain in place during April to September, no netting or sheeting will be used on the scaffolding. No scaffolding, sheeting, netting or other materials will be located within 1m of the new bat roosting features from April to September inclusive. Alternatively, access points of appropriate size will be opened in sheeting to allow bats to pass through while the scaffolding is in place. The scaffolding will all be removed upon completion of the works prior to the main period when bats occupy summer roosts (April to September inclusive).

Lighting

- 9.7.30 Although bat activity across the site has proved to be relatively low, the adjacent areas of broadleaved woodland to the eastern and rough grassland to the north provide linkages for bats to disperse into the wider landscape.
- 9.7.31 Indirect impacts to foraging and/ or commuting bats could occur through increased light spill during construction or operational phases. A sensitive lighting strategy must form part of the development both during construction and operational phases. This will mitigate against any light disturbance to foraging/ commuting bats using the woodland and rough grassland at the perimeters of the site.

Landscaping

- 9.7.32 Considering the large footprint of the proposed works, opportunities for landscaping on site are somewhat limited. However, the measures detailed in Section 9.7.38 to 9.7.43 will be adopted in the retained sections of the site. Significant compensatory landscaping will be undertaken at the adjacent receptor site, to the north-east. Full details of landscaping measures within the receptor site are provided in the dedication mitigation and enhancement report (Document Ref. 57100-0166).

Reptile Mitigation

Site Induction/ Toolbox Talk

- 9.7.33 Clearance and construction personnel will be briefed by a suitably qualified ecologist about the confirmed presence of reptiles remaining on the site and the necessary course of action, if any reptile is encountered.

Receptor Site

- 9.7.34 Prior to the commencement of any translocation, a suitable receptor was identified to the north-east of the proposed development site. Full details are provided in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166).

Site Clearance after Completion of Trapping Exercise – Destructive Search

- 9.7.35 Once the site has been cleared of reptiles, the suitable areas for reptiles will be stripped of all vegetation and the topsoil removed, leaving bare subsoil. Any potential refugia will be dismantled by hand, carefully searching for any reptiles that may not have been discovered during the translocation exercise. The final stripping may be done with machinery (ideally using a toothed bucket).

Species Deterrence

- 9.7.36 Upon completion of the trapping exercise, the site will remain in a sterile (reptile-free) condition by regular ploughing or intensive mowing to prevent the area from becoming suitable for re-colonisation of reptiles.

Precautionary Measures

Soft Felling

- 9.7.37 Clearance or lopping of trees will be undertaken in accordance with the bat survey protocol for trees affected by arboricultural work. This will comprise 'soft felling', which is a generic term used to describe more cautious felling approaches, using lowering and cushioning techniques to reduce the impact of felling limbs/ ivy growth which may still have bats within cavities.

Compensation and Enhancement Measures

- 9.7.38 The impact of the proposed development would be of high magnitude. The development would require significant levels of mitigation and compensation measures to render an outcome which is acceptable in environmental and ecological terms. Considering the extent of the woodland habitats on site, it is considered impossible that sufficient like-for-like compensation could be achieved on site. Significant compensatory and enhancement measures will therefore be implemented within the receptor site to offset losses within the proposed development site. Full details of compensatory and enhancement measures within the receptor site are provided in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166). It is considered that the implementation of adequate avoidance, mitigation and enhancement measures on site and in the adjacent receptor site can render an outcome which maintains the long-term viability of ecological features on site.

Site Enhancement for Birds

- 9.7.39 Bird nesting opportunities on site will be compensated for and enhanced by the incorporation of bird boxes on suitable retained features elsewhere on site. Details on the location of bird boxes are provided in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166).

Site Enhancement for Bats

- 9.7.40 The majority of the compensatory measures for bats will be located within the receptor site, adjacent to the north-east of the proposed development site and will be specified in the dedicated survey report. However, provision of roosting opportunities for bats (bat Boxes)

on retained features within the proposed development site itself will be incorporated into the site plans as a site enhancement measures. The bat boxes will be retained on site after completion of the works in-perpetuity as a biodiversity enhancement.

Use of Wildlife-Friendly Planting Scheme

- 9.7.41 To compensate for the permanent loss of large areas of relatively species-rich semi-improved grassland and ephemeral vegetation, any soft landscaping scheme for the site will include habitat enhancements for birds, foraging bats, hedgehogs and invertebrates through the provision of shrubs or trees that bear berries or nuts. Native trees and shrubs that are indigenous to the region will be utilised, and any new plantings of native species should be of UK provenance. Any ornamental hedgerows will utilise wildlife-friendly species.
- 9.7.42 Any areas of landscaped grassland will be planted with a wildlife-friendly seed mix.
- 9.7.43 Full details of compensatory and enhancement measures within the receptor site are provided in the dedicated mitigation and enhancement report (Document Ref.: 57100-0166).

9.8 Summary and Conclusion

- 9.8.1 The following table (Table 9.8-1) presents a summary of the assessment of ecological effects of the proposed development. It identifies the receptor likely to be impacted, the magnitude of effect and, where the effect is deemed to be significant.
- 9.8.2 The table includes the mitigation / enhancement proposed and the resulting residual effect.
- 9.8.3 Where ecological effects have been identified as **large** or **large / moderate**, this is considered a significant effect.

Table 9.8-1: Summary of effects arising during construction phase

Receptor	Value / sensitivity of receptor	Description of effect	Additional Mitigation / Compensation	Magnitude of residual effect	Significance of effect
Designated sites					
SAC	Very high (International)	No effect on SACs	None	Negligible	Slight
SSSI	High (National)	No effect on SSSIs	None	Negligible	Slight
NNR	High (National)	No effect on NNRs	None	Negligible	Slight
SINC, BAP habitats	Medium (Regional, County)	No effect on SINC or BAP habitats	None	Negligible	Slight
Habitats					
On-site Section 7, LBAP and SINC Habitats (Wet woodland)	District / medium	Habitat loss - clearance of large portion of the scrub woodland in Area C; losses are difficult to mitigate; mitigation and/ or compensation measures required to reduce impacts to acceptable level in ecological terms	Retention of an ecological buffer around the perimeter of the woodland; Ecological enhancement of retained areas of woodland, and creation of alternative high-value ecological features within the site and in enhancement area north-east of the site	Moderate	Moderate
Habitats Which Do Not Qualify as Section 7, LBAP and SINC Habitat	Local / low	Habitat loss – permanent loss of large portions of the semi natural broadleaved woodland within survey Areas C and D, to the development, and to facilitate the construction of the secondary access road	Retention of ecological corridor of woodland around the perimeter of area C and D (measuring approximately 10m with an additional 1m buffer) with the exception of the new access road and visibility splays.	Moderate	Slight
Habitats Which Do Not Qualify as Section 7, LBAP and SINC Habitat	Local / low	Habitat loss – majority of the remaining habitats on site will be lost to development	Re-instatement of temporarily removed habitats	Moderate	Slight
Protected / Notable Species					

Receptor	Value / sensitivity of receptor	Description of effect	Additional Mitigation / Compensation	Magnitude of residual effect	Significance of effect
Birds	Local / low	Habitat loss / loss of nesting and foraging habitat - loss of relatively large areas of semi-natural broadleaved woodland, wet woodland, scrub and buildings and consequently loss of nesting and foraging habitat for bird species; disturbance of birds due to construction activities (e.g. noise)	Vegetation clearance and works to buildings undertaken from September to February only (outside the bird breeding season); Alternatively, works can take place between March and September if nesting bird check is undertaken by a suitably qualified ecologist and no nests are found; Ecological enhancement of retained areas of woodland, and creation of alternative high-value ecological features in other retained areas.	Moderate	Slight
Bat roosts Bungalow 3	Medium	Loss of occasional day roosts - demolition results in the loss of the occasional day roosts of individual common pipistrelle, soprano pipistrelle, and an unidentified Myotis sp. (likely whiskered), Loss of an old brown long-eared maternity roost	Building works near Bungalow 3 from 1 st October to 31 st March; Permanent mitigation in the form of a standalone bat house with incorporated bat loft will be in place before demolition works to the existing Bungalow commence; Ecological enhancement of retained areas of woodland, and creation of alternative high-value ecological features in other retained areas.	Minor	Slight
Bat roosts Bungalow 1 and 2	Low	No loss of roosting habitat	None	Negligible	Neutral
Bats (Foraging and commuting)	Medium	Foraging habitat loss - permanent loss of a large area of moderate quality foraging habitat; Light pollution - indirect minimal impacts due to increase in artificial lighting	Vegetation clearance and works to buildings undertaken from September to February only (outside foraging season); Retention of an ecological buffer around the perimeter of the woodland;	Minor	Slight

Receptor	Value / sensitivity of receptor	Description of effect	Additional Mitigation / Compensation	Magnitude of residual effect	Significance of effect
			Ecological enhancement of retained areas of woodland, and creation of alternative high-value ecological features in other retained areas; Lighting strategy		
Otters	Low	Loss of potential otter habitat - clearance of wet woodland in survey area C may result in the direct death or injury of any otters present at the time of clearance works,	Retention of an ecological buffer around the perimeter of the woodland; Ecological enhancement of retained areas of woodland, and creation of alternative high-value ecological features in other retained areas; Updated otter inspection; Mitigation measures during construction phase as described in Outline CEMP	Negligible	Neutral
Badgers	Low	No direct impacts to badgers	Mitigation measures during construction phase as described in Outline CEMP	Negligible	Neutral
Reptiles	Low	Habitat loss - clearance of woodland and other vegetation	Precautionary measures (reptile translocation); Compensatory measures in the form of new reptile habitat	Minor	Neutral / slight
Hedgehog	Low	Accidental killing or injury - clearance of woodland and scrub; Habitat loss - Woodland clearance results in net habitat loss;	Mitigation and enhancement measures (i.e. restoration or enhancement of hedgehog habitat); Mitigation measures during construction phase as described in Outline CEMP	Minor	Neutral / slight

- 9.8.4 There are no internationally designated sites or SSSIs close enough to the site whose features would be directly or indirectly affected by the development. Similarly, sites of local nature conservation importance should not be affected.
- 9.8.5 The development site includes a mix of woodland, scrub, buildings and large areas of hard-standing. Habitats of principal importance include areas of woodland along the southern perimeter and in the south eastern portion of the site.
- 9.8.6 Although the proposed building footprints and infrastructure do not cover the entire development site, the majority of existing habitats are expected to be lost to facilitate the new development.
- 9.8.7 The main ecological effect of the proposed development will be net habitat loss in the form of ecologically valuable woodland.
- 9.8.8 Species of principal importance that are confirmed as present include bat species, reptiles, and a variety of bird species.
- 9.8.9 The assessment of ecological sensitivities highlights that a number of valued habitats and species are susceptible to the effects of an unmitigated scheme necessitating the requirement for mitigation and compensatory measures. With the proposed mitigation and enhancement strategy successfully in place, all adverse impacts are reduced to an at least moderate and slight level of significance. The implementation of the ecological mitigation and enhancement strategy would be overseen by qualified personnel to ensure that the ecology of the site is disturbed as little as possible, and that the enhancements specified are implemented to good effect.
- 9.8.10 Impacts of slight significance are predicted because of constructional impacts on woodland habitats, and disturbance to foraging bats and breeding birds.
- 9.8.11 The loss of woodland habitats and the loss of bat roosts in Bungalow 3 remain as key residual impacts judged to be of **slight** and **moderate** significance respectively.
- 9.8.12 Appropriately positioned, specified and operated lighting will limit effects on bat species.
- 9.8.13 As only ecological effects that have been identified as **large** or **large / moderate**, are considered significant, the proposed development does not result in significantly adverse impacts on the ecological features of the site or its surrounding.

10.0 Flood Risk and Drainage

10.1 Introduction and Scope

- 10.1.1 This chapter considers the flood risk issues associated with the proposed development.
- 10.1.2 Flood Risk Assessments are required depending on the location of developments relative to Natural Resources Wales (NRW) flood mapping zones or where the development is more than 1 hectare. Phoenix Design Partnership Limited had been commissioned by Quorum Consulting Engineers and BHM Ingenieure / WEPA UK Ltd to undertake a Flood Consequences Assessment (FCA) (Document Ref. 57100-0163) for the construction of the proposed development.
- 10.1.3 This FCA has been prepared in accordance with current planning policy and complies with the requirements of Technical Advice Note 15: Development and Flood Risk (TAN 15). An assessment has been made of the risks posed to the new development from a range of sources such as fluvial, groundwater, surface water and sewers. All available information at the time of writing the report has been reviewed such as geology, topography and hydrology.
- 10.1.4 The proposed development will need to comply with the Statutory Standards for Sustainable Drainage Systems produced by Welsh Government and the CIRIA SuDS Manual (C753).

10.2 Legislation and Planning Context

- 10.2.1 The proposed development will have to comply with the following legislation in relation to flood risk:
 - Planning Policy Wales (PPW)
 - TAN 15 Development and Flood Risk
 - The Flood and Water Management Act 2010

Planning Policy Wales

- 10.2.2 PPW (Edition 10) published in January 2018 is a key part of the Welsh Government's guidance in relation to flood risk. The Welsh Government's objectives are to:
 - maximise environmental protection for people, natural and cultural resources property and infrastructure; and
 - prevent or manage pollution and promote good environmental practice
- 10.2.3 PPW makes reference to the fact that '*all development on land within the flood plain of a watercourse, or drained via a culvert, or on low lying land adjacent to tidal waters, is at some risk of flooding and whilst flood risk can be reduced by using mitigation measures it can never be completely eliminated*'.
- 10.2.4 The Welsh Government's objective for sustainable development is to move away from flood defence and mitigate the consequences of new development in areas of flood hazard towards a more positive avoidance of development in areas defined as being of flood hazard.
- 10.2.5 There is a requirement for local planning authorities to take a strategic approach to flood risk and consider the catchment as a whole, with Natural Resources Wales (NRW) having a key

role in advising and helping planning authorities and developers to understand the causes and effects of flooding within a river catchment.

Technical Advice Note 15: Development and Flood Risk (July 2004)

- 10.2.6 TAN 15 supplements policies set out in PPW and provides guidance in relation to development and flood risk, which is intended for use by Local Planning Authorities. It provides a precautionary framework from which risks associated with river, coastal and surface water flooding can be assessed.

Flood and Water Management Act 2010

- 10.2.7 The Flood Water Management Act is key legislation on the sustainable management of water. The Act is considered to be directly relevant to the proposed development as it encourages the implementation of sustainable drainage at new and re-development locations (Defra website, 2010).

10.3 Assessment Methodology

- 10.3.1 Development Advice Maps (DAMs), published in conjunction with TAN 15, designate different flood zones according to the flood risk associated with them and are set out below:

- Zone 1 – areas that have a low probability of flooding i.e. less than 1 in 1000 annual probability of river or sea flooding.
- Zone 2 – areas that have a medium probability of flooding i.e. between a 1 in 100 and 1 in 1000 annual probability of river flooding; or between a 1 in 200 and 1 in 1000 annual probability of sea flooding.
- Zone 3a – areas that have a high probability of flooding i.e. 1 in 100 or greater annual probability of river flooding or 1 in 200 or greater annual probability of sea flooding.
- Zone 3b – areas classed as functional flood plains where water has to flow or be stored in times of flood.

- 10.3.2 Although the NRW flood maps show the above flood zones for planning purposes TAN 15 which is still relevant in Wales classifies these zones slightly different to this with zones from A to C. These are explained below;

- Zone A – Considered to be at little or no risk of fluvial or tidal/coastal flooding.
- Zone B – Areas known to have been flooded in the past evidenced by sedimentary deposits.
- Zone C – Based on the extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).
 - Zone C1 – Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
 - Zone C2 – Areas of the floodplain without significant flood defence infrastructure.

Vulnerability classification

- 10.3.3 The vulnerability (or sensitivity) of the land use development must be taken into account as the consequences of flooding may not be acceptable for particular types of development. The precautionary framework identified in the TAN 15 categorises different uses by their vulnerability.
- 10.3.4 In accordance with TAN 15, the proposed industrial use fall under the Less Vulnerable category. Based on the criteria described in Table 10.3-1, it is assessed as being of **low** sensitivity.

Table 10.3-1: Assigning Sensitivity to Flooding

Sensitivity of receptor	Description
High	Emergency services (hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood)
Medium	Highly vulnerable (all residential premises, public buildings, especially vulnerable industrial development, and waste disposal sites)
Low	Less vulnerable (general industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction, sites and associated processing facilities, excluding waste disposal sites).

10.4 Baseline Conditions

Site Topography

- 10.4.1 Access to the site is via a single access off the A4063 with a gradient of between 1 in 30-40.
- 10.4.2 Overall, the site sits in a valley with levels falling into the site from the North, West and South. Levels range from approximately 105mAOD to 72.50mAOD at the railway line. The levels continue to fall away to the East into the Llynfi River.
- 10.4.3 To the west of the site near the entrance there is a large area of parking, three bungalows and a security hut. The main building / series of buildings and plant sits in the centre of the site. The loading bays and storage yards are located along the south of the site. There is a wastewater treatment facility located over the railway line next to the river. However this is not being considered as part of this report as no works are located further than the railway line.

Site Geology

- 10.4.4 The site has had an array of ground investigation carried out both recently and historically with further information to be published shortly. Works have been carried out by Golder Associates, Ove Arup and Integral Geotechnique. A plan showing where boreholes and trial pits have been carried out can be seen in the full Flood Risk Assessment (Document Ref. 57100-0163) along with samples of boreholes taken across the site to give an overall idea of the ground conditions.

- 10.4.5 The British Geology Survey maps indicate the bedrock across the site to be a sequence of sandstones, siltstones and mudstones. The superficial deposits comprise of alluvium where the valley was historically located (now culverted watercourse) and glacial till surrounding this to the North and South.
- 10.4.6 Groundwater has been recorded at varying depths across the site along with seepages at shallow depth. To the west Golder Associates recorded ground water at depths of 7-9m Bgl, Ove Arup recorded ground water at 4m Bgl in the same area. To the east Ove Arup have recorded ground water from approximately 3m Bgl which did rise in two of the boreholes.
- 10.4.7 It has been noted by Quorum that during foundation installation for some of the existing buildings ground water was struck 1m down from surface level.
- 10.4.8 The bedrock is classified as a Secondary A aquifer and the overlying superficial soils are classified as either a Secondary A or a Secondary – undifferentiated aquifer.
- 10.4.9 The site is not underlain by a principle aquifer and is not located within a source protection zone.

Existing Drainage

- 10.4.10 Dwr Cymru Welsh Water (DCWW) plans were not available at the time of writing the report however it is not believed any of the onsite systems are adopted.
- 10.4.11 The site has an extensive network of existing foul and surface water drainage. Surface water flows are discharged un-attenuated into the culverted (1200dia) Nant Gwyn watercourse which is culverted throughout the site until it discharges into the Llynfi River.
- 10.4.12 Foul flows are directed to the onsite treatment works before being discharged into the Llynfi River.
- 10.4.13 The existing 1200dia culverted watercourse also has a second inlet near the site entrance from an unnamed watercourse to the North West.

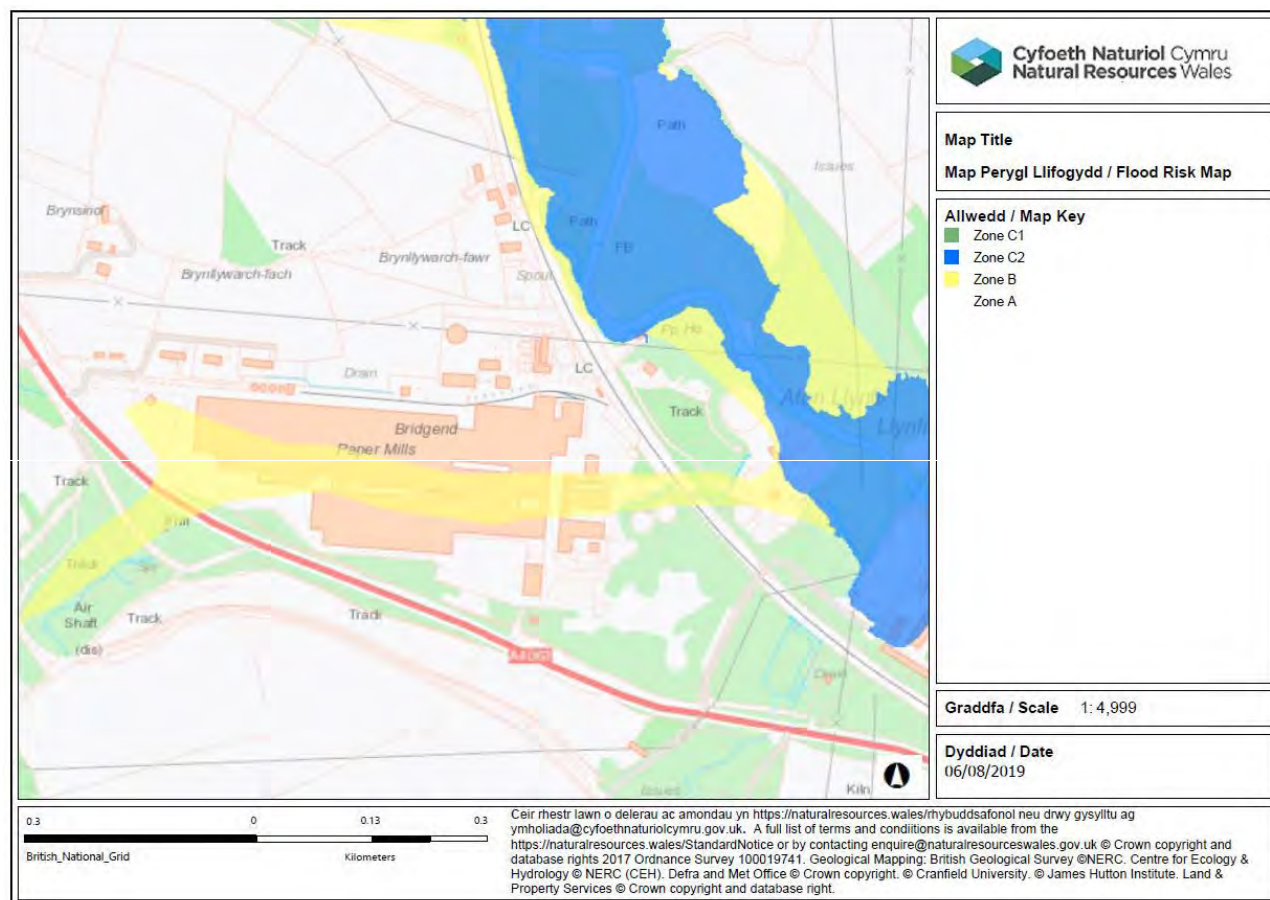
10.5 Assessments of Effects

- 10.5.1 This section explores the potential flood risk from a range of sources.

Fluvial Flooding

- 10.5.2 The nearest main river to the application site is the Llynfi river located along the Eastern boundary of the site on the opposite side of the railway line.
- 10.5.3 The NRW flood map for planning in Figure 10.5-1 shows that the proposed development site is located mainly in Zone A but with a section through the centre of the site falling under Zone B. Ordinarily, this zone would be assessed based on levels compared to flood level data for the river. However, as this zone is based on the underlying geology, it is believed to no longer be relevant as the existing site has been developed. Levels have been raised and the watercourse has been culverted. The British Geology Survey Map shows exactly the same shape for the superficial alluvium deposits as the NRW flood Zone B.

Figure 10.5-1: NRW Flood map for planning



10.5.4 The site is therefore considered at this stage to be at little or no risk of fluvial flooding.

Tidal Flooding

10.5.5 The site is not influenced by Tidal flooding.

Surface Water (Overland) Flooding

10.5.6 Intense periods of rainfall over a short duration can often lead to overland flow and flooding as rainwater is unable to infiltrate into the ground or enter drainage systems. It is made worse when soils are saturated so that they cannot accept any more water. The NRW surface water flood map in Figure 10.5-2 has been generated by simulating rainfall events over the site to determine where surface flows and collects based on Lidar survey information.

[illegible]

- ## Flooding from Sewers

- Page 219 of 315

10.5.14 It is therefore considered at this time that there is **little** to **no** risk of flooding from sewer systems.

Flooding from Groundwater

10.5.15 There are no known springs within the site. As mentioned earlier in this chapter, ground water has been encountered in boreholes across the site at varying depths but has not been recorded as rising to the surface or above. Therefore, it is considered that there is a **low** risk of flooding from groundwater which will need to be considered with any foundation design or design of the new sustainable drainage systems.

Flooding from Artificial Sources

10.5.16 There are no artificial bodies of water located within or near the proposed application area and as a result it is considered that flooding from artificial sources poses **no** risk to the development.

Flooding from Construction Activities

10.5.17 Construction activity is known to increase flow rates into drainage systems and off site usually through the stripping of surface vegetation. It is also known for clogging up existing systems through siltation and washing away of rubble etc.

10.5.18 As part of the SAB approval process a detailed construction surface water management plan will be required to be submitted and approved highlighting how run off will be restricted and how contaminants will be prevented from entering the river.

Flooding from Operation of the site

10.5.19 Operation and maintenance of the existing drainage systems will remain the responsibility of the site owners and regular maintenance and inspection regimes should be followed. In regard to the new proposed systems these will be approved by the council SAB team before construction can commence and then maintenance will again fall to the site owner.

10.5.20 The risk from the future operation of the site is therefore considered to be **low** so long as maintenance and inspection regimes are followed.

10.5.21 Suitable flow restriction into the culverted watercourse will be required for any of the proposed systems so as not to increase flood risk on site or downstream, this will either follow greenfield rates for each rainfall event or be restricted to Q_{bar} in line with the current Welsh Government guidance.

10.6 Mitigation Measures

10.6.1 The long term implications of the development in terms of flood risk are likely to be **low**; and hence do not require further assessment or the implementation of mitigation measures.

10.6.2 However, management of the activities during construction may be required to mitigate potential flood risk issues. These would be:

- Under Schedule 3 of the Flood and Water Management Act 2010, the surface water proposals will be reviewed and approved by Bridgend County Borough Council SAB team.

- The on-site sewers will be designed to the current standards and in line with good practice at an early stage of the construction phase. All systems will be designed for the 1 in 100 year + 30% climate change event.
- Floor levels and the site drainage strategy has been designed to work together in order that the risk of on-site flooding as a result of site run-off is minimised.
- The works/scheme will be constructed and completed in accordance with the approved plans/specification at such time(s) as may be specified in the approved scheme

10.7 Residual Effects

- 10.7.1 The implications of the development in terms of flood risk are likely to be **low**; and hence do not require the implementation of mitigation measures. All effects identified in this chapter are therefore residual.

10.8 Summary and Conclusion

- 10.8.1 The majority of the site is located in Flood Zone A, and partially within Flood Zone B. Flood Zone B extent is likely in relation to the underlying geology as shown on the British Geology Survey Maps.
- 10.8.2 The Site lies in a valley with levels falling into the site from the West, North and South.
- 10.8.3 The river Llynfi lies to the East of the site and the Nant Gwyn watercourse is culverted through the site before discharging into the River Llynfi.
- 10.8.4 The site bedrock geology consists of sandstones, siltstones and mudstones. The superficial deposits comprise of alluvium and made ground.
- 10.8.5 Groundwater has been encountered at a range of depths from 1mBgl.
- 10.8.6 No Dwr Cymru Welsh Water assets are located within the site, and all existing drainage is considered to be private.
- 10.8.7 The development can be considered to be at low to no risk from the majority of sources. Surface water flooding mitigation will be provided by existing and proposed drainage systems.
- 10.8.8 Under Schedule 3 of the Flood and Water Management Act 2010 the surface water proposals will need to be reviewed and approved by Bridgend County Borough Council SAB team.
- 10.8.9 All systems need be designed for the 1 in 100 year + 30% climate change event.
- 10.8.10 On the basis of the findings of this assessment, there are no grounds for objecting to the proposed development due to flood risk.

11.0 Archaeology and Cultural Heritage

11.1 Introduction and Scope

- 11.1.1 This Section of the Environmental Statement (ES) reports the findings of the assessment and impact of development on cultural heritage in terms of archaeology and built heritage.
- 11.1.2 This assessment addresses all known and potential heritage receptors that could potentially be impacted by the development. These are Scheduled Monuments, archaeological remains, listed buildings, conservation areas, Registered Historic Landscapes, registered parks and gardens, non-listed buildings of historic or architectural value, and the wider historic landscape. The assessment also considers the potential of the relevant Study Area (Figure 11.1-1) to contain unknown archaeological remains i.e. archaeological potential. No World Heritage Sites or candidate World Heritage Sites would be affected by the Scheme as none of these receptors are located within the identified study areas.
- 11.1.3 A description of the features of historic importance on and around the site is given in Chapter 11.4 and additional information can be found in Appendix 11-1.

Archaeological Assessment 2003

- 11.1.4 An archaeological assessment of the site and surroundings was conducted by Glamorgan-Gwent Archaeological Trust (GGAT – Contractors) in 2003 and its report is provided at Appendix 11-1. As the development site lies entirely within the study area of this previous archaeological assessment, all findings of the 2003 assessment also apply for the location of the proposed development.
- 11.1.5 All information provided in this chapter has been extracted from the full Archaeology Assessment in Appendix 11-1, which should be consulted for detailed information.

11.2 Legislation and Planning Context

Planning Policy Wales (Edition 8, January 2016)

- 11.2.1 Chapter 6 of Planning Policy Wales (PPW) provides Welsh Government policy in relation to the conservation of the historic environment. Objective 6.1.1 provides that the Welsh Government's aims in this regard are to:
- *“preserve or enhance the historic environment, recognising its contribution to economic vitality and culture, civic pride and the quality of life, and its importance as a resource for future generations; and specifically to:*
 - *protect archaeological remains, which are a finite and non-renewable resource, part of the historical and cultural identity of Wales, and valuable both for their own sake and for their role in education, leisure and the economy, particularly tourism;*
 - *ensure that the character of historic buildings is safeguarded from alterations, extensions or demolition that would compromise a building's special architectural and historic interest; and to*

- *ensure that conservation areas are protected or enhanced, while at the same time remaining alive and prosperous, avoiding unnecessarily detailed controls over businesses and householders.”*

11.2.2 Paragraph 6.5.1 sets out the following in relation to nationally important archaeological remains:

“The desirability of preserving an ancient monument and its setting is a material consideration in determining a planning application, whether that monument is scheduled or unscheduled. Where nationally important archaeological remains, whether scheduled or not, and their settings are likely to be affected by proposed development, there should be a presumption in favour of their physical preservation in situ.”

11.2.3 In relation to other archaeological remains it states in paragraph 6.5.3 that

“Where local planning authorities decide that physical preservation in situ of archaeological remains is not justified in the circumstances of the case, and that development resulting in the destruction of the archaeological remains should proceed, before granting planning permission the authority needs to be satisfied that the developer has made appropriate and satisfactory provision for the archaeological investigation and subsequent recording of the remains and the publication of the results. Archaeological investigations should be carried out before development commences, working to a project brief prepared by the planning authority.”

11.2.4 Technical Advice Note (TAN) 6 that supports PPW makes reference to the need to ‘protect and enhance the natural and historic environment’.

Other National Guidance

11.2.5 The assessment is intended to conform to the Institute of Field Archaeologists (IfA) *Standards in British Archaeology: Archaeological desk-based assessments*.

11.2.6 The archaeological sites within the study area are categorised in accordance with the only available criteria that are nationally agreed. These are set out in the Department of Transport/ Welsh Office/ Scottish Office *Design Manual for Roads and Bridges* paragraph 3.4, Vol. 11, Section 3 Part 2 (Cultural Heritage).

11.2.7 The IfA Standards for Archaeological Desk-based Assessments were revised (i.e. renamed) in 2008 but it was stated that no contents had been revised.

11.2.8 DMRB Volume 11 Section 3 Part 2 was revised in August 2007. These changes resulted in the definitions of “significance” being brought more in line with the IfA Standards, and so the conclusions of the assessment are still valid as IfA Standards are used.

11.3 Assessment Methodology

Data collection

- 11.3.1 The assessment comprises a review of existing information about the archaeological resource within a 400ha study area, centred at NGR SS 87489 87615.
- 11.3.2 Information recorded on the regional Sites and Monuments Record (SMR) and National Monuments Record (NMR) was assessed. Cartographic and documentary sources were studied, along with relevant published information. Current Listed Building data and information on Scheduled Ancient Monuments and registered landscapes was obtained from Cadw: Welsh Historic Monuments. Collections of aerial photographs held by the Central Register of Air Photography for Wales and Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) were examined. The National Museums and Galleries of Wales was also contacted for information regarding artefacts found within the study area, but no reply was received within the project timetable.
- 11.3.3 The Bridgend County Borough Councils Unitary Development Plan (2001) was consulted; LANDMAP information was also requested, but was not forthcoming.
- 11.3.4 A site visit was undertaken on the 14 March 2003 to assess the current condition of the known archaeological features and to check for previously unrecorded sites.

Assessment Criteria

- 11.3.5 The archaeological sites within the study area are categorised in accordance with the only available criteria that are nationally agreed; these are set out in the Department of Transport/Welsh Office/Scottish Office Design *Manual for Roads and Bridges* (DMRB) paragraph 3.4 Vol. 11 Section 3 Part 2 (Cultural Heritage).

Determining the value (relative sensitivity) of receptors

- 11.3.6 The assessment of the importance of individual sites is essentially a subjective exercise based upon the experience of the assessor. The importance of certain sites will be implied by their status within the statutory framework, e.g. Scheduled Ancient Monuments will always be of national importance; Listed Buildings will be of at least regional importance.
- 11.3.7 Values assigned to other sites are given both in relation to their individual importance and to their context within the wider landscape.

Table 11.3-1: Criteria for assessing the value (relative sensitivity) of Cultural resources

Category	Examples
Category A: National importance	<p>Scheduled Monuments</p> <p>Grade I and Grade II* Listed Buildings</p> <p>Grade I and Grade II* Registered Parks and Gardens</p> <p>Other Listed Buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the Listing grade.</p> <p>Registered Historic Landscapes of Outstanding Historic Interest</p> <p>Conservation areas containing very important buildings.</p> <p>Undesignated structures of clear national importance.</p> <p>Undesignated assets of schedulable quality and importance.</p> <p>Assets that can contribute significantly to acknowledged national research objectives.</p>
Category B: Regional importance	<p>Grade II Listed Buildings</p> <p>Grade II Registered Parks and Gardens.</p> <p>Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations.</p> <p>Registered Historic Landscapes of Special Historic Interest</p> <p>Conservation areas containing buildings that contribute significantly to its historic character.</p> <p>Historic Townscape or built-up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).</p> <p>Designated or undesignated assets that contribute to regional research objectives.</p>
Category C: Local importance	<p>'Locally Listed' buildings.</p> <p>Historic (unlisted) buildings of modest quality in their fabric or historical association.</p> <p>Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).</p> <p>Assets compromised by poor preservation and/or poor survival of contextual associations.</p> <p>Assets of limited value, but with potential to contribute to local research objectives</p>
Category D: Low importance	<p>Buildings of no architectural or historical note; buildings of an intrusive character.</p> <p>Features with very little or no surviving archaeological interest.</p>
Category U: Unknown	<p>Features with some hidden (i.e. inaccessible) potential for historic significance.</p>

11.3.8 The condition of individual sites and the general overall condition of surviving remains has bearing on the value of the sites themselves and on the value that they impart within a wider landscape context. The condition of sites is recorded following the system used by the GGAT SMR, using the following criteria:

- Intact: the site is intact
- Near intact: the site is nearly intact
- Damaged: the site has been moderately damaged
- Near destroyed: the site has nearly been destroyed
- Destroyed: the site has been destroyed
- Restored: the site has been restored
- Moved: the site has been moved (usually finds)
- Not known: the condition of the site is not known

11.3.9 The assignment of values to identified interests requires consideration of the reliability and accuracy of the source data, ranging from fully-recorded features seen in open excavation to antiquarian comments on finds of note from a poorly-defined location. The confidence with which the values have been assigned is noted, using the following criteria:

- Very high: existing information is derived from excavation to modern standards with full supporting detail
- High: existing information is reliable and detailed
- Medium: existing information is apparently reliable but limited in detail
- Low: existing information is too limited to allow its reliability to be assessed

Assessing the Magnitude of Effect

11.3.10 The effect of the proposal on the archaeological resource has been assessed using the following criteria:

Table 11.3-2: Broad Criteria for Assessing the Magnitude of Change / Effect

Magnitude of Effect	Description and Nature of Change / Effect
Severe	<p>Substantial harm to, or total loss of, an asset's significance as a result of changes to its physical form or setting;</p> <p>For example, this would include demolition, removal of physical attributes critical to an asset, loss of all archaeological interest or the transformation of an asset's setting in a way that fundamentally compromises its ability to be understood or appreciated.</p> <p>The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.</p>
Major	<p>Less than substantial harm to an asset's significance as a result of changes to its physical form or setting;</p>

Magnitude of Effect	Description and Nature of Change / Effect
	For example, this could include: physical alterations that remove or alter some elements of significance but do not substantially alter the overall significance of the asset; notable alterations to the setting of an asset that affect our appreciation of it and its significance; or the unrecorded loss of archaeological interest; Significant loss likely to result in a reduction of value of the surviving site.
Minor	Limited harm to an asset's significance as a result of changes to its physical form or setting (Less than Substantial Harm); For example, this could include: physical changes that alter some elements of significance but do not noticeably alter the overall significance of the asset; and small-scale alterations to the setting of an asset that hardly affect its significance; Loss unlikely to result in a reduction of value of the surviving site.
None / Neutral	no identifiable effect
Beneficial	development will protect, preserve or enhance site better than if the development did not occur

Determining Significance

- 11.3.11 By combining the magnitude of the impact (or change) on the significance of an asset as a result of the development and the importance (value) of each heritage asset, an assessment will be made of the significance of the effect, taking into account the possibility and nature of available mitigation options.
- 11.3.12 The significance of effect is expressed in the manner set out in the matrix below (Table 11.3-3). Effects are defined on a five-point scale (severe, major, moderate, minor, and negligible).
- 11.3.13 Generally, moderate to severe effects are considered to be 'significant' in EIA terms.

Table 11.3-3: Assessing the Significance of Change / Effect

Significance	Examples
Severe	Damage to a World Heritage Site. Damage to a Scheduled Ancient Monument. Demolition of/ damage to a Grade I/II* Listed Building. Land take or damage resulting in the loss of integrity of a Landscape of Outstanding Historic Interest in Wales, Grade I/II* Historic Park or Garden or cultural heritage site of national importance, to the extent that the designation would be affected. The resulting loss of integrity could involve a dramatic change in the setting or visual amenity of the feature/site.
Major	Extensive change to the setting or visual amenity of a Scheduled Ancient Monument. Land take which by reason of scale or loss of a critical qualitative component results in the degradation of a Landscape of Outstanding

Significance	Examples
	<p>Historic Interest in Wales, Grade I/II* Historic Park or Garden or a cultural heritage site of national importance.</p> <p>Extensive damage to the value of a Conservation Area, or adverse effects on the setting of a Grade I/II* Listed Building.</p> <p>Demolition of/damage to a Grade II Listed Building.</p> <p>Loss of integrity of sites of archaeological interest of known county or equivalent value, e.g. a dramatic change in the setting or visual amenity of a county site.</p>
Moderate	<p>Extensive change to the setting of a Grade II Listed Building.</p> <p>Encroachment upon a Conservation Area, Grade II Historic Park or Garden and or a Landscape of Outstanding Historic Interest in Wales where the quality of the setting, its amenity or intrinsic value would be noticeably impaired.</p> <p>Encroachment on a feature or site which has yielded a series of finds or a site where a high archaeological potential is considered to exist at a county or equivalent scale, reducing its integrity or creating a noticeable change in the setting or amenity of the site.</p>
Minor	<p>Slight change to the setting of a Grade II Listed Building.</p> <p>Encroachment upon a Conservation Area, Grade II Historic Park or Garden and or a Landscape of Outstanding Historic Interest in Wales but where no intrusive views are created or effects upon its integrity or overall value would result.</p> <p>Encroachment on an area where common archaeological features/areas have been identified, but where low archaeological potential is considered to exist.</p>
Negligible	<p>Landscape or ecological planting on an area where common archaeological features have been identified.</p>

11.4 Baseline Conditions

Archaeological Background

- 11.4.1 The majority of the Llynfi Valley remained rural in character until the arrival of industry in the early nineteenth century. The development area is located within the parish of Llangynwyd (Llangonoyd); the village itself lies on the northern edge of the study area. The settlement of Maesteg developed following the arrival of the iron industry during the nineteenth century. An iron works was opened at Maesteg (known as the 'Old Works') during this period. The 1841 Tithe Map shows a small number of streets, together with the place name 'Maesteg'.

Prehistoric and Roman

- 11.4.2 There is no direct evidence for any Prehistoric or Roman activity within the study area.

Medieval

- 11.4.3 Medieval activity in the wider area is attested to by the presence of St. Cynwyds Church at Llangynwyd (PRN 00910m) and the Llangynwyd Mound and Bailey Castle.
- 11.4.4 There is also the possibility that farmsteads such as Gellisiriol and Brynllwarch-fawr have medieval precursors. However, evidence within the evaluation area is restricted to the possible presence of a number of holy wells, such as Llangynwyd Well, Ffynnon Wrgan, Ffynnon Caerau, Ffynnon Vysgar and the pump at Cefn Ydfa. Apart from the pump, the exact location of all of the wells is unclear.

Post-Medieval

- 11.4.5 Post-medieval activity in the area was initially mainly agricultural in nature and is represented in the archaeological record by several farmhouses, such as Cefn Ydfa (along with its associated outbuildings and stable, Gellisiriol, Brynllwarch-fawr and Tyn-ywaun. These tend to be of a regional type dated to the seventeenth century.

Industrial

- 11.4.6 In addition to the ironworks at Maesteg, nearby industrial sites include four furnaces and a calciner at Caerau (then known as Spelters), constructed by James H. Allen of Neath.
- 11.4.7 The industry of the area was served by two railways; the Dyffryn Llynfi and Porthcawl Railway (DLP) and the Port Talbot Railway. The Dyffryn Llynfi and Porthcawl Railway was authorised by an Act of Parliament in 1825. Construction began in 1826 and the line was opened in 1828. This line transported raw materials, such as zinc ore, up the valley from Porthcawl, with the products returned to the same port for shipping.
- 11.4.8 In 1894, the Port Talbot Railway and Docks Company was incorporated and provided the first competition to GWRs' monopoly of the developing coalfields. The first section was opened for freight traffic in 1897 and extended for just under eleven miles from Port Talbot through Maesteg to Lletty Brongu on the eastern slope of the Llynfi Valley. In 1898, the Port Talbot Railway was extended for three miles to a junction at Pontyrhyll with the Garw Branch.

Identified Archaeological Interests

- 11.4.9 There are 21 identified sites of archaeological interest within the study area, including four Grade II Listed Buildings. These sites are shown in Figure 11.1-1. There are no Scheduled Ancient Monuments within the study area. Further information relating to these interests can be found in Appendix 11-1.
- 11.4.10 Numbers with a letter suffix are Primary Record Numbers (PRN) in the regional Scheduled Monuments Register (SMR). Fivefigure numbers without a suffix are National Primary Record Numbers (NPRN) of the National Monuments Record, as supplied to the SMR.

Table 11.4-1: Identified Archaeological Interests

ID	NGR	Name and type	Period
00136m/18292	SS87778662	Cefn Ydfa	Post medieval
00911m/18754	SS87638801	Gelli Sirion / Gellisiriol	Post medieval
01142m	SS8687	Llangynwyd Well	Medieval
01143m	SS8687	Ffynnon Wrgan	Medieval
01144m	SS8687	Ffynnon Caerau	Medieval
01145m	SS8686	Ffynnon Vysgar	Medieval
01229,0w	SS56079800	GWR Brunel's S Wales Railway	Post medieval
01402m/18132	SS87908739	Brynllwarch-fawr	Post medieval
03111,0m	SS86108684	Ffordd y Gyfraith	Not known
04291,0w	SS78398982	Port Talbot Railway	Post medieval
04470m	SS8648686614	Maesteg Landscape	Modern
04471m	SS87608750	Brynsiriol drainage ditch	Post medieval
04472m	SS86058792	Gadlys Woollen Mill	Post medieval
04473m	SS87528847	Gellisiriol Colliery	Post medieval
04474m	SS88058815	Maes-y-Bettws Colliery	Post medieval
20235	SS86548842	Tyn-y-waun farmhouse	Post medieval
32334	SS87738665	Cefn Ydfa, pump	Medieval?
34804	SS86728836	Dyffryn Llynfi and Porthcawl Railway	Post medieval
34805	SS86688798	DLP Railway embankment	Post medieval
37493	SS87738665	Cefn Ydfa outbuildings	Post medieval
37494	SS87738665	Cefn Ydfa stable	Post medieval

11.5 Assessments of Effects

- 11.5.1 For the purposes of assessment, any site within 100m of the proposed development has the potential to be directly affected by the development (see Figure 11.1-1).

Table 11.5-1: Effect on Known Sites

ID	NGR	Value	Effect	Significance
00136m/18292	SS87778662	B	Minor	Minor
00911m/18754	SS87638801	B	None	Negligible
01142m	SS8687	U	None	Negligible
01143m	SS8687	U	None	Negligible
01144m	SS8687	U	None	Negligible
01145m	SS8686	U	None	Negligible
01229,0w	SS56079800	C	Minor	Negligible
01402m/18132	SS87908739	B	Minor	Minor
03111,0m	SS86108684	D	None	Negligible
04291,0w	SS78398982	D	None	Negligible
04470m	SS8648686614	C	None	Negligible

ID	NGR	Value	Effect	Significance
04471m	SS87608750	U	None	Negligible
04472m	SS86058792	C	None	Negligible
04473m	SS87528847	C	None	Negligible
04474m	SS88058815	C	None	Negligible
20235	SS86548842	B	None	Moderate
32334	SS87738665	U	None	Negligible
34804	SS86728836	D	None	Negligible
34805	SS86688798	D	None	Negligible
37493	SS87738665	B	Minor	Minor
37494	SS87738665	B	Minor	Minor

- 11.5.2 The 'minor' effects on known sites of archaeological interest are restricted to possible off-site changes (for example noise, and pollution) during the construction phase of works.

Effect on potential sites

- 11.5.3 There is no specific evidence for the existence of potential sites in the development area, although there remains a general possibility that unexpected archaeological remains survive within the area. Furthermore, four medieval wells are believed to be located in the region, although their exact location is unknown.

Effect on settings and landscape

- 11.5.4 Within the Maesteg Landscape (04470m), a major road and railway are already apparent, and the proposal will not greatly alter the existing landscape character. There will, however, be a temporary 'minor' effect, due to off-site changes (i.e. noise, pollution, vibration) during the construction phase.
- 11.5.5 The hedgerow system, which is deemed to be of historic importance (being part of a field system pre-dating 1845 and shown on the Tithe Map of 1841), will not be affected as no hedgerows would have to be removed as a result of the proposed development.
- 11.5.6 A designated landscape of Special Historic Importance, Margam Mountain (HLW (WGI/MGI) (Cadw/ICOMOS UK/CCW 2001, 63) is located 5km to the west of the development area. However, it is located beyond the boundaries of the proposed scheme and it is considered that it will not be directly or indirectly affected by the proposal.

11.6 Mitigation Measures

- 11.6.1 Efforts should be made to reduce the off-site changes (i.e. noise, pollution, vibration) during the construction phase, in order to minimise the effects on the identified archaeological interests.
- 11.6.2 It is also recommended that contingency plans be drawn up, for the unlikely occurrence of unexpected archaeological remains being discovered during the development scheme.

11.7 Summary and Conclusion

- 11.7.1 GGAT (Contracts) has undertaken an assessment of the archaeological effects of the extensions to the Bridgend Paper Mill, Maesteg. The assessment reviewed information held by the regional Sites and Monuments Record and the National Monuments Record, as well as aerial photographs, cartographic and documentary sources.
- 11.7.2 A total of 21 sites of archaeological interest were identified, including 4 Grade II listed buildings.
- 11.7.3 The 'minor' effects on known sites of archaeological interest are restricted to possible off-site changes (for example noise and pollution during the construction phase of works.
- 11.7.4 Reduction of off-site changes during construction works is also recommended.
- 11.7.5 Additional effects on the historic landscape are considered likely to be negligible.
- 11.7.6 Contingency plans for unexpected archaeological remains being discovered during the construction works should be made.

12.0 Water Resources and Water Quality

12.1 Introduction and Scope

- 12.1.1 This chapter of the Environmental Statement (ES) considers the impact of the proposed development on water resources (including both groundwater and surface water), flood risk and drainage at the site of the proposed development and in the surrounding area. It seeks to identify possible hydrogeological and hydrological impacts associated with the scheme during both the construction and operational phases, including impacts associated with the required changes in the abstraction and discharge regime.
- 12.1.2 It should be noted that, as an impact assessment, this chapter does not explicitly consider the risk of flooding to the proposed development but does consider how the proposals may alter flood risk at the site and elsewhere.
- 12.1.3 The flood risk to the proposed development is considered separately in a Flood Consequence Assessment (FCA) which is enclosed as Document Ref. 57100-0163.

12.2 Legislation and Planning Policy

- 12.2.1 Reference has been made to relevant legislation, planning policy, technical guidance and other codes of best practice in the design of the proposed development to limit,
- the potential for contamination of ground and surface waters,
 - the potential for flooding to be caused or exacerbated by the proposed development, and
 - other potential impacts on the water environment.
- 12.2.2 The proposed development would therefore be in accordance with the following legislation, guidance and planning policies.

Legislation

- 12.2.3 Water within the local area of the proposed development is currently regulated according to the following key European Commission (EC) Directives and the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. These legislations will remain extant and applicable within Wales despite Brexit until they are either superseded by national legislation by the UK government or devolved assembly.

Water Framework Directive

- 12.2.4 The Water Framework Directive (2000/60/EC) (the "WFD") provides the foundation for the protection of the UK's water environment. The WFD seeks to protect all elements of the water cycle and to enhance the quality of groundwater, surface waters, estuaries and coastal waters. The Directive is transposed and implemented within England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

Groundwater Directive

- 12.2.5 The Groundwater Directive (2006/118/EC, including amendments to Annex II detailed under Directive 2014/80/EU) (the "GWD") is designed to combat groundwater pollution and sets out procedures for assessing quality of groundwater. Aspects of the GWD are transposed and implemented through the Water Environment (Water Framework Directive) (England

and Wales) Regulations 2017, the Environmental Permitting (England and Wales) Regulations 2016 and the Groundwater (England and Wales) Regulations 2009;

Floods Directive

- 12.2.6 The Floods Directive (2007/60/EC) requires assessment of all watercourses and coastlines to determine risk of flooding and action to take adequate and coordinated measures to reduce this flood risk. The Flood Risk Regulations 2009 transpose the EU Floods Directive into law in England and Wales;
- 12.2.7 The Flood and Water Management Act 2010 largely devolved powers in relation to flood risk management in Wales to Welsh Ministers.

Freshwater Fish Directive

- 12.2.8 The Freshwater Fish Directive (78/659/EEC) (recodified 2006/44/EC) was originally adopted on 18th July 1978 but consolidated in 2006. The Directive seeks to protect fresh water bodies identified as waters suitable for sustaining fish populations. For those waters identified, physical and chemical water quality objectives are set for salmonid waters and cyprinid waters. Waters protected under the Directive are formally designated through the issue of a notice. In Wales, the notice is issued by the Department for Environment, Food and Rural Affairs (DEFRA) and it places an obligation on the Natural Resources Wales (NRW) to ensure that designated waters meet their objectives.

Nitrates Directive

- 12.2.9 The Nitrates Directive (91/676/EEC) aims to reduce water pollution by nitrate from agricultural sources and to prevent such pollution occurring in the future. The directive requires DEFRA and the Welsh Assembly Government to identify surface or groundwaters that are, or could be, high in nitrate from agricultural sources. Nitrogen is one of the nutrients that can affect plant growth. Surface waters also have to be identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals and the use of the water. Once a water body has been identified, all land draining to that water is designated as a Nitrate Vulnerable Zone.

Planning Policy

Planning Policy Wales

- 12.2.10 Planning Policy Wales (PPW) sets out the Government's planning policies for Wales and how they are expected to be applied. PPW, Technical Advice Notes (TAN's), circulars and policy clarification letters comprise national planning policy. The PPW states that:
- Planning policies, decisions and proposals should promote resource-efficient and climate change resilient settlement patterns that minimise land-take (and especially extensions to the area of impermeable surfaces) and urban sprawl, especially through preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites;

- When drawing up policies and proposals for their area local planning authorities must acknowledge that government resources for flood and coastal defence projects are directed at protecting 'existing' developments and are not available to provide defences in anticipation of future development. A sustainable approach to flooding will therefore involve the avoidance of development in flood hazard areas and, where possible or practical, the encouragement of managed retreat, the creation of wash-lands and flood plain restoration;
- Development plans should take water-related issues into account from an early stage in the process of identifying land for development and redevelopment. New development should be located, and its implementation planned in such a way as to allow for sustainable provision of water services, in particular minimising vulnerability to the impacts of climate change. Design approaches and techniques that improve water efficiency and minimise adverse impacts on water resources, surface water quality, the ecology of rivers and groundwater should be encouraged;
- Development proposals should also include features that provide effective adaptation to, and resilience against, the current and predicted future effects of climate change, for example by incorporating green space to provide shading and sustainable drainage systems to reduce run-off, and are designed to prevent overheating and to avoid the need for artificial cooling of buildings;
- The adequacy of water supply and the sewage infrastructure are material in considering planning applications and appeals. The need to balance the growing demand for water with the needs of the environment is crucial;
- Even where there is theoretical capacity, timely investment in infrastructure is required to ensure that new development does not adversely affect water supplies, water quality or sewerage. These issues require early identification when locating future development. Local planning authorities should therefore encourage the use of sites where existing water supply and/or drainage provision problems can be solved and seek to avoid the use of sites where adequate water supply and/or drainage provision is unlikely to be achieved;
- Development proposals in sewered areas must connect to the main sewer, and it will be necessary for developers to demonstrate to local planning authorities that their proposal site can connect to the nearest main sewer. To ensure consistency of design and facilitate long-term maintenance, sewers should be built to an adoptable standard, and developers should consult sewerage undertakers in the early stages of design and planning.

Technical Advice Note – TAN 15

- 12.2.11 Technical Advice Note (TAN) 15 provides technical guidance which supplements the policy set out in Planning Policy Wales in relation to development and flooding.
- 12.2.12 National Assembly for Wales produced the 'Technical Advice Note (TAN15)' in July 2004. An update to TAN15 was published as a consultation draft in October 2019. The consultation period will end in January 2020. Included with the proposed work is a new Wales Flood Map/

12.2.13 Currently the majority of the site is located within Flood Zone A (lowest flood risk), however an area of the site is indicated to lie within Flood Zone B as defined by the Development Advice Maps¹⁶.

12.2.14 In relation to new development within Zone B, it states that:

“When considering allocations in Zone B, local planning authorities should consult the Environment Agency to ascertain whether flooding raises a significant constraint in terms of land use. It is not expected that an assessment of the consequences be undertaken at the plan preparation stage but should flooding be considered an issue then policies outlining the appropriate requirements should be included in the plan, in accordance with Sections 6 and 7, and Appendix 1.”

12.2.15 TAN15 also requires new developments to reduce the causes and impacts of surface water flooding by implementing the Sustainable Drainage System (SuDS).

12.2.16 With respect to surface water run off from new development, TAN15 states that:

“SuDS can perform an important role in managing run-off from a site and should be implemented, wherever they will be effective, in all new development proposals, irrespective of the zone in which they are located.

Development in one part of a catchment may increase run-off and hence flood risk elsewhere, therefore, the aim should be for new development not to create additional run-off when compared with the undeveloped situation, and for redevelopment to reduce run-off where possible. It is accepted that there may be practical difficulties in achieving this aim.”

National Strategy for Flood and Coastal Erosion Risk Management in Wales

12.2.17 In accordance with the Flood and Water Management Act, 2010, the Welsh Government has prepared the ‘National Strategy for Flood and Coastal Erosion Risk Management in Wales’ in November 2011.

12.2.18 In relation to flood risk management, it states that:

“Drainage and defence still have a place within a flood and coastal erosion system based on the principals of risk management, but we also need to considered other options that could reduce both the likelihood of an event occurring and the consequence of those events”.

12.2.19 Examples of other options that could be used include:

- Deploying sustainable drainage systems more widely;
- Incorporating greater resilience into the design of developments;
- Ensuring wider awareness of individual risk to increase levels of preparedness and planning for flood events.

¹⁶ Natural Resources Wales, Development Advice Map (Accessed June 2019)
<https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

12.2.20 It is also required that Development of Local Development Plans to include adequate provisions in respect of flood and coastal erosion risk in compliance with the requirements of Planning Policy Wales and relevant Technical Advice Note (TAN15).

Strategic Flood Consequence Assessment

12.2.21 A Strategic Flood Consequence Assessment (SFCA) for Bridgend County Borough was carried out by Capita Symonds in October 2010. The aim of the SFCA was to inform a range of activities, including land use planning, emergency planning, development control and the development of specific flood risk management policy. The SFCA has been developed at a Strategic Scale to support the (existing) Local Development (LDP).

Bridgend County Borough Local Development Plan (LDP)

12.2.22 The existing Bridgend Local Development Plan (2006-2021) was adopted by Bridgend County Borough Council on 18th September 2013.

12.2.23 In relation to protecting and enhancing the environment, the following are included within the objectives of the LDP:

- “OBJ 2a: To promote, conserve, and enhance the natural, historic and built environment of the County Borough.
- OBJ 2b: To safeguard the quality of water, air and soil and tackle or sources of pollution.
- OBJ2c: To manage development in order to avoid or minimise the risk and fear of flooding and enable and improve the functionality of floodplains.”

12.2.24 The policies to achieve these objectives are:

- “Policy PLA4: Climate Change and Peak Oil
 - *All development proposals will be required to make a positive contribution towards tackling the causes of and adapting to the impacts of Climate Change and Peak Oil issues. Mean of achieving this may include:...*
 - 6) *Using resources more efficiently, and minimising waste water use and pollution;*
 - 7) *Avoiding or minimising the risk from flooding and/or adapting to the increased risk of flooding, coastal erosion and warmer annual mean temperature; and*
 - 8) *Promoting sustainable building methods and drainage systems where appropriate.”*
- “Policy ENV7: Natural Resource Protection and Public Health
 - *Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and / or local amenity due to: ...*
 - 6) *Water (including groundwater) pollution;*
 - 7) *Any other identified risk to public health or safety.*

- *Development in areas currently subject to the above will need to demonstrate mitigation measures to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level.”*

Supplementary Planning Guidance

12.2.25 There are no current Supplementary Planning Guidance documents adopted by Bridgend County Borough Council which are of relevance to this Water Resources chapter.

12.2.26 Guidance

12.2.27 Relevant UK guidance on good practice for construction projects is detailed in the following documents:

- Control of Water Pollution from Construction Site (C532), Construction Industry Research and Information Association (CIRIA) 2001;
- Environmental Good Practice on Site (C741), CIRIA 2015;
- NRW have adopted the Environment Agency’s approach to protecting groundwater set out in their guidance note; Protect Groundwater and Prevent Groundwater Pollution¹⁷, EA 2017.
- The SuDS Manual (C753), CIRIA 2015.

12.2.28 The CIRIA guidance provides help on environmental good practice for the control of water pollution arising from construction activities. It focuses on the potential sources of water pollution arising from construction activities and the effective methods of preventing its occurrence.

12.2.29 The EA guidance is part of a wider suite of documents and guidance relating to groundwater protection which sets out principles for assessing risk, protecting groundwater and permitting of abstractions and discharges from groundwater.

12.2.30 The SUDS Manual incorporates the latest research, industry practice and guidance for design, delivery and maintenance of Sustainable Drainage Systems (SuDS).

12.3 Assessment Methodology

Information Sources

12.3.1 Detailed desk studies and site surveys were undertaken to determine the baseline conditions of the site using the following sources:

- British Geological Survey (BGS) Onshore GeoIndex online maps for details of geology and borehole logs (<http://mapapps2.bgs.ac.uk/geoindex/home.html>);

¹⁷ <https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution>

- Lle Geoportal for details on aquifer classification, source protection zones, groundwater vulnerability, flood risk and Water Framework Directive classifications for groundwater and rivers;
- The Swansea Bay Abstraction Licensing Strategy, by Natural Resources Wales;
- NRW information provided in response to an information request by SLR;
- Information provided in response to an information request by SLR to Bridgend County Borough Council and Vale of Glamorgan Council;
- Strategic Flood Consequence Assessment of Bridgend County Borough Council, Volume I, User Guide, October 2010
- Previous ES chapters written for the development proposal at or close to the site (ARUP, December 2002) and the neighbouring site (Sustainable Direction Limited, January 2011);
- Appendix 12-1 – Flood Consequence Assessment¹⁸, prepared by Quorum Consulting Engineers; and
- Aerial Imagery available on Google Earth and observations from a site walkover undertaken in December 2019.

Scoping Opinion

- 12.3.2 A Scoping Opinion was sought from Bridgend County Borough Council by way of a Scoping Request Report submitted on 2nd September 2019.
- 12.3.3 The response from council outlined the requirement for the inclusion of appropriate pollution control measures given the location of the site close to Afon Llynfi. The response also confirms that a Flood Consequence Assessment (provided in Technical Appendix 12-1) is required.

Additional Consultation

- 12.3.4 Flood risk data has been obtained by a data request to NRW and Bridgend County Council. The information received is considered in the baseline section of this chapter.
- 12.3.5 The assessment has involved the following:
- Detailed desk study to establish current baseline hydrological and hydrogeological conditions;
 - Site visit completed 28 November 2019;
 - Identification of potential adverse changes (impacts) resulting from the proposed construction and operation of the development;
 - Specification of proposed measures to avoid or mitigate these adverse impacts; and
 - Evaluation of the residual significance of these adverse impacts following mitigation.
- 12.3.6 The desk study and site visit were undertaken to:

¹⁸ Quorum Consulting Engineers, WEPA UK Ltd Llangynwyd, Bridgend, Flood Risk Assessment, August 2019

- Describe the hydrological and hydrogeological setting;
- Describe any surface water hydrology within and adjacent to the site;
- Describe existing drainage arrangements on and around the site;
- Identify flooding risk; and
- Identify sensitive hydrogeological and hydrological features which may potentially be impacted by the proposed development.

12.3.7 The extent of the desk study and site visits was based on professional judgment and is based on both proximity and the direction of flow pathways leading to and from the proposed development.

Study Area

12.3.8 The study area encompasses the site of the proposed development and immediate environs. All water features have been screened and those relevant have been considered.

Predicting Effects

12.3.9 A qualitative risk assessment methodology has been used to assess the significance of the potential effects associated with the proposed development. Two factors have been considered using this approach: the sensitivity of the receiving environment and the potential magnitude of impact, should that potential impact occur.

12.3.10 This approach provides a mechanism for identifying the areas where site specific mitigation measures are required and for considering the effectiveness of mitigation measures proposed to manage the risk presented by the proposed development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

Sensitivity of Receptor

12.3.11 Criteria for determining the significance of effects relates primarily to the importance of the hydrological receptor. Definitions are provided in Table 12.3-1.

Table 12.3-1: Value / sensitivity assessment

Sensitivity	Definition
High	<ul style="list-style-type: none"> • International importance. • Receptor with a high quality and rarity, regional or national scale and limited potential for substitution / replacement.
Medium	<ul style="list-style-type: none"> • National importance. • Receptor with a high quality, local scale and limited potential for substitution / replacement; or • Receptor with a medium quality and rarity, regional or national scale and limited potential for substitution / replacement.
Low	<ul style="list-style-type: none"> • Regional importance. • Receptor with a medium quality and rarity, local scale and limited potential for substitution / replacement; or • Receptor with a low quality and rarity, regional or national scale and limited potential for substitution / replacement.

Negligible	<ul style="list-style-type: none"> Local importance. Receptor with a low quality and rarity, local scale. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.
-------------------	--

Magnitude of Change (Impact)

12.3.12 The criteria that have been used to assess the magnitude of potential impacts (i.e. the potential scale of change) to the hydrological and hydrogeological environment will be based on professional judgement. Examples are however provided in Table 12.3-2.

Table 12.3-2: Magnitude of change (impact)

Magnitude	Criteria	Definition
High	Results in loss of attribute	Fundamental (long term or permanent) changes to hydrology, hydrogeology or water quality, such as: <ul style="list-style-type: none"> Wholesale changes to watercourse channel, route, hydrology or hydrodynamics. Changes to the application site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns. Major changes to the water chemistry or hydro-ecology. Major changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in impact on integrity of attribute or loss of part of attribute	Material but non-fundamental and short to medium term changes to hydrology, hydrogeology or water quality, such as: <ul style="list-style-type: none"> Some measurable changes to watercourses, hydrology or hydrodynamics. Changes to land cover within the application site resulting in an increase in runoff within system capacity. Moderate changes to erosion and sedimentation patterns. Moderate changes to the water chemistry of surface runoff and groundwater. Moderate changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on attribute	Detectable but non-material and transitory changes to hydrology, hydrogeology or water quality, such as: <ul style="list-style-type: none"> Minor or slight changes to the watercourse, hydrology or hydrodynamics. Changes to application site resulting in slight increase in runoff well within the drainage system capacity. Minor changes to erosion and sedimentation patterns. Minor changes to the water chemistry of surface runoff and groundwater. Minor changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of	No perceptible changes to geology, hydrology, hydrogeology or water quality, such as:

	insufficient magnitude to affect the use/integrity.	<ul style="list-style-type: none"> No impact or alteration to existing important geological environs. No alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns. No pollution or change in water chemistry to either groundwater or surface water. No alterations to groundwater recharge or flow mechanisms.
--	---	--

12.3.13 It should be noted that many potential hydrological and hydrogeological impacts are probabilistic in nature. This type of impact (i.e. an impact relate to a severe storm or flood event) is clearly different from one that will definitely occur (i.e. changes process effluent discharge quality or volumes). As such, where appropriate and with justification, professional judgement would be used to adjust the stated magnitude of an impact for low probability impacts.

Significance of Effect

12.3.14 The sensitivity of the receiving environment together with the magnitude of the impact defines the significance of the potential effect, as identified within Effects of 'major' and 'moderate' significance are considered to be 'significant' in terms of the EIA Regulations.

Table 12.3-3: Significance of Effect

	Sensitivity of Receptor				
Magnitude of Effect		High	Medium	Low	Negligible
	High	Substantial / Major	Substantial / Major	Moderate	Neutral / Negligible
	Medium	Substantial / Major	Moderate	Minor	Neutral / Negligible
	Low	Moderate	Minor	Minor	Neutral / Negligible
	Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible

12.3.15 The characteristics of the impacts are described in terms of direct / indirect, secondary, cumulative, transboundary, temporary (reversible) / permanent (irreversible), together with timescales (Short, medium, long term).

Mitigation Hierarchy

Flooding

12.3.16 The general approach of the Planning Policy for Wales, supported by TAN15, is to advise caution in respect of new development in areas at high risk of flooding by setting out a precautionary framework to guide planning decision. The overarching aim of the precautionary framework is, in order of preference to:

- Direct new development away from those areas which are at high risk of flooding;
- Where development has to be considered in high risk areas only those developments which can be justified on the basis of the Justification Tests set out in TAN 15 will be permitted

Drainage

12.3.17 Current best practice guidance, The SuDS Manual (CIRIA Report C753), promotes sustainable water management (SuDS) as a means of mitigating the impact of development. The SuDS Manual identifies a hierarchy of SuDS for managing runoff, commonly referred to as a 'management train', which summarised below:

- **Prevention** – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
- **Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting).
- **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
- **Regional Control** – management of runoff from several sites, typically in a retention pond or wetland.

Effects Requiring Further Assessment

12.3.18 There are no effects highlighted as requiring further assessment in the Scoping Opinion Report relating to Water Resources contained.

12.4 Baseline Conditions

Existing Site

- 12.4.1 The existing site is a paper mill set within a series of large buildings with associated hardstanding. The site is located in the Afon Llynfi Valley, the applicant ownership boundary extending to the river in the north east. The site consists of the area to the south east of the railway, which separates the treatment plant from the rest of the factory.
- 12.4.2 The existing mill buildings and associated hardstanding cover around two thirds of the land broadly to the south and centre of the application site. The north of the site is currently predominantly grass fields and the eastern part of the site, which is raised, is an area of wood and scrubland.
- 12.4.3 While the northern part of the site is currently predominantly grass fields it also contains an office, laboratory, and personnel room located in the north east corner. Also, in this area, is a small car park, a water tower, and a filtration plant.

- 12.4.4 The A4063 forms the southwestern a boundary of the site. Access onto the site is provided off of the A4063 via a small road that passes along the northern side of the main mill building area.
- 12.4.5 An unnamed private road bounds the application site to the southeast. This is the access road for the effluent treatment plant and substation for the paper mill which are located outside and to the east of the application site but within the wider area that is owned and operated by the applicant. A watercourse called the Afon Llynfi flows through this land from the northwest to the southeast.
- 12.4.6 The existing site abstracts water from Afon Llynfi and passes it through sand and gravel filters for use as process water. Effluent from operations is routed towards the effluent treatment plant and either recycled or treated for discharge to the river depending on demand. The effluent treatment plant consists of six primary effluent settlement tanks and secondary biological treatment using “activated sludge”.
- 12.4.7 The abstractions and discharges are permitted by NRW under environmental permit EPR/EP3738NG.

Proposed Development

- 12.4.8 The proposed development consists of several additional buildings surrounding the existing buildings. These will be located around the western half of the main existing building area as well as an additional area to the south east. The hardstanding will also be updated at the mill including constructing a new car parking area with 208 car parking spaces.
- 12.4.9 The proposal will increase the demand for water at the site and the amount of effluent that is generated. This will however be managed to a large extent through recycling and reuse of treated effluent. The existing abstraction and effluent treatment plants have capacity for the additional water requirements associated with the proposed extension without any changes and no changes to the permitted rates and volumes of abstraction and discharge will be required to facilitate the development proposals.

Baseline Conditions

- 12.4.10 The following hydrogeological and hydrological regime is considered below:
- regional and local geology;
 - aquifer characteristics;
 - recharge mechanisms;
 - groundwater levels and flow;
 - water abstraction and use;
 - groundwater quality;
 - surface water features and connections;
 - surface water quality; and
 - flood risk.

12.4.11 The hydrogeological and hydrological data have been used to develop a conceptual site model.

Topography

12.4.12 The site is located within the Llynfi Valley with elevations falling across the site towards the north east where the Afon Llynfi is situated. The area to the south east where the new warehouse building is proposed, is raised circa 6m above the existing yard and access road. Areas of higher elevation are located both to the south east and north east of the site.

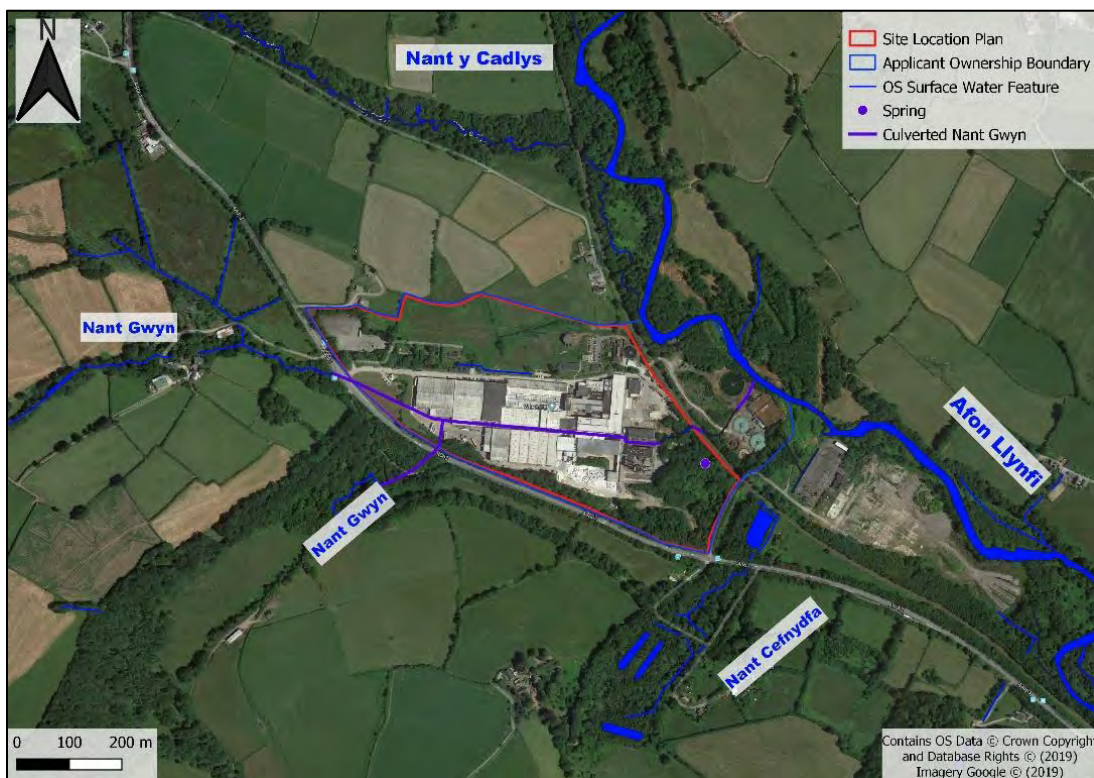
12.4.13 Elevations across the site range between 72.7m above Ordnance Datum (aOD) in the east of the site and 105.0maOD in the north of the site.

Catchment Overview

Hydrology

12.4.14 An overview of mapped surface water features near the site is presented in Figure 12.4-1.

Figure 12.4-1: Local Hydrology



12.4.15 The site is located within the Llynfi Valley with all surface water (runoff and watercourses) naturally proceeding towards the Afon Llynfi which is located to the north east of the application site. The Afon Llynfi flows from west to east past the site and has an upstream catchment¹⁹ of circa 39.2km². Upstream of the site the river passes through the urban area of Maesteg as well as some rural agricultural land.

¹⁹ Flood Estimation Handbook Webservice, <https://fehweb.ceh.ac.uk/GB/map>, Accessed December 2019

12.4.16 Afon Llynfi is monitored under the Water Framework Directive WFD and is assigned a status for hydromorphological, ecological, chemical criteria. An overall status (moderate) is also assigned. A summary of the cycle 2 (2016) status is presented in Table 12.4-1 unterhalb.

12.4.17 The Swansea Bay Abstraction Licensing strategy²⁰ states that the Afon Llynfi has water available for licensing meaning that there is more water than required to meet the needs of the environment even under low flow conditions. This is based on monitoring at Coytrahen gauging station located circa 2.5km downstream of the site. This assessment is undertaken by Natural Resources Wales to provide a guide as to whether new abstraction licence applications should be approved and is based on a modelled scenario where all existing licensed abstractions (including the abstraction for this site) are fully utilised.

Table 12.4-1: WFD Summary Data (2016 Cycle 2) for potential receptor

Waterbody	Afon Llynfi
WFD Waterbody name	Llynfi - Lletty Brongu STW to conf with Ogmores
WFD ID	GB110058026332
Type	River
Hydro morphological designation	Supports Good
Ecological Status	Moderate
Chemical Status	Good
Overall Status	Moderate

12.4.18 The Nant-Gwyn, a tributary of the Llynfi passes through the site. The section of the Nant-Gwyn through the application site (i.e. to the west of the railway line) is culverted and consists of two branches. One approaches the site from the south and one which approaches from the west. The southern branch has an upstream catchment of circa 1.27km² and the western branch has an upstream catchment of circa 0.98km². Both enter culverts on the opposite side of the A4063 to the site. The two branches converge in the south west of the site in an area that is currently a yard. The Nant-Gwyn has a short section of open channel immediately west of the railway line and is open channel to the east of the railway line past the treatment works.

12.4.19 The Nant-Gwyn receives runoff from roofs within the application site. While runoff from yard area on the site do not drain to Nant-Gwyn, undeveloped areas of the site do still drain to this watercourse via surface and shallow sub surface pathways. It is also possible that small amounts of flow from the operational site (at ground level) could drain to this stream via misdirected drainage connections or damaged / cracked pipework and hardstanding.

12.4.20 Another tributary of the Afon Llynfi, the Nant Cefnydfa, flows north past the site circa 80m to the east of the site. The upstream catchment is circa 0.95km². Based on a review of local topography no flows from the site will enter this watercourse and therefore this potential receptor is scoped out of this assessment

- 12.4.21 The site is located in a rural area and the catchments for the streams are agricultural and woodland land uses.
- 12.4.22 There is a spring feature located in the east of the site which is associated with steep topographic gradient in this area. Flows discharging from the spring drain into Nant-Gwyn.

Abstractions and Discharges (Site)

- 12.4.23 The existing paper mill is self-reliant in terms of water resources for processing purposes and has an abstraction licence (21/58/41/0015) with the main water intake from the Afon Llynfi and a second abstraction point from the Nant-Gwyn. The licence allows for the abstraction of up to 12,000 m³/day at an instantaneous rate not exceeding 167l/s. The abstracted water is pumped under the railway line into the operational site and then processed through a filtration plant before being used in processes within the factory.
- 12.4.24 Although a paper mill unavoidably has a high water demand much of the water is recycled within the site. This significantly reduces the amount of water that needs to be abstracted and the amount of discharge. Water recycling is used as a way of managing water within the mill and provides a degree of resilience for site operations in the event that abstraction was not possible for a period.
- 12.4.25 The paper mill has its own effluent treatment plant with a two stage treatment system. The treated water is either sent back to the mill for reuse or discharged into Afon Llynfi. The maximum daily flow volume of the discharge under the environmental permit (EPR/EP3738NG) is 17,500m³/day.
- 12.4.26 Foul water (sewerage) is also processed at the site passing initially into a settlement tank before discharging into the site effluent going to the main treatment plant.
- 12.4.27 Surface water runoff from the roofing areas is currently discharged directly into the Nant-Gwyn with no treatment or attenuation. Surface water runoff from the yard areas, which have potential for contamination with pulp or processing chemicals, is discharged into the effluent drainage and therefore drains to the treatment plant.

Abstractions and Discharges (Offsite)

- 12.4.28 There is one record of another abstraction permit held by NRW within 2km of the site from the Nant Cwm-du, a tributary of Afon Llynfi. This is located 1.86km north of the site and 2.66km upstream of the site.
- 12.4.29 Records provided by NRW indicate there are three permitted discharges within 2km of the site²¹. These are summarised in

21 Natural Resources Wales, Consented Discharges to Controlled Water with Conditions, <http://lle.gov.wales/catalogue/item/ConsentedDischargesToControlledWatersWithConditions/?lang=en> , October 2019

12.4.30 Table 12.4-2 below:

Table 12.4-2: Summary of Permitted Discharges into Controlled Water (NRW)

Map ID	Licence Holder	Discharge Type	Distance	Direction
1	Dwr Cyru Cyfyngedig	Sewage Disposal Works	750m	North
2	Dwr Cyru Cyfyngedig	Sewage Disposal Works	1000m	North
3	Dwr Cyru Cyfyngedig	Sewage Disposal Works	1125m	East

12.4.31 No records of private water supplies were supplied by either Bridgend County Council or Vale of Glamorgan Council in response to an information request.

Flood Risk

12.4.32 The development site is predominantly located within Flood Zone A. An area along the Nant-Gwyn is indicated to lie within Flood Zone B, which is associated with historical alluvium deposits.

12.4.33 A Flood Consequence Assessment (FCA) has been completed at the site in accordance with Technical Advice Note 15: Development and Flood Risk (TAN15). This report is included as Document Ref. 57100-0163.

12.4.34 The FCA assessed the risk of flooding from fluvial, tidal, surface water, sewers, groundwater, artificial sources, and from the construction and operational activities and concluded that there was only a low risk of flooding.

Hydrogeology

Aquifer Characteristics

12.4.35 BGS mapping indicates that the southeast of the site is underlain by bedrock with “*Brithdir Member – Sandstone*”. Adjacent to this is “*Mudstone, Siltstone and Sandstone*” part of the Brithdir Member. The north of the site is underlain by the “*Hughes Member – Mudstone, siltstone and sandstone*” and “*Hughes Members – Sandstone*”.

12.4.36 The bedrock across the site is designated by NRW as a *Secondary A aquifer*, which is defined as layers with moderate permeability capable of supporting water supplies at a local rather than strategic scale. These aquifers can be an important source of base flow to rivers.

12.4.37 BGS mapping indicates that there are superficial till deposits which are described across diamicton the centre of the site. These are overlain by alluvial deposits adjacent to the historical course of the Nant-Gwyn. The till deposits are designated as *Secondary (undifferentiated)* while the alluvium *Secondary A aquifer*.

12.4.38 Borehole logs for the site indicate there is are superficial glacial till deposits consisting of stiff grey brown sandy silty clay with coarse gravel and occasional cobbles. This is underlain by sandstone with occasional thin (less than 1m) layers of coal. This supports the geological mapping,

12.4.39 The nearest Source Protection Zone (SPZ) is located circa 7.3km south east of site. The site is unlikely to be in hydraulic connectivity with this abstraction.

12.4.40 The geoportal for Water Framework Directive summarises the regional qualitative and quantitative quality of the groundwater. This indicates the site lies within the Swansea

Carboniferous Coal Measures (Waterbody ID – GB41002G201000) and it is therefore assumed that the Birthdir Member and Hughes Member form part of this regional aquifer. The groundwater in 2015 (Cycle 2) was classified as:

- Overall Status: Poor
- Quantitative Status: Good
- Chemical Status: Poor

12.4.41 The poor chemical status is due to the following factors being identified as being at risk:

- Groundwater quality;
- Surface water chemistry and ecology; and
- Terrestrial Ecosystems (wetlands).

Groundwater Quality

12.4.42 Groundwater quality for a range of determinands is measured at the site as part of the ongoing environmental monitoring. The majority of the analysed determinands are below the limit of detection.

12.4.43 In June 2018 the following determinands were detected (i.e. above the limit of detection) within the groundwater:

- Arsenic at the spring – the concentration was half of the environmental quality standard (EQS) for freshwater.
- Iron in boreholes BH1, BH3, BH5 and Spring – BH1 and BH3 exceed the EQS value. These are located either side of the existing papermill building.
- Biological and Chemical Oxygen Demands (BOD and COD) were recorded in BH1, BH3 and at the Spring.

12.4.44 In November 2018 the following determinands were detected (i.e. above the limit of detection) within the groundwater:

- Sodium at BH3 – there is no EQS for sodium in freshwater, however it does not exceed UK drinking water standards and therefore is not considered significant.
- Iron in BH1, BH3, BH4, and Spring – only BH3 exceeds the EQS value;
- Increased levels of BOD were recorded in BH3, BH4, and at the Spring. The Spring was also recorded as having high COD.

Groundwater Levels and Flow

12.4.45 Groundwater levels are measured at the site as part of the environmental monitoring. The levels from the June and November 2018 monitoring have been provided to inform this assessment and are presented in

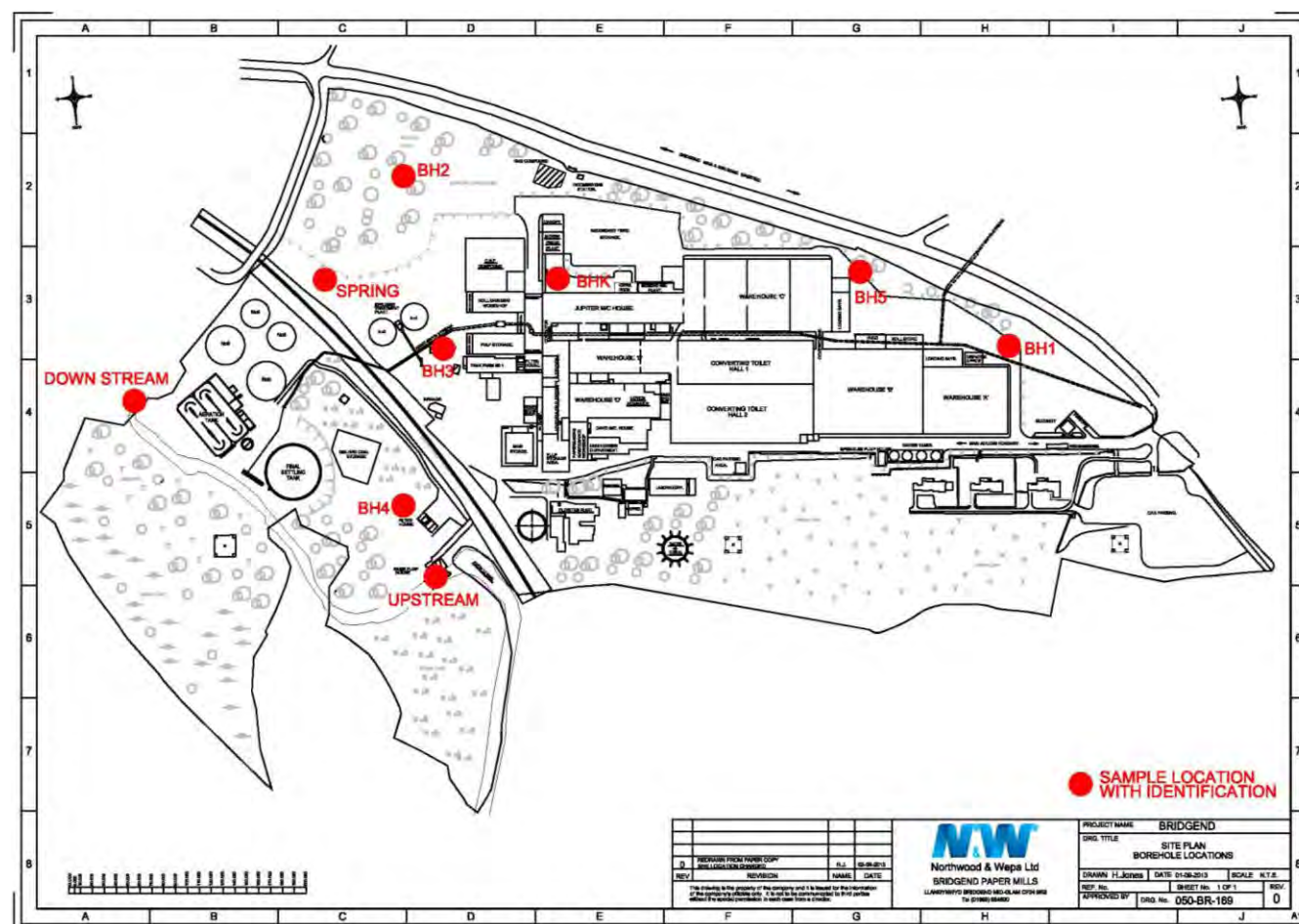
12.4.46 Table 12.4-3. A borehole location plan is presented in Figure 12.4-2.

12.4.47 The data indicates a large amount of spatial variability in ground water depths (and levels) with no clear trend across the site. This suggest that the geology is largely impermeable with little or no groundwater flow and a potential for water logging in areas with poor surface drainage.

Table 12.4-3: Groundwater Levels from 2018 Monitoring

Borehole	Groundwater Level June 2018 (mbgl)	Groundwater Level November 2018 (mbgl)
BH1	0.00	0.00
BH2	5.10	3.80
BH3	3.60	2.80
BH4	5.95	5.60
BH5	4.30	4.30
BHK	0.00	2.10

Figure 12.4-2: Borehole Location Plan



Recharge Mechanisms

- 12.4.48 Met Office data indicates that the average annual rainfall in Wales since 1910 is 1396mm. The Flood Estimation Handbook (FEH) states that the Standard Average Annual Rainfall is 1544mm.
- 12.4.49 Estimates for the potential and actual evaporation rates for the UK are included in the UK Hydrological Review, which is published by the Centre for Ecology & Hydrology and British Geological Survey each year. Review of the reports between 1999 and 2010 indicate that the actual evaporation often and typically fell within the range of 530-569mm. Evaporation was indicated to be greater than 510mm in all years and less than 609mm in all years.
- 12.4.50 Due to the position of the site (adjacent to several watercourses), the high proportion of impermeable surfaces and the impermeable geology, rainfall at the site will not significantly contribute to recharge into the underlying aquifers. Instead excess rainfall will pass into the Afon Llynfi and flow away from the site. Rain falling on building roof areas are directed into a surface water drainage system that discharges to Nant-Gwyn. Rain falling on all other impermeable areas of the site is routed into the effluent drainage network that discharges to the Afon Llynfi directly (following treatment).

12.5 Assessment of Potential Effects

- 12.5.1 This sub-section identifies the potential impacts of the proposed development on the hydrogeological and hydrological environments prior to mitigation during both the construction and operation of the proposed development. It also assesses the magnitude of each identified impact. The results of this assessment are summarised in **Fehler! Verweisquelle konnte nicht gefunden werden..** It should be noted that the magnitude of the potential impacts has been assessed as described in Table 12.2-2. The significance of any potential effect has then been assessed (based on the sensitivity of the receptor) as described in Table 12.2-3.
- 12.5.2 The proposed design and operation of the application site incorporates measures to mitigate potential impacts on the water environment. Except where detailed in the development description above these measures are not included in the initial assessment of impacts so that their effect can be explicitly stated in the mitigation section of this chapter.
- 12.5.3 In this assessment the sensitivity of the potential receptors is designated as follow:
- Afon Llynfi – Medium Sensitivity - because it is a designated by NRW as a main river which is classified as moderate in line with the WFD with good chemical status. Afon Llynfi also provides connection to the large urban area of Bridgend to the south of the site.
 - Nant-Gwyn – Low Sensitivity - due to the potential impacted reaches of the watercourse being entirely within WEPA's site boundary, it being predominantly culverted and only locally important. However, the Nant-Gwyn enters Afon Llynfi and represents a significant potential pathway for impacts to this receptor and downstream urban areas including Bridgend to the south of the site.

- Groundwater – Low Sensitivity - the underlying geology is designated as either a Secondary A aquifer or a Secondary undifferentiated aquifer which indicates that it could have local importance as for base flow. Records provided by local authorities did not indicate that there were local abstractions of groundwater.
- Existing Papermill Site – Medium Sensitivity (for flood risk and effluent treatment) – the ground level of the existing site is served by the effluent drainage network. The operation of the site is reliant on the function of these systems and impacts could therefore impact the operation of the existing site.

Demolition and Construction Phase

12.5.4 During the demolition of existing buildings and the construction of the new buildings for the extension of the paper mill, there is potential for adverse impacts on surface water environment and groundwater quality associated with

- the use and storage of oil and chemicals associated with construction activities;
- high level of suspended solids arising from earthworks and the use of plant on the site,
- the use and storage of cementitious material associated with construction activities; and
- physical disturbance to the Nant-Gwyn culvert.

Groundwater and Surface Water Quality

12.5.5 Spilled oils and fuels from site vehicles and / or equipment on the site, if unmitigated could enter surface water runoff from the site. This could enter shallow groundwater or flow over land following topographic gradients entering the Nant-Gwyn, or the operational site drainage systems.

12.5.6 Oils and fuels entering the operational site drainage system would pass to the effluent treatment plant, which would normally effectively treat flows prior to discharge. If a spill was large this could however overload the plant causing a contaminated discharge to Afon Llynfi or resulting in damage from the plant. The magnitude of this potential impact is therefore assessed to be **'Medium'**.

12.5.7 As noted above spills of fuels and oil in the areas of the site that are not already developed could drain into one of the branches of Nant-Gwyn. The Afon Llynfi is also a secondary receptor via the Nant-Gwyn. The magnitude of the potential impact from spilled oils and fuels entering the Nant-Gwyn is assessed to be **'Medium'**.

12.5.8 There is no direct flow pathway for spills from the construction site to enter the Afon Llynfi and therefore all potential impacts have been discussed in the previous pathways.

12.5.9 The magnitude of the impact of oil and fuels entering the groundwater as a result of spill in undeveloped areas is considered **'Medium'**.

12.5.10 Based on the above the significance of the potential effect is assessed to be Moderate for the Afon Llynfi and the Existing Operational Papermill Site and Minor for Nant-Gwyn and Groundwater.

Elevated level of Suspended Solids

- 12.5.11 Without the incorporation of formalised mitigation measures, the construction of the new buildings has potential to generated turbid runoff from the following potential sources:
- Storm runoff across ground churned up construction traffic;
 - Intense rainfall onto exposed earth surface and / or spoil heaps;
 - Dewatering of excavations for foundations; and
 - Tracking of soil by plant onto adjacent roads and hardstanding and mobilisation from there into storm drainage network.
- 12.5.12 Due to the topography in the south east area of the site, there is a steep preferential flow path (down the existing access road to the site). The presence and gradient of this flow route increases the potential for turbid runoff in two ways:
- Higher velocities mean that the runoff has a higher load capacity therefore transports more sediments etc.;
 - Surface water runoff could travel further distances without infiltrating to ground / mixing with other surface water sources.
- 12.5.13 Review of potential surface water flow routes from the south east area indicates that turbid runoff from this area could enter both the effluent drainage network of the existing site and Nant-Gynn.
- 12.5.14 The increased sediment loading could result in blockage of the effluent drainage network. Resulting surcharges could result in flooding of the yard areas with potentially mildly contaminated water (potentially containing paper fibres – bleaching chemicals are highly controlled and therefore unlikely to be in this effluent water). High sediment loading could also overload the effluent treatment plant potentially causing damage to the treatment plant or contaminated discharge to the Afon Llynfi. The magnitude of unmitigated of this potential impact is assessed to be **'High'**.
- 12.5.15 The sediment loaded surface water could passes directly into the Nant-Gwyn via the section of open channels or into the culvert through cracks or damaged manholes. The magnitude of the potential impact on the Nant-Gwyn is considered **'High'**.
- 12.5.16 The Nant-Gwyn flows into the Afon Llynfi, however due to the distance downstream (and settlement along the channel) as well as the higher dilution capacity, the magnitude of the potential impact on the Afon Llynfi would be lower and is assessed as **'Medium'**.
- 12.5.17 The topography of the other areas of development (adjacent to existing building) are relatively flat and the potential for turbid surface water runoff to be generated is therefore smaller. The magnitude of the impacts from construction activity in these areas, if unmitigated, is assessed to be **'Medium'**.

12.5.18 The significance of the potential effect is relating to pollution from high levels of suspended solids is summarised in Table 12.5-1.

Table 12.5-1: Unmitigated significance of increased turbidity of surface water

Receptor	Significance of Effect South East	Significance of Effect Rest of Construction
Afon Llynfi	Moderate	Moderate
Nant-Gwyn	Moderate	Minor
Papermill Drainage Systems	Major	Moderate

Cementitious Material

- 12.5.19 Spillage or accidental discharge of cementitious material during groundworks of construction and spillages of raw building material throughout construction could enter the surface water runoff from the site. This could enter shallow groundwater or flow over land following topographic gradients entering the Nant-Gwyn, or the operational site effluent drainage networks.
- 12.5.20 The Nant-Gwyn flows into the Afon Llynfi and therefore cementitious materials could be conveyed to this receptor either via this pathway or via the effluent treatment plant if this was not working or was overwhelmed. The magnitude of the potential impact taking into account the probability of a major spill is assessed to be **'Medium'**.
- 12.5.21 The significance of the potential effect is therefore **'Moderate'** for the Afon Llynfi and the existing papermill site and **'Minor'** for the Nant-Gwyn and underlying groundwater.

Disturbance to Nant-Gwyn Culvert

- 12.5.22 Plant required for the construction phase of the development will have to pass over the culvert for the Nant-Gwyn. This could result in damage or collapse of the culvert. The magnitude of this impact is **'High'** as it could result to flooding. This could also have an impact of sediment from the collapse being transported into the Afon Llynfi however the magnitude of the impact on Afon Llynfi is considered only **'Low'** due to the dilution effects.
- 12.5.23 The significance of disturbance to the Nant-Gwyn Culvert if unmitigated is considered to be **'Moderate'** for the Nant-Gwyn and **'Minor'** for the Afon Llynfi.

Operational Phase

- 12.5.24 The proposed development involves an extension of an operational papermill, and, unless otherwise stated in the application, the mill will continue to be operated in the same manner. The existing water abstraction, processing, recycling, treatment and discharge will be maintained.
- 12.5.25 Without the incorporation of formalised mitigation measures, the construction of the new buildings has potential to generated turbid runoff from the following potential sources:
- Accidental emissions impacting groundwater and surface water quality;
 - Changes in groundwater recharge;

- Changes in abstraction and discharge impacting water resources; and
- Changes to flood risk and drainage.

Groundwater and Surface Water Quality – Accidental Emissions

- 12.5.26 If unmitigated, the operational extension to the papermill could result in contamination of surface water runoff from paper fibres, pulp etc. However, the construction of the site inherently mitigates against the impact of this by connecting all yard areas into the effluent drainage network which is routed via the existing treatment plant.
- 12.5.27 Fracturing of piping, rupturing or overfilling of containment vessels could potentially result in accidental emissions of chemicals and / or fibres. All new pipework and storage areas will be constructed in accordance with Best Available Techniques. Due to the position of the proposed development the probability of an accidental emission from this source is not altered as a result of the development and therefore the magnitude of the impact is **'Negligible'**. The significance of the impact is therefore **'Negligible'**.
- 12.5.28 The proposed development will result in an increase in yard area. The development includes provision of surface water attenuation tanks and these have been designed to reduce runoff rates from the new areas of the site and prevent the capacity of the effluent network and treatment plant being exceeded. In the event of surcharging of the system in a storm that is larger than design event mildly contaminated water would flood the yard areas and could enter the Nant-Gwyn via any cracks or manholes. However due to the inherent dilution and low probability of this occurring the magnitude of the potential impact is considered **'Low'** and the significance is therefore **'Minor'**.
- 12.5.29 Unloading of chemicals is the highest risk activity for a potential accidental spillage. This could enter the effluent drainage system in significantly higher concentrations than the system has been designed for and overwhelm the treatment plant. This could result in surface water quality impacts to the discharge into Afon Llynfi. However, there is storage in the effluent treatment network upgradient of the treatment plant, which would be used to hold flows back in the event of a major spill and prevent neat produce entering the plant. As per existing operations spill kits will also be located adjacent to the areas of chemical unloading. The magnitude of the potential impact taking into account the low probability of a major spill is assessed to be **'Low'** and the significance of this impact would therefore be **'Minor'** for the Afon Llynfi.
- 12.5.30 Spilled oils and fuels from site vehicles and / or equipment on the site, if unmitigated would enter effluent runoff from the site, which could, if the volumes were very high, overwhelm the effluent treatment plant. This would result in contaminated discharge to Afon Llynfi or failure of the treatment plant. The magnitude of the potential impact taking into account the very low probability of a major spill is assessed to be **'Low'**. The significance of the impact is therefore **'Minor'**. There is no pathway to any other receptor and therefore the magnitude of potential impact and significance of effect for those is assessed to be **'Negligible'**.
- 12.5.31 Temperature gauges are placed on both the abstraction point and effluent discharges. Discharge from the site is halted if there is greater than a 5 degrees centigrade temperature variation between the two or in the event that one of the monitored parameters (BOD, COD, nutrients) exceeds the compliance limits. These existing controls will be maintained and

therefore the magnitude of potential impact and significance of effect on water quality associated with normal operational discharge from the site is '**Negligible**'.

Groundwater Recharge

- 12.5.32 Due to the increase of impermeable coverage as a result of the development there will be a very small reduction in the potential for rainfall to infiltrate into the ground. However, due to the limited increase in impermeable area relative to the catchment of the aquifer and the nature as *Secondary Aquifer*, the magnitude of the potential impact is '**Negligible**' and therefore the significance of effect is '**Negligible**'.

Water Resources

- 12.5.33 As for existing operations, following development only a small proportion of the water abstracted will be consumed by operations (e.g. evaporative losses and export from site within the pulp sludge waste) with the remainder forming an effluent stream. Once the final effluent has been treated it will be discharged from the site back into the Afon Llynfi and therefore the net abstraction volume for operations on site will remain small
- 12.5.34 The operation of the extension area will however increase the water requirements of the mill relative to present day usage. However, due to the improvements in water efficiencies at the mill including the installation of a water recycling system, water abstraction will remain smaller than the mill has historically abstracted and will remain less than the total licence amount of 12,000m³/day.
- 12.5.35 The Catchment Abstraction Management Strategy states that the Afon Llynfi has a status of 'water available' for abstraction (over what is required for the environment) even under low flow conditions. This assessment assumes that all abstraction licences, including the one for the site, are fully utilised.
- 12.5.36 The magnitude of the additional potential impact on the Afon Llynfi from the small uplift in abstraction volumes (which is within the terms of the existing abstraction licence) is therefore considered '**Negligible**'. The significance of effect is therefore also '**Negligible**'.
- 12.5.37 The effluent treatment plant was designed when there four paper machines functioning at the mill. Since this time, not only has there been a reduction in the number of the machines, but the production systems in the factory have become more water efficient. Furthermore, a water recycling system has been installed which allows for all the effluent to be recycled rather than discharged. As such there is a large capacity for both storage and reuse of effluent in the event that the effluent treatment plant ever needed to be shut down for short periods for maintenance.
- 12.5.38 Despite this the changes do mean that there will be a small uplift in the volume of discharge from the site partly associated with storm water runoff from the additional yard area. Peak discharge volumes will however remain significantly lower the permitted under the discharge licence. The high level of treatment and the resilience of the system means that the magnitude of potential impact on the flows within Afon Llynfi from the projected changes in discharge is '**Negligible**' and the significance of effect is also assessed to be '**Negligible**'.

Flood Risk and Drainage

- 12.5.39 The development will result in an increase in the impermeable coverage at the site and therefore will increase the surface water runoff volumes. However, the increase in impermeable coverage is small relative to entire catchments of both the Nant-Gwyn and Afon Llynfi.
- 12.5.40 Runoff from the building roofs will be routed into the surface water drainage network which drains to the Nant-Gwyn and thereby recreates the drainage regime. Attenuation storage will be created along this system to ensure that peak rates of discharge to the stream are not increased as a result of the development.
- 12.5.41 As already discussed, runoff from the yard areas will drain to the effluent drainage system. Storage exists upstream of the effluent treatment plant to accommodate excess flows and peak rates of discharge into the Afon Llynfi are governed by the capacity of the treatment plant and not the small changes in the source areas draining to the plant.
- 12.5.42 A Flood Consequence Assessment has been completed in the site and has concluded that the risk of flooding as a result of the development is low. The magnitude of impact associated with the increase in impermeable coverage on flood risk is assessed to be '**Low**' and therefore the significance of the impact is '**Minor**'.

Summary of Unmitigated Potential Impacts

- 12.5.43 Table 12.6-2 presents a summary of potential impacts associated with the proposed development and identifies where migration measures are required to reduce potential impacts to acceptable levels.

Table 12.5-2: Summary of Unmitigated of Potential Impacts

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Construction Phase						
<i>Groundwater and Surface Water Quality</i>						
Spilled pollutants, oils, fuels etc. contamination	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Medium	Moderate	Yes
Spilled pollutants, oils, fuels etc. contamination	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Low	Minor	No
Spilled pollutants, oils, fuels etc. contamination	Groundwater	Local, Short Term (Adverse)	Medium	Low	Minor	No
Turbid Surface Water Runoff – South-East Area	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Medium	Moderate	Yes
Turbid Surface Water Runoff – South-East Area	Nant-Gwyn	Local, Short Term (Adverse)	High	Low	Moderate	Yes
Turbid Surface Water Runoff – South-East Area	Existing Papermill Site - Flooding	Local, Short Term (Adverse)	High	Medium	Major	Yes
Turbid Surface Water Runoff	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Medium	Moderate	Yes
Turbid Surface Water Runoff	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Low	Minor	No
Turbid Surface Water Runoff	Existing Papermill Site - Flooding	Local, Short Term (Adverse)	Medium	Medium	Moderate	Yes
Cementitious material spillage	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Medium	Moderate	Yes
Cementitious material spillage	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Low	Minor	No

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Cementitious material spillage	Groundwater	Local, Short Term (Adverse)	Medium	Low	Minor	No
Disturbance of Nant-Gwyn Culvert	Nant-Gwyn	Local, Medium Term (Adverse)	High	Low	Moderate	Yes
Disturbance of Nant-Gwyn Culvert	Afon Llynfi	Local, Medium Term (Adverse)	Low	Medium	Minor	No
Operational Phase						
<i>Groundwater and Surface Water Quality</i>						
Fracturing of piping, rupturing or overfilling of containment vessels	Afon Llynfi	Regional, Medium Term (Adverse)	Negligible	Medium	Negligible	No
Fracturing of piping, rupturing or overfilling of containment vessels	Nant-Gwyn	Local, Medium Term (Adverse)	Negligible	Low	Negligible	No
Fracturing of piping, rupturing or overfilling of containment vessels	Groundwater	Local, Medium Term (Adverse)	Negligible	Low	Negligible	No
Increased Runoff from Yard Area	Existing Papermill Site	Local, Short Term (Adverse)	Low	Low	Minor	No
Spillage of Chemicals during Unloading	Afon Llynfi	Regional, Medium Term (Adverse)	Low	Medium	Minor	No
Spillage of Oils and Fuels from Site Vehicles	Afon Llynfi	Regional, Medium Term (Adverse)	Low	Medium	Minor	No
<i>Groundwater Recharge</i>						
Reduction in Recharge due to increases in impermeable cover	Groundwater	Local, Long Term (Adverse)	Negligible	Low	Negligible	No

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
<i>Water Resources</i>						
Increases in Water Abstraction	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Medium	Negligible	No
Increases in Discharge	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Medium	Negligible	No
<i>Flood Risk and Drainage</i>						
Increase in flood risk due to changes in impermeable cover	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Medium	Negligible	No

12.6 Proposed Mitigation Measures

- 12.6.1 Mitigation measures to address potential significant effects detailed in Table 12.6-2 are described below. These measures reduce the magnitude of potential impact. It should be noted that several of the mitigation measures proposed below would result in a positive change on more than one potential impact.
- 12.6.2 A number of operational mitigation measures and best available techniques have been incorporated into the procedures already used at the existing operational site. These have been considered as incorporate mitigation within the initial assessment as the proposed development will continue to operate in the same manner.

Construction Phase

Groundwater and Surface Water Quality

- 12.6.3 The construction of the extension at Bridgend Papermill would be undertaken in line with relevant technical guidance and codes of best practice, to limit the potential for contamination of both ground and surface waters.
- 12.6.4 Best practice techniques would be incorporated within the management procedures for construction and operation activities onsite in order to protect the water environment from pollution incidents. This would involve the preparation of detailed 'construction - site water management plan' which would be completed and agreed with NRW prior to work commencing at the application site. This document would set out:
- Roles and responsibilities for environmental management during the works;
 - Detailed methodology for managing any imported materials;
 - Details of site drainage and water management during works;
 - Details of what other material would be required during the works and where and how these would be stored, and
 - Measures for identifying and addressing any pollution incidents should these occur.
- 12.6.5 The following standard good practice measures would be incorporated and expanded upon within the plan:
- The use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;
 - All on-site fuel, and chemical storage would be above ground and would be lined and bunded;
 - Emergency spill response kit would be provided and maintained on site and site personnel would be trained in their use; and
 - A vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision;
 - Direct discharge of sediment laden water to adjacent surface water bodies would be forbidden;

- Spoil heaps should be minimised and kept covered as far as possible; and
- Wheel cleaning should be carried out on exit to the site to minimise tracking of sediment onto adjacent roads.

12.6.6 A detailed inventory of potential pollutant sources and specific high risk activities (such as refuelling) that are on site through the construction process will be made and kept on site. As already noted, appropriate storage facilities for these material would be provided and these facilities.

12.6.7 The natural topography of the south-east area, which essentially funnels surface water runoff towards the existing site down the access “track” will be altered to route surface water into a depression(s) which will act as a temporary settlement pond to reduce the turbidity of the surface water.

Operational

12.6.8 The extension areas of the papermill will be operated in the same way as the existing papermill site and within the requirements of the environmental permit.

12.6.9 Spillage kits will be located adjacent to chemical storage and loading areas and only staff trained in the use will be responsible for the unloading of chemicals.

12.6.10 The initial assessment concluded that given the incorporated mitigation inherent within the design of the scheme all other operational impacts relating to water resources, flood risk and drainage were minor or negligible and as such no further mitigation or management measures are required.

Table 12.6-1: Summary of the Residual Potential Impact after Mitigation

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Potential Effect	Mitigated Magnitude of Impact	Significance of Potential Effect after Mitigation
Construction Phase						
<i>Groundwater and Surface Water Quality</i>						
Spilled pollutants, oils, fuels etc. contamination	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Moderate	Low	Minor
Spilled pollutants, oils, fuels etc. contamination	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Minor	Low	Minor
Spilled pollutants, oils, fuels etc. contamination	Groundwater	Local, Short Term (Adverse)	Medium	Minor	Low	Minor
Turbid Surface Water Runoff – South-East Area	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Moderate	Low	Minor

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Potential Effect	Mitigated Magnitude of Impact	Significance of Potential Effect after Mitigation
Turbid Surface Water Runoff – South-East Area	Nant-Gwyn	Local, Short Term (Adverse)	High	Moderate	Low	Minor
Turbid Surface Water Runoff – South-East Area	Groundwater	Local, Short Term (Adverse)	High	Moderate	Low	Minor
Turbid Surface Water Runoff – South-East Area	Existing Papermill Site - Flooding	Local, Short Term (Adverse)	High	Major	Low	Minor
Turbid Surface Water Runoff	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Moderate	Negligible	Negligible
Turbid Surface Water Runoff	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Minor	Negligible	Negligible
Turbid Surface Water Runoff	Groundwater	Local, Short Term (Adverse)	Medium	Minor	Negligible	Negligible
Turbid Surface Water Runoff	Existing Papermill Site - Flooding	Local, Short Term (Adverse)	Medium	Moderate	Negligible	Negligible
Cementous material spillage	Afon Llynfi	Regional, Short Term (Adverse)	Medium	Moderate	Negligible	Negligible
Cementous material spillage	Nant-Gwyn	Local, Short Term (Adverse)	Medium	Minor	Negligible	Negligible
Cementous material spillage	Groundwater	Local, Short Term (Adverse)	Medium	Minor	Negligible	Negligible
Cementous material spillage	Existing Papermill Site - Flooding	Local, Short Term (Adverse)	Medium	Moderate	Negligible	Negligible

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Potential Effect	Mitigated Magnitude of Impact	Significance of Potential Effect after Mitigation
Operational Phase						
<i>Groundwater and Surface Water Quality</i>						
Fracturing of piping, rupturing or overfilling of containment vessels	Afon Llynfi	Regional, Medium Term (Adverse)	Negligible	Negligible	Negligible	Negligible
Fracturing of piping, rupturing or overfilling of containment vessels	Nant-Gwyn	Local, Medium Term (Adverse)	Negligible	Negligible	Negligible	Negligible
Fracturing of piping, rupturing or overfilling of containment vessels	Groundwater	Local, Medium Term (Adverse)	Negligible	Negligible	Negligible	Negligible
Spillage of Chemicals during Unloading	Afon Llynfi	Regional, Medium Term (Adverse)	Low	Minor	Low	Minor
Spillage of Oils and Fuels from Site Vehicles	Afon Llynfi	Regional, Medium Term (Adverse)	Low	Minor	Negligible	Negligible
Spillage of Oils and Fuels from Site Vehicles	Nant-Gwyn	Local, Medium Term (Adverse)	Low	Minor	Negligible	Negligible
Spillage of Oils and Fuels from Site Vehicles	Groundwater	Local, Medium Term (Adverse)	Low	Minor	Negligible	Negligible
<i>Groundwater Recharge</i>						
Reduction in Recharge due to increases in impermeable cover	Groundwater	Local, Long Term (Adverse)	Negligible	Negligible	Negligible	Negligible
<i>Water Resources</i>						
Increases in Water Abstraction	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Negligible	Negligible	Negligible

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Potential Effect	Mitigated Magnitude of Impact	Significance of Potential Effect after Mitigation
Increases in Discharge	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Negligible	Negligible	Negligible
<i>Flood Risk and Drainage</i>						
Increase in flood risk due to changes in impermeable cover	Afon Llynfi	Regional, Long Term (Adverse)	Negligible	Negligible	Negligible	Negligible

12.7 Cumulative Effects

- 12.7.1 This development has been considered in the context of any potential cumulative effects on the Water Environment, and specifically on the Afon Llynfi.
- 12.7.2 The site is located in a relatively remote location. Review of Bridgend Council Planning Application search for the area of LLangynwyd Middle Community Council (in which the site is located) indicates that there are no planning applications within the last five years for any industrial developments that would result in cumulative effects with the proposed papermill extension.

12.8 Conclusions

- 12.8.1 The surface water and groundwater regimes at the application site have been assessed with reference to information held by the BGS, Natural Resources Wales, Local Authority, and by the consideration of site specific investigation and reports relating to the application site. Key potential receptors identified are the:
- Afon Llynfi, from which water is abstracted and discharged and which is adjacent to the site;
 - Nant-Gwyn, a culverted watercourse through the main operational area and open channel passed the effluent treatment. Nant-Gwyn flows into the Afon Llynfi adjacent to the site;
 - Groundwater within some of the superficial deposits and bedrock geology;
 - Bridgend Papermill Effluent and Surface Water Drainage networks.
- 12.8.2 The potential impacts of the proposed development upon the hydrological and hydrogeological environment have been identified and assessed. Key potential impacts relate to the management of pollution during the construction of the site and the provision, management and disposal of water used in the operational processes within the mill.
- 12.8.3 Where appropriate, mitigation measures will be implemented during construction and have also been accommodated into the design of the proposed development and ongoing operations. Critically the construction of the extension to the papermill will be undertaken in

line with current technical guidance and relevant codes of best practice to limit the potential for contamination of both ground and surface waters. Best practice techniques, including the treatment and controlled release of all process water, will be incorporated within the management procedures for construction and operation activities onsite in order to protect the water environment from both regular discharges and any pollution incidents.

- 12.8.4 This assessment has found that there would be no significant residual effects on the water environment. It is therefore also concluded that the proposals would not have a significant impact on the objectives of the Water Framework Directive.
- 12.8.5 Assessment of the residual effects of the development proposals on the water environment alongside other approved developments within the area has also been undertaken. This assessment has also identified no significant effects of multiple developments being carried out within the same sub-catchment (draining to Afon Llynfi).
- 12.8.6 Overall, it is concluded that, with respect to groundwater and surface water, there would be no significant residual or cumulative effects of the proposed development after inclusion of the identified mitigation measures.

13.0 Traffic and Transportation

13.1 Introduction and Scope

- 13.1.1 This chapter assesses the potential effects of the proposed development in relation to Traffic and Transport. It summarises the findings of the Transport Assessment (TA) (Entran 12/2019) which is submitted as a separate report as part of the application (Document Ref.: 57100-0167). It also describes the methods used to assess the impacts; the baseline conditions currently existing at the site and in the surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual impacts after these measures have been adopted.
- 13.1.2 The air quality and noise impacts arising from predicted traffic attributable to the proposed development are assessed in Section 6 (Air Quality) and 7 (Noise) respectively.
- 13.1.3 The existing transport network near the site has been described in the context of national and local transport policy. The effects of the proposed development on the network have been assessed taking into consideration future changes resulting from committed developments in the area and the net changes in travel demand resulting from the proposed development.

13.2 Legislation and Planning Context

Policy and Legislative Context

National Planning Policy

National Planning Policy Framework (NPPF; 2019) - Section 9: Promoting Sustainable Transport

- 13.2.1 The revised NPPF document states that:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- a) the potential impacts of development on transport networks can be addressed;*
- b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- c) opportunities to promote walking, cycling and public transport use are identified and pursued;*
- d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
- e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places".*

13.2.2 Under 'considering development proposals' within the NPPF paragraphs 108 & 109 state the following:

"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

- a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- b) safe and suitable access to the site can be achieved for all users; and*
- c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.*

Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe".

13.2.3 Paragraph 111 concludes that:

"All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed".

Local Planning Policy

Bridgend Local Development Plan (BLDP; 2006 – 2021)

13.2.4 The BLDP was formally adopted in September 2013, covering the period up to 2021. The Local Plan establishes the context for future growth and development within Bridgend.

13.2.5 In Part 2 of the Local Plan at Section 2.2 a range of objectives are identified including:

- 1. To produce high quality sustainable Places.*
- 2. To protect and enhance the Environment.*
- 3. To spread prosperity and opportunity through Regeneration.*
- 4. To create safe, healthy and inclusive Communities.*

13.2.6 As part of Number 1, the same section states

OBJ 1a To promote Bridgend as the key principal settlement of the County Borough where major employment, commercial and residential development is focused. (NR1, NR2, NR6, LS19)

OBJ 3a To build a more diverse, dynamic and self reliant economy and business environment. (NR1, NR2, NR6, LS16, LS17, LS18)

OBJ 3b To provide a realistic level and variety of employment land to facilitate the delivery of high quality workspaces and job opportunities. (NR1, NR2, LNR6, LS16, LS17, LS18)

13.2.7 Section 3 under the heading Producing High Quality Sustainable Places, particular reference is made to PLA 1, PLA 2, SP2 , SP 3 and associated explanatory text.

13.2.8 Section 5 under the heading To Spread Prosperity and Opportunity Through Regeneration, particular reference is made to REG1 and REG 2 and associated explanatory text.

13.2.9 Section 6 under the heading To Create Safe, Healthy And Inclusive Communities To Create Safe, Healthy And Inclusive Communities particular reference is made to which states:

SP14 - Applications for development should include material proposals which deal with the fair and reasonable infrastructural requirements of the development, and which help to mitigate any negative impacts that may arise as a consequence of the development. Where appropriate, such proposals will be secured by means of planning agreements/obligations.

13.2.10 Bridgend County Borough Council Local Transport Plan (LTP) 2015 – 2030 was formally adopted in September 2015. The LTP states;

The LTP has drawn on major influences derived from key priorities established by the Welsh Government. In particular, the Welsh Government's Programme for Government has provided a model for collaboration between government, the business community and social partners to deliver key outcomes for a successful Wales. The priorities identified in the Programme for Government form the basis of the development and delivery of targets set out in this Plan. These are:

- *Growth and sustainable jobs;*
- *Health and well-being;*
- *Educational attainment; and*
- *Supporting children, families and deprived communities.*

13.2.11 Other Welsh Government plans and strategies that have influenced and guided this LTP are listed below:

- *Wales Spatial Plan;*
- *Wales Transport Strategy;*
- *National Transport Plan 2015 – Draft;*
- *Active Travel Act 2013;*
- *Cardiff Capital Region Metro;*
- *Road Safety for Wales;*
- *Learner Travel – Statutory Provision and Operational Guidance (June 201*

13.2.12 The LTP then Identifies Key Priorities and further states:

KP1 - To support economic growth and safeguard jobs with a particular focus on City Regions, Enterprise Zones and local growth zones by:

- *Improving access to jobs and services by sustainable and active travel;*
- *Reducing congestion, improved journey time reliability, greater network resilience;*
- *Maximising potential to use bus and/or rail to access key employment and other sites;*
- *Improving access for freight.*

13.2.13 Other key policies include KP2 and associated explanatory text.

13.3 Baseline Conditions

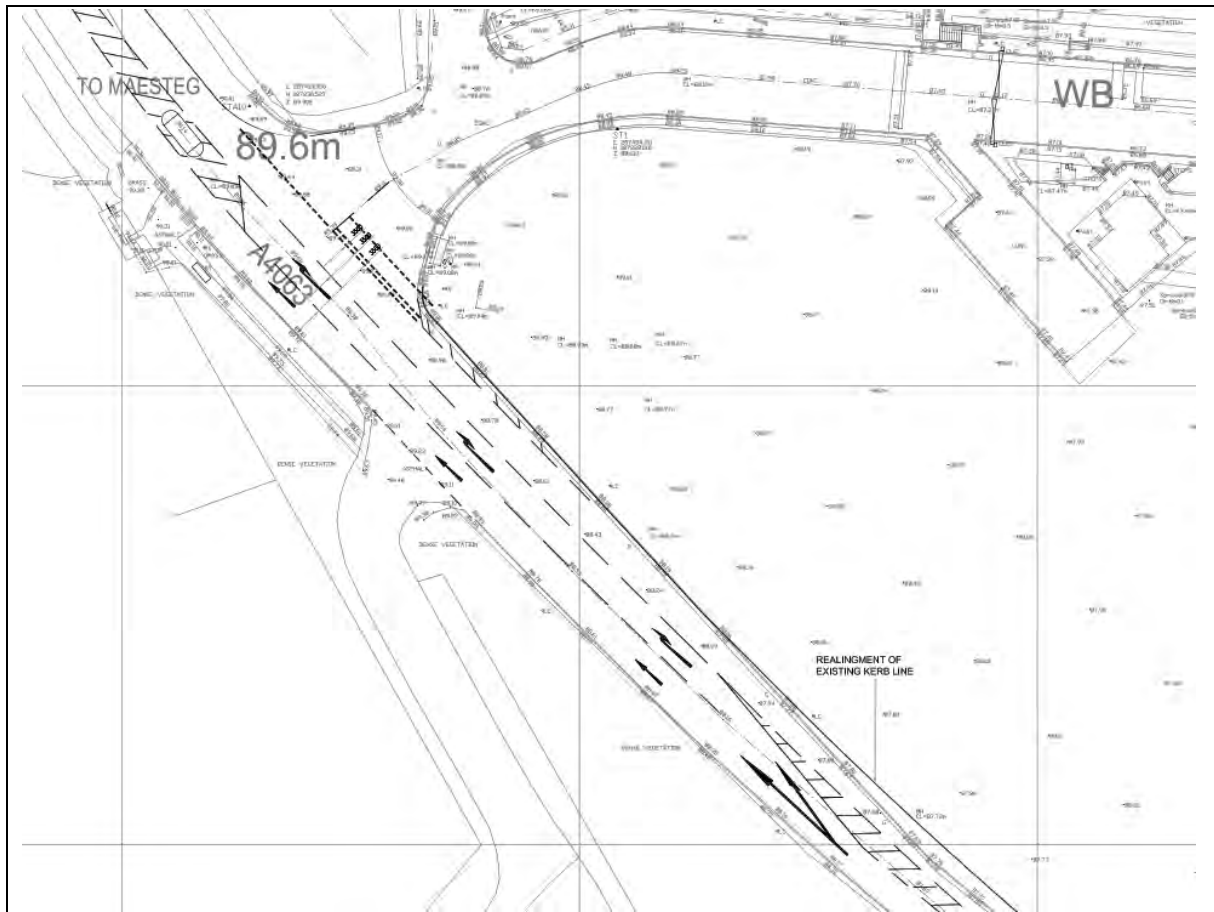
Site Location

- 13.3.1 The proposed development site is located on the site of the existing Bridgend mill site approximately 5 km to the north of Bridgend town centre, in an area bound to the south and to the west by the A4063, to the east by the River Llynfi, and to the north by open farmland. The site is orientated along its long axis in an approximate west to east direction and it is accessed via the A 4063 (Bridgend Road) between Maesteg and Coytrahen, with site traffic generally proceeding south towards the M 4. The A4063 in this location is subject to a 60mph speed limit with a comprehensive street lighting system in place.

Site Access

- 13.3.2 The development site is currently accessed via a wide T-junction and widened northern carriageway lane.

Figure 13.3-1: Existing Site Access



- 13.3.3 The A4063 within close proximity to the existing site access is approximately 10.5m wide. However, although there is sufficient width to do so, there is no physical right turn lane facility on the ground and all right turning traffic movements do so from straddling the centre line within the northbound carriageway.

- 13.3.4 Within close proximity to the proposed secondary access (discussed in Section 3) the width of the existing carriageway is approximately 7.3m.
- 13.3.5 There is approximately 2m of grass verge either side of the public highway.
- 13.3.6 There are no crossing facilities currently within close proximity to the development site.
- 13.3.7 The A4063 forms a signalised junction with a local retail park at Tondy. Adjacent to this slightly further south the A4063 forms another signalised junction with A4063 Maesteg Road (N)/ Bryn Road (A4065)/ A4063 (E)/Bridgend Road (A4065) south. The A4063 south east provides access to the M4 at junction 36, Sarn. From the M4 all major destinations can be accessed.

Walking and cycling

- 13.3.8 The A4063 does not currently benefit from pedestrian footways.
- 13.3.9 There are no dedicated on-road cycle lanes available but all roads are of sufficient width for cyclists to share the carriageway with motor vehicles thus ensuring no impediment to cyclists.
- 13.3.10 There is one proposed national cycle way routed along the River Llynfi east of the site. Route 885 of the National Cycle Network connects Maesteg and Bridgend (Tondy). The route follows Public Rights of Way, tracks and minor roads, and links with other long distance routes in Bridgend.

Public Transport

- 13.3.11 Bus services 70 and 71 pass the site travelling between Bridgend and Cymmer via Maesteg. The timetables for these routes are given at Appendix 13-1. The bus services along Bridgend Road are scheduled to stop at the bus stop "Paper Mills" (H9FF+2G Llangynwyd) which is the nearest stop to the main entrance of the site.
- 13.3.12 Bus tables illustrate that the service frequencies vary between 30 minutes during peak times and 60 minutes off-peak. The tables also reveals that there are sufficient services during the early (7am) and late (7pm) shift change.
- 13.3.13 As shown in Figure 13.3-2, adjacent to the site entrance there are both north and south bound bus stops which include for raised kerbing, shelter and flag.
- 13.3.14 These stops provide access to routes 70 & 71: Bridgend Bus Station to Cymmer (Turning Circle) via Aberkenfig, Llangynwyd, Garth (70), Llwydarth (71), Maesteg Bus Station and Caerau.
- 13.3.15 These services during the week run from approximately 0600 to 2300 at variable intervals, but intervals sufficient to ensure that travel to the site by bus is viable.

Figure 13.3-2 Location of “Paper Mills” bus stop



Baseline Traffic Data

13.3.16 As set out in the Transport Assessment, to ascertain the current baseline traffic conditions and to enable a thorough and fit for purpose assessment of the proposed development impacts, a traffic survey programme was outlined and agreed with BCBC. The traffic survey data collected as follows:

- MCC Site access junction
- MCC A4063 / Bryn / Bridgend Road staggered traffic signal junction
- Wednesday 11th September 2019 during the time period 0700-1800
- Thursday 12th September 2019 during the time period 0700-1800

13.3.17 Baseline traffic and transport conditions also examined included:

- existing access arrangements;
- local highway network;
- pedestrian and cycle routes;
- public transport facilities; and
- accident data.

13.3.18 Reference should be made to the Transport Assessment (Document Ref. 57100-0170) for the detailed assessment and associated findings.

Road safety

- 13.3.19 Automatic traffic counters (ATC) speed surveys have also been carried out to assess speeds along the A4063 at either end of a 215m visibility splay from both the existing northern access and the proposed new southern access. In total 3 locations were surveyed.
- 13.3.20 The speed survey illustrates that the 85th percentile speeds across the three sites were generally:
- Northwest bound - 53mph
 - Southeast bound - 53mph
- 13.3.21 Although the 85th percentile survey speeds are below that of the 60mph speed limit, there are occasions where vehicles were measured travelling in excess of 60mph. In particular, speeds of 65.8mph, 66.2mph, 66.4mph, and 76.2mph were recorded between the hours of 2300 and 0500.

13.4 Assessment Methodology and Significance Criteria

- 13.4.1 The magnitude of the potential impacts and residual impacts of the proposed development upon all transport modes will be assessed using the criteria in Table 13.4-1. The impact of construction traffic has been established based on information provided by both potential contractors and WEPA themselves from known practices.
- 13.4.2 The assessment of environmental effects will be taken into account and the significance level attributed to each effect will be assessed based on the magnitude of change due to the development proposals, and the sensitivity of the area affected by these changes. The magnitude of change and the sensitivity of the affected receptor are both assessed on a scale of major, moderate, minor and negligible.
- 13.4.3 IEMA guidance suggests that the assessment should encompass highway links where traffic flows are predicted to increase traffic by more than 30% above the baseline traffic flow or where the number of HGVs is predicted to increase by more than 30% above the baseline traffic flow. Baseline traffic flows have been established via the collection of highway link specific data. Estimated construction traffic flows have been considered but not defined. The two are then compared and the predicted increase established.
- 13.4.4 It also suggests inclusion of any other sensitive receptors where traffic flows are predicted to increase by 10% or more above the baseline traffic flow such as villages, hospitals, churches, schools, historic buildings, tourist attractions, recreational sites, shopping areas, accident hotspots and places where there may be accumulations of cyclists or pedestrians, especially if they are elderly or young. Increases of less than 10% are generally considered not to be significant.
- 13.4.5 The above guidance also suggests that other receptors should be considered if the assessor thinks it appropriate, such as areas where there is pedestrian activity with poor facilities such as footways and controlled road crossings. It should be noted that increases below 10% are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level are therefore assumed to result in no discernible environmental impact.

Assessing the value (sensitivity) of the receptor

13.4.6 Sensitive areas are defined by the presence of sensitive receptors and are classified as follows:

- receptors of **Negligible** sensitivity: areas of low sensitivity to traffic flows;
- receptors of **Low** sensitivity: public open space, nature conservation areas, residential areas with adequate pavements;
- receptors of **Medium** sensitivity: congested junctions, hospitals, community centres, conservation areas; and
- receptors of **High** sensitivity: sections of highway close to schools and colleges or accident black-spots.

Magnitude of Effects

13.4.7 The list below provides a description of the terms, used in Table 15.1 to define the magnitude of effect on traffic volumes on the surrounding highway network:

- **High**: where the development could be expected to have a very significant change (either positive or negative);
- **Medium**: where the development could be expected to have a noticeable change (either positive or negative);
- **Low**: where the development could be expected to result in a small, barely noticeable change (either positive or negative);
- **Negligible**: where no discernible effect is expected on the highway network.

Table 13.4-1: Significance Criteria Magnitude of Impact

Magnitude Criteria	Definition of Impact by Category			
	Traffic	Public Transport	Walking And Cycling	Construction Traffic
High beneficial	No increase in traffic on any road with >60% reduction in daily and peak hour traffic flows on one or more roads.	>60% reduction in daily and peak hour passenger demand for public transport.	Walking and cycling actively promoted over other modes with on and off site facilities for pedestrians and cyclists enhanced.	Not applicable.
Medium beneficial	No increase in traffic on any road with 30%-60% reduction in daily and peak hour traffic flows on one or more roads.	30%-60% reduction in daily and peak hour passenger demand for public transport.	On and off site facilities for pedestrians and cyclists enhanced.	Not applicable.
Low beneficial	No increase in traffic on any road with 10%-30% reduction in daily and peak hour traffic flows on one or more roads.	10%-30% reduction in daily and peak hour passenger demand for public transport.	On site facilities for pedestrians and cyclists enhanced.	Not applicable.

Magnitude Criteria	Definition of Impact by Category			
	Traffic	Public Transport	Walking And Cycling	Construction Traffic
Negligible / no effect	<10% change in daily and peak hour traffic flows on all roads.	<10% change in daily and peak hour passenger demand for public transport.	Facilities for pedestrians and cyclists neither enhanced nor degraded.	<10% change in daily and peak hour traffic flows on all roads.
Low adverse	10%-30% increase in either daily or peak hour traffic flows on any road.	10%-30% increase in either daily or peak hour passenger demand for public transport.	On site facilities for pedestrians and cyclists degraded.	10%-30% increase in either daily or peak hour traffic flows on any road.
Medium adverse	30%-60% increase in either daily or peak hour traffic flows on any road.	30%-60% increase in either daily or peak hour passenger demand for public transport.	On and off site facilities for pedestrians and cyclists degraded.	30%-60% increase in either daily or peak hour traffic flows on any road.
High adverse	>60% increase in either daily or peak hour traffic flows on any road.	>60% increase in either daily or peak hour passenger demand for public transport.	Other modes promoted over cycling and walking with on and off site facilities for pedestrians and cyclists degraded.	>60% increase in either daily or peak hour traffic flows on any road.

13.4.8 In addition to the quantitative assessment criteria listed above, the following impacts are assessed qualitatively:

- severance;
- pedestrian and cycle infrastructure/crowding; and
- fear and intimidation.

13.4.9 The combination of the sensitivity of the receptor and the magnitude of impact (in comparison to the existing baseline conditions) will be used to qualitatively assess the significance of the effect, as per Table 13.4-2 below. A level of significance will be assigned to both potential effects (pre-implementation of any mitigation not incorporated within the proposed development) and residual effects (following the implementation of any further mitigation to be conditioned).

Table 13.4-2: Impact Significance

Receptor Sensitivity	Magnitude of Change			
	High	Medium	Low	Very Low / Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

13.4.10 All impacts are assessed in terms of duration and spatial significance as follows:

- Temporary, such as short (weeks/months), medium (years) or long term (decades), or
- permanent;

13.4.11 Moderate and Major effects are considered to be significant.

13.5 Assessment of Effects and Mitigation Measures

Construction phase

Effect of Additional Large Vehicles During the Construction Phase

13.5.1 As yet a contractor has not been appointed so full details of the construction operations and programme have yet to be finalised. It is intended that a Construction Traffic Management Plans (CTMP) will be developed for each phase of the development including (but not necessarily limited to):

- Tree clearance
- Land clearance and foundation work
- Internal road building
- New access temporary construction
- New access permanent construction
- Building construction

13.5.2 Nevertheless, aside from a number of abnormal loads, which will be specified on an individual basis and routing agreed with the relevant authorities, it is anticipated that the largest vehicle accessing the site will be a 16.5 m articulated semi-trailer.

13.5.3 The site and surrounding road network are capable of receiving deliveries from large vehicles; it is therefore not deemed necessary for large loads to be broken down into smaller delivery vehicles prior to being delivered to site. This will reduce the overall volume and impact of deliveries upon the road network and neighbours; however, it may be necessary to limit the use of large vehicles during peak commuting times.

13.5.4 It is anticipated that traffic flows will generally take place out of peak hours (0800-0900 and 1700-1800) when the local highway network has a greater operational capacity.

13.5.5 Access routes to and from the site which will be utilised by HGVs, will be agreed with BCBC prior to the start of any site based works as will any local traffic management measures. As no route closures are proposed at this stage, it is considered that there will be a minor adverse effect on the journey times for pedestrians, cyclists or public transport along delivery routes.

13.5.6 The presence of additional large vehicles on the local highway network often has the potential to have a temporary, local, minor adverse effect on fear and intimidation of vulnerable road users. Furthermore, construction traffic has the potential to have a temporary, local, minor adverse effect of driver severance and delay as well as disruption to pedestrians.

Mitigation Measures

13.5.7 In order to address construction effects identified above, during the construction phase, vehicle movements will be controlled and regulated by a the CTMP, further details of which are set out below.

13.5.8 A CTMP will be produced and submitted during the application process and has already been discussed in outline with BCBC. Inevitably the CTMP will have the opportunity to change once a contractor is on board and vehicle numbers by type, volume and time of day can be established. No works will be carried out until such time as the CTMP has been agreed in writing with BCBC.

13.5.9 The CTMP will set out measures so that construction materials can be delivered and demolition and construction waste can be removed in a safe, efficient and sustainable manner.

13.5.10 The CTMP will implement a series of measures to reduce the impact of construction vehicle traffic upon the highway network, these may include:

- the provision of clear signed and uncongested routes for construction vehicles, and providing drivers with access route maps;
- encouraging construction workers to travel to the site using alternative modes of travel to cars and/or car sharing;
- encouraging contractors to use local materials, reducing the number of deliveries and distance of vehicles travelled;
- publish details of construction facilities and procedures to workers and contractors to indicate the most suitable times for deliveries, delivery locations, and preferred suppliers and couriers.
- the use of a centralised area for loading and unloading of construction materials, if possible, in close proximity to materials storage area, to minimise construction vehicle movements within the site;
- implementation of a vehicle booking system, to manage and schedule deliveries to the site; and
- managing access and egress through a 'Just in Time' operating system, with vehicles travelling to the site held in a holding yard until notified by the site operative, to prevent multiple vehicles from entering and leaving the site at the same time.

- 13.5.11 The CTMP also provides a framework for future on-site contractors for construction to develop targets including, the number of construction vehicle trips during AM and PM peak hours and a percentage of vehicles to be 'green' or low emission vehicles.
- 13.5.12 The plan will also impose requirements on the internal operations of the site so that during the demolition and construction phase the developer will:
- establish and maintain an area for turning vehicles on site so that all vehicles can enter and leave in a forward gear;
 - establish and maintain an area for site workers to park on site; and
 - establish and maintain a wheel-wash facility for the use of all vehicles leaving the site.
- 13.5.13 The route management plan, included in the CTMP, will ensure that HGVs only use roads wide enough and suitable for that class of vehicle. The use of large vehicles where possible actually reduces the number of vehicle movements and it is clear that many pedestrians and cyclists are just as intimidated by 15t vehicles as by 30t vehicles. The measures to minimise vehicle numbers and ensure correct routing therefore reduce the impact to a negligible effect on fear and intimidation of vulnerable road users.
- 13.5.14 The CTMP for the various phases will also include details such as:
- Routing plans
 - Temporary traffic management plans
 - Temporary Traffic Regulation order requirements
 - Construction traffic volume by hour, day, week and month
- 13.5.15 A Temporary Traffic Road Order (TTRO) will be also be implemented during the construction phases to reduce the speed down to 30mph through this section of the A4063 and all details to be provided in terms of Chapter 8 signage and traffic management to be provided within the CTMP.
- 13.5.16 The implementation of a CLP for the proposed development will ensure that there is a Negligible effect significance on drivers' severance and delay, disruption to pedestrians and cyclists and fear and intimidation to pedestrian and cyclists.

Operational phase effects and mitigation measures

Potential Operational Phase Effects

- 13.5.17 A detailed Traffic Assessment has been undertaken for the development. Analysis shows that the development proposals will have a **negligible** impact on traffic flow, highway capacity or highway safety and that neither of the surveyed junctions require detailed analysis.
- 13.5.18 The presence of additional vehicles on the local highway network has the potential to have, local, **Minor Adverse** effect on driver severance and delay, but a **negligible** effect on pedestrians, cyclists and public transport.

Mitigation Measures

13.5.19 By way of mitigation, a comprehensive Travel Plan will be developed including Active Travel Measures. Active Travel Measures include:

- appoint travel plan co-ordinator;
- travel information pack;
- Travel Information Boards in public areas;
- Free high visibility equipment;
- Staff Travel Surveys and annual monitoring reports;
- promote public transport;
- encourage car sharing;
- provision of EVCP; and
- personal journey planner.

13.5.20 Active Travel – Soft Measures already in place include:

- Changing areas
- Lockers
- Showers
- Bus stops at existing access
- Bus stops at new access

13.5.21 Active Travel – Hard Measures already proposed include:

- New signalised secondary site access with an uncontrolled pedestrian crossing to link the site to the existing bus stops to the south east along the A4063; and
- New pedestrian footway from internal to the site along the new secondary access to the south east up to the A4063.

13.5.22 In summary, it is considered that the implementation of the TP will result in a **negligible** impact on:

- driver severance and delay;
- cyclists;
- pedestrians; and
- public transport.

Road Safety

13.5.23 Although it is clear that the development proposals will have a negligible effect on overall traffic flow and capacity, the applicant has raised a legitimate safety concern for both the existing and proposed accesses. In this regard therefore, new access designs are proposed

in the form of a formalised RT Lane serving the existing access and a new Traffic Signalled junction serving the new access. In addition, the proposed offsite works are considered to represent a benefit when considered in terms of road safety.

Decommissioning Phase

- 13.5.24 The levels of traffic associated with decommissioning of the development are anticipated to be similar or lower than those required during construction. Therefore, the construction phase assessment of effects is broadly relevant to that for decommissioning.

13.6 Cumulative Effects

- 13.6.1 The IEMA guidance and the thresholds provided herein are based upon research and experience of environmental effects of traffic. The 30% threshold is based upon the experience of the environmental effects of traffic, with less than a 30% increase generally resulting in imperceptible changes in the environmental effects of traffic. The guidance considers that projected changes in total traffic flow of less than 10% create no discernible environmental effect. The predicted daily increase in total vehicle and HGV traffic flows are well below the 30% and the 10% thresholds identified by the IEMA Guidelines, and is considerably less than the daily and seasonal variability of urban traffic flows.
- 13.6.2 It is therefore reasonably unlikely that the proposed development generates cumulative impacts irrespective of other developments taking place in the region.

13.7 Summary and Conclusion

- 13.7.1 Based upon the appraisal of the impacts discussed above, the residual impacts associated with the construction phase are deemed to be of **negligible** significance, short-term and temporary in nature. The residual impacts associated with the operational phase are deemed to be of **negligible** significance, long-term and permanent in nature.
- 13.7.2 Abnormal loads would be scheduled to occur during off-peak periods, at times to be agreed with the Local Authority and the Police in order to minimise delays to other road users.
- 13.7.3 Bearing the above in mind, it is concluded that so far there are no transportation issues preventing this development from taking place.
- 13.7.4 The implementation of a Travel Plan will assist in minimising any arising impact.

Table 13.7-1: Summary and Residual Effects

Effect	Sensitivity of Receptor	Magnitude of Effect	Effect Significance (pre-mitigation)	Mitigation measures	Residual Effect Significance (post-mitigation)
Construction / Decommissioning Phase					
Driver severance and delay	Low	Low	Minor Adverse	<p>A Construction Logistics Plan (CLP) will implement a series of measures to reduce the impact of construction vehicle traffic upon the highway network, these include:</p> <ul style="list-style-type: none"> the provision of clear signed and uncongested routes for construction vehicles, and providing drivers with access route maps; encouraging construction workers to travel to the site using alternative modes of travel to cars and/or car sharing; encouraging contractors to use local materials, reducing the number of deliveries and distance of vehicles travelled; publish details of construction facilities and procedures to workers and contractors to indicate the most suitable times for deliveries, delivery locations, and preferred suppliers and couriers. 	Negligible
Disruption to pedestrians and cyclists and fear and intimidation	Low	Low	Minor Adverse	<ul style="list-style-type: none"> the use of a centralised area for loading and unloading of construction materials, if possible, in close proximity to materials storage area, to minimise construction vehicle movements within the site; implementation of a vehicle booking system, to manage and schedule deliveries to the site; and managing access and egress through a 'Just in Time' operating system, with vehicles travelling to the site held in a holding yard until notified by the site operative, to prevent multiple vehicles from entering and leaving the site at the same time. 	Negligible

Effect	Sensitivity of Receptor	Magnitude of Effect	Effect Significance (pre-mitigation)	Mitigation measures	Residual Effect Significance (post-mitigation)
Disruption to public transport	Negligible	Negligible	Negligible	No mitigation measures are required	Negligible
Operational Phase					
Driver severance and delay	Low	Low	Minor Adverse	<p>A Travel Plan will be implemented and the mitigation measures will include:</p> <ul style="list-style-type: none"> • appoint travel plan co-ordinator; • travel information pack; • Travel Information Boards in public areas; • Free high visibility equipment; • Staff Travel Surveys and annual monitoring reports; • promote public transport; • encourage car sharing; • provision of EVCP; and • personal journey planner. 	Negligible
Cyclists amenity and delay	Negligible	Negligible	Negligible	No mitigation measures are required	Negligible
Pedestrian amenity and delay	Negligible	Negligible	Negligible	No mitigation measures are required	Negligible
Disruption to bus users	Negligible	Negligible	Negligible	No mitigation measures are required	Negligible

14.0 Socio-Economics

14.1 Introduction and Scope

- 14.1.1 This chapter sets out the assessment of likely significant effects of the development socio-economics.
- 14.1.2 This chapter considers the relevant policy context and the socio-economic baseline for the proposal. The assessment methodology and significance criteria are outlined. The likely socio-economic impacts from the proposal are assessed for the construction and operational phases of the project. Mitigation measures required to prevent, reduce, or offset the effects are then considered, together with the residual effects following mitigation.
- 14.1.3 The construction and operation of the proposed development have the potential to impact on the local and regional economy. It is anticipated that the potential impacts of the proposed development will be positive. The inward investment to the area is estimated at £100M, which will further stimulate the local economy.
- 14.1.4 During construction, it will involve a fairly substantial construction workforce, although during operation the workforce will be lower. The proposed development will also have the capacity to bring economic benefits through supply chain and product related consequences.

14.2 Legislation and Planning Context

- 14.2.1 A review of relevant planning guidance and policy is provided in the Planning Statement (Document Ref. 57100-0211) that has been prepared in support of the Application. A further summary of the national policy context relevant to the socio-economic issues of the development is provided in Chapter 4 of this ES, the most relevant policy documents being the Planning Policy Wales and its Technical Advice Notes (TANs) at a national level, and the Local Development Plan (LDP) of Bridgend Council at a local level.

National Policies

Planning Policy Wales and TAN 23

- 14.2.2 Planning Policy Wales (PPW) notes the importance of sustainable development and the vision for Wales to become economically, socially and environmentally sustainable. The elements of the vision of relevance to this socio-economic assessment include:
 - “A sustainable economy: A resilient and sustainable economy for Wales that is able to develop whilst reducing its use of natural resources and reducing its contribution to climate change.”*
 - “A sustainable society: Safe, sustainable, attractive communities in which people live and work, have access to services, and enjoy good health and can play their full roles as citizens.”*
- 14.2.3 Chapter 7 of PPW refers to economic development and defines it as *“development of land and buildings for activities that generate wealth, jobs and incomes”*. The construction and industrial sectors are considered by the Welsh government to be important to the economy.
- 14.2.4 The expansion of the paper mill will create construction jobs and permanent jobs throughout its operation.

- 14.2.5 PPW is supplemented by a series of topic based Technical Advice Notes (TANs) which provide practical guidance relating to various forms of development and the role of the planning system in dealing with the determination of planning applications.
- 14.2.6 TAN 23 provides a framework of how development and its economic benefit should be positively sought, balancing social, economic and environmental considerations in doing so. This particular TAN directly focuses on B-class development (i.e. industrial development). The guidance seeks to ensure that economic development is encouraged and advises Local Authorities to support the shift towards a low carbon economy. PPW states that Local Planning Authorities should...*“look favourably on proposals for new on-site low carbon energy generation (para 7.4.1); adopt a positive and constructive approach to applications for economic development (paragraph 7.6.1); take account of the likely economic benefits of the development [when determining planning applications] based on robust evidence” (paragraph 7.6.1).*
- 14.2.7 Assessing the socio-economic impacts of a project is not covered by any particular legislation or policy. There is no information about how to assess these impacts described in the Technical Advisory Notes (TANs) issued by the Welsh Assembly Government.

Local Policies and Issues

- 14.2.8 The Local Development Plan (LDP) of Bridgend acknowledges that “the economy of Bridgend County Borough is more reliant on the manufacturing sector than Wales as a whole” (LS16)(local needs and issues prefixed with LS).
- 14.2.9 In addition, there is a mismatch in the current location of employment sites in the County Borough and the areas of higher deprivation especially in the Valleys (LS17).

14.3 Assessment Methodology

- 14.3.1 In the absence of a Government regulation or guidance setting out a prescribed method to quantify socio-economic effects, the significance criteria employed for most other EIA topics of this ES are not used. Instead, a broader qualitative assessment is made of whether effects are significant.
- 14.3.2 However, using accepted good practice in terms of converting temporary employment into fulltime equivalents (FTEs) (Homes and Communities Agency, 2015), it is possible to equate construction activity associated with a development to permanent full-time jobs.
- 14.3.3 It is generally accepted in economic appraisals of development schemes that 10 person-years of employment is the equivalent of one FTE job.

Table 14.3-1: Assessment of Significance

Magnitude	Criteria
Large	Considerable impact (by extent / duration / magnitude) to an area of regional or national importance. Examples of adverse socio-economic indicators would show major detrimental effect upon the economy or well-being of the population, reducing quality of life in the South Wales region and leading to greater levels of deprivation.
Major	Considerable impact (by extent / duration / magnitude) of local or district significance. Examples of adverse socio-economic indicators would show major change attributable to the development, such as a significant reduction in JSA or an increase in deprivation; or where there are more than 100 FTE affected at any one time, or where there is potential for cumulative impact (a large number of impacts upon more than 50 people).
Moderate	Limited impact (by extent / duration / magnitude) which may be considered significant. These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Examples would include effects on resources such as accommodation close to the Application Site that is attributable to the development; or where there are 20 to 100 FTE affected at any one time, or where there is potential for cumulative impact (a large number of impacts upon up to 50 people).
Minor	Slight impact (by extent / duration / magnitude) of no significant consequence. These are small effects that may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless they are of relevance in enhancing the subsequent design of the development and consideration of mitigation or compensation measures; or where there are up to 20 FTE affected at any one time
Negligible	No measureable impact (by extent / duration / magnitude). Such effects should not be considered by the decision maker.

14.4 Baseline Conditions

14.4.1 This section establishes the regional and local economic baseline with regard to the following characteristics relevant to the proposed development:

- Area and Population
- Local Employment and Economic Profile
- Index of deprivation
- Unemployment and job seekers allowance (JSA)

14.4.2 A desk study was undertaken to establish the existing situation for the region and locality to allow assessment in line with the defined significance criteria. The study area for this assessment is focused on the local authority area of Bridgend County Borough Council.

Sources of Information

14.4.3 This desk study has relied on assembling relevant data to establish the baseline conditions from a number of sources:

- <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=10151>
- <http://www.nomisweb.co.uk>
- <http://www.neighbourhood.statistics.gov.uk>
- <http://www.wales.gov.uk/statistics>
- <http://www.dataunitwales.gov.uk/eng/Data.asp>
- The Welsh Index of Multiple Deprivation (WIMD)
- Bridgend Public Services Board Assessment of Local Well-being, April 2017
- <http://www.infobasecymru.net/IAS/eng>.
- Statistics published by BCBC on their website

Area and Population

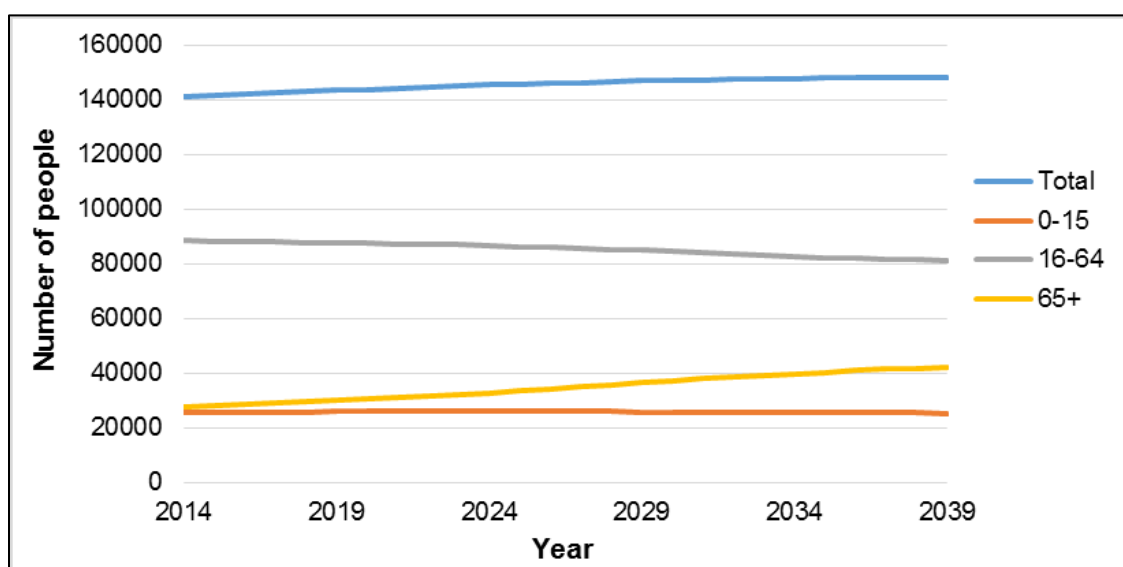
- 14.4.4 The total extent of the County Borough of Bridgend is 250 square kilometres and has a population of approximately 143,400 (ONS Population estimate). Bridgend County Borough's population has risen rapidly over the past decade. The 2015 ONS estimate figure of 143,400 up from 128,700 in 2001.
- 14.4.5 The population density of Bridgend was 566.7 people per square kilometre (compared to 149 people per square kilometre across Wales).
- 14.4.6 The largest town and main commercial centre is Bridgend (pop: 39,773), followed by Maesteg (pop: 20,700) and seaside resort of Porthcawl (pop: 19,238). Table 14.4-1 below shows an approximate breakdown of population between the sub-areas of the county borough. As it demonstrates, the three major towns together account for 61% of the total population. A significant proportion of the population is located in and around the settlements of Pyle, Kenfig Hill and North Cornelly, near junction 37 of the M4.

Table 14.4-1: Population distribution by sub area

Sub Area	Proportion (%)
Bridgend	33
Porthcawl	12
Maesteg (Llynfi Valley)	16
Pencoed	7
Valleys Gateway	8
Pyle / Kenfig / Cornelly	12
Ogmore Valley	6
Garw Valley	6

- 14.4.7 The county borough benefits from good transportation infrastructure with the M4 motorway crossing the southern part of the county borough in an east-west alignment, providing speedy access to Cardiff, Swansea and the rest of South Wales and beyond. There are three motorway junctions (35 – 37) within the county borough. Additionally, an inter-city high speed rail service linking the area with the whole of the national rail network provides fast and efficient rail transport whilst Cardiff Airport is only 15 miles away. Bridgend is also well connected to the sea ports, with Barry, Cardiff, Port Talbot and Swansea within 30 minutes drive-time (Bridgend County Borough Profile – 2018).
- 14.4.8 Bridgend has a very similar age profile to that of the whole of Wales: in June 2015, 18 % of the population were aged 0-15, 62.4 % were aged 16-64, and 19.6% aged over 65. By 2039, according to population projections, Bridgend's population aged 0-15 and 16-64 will have decreased, whilst the population aged 65+ and the total population will have increased in size.

Figure 14.4-1: Projected population of Bridgend by age group, 2014 to 2039.



Source: 2014-based local authority population projections for Wales: 2014 to 2039, Welsh Government

Employment and Economic Profile

- 14.4.9 From 2011 to 2015, the employment rate in Bridgend - that is, the number of people in Bridgend who did some paid work expressed as a percentage of all people aged 16-64 in Bridgend - increased from 70.2 per cent to 71.9 per cent, while across Wales it increased from 66.8 per cent to 70.3 per cent. (ONS, Annual Population Survey). Therefore, although there was a greater increase in the rate across Wales as a whole in this period, the employment rate in Bridgend remains above the Wales average.
- 14.4.10 The picture is also the same when people classed as 'economically active' (those in employment and those unemployed but seeking work) are considered. Each year between 2011 and 2015, the economic activity rate was higher in Bridgend than across Wales (Ref.

ONS, Annual Population Survey). However, each year between 2011 and 2015 (except 2014), working people aged 50-64 in Bridgend were less likely to be in employment than across Wales (Ref. ONS, Annual Population Survey).

14.4.11 Around 76% of the working age population of Bridgend are economically active, and 2.3% claim Job Seekers' Allowance. This compares to an economically active population of 75% for Wales, and 2.2% claiming Job Seekers' Allowance.

14.4.12 Rates of both employment and economic activity are generally higher in Bridgend than the Wales average.

14.4.13 More than one in three Bridgend residents is employed in Public Administration, Education and Health. The proportion of Bridgend residents employed in Manufacturing decreased between 2010 and 2015.

Table 14.4-2: Industry of employment by proportion of working population, Bridgend and Wales, 2010 and 2015

	2010		2015	
Industry	Bridgend (%)	Wales (%)	Bridgend (%)	Wales (%)
Agriculture and Fishing	1,4	2,1	n/a	2,3
Energy and Water	1,6	2,1	1,9	2,2
Manufacturing	14,6	10,4	12,8	11
Construction	9,6	8,1	9,1	7,4
Distribution, Hotels and Restaurants	17,2	18,5	19,3	19,3
Transport and Communications	5	6,2	7,8	5,9
Banking, Finance and Insurance	10,1	11,4	9,7	12,4
Public Administration, Education , Health	36,2	35,2	34,2	33,5
Other Services	4,2	5,2	4,4	5,2

Source: ONS annual population survey

14.4.14 Between 2010 and 2015, it appears that there was a small shift in the industry of employment of residents of Bridgend. The proportion of those who worked in Manufacturing and Public Administration, Education and Health decreased by over a percentage point, whereas the proportion who worked in Distribution, Hotels and Restaurants, and Transport and Communications increased by over two percentage points.

14.4.15 Between 2011 and 2015, both the unemployment rate and proportion of people who claimed Job Seekers' Allowance (JSA) decreased in Bridgend and across Wales.(Ref. 10 Department for Work and Pensions, per cent of working age people who are claiming Job Seekers Allowance).

14.4.16 In 2015, however, the unemployment rate in Bridgend was one percentage point above the Wales average, although the JSA claimant rate was slightly below the Wales average (Ref. ONS Population Survey).

Index of Deprivation

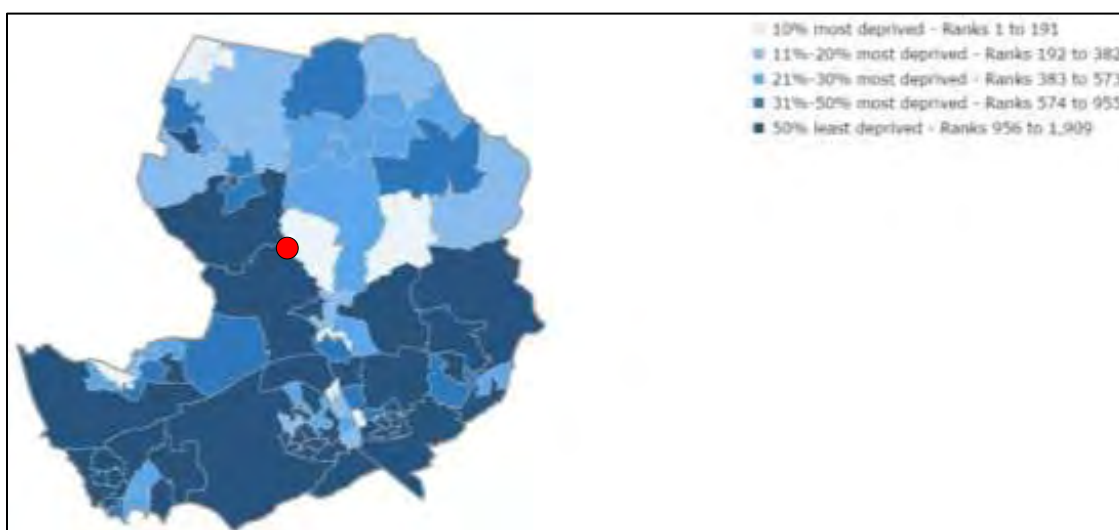
14.4.17 The Welsh Index of Multiple Deprivation (WIMD) is the Welsh Government's official measure of relative deprivation for small areas in Wales. It identifies areas with the highest concentrations of several different types of deprivation. WIMD ranks all small areas in Wales from 1 (most deprived) to 1,909 (least deprived). It is a National Statistic produced by statisticians at the Welsh Government. The most recent index was published in 2019. Although WIMD does not provide deprivation ranks for local authorities as a whole, it is possible to look at the rank of LSOAs within a local authority.

14.4.18 In Bridgend (which has 85 LSOAs):

- 10 LSOAs (12%) fall within the 10% most deprived LSOAs in Wales;
- The majority (59%) of LSOAs are more deprived than the Wales average.

14.4.19 In relation to Wales as a whole, this means that a relatively high proportion of areas in Bridgend are among the 10% most deprived, and overall the majority of areas fall in the more deprived half of Wales. Figure 14.4-2 shows what proportion of Bridgend's LSOAs are in the 10% most deprived in Wales for each individual domain as well as for overall deprivation.

Figure 14.4-2: Deprivation in Bridgend County Borough (WIMD Overall 2014)



Source: WIMD 2014, Local Government Data Unit, Welsh Government and Ordnance Survey

14.4.20 In the context of the County Borough, areas of high deprivation are particularly concentrated in the Bridgend Valleys.

14.4.21 The proposed development is a Class B2 (general industrial use) development and it is located in an area considered highly deprived.

14.5 Assessments of Effects

Construction Phase

- 14.5.1 Construction works to be carried out on site will include site preparation, provision of access roads within the site, piling, forming of foundations, erection of structural steel work, erection of cladding and roofing to structures, and mechanical and electrical works.
- 14.5.2 The Developer anticipates there being an average of 80-100 construction staff on site over the construction phase of some 63 months (with a peak of around 150 construction staff present during the construction of the paper machine building and 80 staff for the Bale Handling building. For the equipment installation of the Bale Handling area, 70-100 staff members will be involved for a period of around 3-4 months. For the equipment installation of the Paper Machine, 150-200 staff members will be involved for a period of approximately 7 months.
- 14.5.3 Subject to procurement rules, it is anticipated that as many as possible of these workforces would be recruited locally. During the construction phase, accommodation will be required for all workers visiting the area. This will provide a strong trade for the temporary accommodation market in the region.
- 14.5.4 A summary description of development is provided in Chapter 3 and the construction phasing programme is described in the Outline CEMP (Document Ref. 57100-0222).

Ancillary Employment Associated with Construction Works

- 14.5.5 The figures referred to above exclude personnel required to facilitate the proposed development in other ways. Such ancillary personnel will include existing staff in various sectors who will benefit from additional work as a by-product of the scheme, and newly created posts which are directly attributable to construction of the new development.
- 14.5.6 There will also be indirect employment in the Bridgend area associated with the manufacture of building materials and equipment used in construction. They include:
- Component manufacturers
 - Component suppliers
 - Plant hire firms
 - Aggregate suppliers
 - Hauliers
 - Shipping companies
 - Storage and reception companies
 - Support services – administrative, catering, telecommunications, accommodation, utilities etc.
- 14.5.7 In addition, substantial indirect benefits will derive from the boost to employment levels created by the presence of construction workers and suppliers working in the area - the local retail sector in particular.

14.5.8 It is likely that a high proportion of contracts will be let to local contractors and suppliers during the construction period, assuming that their proximity enables them to offer more competitive terms than others further afield.

14.5.9 In relation to population and workforce in the construction sector, the available figures suggest that there is unlikely to be a shortage of construction workers within the area who could be employed in the construction of the development.

Table 14.5-1: Calculation of Fulltime Employment (FTE)

Construction Work	Week	Staff average No.	Person weeks	Person years	FTE jobs*
site preparation, provision of access roads within the site, piling, forming of foundations, erection of structural steel work, erection of cladding and roofing to structures, and mechanical and electrical works	750	80-100	60,000	1,153	115.3
Equipment installation of Bale Handling area	14	70-100	980	19	1.9
Equipment installation of Paper Machine	30	150-200	4,500	87	8.7
Total			65,480	1,259	125.9

*10 person years of employment is the equivalent of one Full Time Job (FTE) job

14.5.10 The construction/decommissioning and operation of the proposed development will not result in significant population change or change to occupational profiles in the region. The numbers of operations staff required for the extended mill means that there will be no significant requirement for particular skill-sets as a result of the development.

14.5.11 Overall, the temporary employment of construction workers over the predicted construction period would have a **beneficial** effect.

Operational Phase

14.5.12 The WEPA paper mill already represents an important contributor to the local economy as it employs approximately 275 people in a variety of disciplines. It is expected that more than 70 new direct full time jobs will be created.

14.5.13 In addition, the inward investment to the area is estimated at more than £100M, which will further stimulate the local economy. However, it is acknowledged that there could also be negative effects of a minor magnitude on tourism due to adverse impacts on the landscape views.

14.5.14 Overall, the positive impacts would considerably outweigh the negative impacts, which largely relate to visual implications that would only marginally impinge upon the tourism economy. These would be greatly overshadowed by the fact that the proposed development would be located in an already industrialised area surrounded by similar buildings which are already a feature of the WEPA site character. Moreover, the proposed development is important to ensuring the competitiveness of the WEPA group in the tissue paper industry.

As such, the proposed development will enable the site to improve efficiency, the competitiveness of the site and, therefore, its longevity.

- 14.5.15 There will also be substantial annual operating costs. These expenditures will result in economic benefit to the local and regional economy.

Multiplier Effects

- 14.5.16 It is widely recognised that projects of this magnitude have multiplier effects. There are four related ways that the area economy benefits from construction and operation of the mill expansion:

- Introduction of new work and employment opportunities,
- Expansion and creation of local businesses directly attributable to the needs of the paper mill (e.g. waste paper suppliers, hauliers, accommodation, etc.),
- Community income from payment of local rates and taxes,
- Spread of wealth through the local economy – from people benefiting from the receipt of wages/salaries and having more disposable income, more liquidity and finance available to local companies to spend in the area etc.

- 14.5.17 These factors cannot be quantified in financial terms at a local level but it can reasonably expected that a proportion of both the estimated construction value of the mill and associated developments and, particularly, the annual wage bill, will find its way into the local economy directly or indirectly.

- 14.5.18 Based on the criteria described in Table 14.3-1, the creation of 125 full time construction and 70 jobs in operation of the mill, the potential economic impacts of the proposed development are assessed of being **major beneficial**.

14.6 Mitigation Measures

- 14.6.1 Since the economic impacts of the project will be beneficial, no mitigation measures or monitoring programme are considered necessary.

14.7 Summary and Conclusion

- 14.7.1 The proposed development is important to ensuring the competitiveness of the WEPA group in the tissue paper industry. As such, the proposed development will enable the site to improve efficiency, the competitiveness of the site and, therefore, its longevity.
- 14.7.2 There will also be substantial annual operating costs. These expenditures will result in economic benefit to the local and regional economy.
- 14.7.3 This is particularly important since the Paper mill is one of the largest employers in the Bridgend area, where manufacturing, mining and heavy industrial jobs markedly are in decline.
- 14.7.4 The expansion and consolidation of employment – supplemented by ‘multiplier effects’ – will be a boost to the local economy and will bring a number of socio-economic benefits. Accordingly, the proposed development is considered to be of **major beneficial** significance.

15.0 Geology and Ground Conditions

15.1 Introduction and Scope

- 15.1.1 This chapter summarises the geological and hydrogeological conditions at the Application Site and outlines the potential environmental impacts of the proposed development. It describes the status of the Development Site in terms of existing contamination and the potential risks posed to human health (particularly future site users). Where potentially significant impacts have been identified, mitigation measures have been proposed to reduce the severity of such impacts to an acceptable level.
- 15.1.2 This section is based on the Site Investigation Report (Document Ref. 57100-0159) as well as the Remediation Strategy Report (Document Ref. 57100-0158) provided by Intégral Geotechnique.
- 15.1.3 The likely significant effects are assessed against pre-determined baseline conditions for the site using a Conceptual Site Model (CSM) that enables risks to site users and environmental receptors to be determined.
- 15.1.4 There are not anticipated to be any impacts relating to geology and land contamination during the operational phase of the development.
- 15.1.5 Potential effects on ground conditions are interrelated with effects on the surface water environment and therefore this chapter should be read in conjunction with Chapter 12 Water Resources.

15.2 Legislation and Planning Context

- 15.2.1 The Application Site is located on land that has been previously developed. The redevelopment of previously developed land must be in accordance with UK legislation, policy and statutory guidance, as summarised in this Section.
- 15.2.2 Legislation relating to Water Resources, including groundwater, is summarised in Section 12.2.

National Policy - Planning Policy Wales (PPW)

- 15.2.3 Planning Policy Wales (PPW) sets out the Welsh Government's interpretation of the planning system and identifies main policy objectives and principles. With regard to development of land, the PPW states that Local Planning Authorities should take into account the nature, scale and extent of contamination which may pose risks to health.
- 15.2.4 Section 13.7.1 of the guidance also states that planning decisions need to take into account:
- the potential hazard that contamination presents to the development itself, its occupants and the local environment; and
 - the results of a specialist investigation and assessment by the developer to determine the contamination of the ground and to identify any remedial measures required to deal with any contamination.
- 15.2.5 PPW Section 13.7.2 notes that where significant contamination issues arise, the local planning authority will require evidence of a detailed investigation and risk assessment prior

to the determination of the application to enable the beneficial use of land. Where acceptable remedial measures can overcome such contamination, planning permission may be granted subject to conditions specifying the necessary measures.

Local Planning Policy

- 15.2.6 The Bridgend Local Development Plan 2006-2021 was adopted in September 2013. It sets out its objectives for the development and use of land in the County Borough over the plan period to 2021, and its policies to implement them. The Plan is used by the Council to guide and manage development, providing a basis for consistent and appropriate decision-making.

Strategic Policy SP2 - Design and Sustainable Place Making

- 15.2.7 This policy states that all development should contribute to creating high quality, attractive, sustainable places which enhance the community in which they are located, whilst having full regard to the natural, historic and built environment by incorporating methods to ensure the site is free from contamination (including invasive species).

Policy ENV7 - Natural Resource Protection and Public Health

- 15.2.8 Policy ENV7 requires an Applicant to demonstrate that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to contamination (including invasive species). Advice should, therefore, be sought prior to clearance works as to whether a site is contaminated with invasive species and what measures are required to ensure that these species do not spread to neighbouring land or other areas where cleared material containing invasive species is deposited.

15.3 Assessment Methodology

- 15.3.1 In assessing the effects of the proposed development, it is necessary to consider the sensitivity of the resource, as well as the magnitude of any impact.

Sensitivity of Receptors

- 15.3.2 Sensitivity criteria can be based both on the degree of environmental response to any particular impact, as well as the 'value' of the receptor, e.g. brownfield sites are less sensitive than a site with an agricultural land use. The sensitivity of a receptor is determined in accordance with the criteria outlined in Table 15.3-1.

Table 15.3-1: Criteria for Determining Sensitivity (value) of receptor

Sensitivity	Criteria	Examples
High	Feature or attribute with high quality and rarity, important at national or regional scale or a feature of high quality and rarity	<u>Geology / Soils</u> <ul style="list-style-type: none"> Designated SSSI for geology/soils Grade 1 agricultural land Land supports nationally rare plant species <u>End users</u> <ul style="list-style-type: none"> Residential, allotments, play areas

Sensitivity	Criteria	Examples
		<u>Construction Workers</u> <ul style="list-style-type: none"> Extensive earthworks and demolition of buildings The users of the site will come into contact with potentially contaminated soils on site i.e. construction workers <u>Surrounding Land Uses</u> <ul style="list-style-type: none"> Greenfield Site Residential area <u>Controlled waters</u> <ul style="list-style-type: none"> Major aquifer or surface water in close proximity to site Aquifer providing potable water to a large population
Medium	Feature or attribute with a medium quality and rarity, important at a regional scale, or a feature of medium quality and rarity	<u>Geology / Soils</u> <ul style="list-style-type: none"> Non designated geological exposures Grade 2 agricultural land currently used for important crops Land supports regionally/locally rare plant species <u>End users</u> <ul style="list-style-type: none"> Landscaping or public open space Occasional contact of site users with potentially contaminated soils i.e. installers of utilities in landscape areas. <u>Construction Workers</u> <ul style="list-style-type: none"> Limited earthworks <u>Surrounding Land Uses</u> <ul style="list-style-type: none"> Open spaces Commercial use <u>Controlled waters</u> <ul style="list-style-type: none"> Minor aquifer Aquifer supporting abstraction for agriculture or industrial use
Low	Feature or attribute with low quality and rarity, important at a local scale	<u>Geology / Soils</u> <ul style="list-style-type: none"> Brownfield / industrial site, Site of little or no agricultural value, landscaped areas <u>End users</u> <ul style="list-style-type: none"> Hard end use (e.g. industrial, car parking) <u>Construction Workers</u> <ul style="list-style-type: none"> Minimal ground disturbance <u>Surrounding Land Uses</u>

Sensitivity	Criteria	Examples
		<ul style="list-style-type: none"> Industrial area <u>Controlled waters</u> <ul style="list-style-type: none"> No surface water bodies or aquifers close to the site
Negligible	Environment is insensitive to impact, no discernible changes.	<ul style="list-style-type: none"> Previously disturbed land, Soils are not in use, the land has an industrial/ commercial land use and/or mainly covered by hardstanding, Contaminated land, Site users will not come into contact with any potentially contaminated soils on site i.e. site is completely covered with hard standing/ buildings.

Magnitude of Impact

- 15.3.3 The magnitude of the impact is assessed without regard to the sensitivity /value of the resource. The criteria used to determine the magnitude of a potential impact are defined in Table 15.3-2. Assessment of magnitude includes consideration of the amount and intensity of impact and the duration of that impact (i.e. whether permanent or temporary).

Table 15.3-2: Magnitude of Impact

Magnitude	Criteria / Examples
Major	<p>A permanent or long term adverse impact on the integrity and value of an environmental attribute or receptor, or exposure to acutely toxic contaminants. Fundamental changes to the geology and hydrogeology; loss of a feature e.g. pollution of a potable groundwater abstraction.</p> <p>For example, harm to human health, designated habitats or pollution to controlled waters.</p>
Moderate	<p>Adverse impact on the integrity and/or value of an environmental attribute or receptor, but recovery is possible in the medium term and no permanent impacts are predicted.</p> <p>Material but non-fundamental changes to geology or hydrogeology.</p>
Minor	<p>An adverse impact on the value of an environmental attribute or receptor, but recovery is expected in the short-term and there would be no impact on its integrity.</p> <p>Measurable but non-material changes to geology and hydrogeology.</p> <p>For example, temporary effects on receptors not designated under environmental legislation.</p>
Negligible	No impact would be detectable

Significance of Effects

- 15.3.4 The significance of effects combines the **sensitivity** (value) of the resource and the degree to which the resource would be affected (i.e. **magnitude** of effect).

Table 15.3-3: Assessing the Significance of Effects

SENSITIVITY / VALUE	High	Slight	Moderate	Large	Large
	Medium	Neutral/ Slight	Slight	Moderate	Large
	Low	Neutral/ Slight	Neutral/ Slight	Slight	Moderate
	Negligible	Neutral	Neutral	Slight	Moderate
		Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT			

- 15.3.5 **Moderate** and **large** effects are considered to be significant.

Sources of Information

- 15.3.6 The work instructed included a desk study review of available information, site reconnaissance and intrusive investigation. This was followed by laboratory testing, onsite monitoring and geotechnical and geo-environmental reporting.
- 15.3.7 Previous site investigation reports have been completed within the area of the existing factory. When compiling the Site Investigation Report (Document Ref. 57100-0159), reference has been made to the following reports:
- Geotechnical Report reference 7261/C dated November 1997 completed for Quorum Associates Limited and entitled "Proposed New Warehouse, Jamont UK Limited, Llangynwyd, near Bridgend".
 - Site Investigation Factual Report reference 7741/C dated December 1999 completed for Fort James UK Limited and entitled "Proposed Expansion of Bridgend Paper Mills, Llangynwyd, Bridgend".
 - Geotechnical Report reference 8670/PB/03 dated July 2003 completed for Quorum Associates Limited and entitled "Proposed New Warehouse and Paper Mill, Bridgend Paper Mills"
 - Golder Associates UK Consulting Limited Engineers report reference 9253009 dated April 1992 completed for James and Nicholas entitled "Ground Investigation at British Tissues, Maesteg".
 - Ground Investigation Geotechnical and Contaminated Land Consultants report reference p-w.0960-01.letter.doc dated February 2012 completed for Georgia-Pacific UK Limited entitled "Bridgend Paper Mill"
- 15.3.8 The above reports should be reviewed in conjunction with this assessment to gain a detailed appraisal of the site and the works completed to date.

15.4 Baseline Conditions

Site History

- 15.4.1 The history of the site was assessed with the aid of historical maps included within the Envirocheck Report presented within the site investigation report (Document Ref. 57100-0159).
- 15.4.2 The earliest edition of the map dated 1877 indicated the site to be undeveloped fields with a number of field boundaries passing through the site. Trees and vegetation were indicated through the central area of the site, approximately along the banks of an existing surface water feature, on a west-east orientation. The Great Western Railway line formed the northeast boundary of the site and an existing road ran along the southern boundary of the site. The nearest developments at this time were two farms to the north of the site known as Brynllwarch-fach and Brynllwarch-fawr.
- 15.4.3 The site remained relatively unchanged until the editions of the maps dated 1918-1921. The central area of the site was still crossed by a surface water feature but was indicated to be less heavily vegetated. Two old levels were indicated within the western area of the site. There was also evidence of disturbed ground within the area and a small pond feature which could have been a third coal level. All the levels are orientated in a northerly direction into the site. An old tramway was indicated to the south of the site and old quarries and an air shaft was indicated to the southwest.
- 15.4.4 The map dated 1947-1953 indicated development to have commenced within the site. At this stage a small access road was constructed across the northern area of the site on an east-west orientation. Some small buildings were also constructed off the road and some general earthworks were evident in the vicinity of the road.
- 15.4.5 The 1964 edition of the map indicated the area of the site to the north of the surface water feature, known as Nant Gwyn, to have been developed by a large "Mill" building. The access roads had also been upgraded with access into site from the west. Three bungalows known as Glan Nant, Cae Glas and Tir-iarll were constructed to the north of the access road within the northwest area of the site. A car parking area had also been constructed to the south of the bungalows with the construction of a fill embankment.
- 15.4.6 new road had also been constructed along the southeast boundary of the site by the 1960's to access the nearby power station on the other side of the railway line. The road was constructed on a large embankment which extended into the site. A large pond feature was now evident within the southeast area of the site to the south of Nant Gwyn, with two large settling tanks to the east of the pond. The southern area of the site remained undeveloped and covered with vegetation. By the 1960's there was no longer any indication of the old coal levels.
- 15.4.7 During the 1980's the mill continued to expand to the south and east of the original building and became known as Bridgend Paper Mills. The large pond feature was infilled to accommodate the expansion and Nant Gwyn had been culverted along parts of its course.
- 15.4.8 Overhead electricity lines were indicated to cross the northern area of the site on an eastwest orientation.

15.4.9 The Paper Mill continued to expand during the 1990's and 2000's and was indicated to be the approximate layout, as it is today, by circa 2003. It is understood that the southeast corner of the site was covered with pulverised fuel ash (PFA) spoil from the nearby power station, which is understood to have been shut down in the 1970's. In later years the Nant Gwyn was completely culverted.

15.4.10 One of the most recent developments within the site was a new security lodge and weighbridge within the north-western area, adjacent to the main access road. It is understood that drilling and grouting works were carried out in order to stabilise underlying shallow mine workings beneath this area including the adjacent stretch of the main access road. It is also understood that drilling and grouting stabilisation works were undertaken beneath the westernmost of the three bungalows to the north of the access road.

Geology and Soils

15.4.11 The 1:50,000 and 1:10,560 scale geological maps of the area indicate that the majority of the site is underlain by Brithdir Member Sandstone and Mudstone and with the northern area underlain by Hughes Member sandstone and mudstone, all of the Carboniferous period. These rocks typically comprise green-grey Pennant sandstones with thin mudstone/siltstone and seatearth interbeds, and mainly thin coals. The geological map indicates that these strata dip approximately 10° in a northerly direction. The bedrock beneath the majority of site is indicated to be overlain by Devensian Till deposits of the Quaternary period. These deposits are generally poorly sorted and variable in nature and are likely to comprise sands, clays and gravel. Through the centre of the site, along the path of the stream, alluvium deposits, also of the Quaternary period are indicated to be present. Alluvium is a general term for clay, silt, sand and gravel deposited by a river as a sorted or semi-sorted sediment. It often comprises soft to firm, unconsolidated, compressible silty clays, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present. No superficial deposits are indicated to be present within the northern and southeast areas of the site.

15.4.12 Made ground is likely to be present within the site, particularly around the buildings and in the western area of the site, in the vicinity of the former old coal levels and also within the east where pulverised fuel ash (PFA) was historically deposited.

Radon

15.4.13 Information with regard to Radon Protective Measures is provided within the Envirocheck Report as presented in Document Ref. 57100-0159. The report states that the worse-case scenario for the site is that it lies within an intermediate probability area, as 3% to 5% of properties are above action level, and that therefore basic radon protective measures would be necessary in the construction of new buildings within the site. However, parts of the site are classified as being within a lower probability area as less than 1% of properties are above action level, and therefore no radon protection is required. It may be prudent to obtain a BGS Radon Report prior to development in order to determine the radon classification specific to each of the development areas.

Mining

- 15.4.14 A Coal Mining Report for the site has been obtained from the Coal Authority and a copy is included in the Site Investigation Report (Document Ref. 57100-0159). The Coal Authority states that the property is within a surface area that could be affected by underground mining in 2 seams of coal at shallow to 560m depth, and last worked in 1938.
- 15.4.15 The Coal Authority states that within or within 20m of, the boundary of the property there are 5 mine entries, the approximate positions of which are shown on the enquiry boundary plot. There are no records of what steps, if any, have been taken to treat the mine entries. The Coal Authority states that it is not aware of any damage due to geological faults or other lines of weakness affected by coal mining.
- 15.4.16 The geological map indicates that the northerly dipping Bettws Four Feet seam outcrops near the site access road and is therefore likely to underlie this area and the northern part of the site at shallow depths. The seam has a thick workable section and both the geological map and the 1918 historical map show evidence of past associated mining activity in the form of levels near the access road. These levels were orientated in a northerly direction. Extensive open cut mining of the seam has also taken place further to the west of the site.
- 15.4.17 The conjectural outcrop of the Brithdir Rider seam is indicated to south of the site and this seam would also underlie the site but at greater depths. The generalised Vertical Section indicates another seam, Glyngwilym, in between the Bettws Four Feet and the Brithdir Rider.
- 15.4.18 The Coal Authority online viewer indicates that the northern area of the site is classified as a high-risk development area, as well as the areas in the vicinity of the mine adits. The high-risk classification is due to the likely presence of recorded shallow workings within the area and the presence of the mine entries.

Hydrology and Hydrogeology

- 15.4.19 The Envirocheck Report indicates that the nearest surface water features are located on site. The on-site feature is known as Nant Gwyn and is culverted underground at points within the site. The on site features flow approximately in an easterly direction towards the River Lynfi which is located 37m to the northeast at the nearest point.
- 15.4.20 The Environment Agency groundwater vulnerability map and aquifer database classifies the bedrock beneath the site as a Secondary 'A' Aquifer. Secondary 'A' Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 15.4.21 The Environment Agency groundwater vulnerability map and aquifer database classifies the Alluvium deposits beneath the site to also be a Secondary 'A' Aquifer. The Devensian Till deposits are classified as a Secondary Aquifer Undifferentiated. This classification has been assigned in cases where it has not been possible to attribute either category A or B to a strata type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the strata type.
- 15.4.22 A perched water body could be encountered within the made ground.

15.4.23 It is considered possible that the existing site drainage can act as a pathway for potential surface contaminants.

15.4.24 There are three discharge consents recorded on site and an additional seven within 500m of the site boundary. Only one on site consent is currently active, the other two have been revoked. The active discharge consent is a final treated sewage discharge received by Nant Gwyn. Two discharge consents are recorded 110m to the east of the site, one of which has been revoked. The active consent is for a trade effluent discharge received by Nant Gwyn. A further five discharge consents are recorded 165m to the east of the site but only one is active. The consent is for an unspecified discharge received by the River Llynfi.

15.4.25 The Envirocheck Report states that there are thirty-three water abstractions recorded within 500m of the site boundary. The nearest abstractions were recorded 59m to 80m to the northeast of the site. They are surface water abstractions utilised for commercial/industrial use including cooling and process water. Seven further surface water abstractions were recorded 138m to the east of the site with the water also used for commercial/industrial use.

15.4.26 Tables 15.4-1 and 15.4-2 present a summary of the hydrological features and key hydrogeological nature of the site.

Table 15.4-1: Summary of Site Hydrology

Feature	Distance from Site	Flow	Classification	Abstraction	Discharge
Unnamed features and Nant Gwyn	On site	Easterly	Not known	No	River Llynfi
River Llynfi	37m north-east	Not known	Not know	No	River Ogmores
Surface run-off	On site	Flows into site drainage	N/A	No	Not known
Site drainage	On site	Not known	N/A	No	Not known

Table 15.4-2: Summary of Site Hydrogeology

Geological Unit	Aquifer Classification	Aquifer Characteristics	Source Protection Zone	Groundwater Abstractions
Made ground	Not classified	Highly variable permeability and porosity. Perched water may be present with variable flow directions.	No	None
Divensian Till	Secondary Aquifer Undifferentiated	Variable low to moderate permeability and porosity with intergranular flow possible. High clay content likely to restrict flow	No	None
Alluvium	Secondary A Aquifer	Variable moderate permeability and porosity with intergranular flow possible. High clay content likely to restrict flow	No	None
Brithdir Member and Hughes Member	Secondary A Aquifer	Variable permeability sandstones, with thin mudstone/siltstone and thin coals	No	None

- 15.4.27 The Groundwater Vulnerability map indicates that the secondary bedrock aquifer has a high vulnerability with a high pollutant speed and well connected fractures.
- 15.4.28 The Environment Agency Flood Risk Map as presented within the Envirocheck Report indicates that the site is not at risk to extreme flooding from rivers or sea without defences.
- 15.4.29 The area off site in the vicinity of the River Llynfi is indicated to be at risk to flooding.
- 15.4.30 The BGS Flood GFS Data map indicates that the majority of the site has limited potential for groundwater flooding to occur. Some areas within the northern part of the site are indicated to have potential for groundwater flooding to occur at surface. There are also areas indicated within the north and south of the site that have potential for groundwater flooding of property situated below ground level.

Land Fill Site

- 15.4.31 The Envirocheck Report indicates an historical landfill site to be located within the eastern area of the site with deposited waste including inert waste associated with the Llynfi Power Station. A local authority recorded landfill site is also recorded 174m to the southeast which accepted inert waste. Another registered landfill site is recorded 66m to the southeast of the site at the site of the disused power station authorised for inert waste. The licence has now lapsed.
- 15.4.32 A Licensed Waste Management Facility is also registered within the eastern area of the site, but is now inactive. Another Licensed Waste Management Facility is indicated 173m to the southeast of the site also associated with the power station and categorised as landfills taking non-biodegradable wastes (not construction). This license has expired.
- 15.4.33 There are areas of potentially infilled land (non-water) located both on site and within 250m of the site boundary. Two areas were indicated within the western part of the site, likely to be associated with former adit features. There is also an area indicated 93m to the southeast of the site in the vicinity of the former tramway. There are also areas of potentially infilled land (water) located within 250m of the site boundary. One area was located 105m to the east and another 179m to the south west at the location of former surface water features.

Potential Contamination

- 15.4.34 During the recent site investigation works undertaken by Intégral Géotechnique representative samples of made ground were taken from across the site and tested for a range of chemical elements/ compounds.
- 15.4.35 The suite of geo-environmental laboratory testing undertaken on the 15 samples of made ground was based on the guidelines provided in the Environment Agency CLR publications as part of the CLEA Model, and other contaminants typical on brownfield sites. The testing suite typically comprised:
- Arsenic, boron, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, vanadium, zinc, Total cyanide, pH value, total polyaromatic hydrocarbons (PAH), phenols, asbestos screen and organic content.
- 15.4.36 A number of samples were also tested for petroleum hydrocarbons.
- 15.4.37 All of the tested elements/compounds were below trigger levels for a commercial end use.

- 15.4.38 Whilst a significant thickness of made ground has been encountered within the southeast part of the site, elsewhere, made ground was absent or much thinner.
- 15.4.39 No visual or olfactory evidence of contamination was observed during the site works, and no obvious point sources of contamination (tanks, hydrocarbons, electrical substations, etc.) were encountered within the areas of the proposed development works.
- 15.4.40 Asbestos was identified within three samples of made ground from the southeast area of the site, at between <0.001% and 0.02% asbestos by weight.
- 15.4.41 Ground gas monitoring carried out to date has not identified any elevated concentrations of methane but has identified elevated carbon dioxide concentrations within one location.

Ground Gas

- 15.4.42 The results of the gas monitoring programme to date indicated a maximum methane concentration of 0.1% and a maximum carbon dioxide concentration of 16.9%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme. In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0492l/hour has been calculated for carbon dioxide. This GSV corresponds to gas characteristic situation 1 which does not require any special gas protective measures.

Assigning sensitivity of receptors

Critical Sensitive Receptor – Human Health

- 15.4.43 The proposed redevelopment of the site is for a commercial end use. Therefore, the critical sensitive receptor from a human health perspective is an on-site commercial receptor.
- 15.4.44 In accordance with S4UL/C4SL and CLEA guidance for a standard commercial scenario, the critical sensitive receptor for a commercial end use risk assessment is a female adult, with exposure from 16 to 65 years.
- 15.4.45 Only the users of the site could come into contact with potentially contaminated soils on site i.e. construction workers.
- 15.4.46 Based on the criteria described in Table 15.3-1, the receptors sensitivity is considered **high**.

Critical Sensitive Receptor – Controlled Waters

- 15.4.47 Based on the proposed redevelopment of the site for a commercial end use, and the findings of the desk study, the critical sensitive receptor from a controlled water perspective is groundwater within the Secondary 'A' Aquifer of the Brithdir Member and Hughes Member strata or the Alluvium deposits.
- 15.4.48 By considering groundwater as the critical sensitive receptor for controlled waters, the groundwater/hydrogeological risk assessment will also be protective of the Nant Gwyn and other surface water features which cross the site.
- 15.4.49 The sensitivity of controlled water in the vicinity of the Site is assessed as being **medium**.

15.5 Assessments of Effects

Construction Phase

Conceptual Site Model

- 15.5.1 Based on the findings and observations, a conceptual site model has been defined for the site. This includes consideration to the residual structures within the ground and the identified made ground.
- 15.5.2 The potential active pathways by which future end users and the wider environment could be affected by the contaminant sources identified are listed below:
1. Outdoor/indoor inhalation of fugitive dust;
 2. Indoor inhalation of ground gas;
 3. Migration of contaminants in ground to drinking water supply pipes
- 15.5.3 The remediation works to be carried out at the site have been designed to address the identified potentially active contaminant pathways listed above.

Asbestos

- 15.5.4 The most recent site investigation report produced by Intégrale Géotechnique (Document Ref. 57100-0159) has been used as the basis for this assessment.
- 15.5.5 The contamination test results and investigation observations have not identified any contaminants above commercial screening values.
- 15.5.6 However, asbestos fibres were identified in the made ground within the south-eastern area of the site. Given the presence of asbestos within the south-eastern site area and within the made ground it is considered that a potential risk to human health may exist via the following relevant pollutant linkages:
- Inhalation of soil bourn dust.
- 15.5.7 The general approach for assessing the potential risk to a receptor is by a combination of qualitative and quantitative risk assessment. A quantitative risk assessment would involve selecting and deriving generic assessment criterion to compare low risk substances, based on the fate, transport and toxicological properties and the exposure scenario being considered.
- 15.5.8 There are no published screening criteria values for asbestos, and neither are there any in preparation. As discussed in CIRIA Report C733 *Asbestos in Soil and Made Ground: a Guide to Understanding and Managing Risks*, agreement has yet to be reached in the UK on an appropriate toxicological criterion on which a screening value for asbestos could be based. It also states that 'based on current knowledge, it is believed that that a scientifically defensible UK GAC (generic acceptance criteria) for asbestos in soil cannot be developed or imported.'
- 15.5.9 It is therefore considered that a more qualitative assessment of the potential risk is appropriate, as asbestos is determined to be a non-threshold substance.

15.5.10 CIRIA Report C733 states that asbestos (asbestos containing materials and asbestos containing soils) only present a risk to health if airborne fibres are released into the atmosphere. The report goes on to state that the number of fibres released into the air from asbestos containing soils is likely to be influenced by a number of site-specific factors, as listed below:

- Characteristics of the asbestos (concentration, degree of heterogeneity, depth in relation to final ground level, volume/area, type, condition, extent of bonding, weathering, fraction of free fibres, shape of fibres);
- Characteristics of the soil (type, moisture content, surface vegetation, presence of hard standing)
- Weather (humidity, precipitation, temperature, ground freezing, wind speed and direction);
- Land use/soil disturbing activities (behaviour of receptors, distance between receptor and source, types of activity, duration/frequency of activity, dust mitigation measures).

15.5.11 The depth below ground level of the asbestos containing soils is imperative to the potential risk posed. CIRIA Report C733 states that in the absence of significant physical disturbance, exposure to airborne asbestos fibres from soil will be from friable materials or asbestos fibres present at, or very close to, the soil surface (the soil – air interface).

15.5.12 Materials that have been buried, or are below the soil surface, will pose a lower, or less immediate, risk as these materials are unable to release airborne fibres unless brought to the soil surface by physical activity/disturbance.

15.5.13 Based on the proposed commercial/industrial end use of the site, and the nature of the proposed development within the area of the site where asbestos was identified, which comprises predominantly hardstanding, the potential risk to end users (considered of **high** sensitivity) is considered to be **low**.

15.5.14 The southeast part of the site proposed for a pulp storage area, bale handling and access will comprise a building and a concrete slab which will prevent the existing made ground from being exposed to the air and forming dust, thereby breaking the potential exposure pathway between the soil and end users.

15.5.15 The potential risk to controlled waters (considered of **medium** sensitivity) is considered to be **low**. The development proposals indicate that the majority of the site will be covered with buildings and hardstanding with the inclusion of capping soils in any landscaped areas, the potential generation of leachate will be reduced from the current status quo.

Soil and Geology

15.5.16 In the absence of gross and / or site wide contamination, the risk to human health through ingestion, inhalation and/or dermal contact with soil contamination is considered **low**. Although the magnitude of such exposure is considered to be **medium**, this exposure pathway is considered of **minor** significance.

Controlled Waters

- 15.5.17 Shallow perched groundwater is expected in the excavations for building foundations required at the Site. Although such groundwater is generally non-potable, exposure to this water does not represent a significant risk to the health of construction workers assuming appropriate personal hygiene protocols and Personal Protection Equipment (PPE) are used during construction. Such short-term exposure is considered to represent an effect of **minor** magnitude, and a risk to human health of **minor** significance.
- 15.5.18 Disturbance of soil during construction may result in the mobilisation of any localised contamination by increased exposure to rain, alteration to ambient physical and chemical conditions etc. This may result in a deterioration of perched groundwater quality held within the topsoil and superficial geology on the Site. The magnitude of the effect is considered **minor**, considering the recorded quality of perched groundwater at the Proposal Site and its negligible resource value. Thus, the significance of a deterioration of perched groundwater quality is considered **minor**.
- 15.5.19 Deep excavations for pile foundations may open new preferential pathways for contamination transport from the surface and/or near surface. This may result in a deterioration of water quality in deep groundwater by accidental spillages during construction and or leakage of shallow perched groundwater. The disturbance of the unsaturated zone soils is likely to have an effect of **negligible** magnitude on any groundwater within or beneath the Site. The significance of this effect is considered to be **minor** and is unlikely to affect any other controlled waters or groundwater dependent environmental receptors.
- 15.5.20 The accidental spillage of hazardous substances from vehicles, plant and the storage of materials on the construction site could result in an effect of **moderate** magnitude ranging from **negligible** to **minor** significance depending on the size and nature of the spillage and proximity to open excavations.
- 15.5.21 Temporary groundwater control and/or dewatering may locally reduce perched groundwater levels in the shallow confined superficial deposits on the Site. In the absence of any groundwater dependent receptors down gradient of the Site (e.g. abstractions, wetlands, rivers and springs) the significance of this temporary effect on controlled waters is **negligible**.
- 15.5.22 The accidental spillage of hazardous substances from vehicles, plant and the storage of materials on the construction site could result in an effect of **moderate** magnitude ranging from **negligible** to **minor** significance depending on the size and nature of the spillage and proximity to open excavations.

Ground Gas

- 15.5.23 The recorded concentrations of potentially hazardous ground gases on the Site are generally low. The risk posed to construction works as a result of vertical and lateral migration of ground gas is considered to be **minor** magnitude, resulting in an effect of **minor** significance.

Operational Phase

Soils / Geology and Groundwater

- 15.5.24 Any necessary land remediation will be undertaken as part of the construction phase. Hazardous materials (e.g. asbestos) will be removed, and the majority of the application site will be covered in hardstanding. Consequently, no potential human health pollutant linkages are anticipated to remain during the operational phase. There will be no further disturbance to the underlying soils or geology during operation of any elements of the development.
- 15.5.25 The proposed development will operate under an environmental permit. The environmental permit will ensure that pollution protection measures including appropriate fuel and chemical storages, a sustainable surface water drainage system, etc. will be designed and installed to very high standards. All potentially contaminative activities will be strictly controlled under current legislation, and as such, it is considered very unlikely that the operation of the proposed development will result in contamination. It is considered that the groundwater and the soil of the application site and its surroundings will be largely unaffected.
- 15.5.26 The application site is accorded a **low** sensitivity with regard to groundwater resources and soils. The magnitude of impact is assessed as being **negligible**, and the effect is considered **neutral to slight**.

Ground Gas

- 15.5.27 Provided ground gas measurements during the construction phase show carbon dioxide and methane levels within acceptable ranges as indicated by the results of previous site investigations, the magnitude of impact from ground gas in the underlying ground is considered to be **negligible**, and the effect is assessed as being **slight**.

15.6 Mitigation Measures

Construction Phase

Geology and Soils

- 15.6.1 Any vegetation, topsoil and subsoil will be removed to expose a suitable sub-grade. Any soils, sub-soils or aggregate suitable for reuse will be stockpiled on impermeable liners. Soils which are to be reused on-site will be tested both geo-technically and for contamination.

Remediation Strategy

- 15.6.2 The construction of the development has the potential to create impacts relating to human health through mobilisation of contamination (asbestos). However, providing that the mitigation measures described in the Remediation Strategy (Document Ref. 57100-0158) as well as more specific measures, as set out below, are adhered to, no significant impacts are anticipated.
- 15.6.3 Within any soft landscaped areas, it is recommended that a capping layer, of a minimum thickness of 300mm, of clean imported subsoil and topsoil complete with a hi-vis geotextile separation membrane/alert membrane at the base, is placed on top of any exposed residual made ground. The thickness of this capping layer will need to be agreed with the regulators.
- 15.6.4 A controlled drainage system should be designed to by-pass the made ground.

Outline CEMP

- 15.6.5 All construction works will be undertaken under the control of a Construction Environmental Management Plan (CEMP) set out within Document Ref. 57100-0222 of this Planning Application. The CEMP will ensure that all relevant national guidance and current UK best practice is adhered to.

Controlled Waters

- 15.6.6 The CEMP will incorporate appropriate mitigation measures (such as covering stockpiles or siting stockpiles away from watercourses) that will be approved by the relevant authorities and adopted, such that it would be unlikely that any impacts would arise during construction.
- 15.6.7 Groundwater is likely to be encountered in shallow excavations required at the Development Site. Although groundwater in the shallow aquifer is generally non-potable, exposure to this water does not represent a significant risk to the health of construction workers provided appropriate personal hygiene protocols and PPE are used during construction, as specified in the CEMP.
- 15.6.8 In the event of encountering groundwater within deep excavations, groundwater management precautions may be required and these may include: dewatering to lower confined water pressures, use of sheet piling to support the excavation and/or sump pumping to control groundwater ingress.
- 15.6.9 If groundwater is encountered during excavations, a groundwater control and management plan will be produced by a suitably qualified specialist. The risk of uncontrolled discharges of groundwater to surface watercourses will be mitigated by the prior sampling and analysis of groundwater and adoption of appropriate discharge arrangements which will be specified in dedicated Risk Assessments and/or Method Statements prior to construction.

Ground Gas

- 15.6.10 In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0492l/hour has been calculated for carbon dioxide. The calculated Gas Screening Value (GSV) corresponds to a gas characteristic situation which does not require any special gas protective measures.
- 15.6.11 However, it should be noted that a carbon dioxide level of 16.9% has been recorded on site. When deliberating this level, and in accordance with CIRIA document C665, consideration should be given to upgrading ground gas precautionary measures to Characteristic Situation 2 where levels of carbon dioxide exceed 5.0%.
- 15.6.12 For a commercial/industrial development, Characteristic Situation 2 requires as a minimum the construction of a cast in-situ reinforced concrete floor slab and a 1200 gauge DPM.

Other Contaminants

- 15.6.13 Water supply pipes will need to be protected from any contamination present within the ground. Measures to protect the pipes will include clean backfill to trenches and possibly alternative material selection. The final design and selection of the pipe and associated backfill should be agreed with the appropriate Regulator prior to installation.

Operational Phase

- 15.6.14 As discussed in Section 15.5, there are not anticipated to be any operational impacts relating to contamination or ground conditions resulting from the development.
- 15.6.15 Nevertheless, all substances stored and handled on site will be done so in accordance with for all best practice guidelines.
- 15.6.16 The site will be mainly capped with a layer of impermeable hardstanding, which will break any pollutant linkages to future site users. Additionally, any landscaped areas of softstanding will be capped with a 300 mm layer of clean cover, thus again breaking any pollutant linkages.

15.7 Residual Effects

- 15.7.1 Following the appropriate use of all mitigation measures outlined in this section and in the Remediation Strategy (Document Ref. 57100-0158), there are not considered to be any residual impacts relating to the geology, soils, hydrogeology or hydrology of the development site or surrounding area. This is summarised in Table 15.8-1.
- 15.7.2 Table 15.8-1 sets out the assessment of likely significant effects. This takes account of all mitigation measures and best practices, including those which have been embedded into the design of the Project and those identified during the EIA process in response to emerging impacts. All significant mitigation relevant to this assessment is identified in this section and/or in section 3).

15.8 Summary and Conclusion

- 15.8.1 An assessment of the baseline ground conditions has been undertaken for the proposed extension of the Bridgend Paper Mill. This assessment has been based on extensive site investigations as well as a Remediation Strategy, that relate to the Site history, geology, hydrology, hydrogeology, and contamination of the Site.
- 15.8.2 The contamination test results and investigation observations have not identified any contaminants above commercial screening values and hence the site is suitable for the proposed development.
- 15.8.3 However, asbestos fibres were identified in the made ground within the south-eastern area of the site, and this contamination would have to be remediated.
- 15.8.4 Perched groundwater has been identified within the site soils and superficial deposits. The geological and hydrogeological setting of the Site suggests that perched groundwater in the underlying superficial deposits and adjacent surface water courses is at little risk of contamination regardless of activities during the construction and development phases.
- 15.8.5 The Brithdir Member Sandstone and Mudstone area are non-aquifer units. The proposed development does not pose a risk to groundwater resources.
- 15.8.6 The majority of the Site will comprise hardstanding areas post construction, such that direct human exposure to contaminated soils following development will be negligible. Thus, the inadvertent contact, ingestion and inhalation of soils represents a low risk to human health,

and the need for formal remediation of near surface contaminated soils is not considered to be necessary.

- 15.8.7 The risk of the Site to construction workers and operational workers is low.
- 15.8.8 All risks to construction works resulting from short-term exposure to soil and / or groundwater contamination will be minimised by the development of a Construction Environmental Management Plan for the construction phase.
- 15.8.9 Site investigation data indicates that ground gas poses a low risk to construction works, with a lesser risk to future site users. The data also indicates that ground gas protection measures should not be required for the development.
- 15.8.10 Residual effects consequent on implementation of the mitigation measures are either minor or negligible.
- 15.8.11 In conclusion, there is considered to be a low risk that significant contamination exists beneath the site for the proposed development. Further intrusive investigation is not considered to be necessary at this stage.

Table 15.8-1: Assessment of Residual Impacts on Attributes

	Attribute				
	Geology / Soils	End users	Construction workers	Surrounding Land Uses	Controlled Waters
Impact and justification	Negligible impact – land is of no agricultural value, not designated and mitigation measures such as safe working practices will eliminate any potential impacts from oil spills etc. effects of minor significance	End users defined as high sensitivity because of hard standing/industrial end use of the site, no significant ground gas recorded at the site. all landscaped areas will be covered with clean cap of soil.	mitigation measures (e.g. appropriate use of PPE) will prevent any significant impacts to construction workers, effects of negligible to minor significance	Negligible impact. Mitigation measures will prevent impacts of mobilisation of contamination, effects of negligible to minor significance	Negligible impact. Hydrogeology of Site considered Secondary A aquifer, mitigation measures will limit any potential impacts to watercourses and groundwater; effects of negligible to minor significance

16.0 Appendices

17.0 Figures