

ENVIRONMENTAL STATEMENT (VOLUME II)

CHAPTER 6 – AIR QUALITY

Padeswood Carbon Dioxide Spur Pipeline Proposed Development

Town and Country Planning Act 1990

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6. AIR QUALITY

6.1. INTRODUCTION

6.1.1. This Chapter reports the assessment of the likely significant effects of the Padeswood Spur Pipeline Proposed Development on air quality and describes:

- Relevant, legislation, policy and guidance;
- Consultation undertaken;
- Assessment methodology;
- Baseline conditions;
- Potential effects of the Construction, Operational and Decommissioning Stages of the Padeswood Spur Pipeline Proposed Development;
- Potential design, mitigation and enhancement measures;
- Residual effects; and
- Next steps.

6.1.2. This chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to **Chapter 3 – Description of the Padeswood Spur Pipeline Proposed Development**, (Document Reference: PW.3.2.3), **Chapter 9 – Biodiversity** (Document Reference: PW.3.2.9) and **Chapter 16 – Traffic and Transport** (Document Reference: PW.3.2.16)..

6.2. LEGISLATIVE AND POLICY FRAMEWORK

6.2.1. A summary of the international, national, and local legislation, planning policy and guidance relevant to the air quality assessment for the Padeswood Spur Pipeline Proposed Development is set out below:

Table 6-1 - Relevant Legislation, Policy and Guidance

Name	Description
Legislation	
Environmental Protection Act 1990 – Control of Dust and Particulates Associated with Construction (Environmental Protection Act, 1990)	Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles: <i>“Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health</i>

	<p><i>or a nuisance</i>"; and "<i>Any accumulation or deposit which is prejudicial to health or a nuisance</i>". Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses. There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept, and its perception is highly dependent upon the existing conditions and the change which has occurred.</p>
<p>Environment Act, 1995 (Environment Act, 1995)</p>	<p>The Environment Act 1995 requires local authorities and other public bodies to review and document local air quality within their area. Where areas not meeting UK air quality standards are identified, an Air Quality Management Area (AQMA) is declared, and an Air Quality Action Plan (AQAP) must be drawn up to secure improvements in air quality.</p>
<p>Environment Act, 2021 (Environment Act, 2021)</p>	<p>The Environment Act 2021 introduced a requirement for the UK Government to set a minimum of 2 new air quality targets, but the targets themselves have not yet been specified. One of the targets will relate to PM_{2.5} concentrations.</p>
<p>Wellbeing of Future Generations (Wales) Act 2015 (Welsh Government, 2015)</p>	<p>Introduced in 2015, the Well-being of Future Generations Act requires public bodies to encourage the improvement of social, economic, environmental and cultural wellbeing of Wales.</p>
<p>UK Air Quality Strategy (UK Government, 2019)</p>	<p>The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales, and Northern Ireland (AQS). The AQS</p>

	provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation
Air Quality (Wales) Regulations	Many of the objectives in the AQS have been made statutory in Wales for the purpose of Local Air Quality Management (LAQM).
Air Quality Standards (Wales) Regulations 2010 (Welsh Government, 2010)	The Air Quality Standards Regulations were derived from the European Union Ambient Air Quality Directive and set legally binding thresholds for the concentration of pollutants in air for the protection of health and ecosystems in Wales. In the Standards Regulations the thresholds are referred to as 'limit values'. The limit values for NO ₂ and PM ₁₀ are the same concentration levels as the relevant AQS objectives and the limit value for PM _{2.5} is a concentration of 25 µg/m ³ .
Clean Air Plan for Wales (Welsh Government, 2020)	In August 2020, the Welsh Government published its Clean Air Plan for Wales, which sets out a 10-year plan to achieve cleaner air. The Clean Air Strategy runs alongside the various statutory Air Quality Plans but considers a broader range of emission sources, including domestic properties, farming, industry, and other forms of transport such as shipping and aviation.
Policy	
Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero, 2024) and NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-	NPS EN-1 requirements for air quality and emissions to air are broadly similar to those in NPPF and PPW. Paragraph 5.2.6 states that significant air emissions and mitigation measures should be identified, distinguishing between project stages, and including impacts from any road traffic.

<p>4) (Department for Energy Security and Net Zero, 2024)</p>	<p>Furthermore, existing air quality levels and the relative change in air quality from these levels should be described, including potential eutrophication impacts.</p> <p>Emphasis is placed on substantial weight being given to air quality considerations where the project will lead to a deterioration in an area or a new area where air quality already exceeds national air quality limits.</p> <p>NPS EN-4 makes reference to the requirements of NPS EN-1 in relation to air quality assessments.</p>
<p>Environment Improvement Plan 2023 (Defra, 2023)</p>	<p>The Environmental Improvement Plan sets out the UK Government's visions at improving the environment in the UK. Goal 2: 'Clean Air' specifies how the government will improve air quality in the UK including the introduction of new targets and commitments.</p>
<p>Future Wales National Plan 2040 (Welsh Government, 2020)</p>	<p>Future Wales is the national development framework for Wales, setting out the spatial plan and strategy for addressing national priorities including decarbonisation and improving health and the environment. Whilst the plan states that the planning policy framework for addressing air quality is set out in Planning Policy Wales (described below), it includes an overarching requirement to minimise exposure to air pollution.</p>
<p>Planning Policy Wales (Welsh Government, 2024)</p>	<p>Planning Policy Wales (PPW, Edition 11) sets the overarching planning policies for Wales. Section 6.7 of PPW sets out Welsh Government's priorities for air quality.</p>

	<p>Para 6.75 states that the "key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments".</p> <p>Para 6.76 places a requirement on developers to address any implications on air quality management areas, not create areas of poor air quality and seek to incorporate measures which reduce overall exposure to air pollution.</p> <p>Decision makers should be provided with an appropriate level of information on air quality and the proposed development, and on mitigation measures. In particular, para 6.7.13 requires careful consideration of the impacts of increased transport activity associated with development activity</p>
<p>Flintshire Local Development Plan 2015-2030 (Flintshire County Council, 2023)</p>	<p>The Flintshire Local Development Plan was adopted 24 January 2023 and is in force as of the date of this report.</p> <p>Policy PC5: Transport and Accessibility sets out requirements to improve the transport network across Flintshire including the use of more sustainable means of transportation. In delivering this objective it will make an important contribution to improving air quality in the region.</p>
<p>Guidance</p>	
<p>Local Air Quality Management Review and Technical Guidance (Defra, 2022)</p>	<p>Defra and the Devolved Administrations have published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to as LAQM.TG (22), has been</p>

	used where appropriate in the assessment presented herein.
Guidance on the Assessment of Dust from Demolition and Construction 2024 (IAQM, 2024)	This document published by the IAQM was produced to provide guidance to developers, consultants, and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts and to identify mitigation measures appropriate to the level of risk identified.
Land-use Planning & Development Control: Planning for Air Quality (IAQM, EPUK, 2017)	Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and the possible mitigation measures that may be implemented to minimise these impacts.

6.3. SCOPING OPINION AND CONSULTATION

RESPONSE TO THE SCOPING OPINION

- 6.3.1. An EIA Scoping Opinion was received by the Applicant from the Local Planning Authority (LPA) on 8 May 2024, including formal responses from Statutory Consultees. The responses from the LPA in relation to air quality and how these requirements should be addressed by the Applicant are set out in **Appendix 1-3 Scoping Opinion Responses (Document Reference: PW.3.3.1.3)**.

CONSULTATION UNDERTAKEN TO DATE

- 6.3.2. No consultation has been undertaken to inform the assessment.

6.4. SCOPE OF THE ASSESSMENT

- 6.4.1. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 5: EIA Methodology (Document Reference: PW.3.2.5)** of this ES.
- 6.4.2. This section provides an update to the scope of the assessment and reiterates the evidence base for scoping out elements following further iterative assessment.

ELEMENTS SCOPED OUT OF THE ASSESSMENT

- 6.4.3. The elements shown in **Table 6-2** are not considered to give rise to likely significant effects as a result of the Padeswood Spur Pipeline Proposed Development and have therefore not been considered within this assessment.

Table 6-2: Elements Scoped Out of the Assessment

Element Scoped Out	Justification
Impacts of NO ₂ , PM ₁₀ and PM _{2.5} from Construction Traffic on the Local Road Network	There is not expected to a be a significant number of vehicles during the Construction Stage of the Padeswood Spur Pipeline Proposed Development and so impacts from vehicles have been scoped out.
Impacts of NO ₂ , PM ₁₀ and PM _{2.5} from Operational Traffic on the Local Road Network	There is not expected to a be a significant number of vehicles during the Operation Stage of the Padeswood Spur Pipeline Proposed Development and so impacts from vehicles have been scoped out.
Impacts of Emissions from Decommissioning Plant	It is currently unknown how many vehicles / plant will be required for the Decommissioning Stage however it is anticipated that there will not be enough to lead to a significant effect to air quality. As a result, impacts from decommissioning plant have been scoped out.
Impacts of NO ₂ , PM ₁₀ and PM _{2.5} from Decommissioning Traffic on the Local Road Network	There is not expected to a be a significant number of vehicles during the Decommissioning Stage of the Padeswood Spur Pipeline Proposed Development and so impacts from vehicles have been scoped out.

ELEMENTS SCOPED INTO THE ASSESSMENT

Construction Stage

- 6.4.4. During the Construction Stage, impacts of dust on human health, from dust soiling, and on designated ecological sites, will be assessed against criteria set by the Institute of Air Quality Management (IAQM). The

impacts of emissions from construction plant have also been considered in line with IAQM guidance (IAQM, 2024).

Operation Stage

6.4.5. During the Operation Stage, impacts to human health have been assessed for the following CO₂ venting scenarios:

- Planned maintenance of the pipeline using Pipeline Inspection Gauges (PIGs or 'pigging' campaigns)
- Manifold venting during planned maintenance of the Northop Hall and Padeswood Above Ground Installations (AGIs)

Decommissioning Stage

6.4.6. During the Decommissioning Stage, impacts of dust on human health, dust soiling and designated ecological sites will be assessed using the IAQM guidance (IAQM, 2024)..

6.5. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

STUDY AREAS

Construction Stage

6.5.1. During the Construction Stage there are potential impacts from dust and PM₁₀ generated by construction works.

6.5.2. Following the IAQM Dust Guidance (IAQM, 2024) the Study Area has been defined as the zone with the following buffers:

- For human receptors;
 - 250 m around the Red Line Boundary (used to define the area within which construction works could occur); and/or
 - For trackout: 50 m from the kerbside of routes to be used by construction traffic, up to 250 m from any points of exit from construction works onto the local road network, including Construction Compounds.
- For ecological receptors:
 - 50 m around the Red Line Boundary
 - 50m from the kerbside of routes to be used by construction traffic, up to 250 m from any points of exit from construction works onto the local road network, including Construction Compounds.

- 6.5.3. The IAQM guidance (IAQM, 2024) states that post-mitigation air quality effects, as a result of construction activities, will not be significant outside of these areas.

Operation Stage

- 6.5.4. Operational effects relate to the venting of Carbon Dioxide gas from the proposed AGIs at Northop Hall and Padeswood during planned maintenance events. Venting will release Carbon Dioxide (CO₂) which may contain trace amounts of Hydrogen Sulphide (H₂S).

- 6.5.5. The study area for these scenarios was set to 10 km from the AGIs, in line with Environment Agency guidance (Environment Agency, 2024) for the assessment of emissions to air for permitting for combustion plants. This approach is a worst-case scenario, intended to capture all potential impacts from the Padeswood Spur Pipeline Proposed Development.

METHOD OF BASELINE DATA COLLECTION

Desk Study

- 6.5.6. Using the Study Areas identified, a desk study was undertaken to understand the baseline air quality of the Padeswood Spur Pipeline Proposed Development.

Site Visits and Surveys

- 6.5.7. Air quality monitoring is undertaken by the local authority and as such, no additional air quality monitoring surveys have been undertaken for the purposes of this assessment. The air quality monitoring undertaken by the local authority is well spread throughout the study area and is suitable for the purposes of this assessment. The last 5 years of data relevant to this assessment is presented in **Table 6-3** below

IMPACT ASSESSMENT METHODOLOGY

Construction Dust Assessment

- 6.5.8. Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited close to the source of emission. Dust, therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

- 6.5.9. The smaller particles of dust (less than 10 µm in aerodynamic diameter) are known as particulate matter (PM₁₀) and represent only a small proportion of total dust released; this includes a finer fraction, known as PM_{2.5} (with an aerodynamic diameter less than 2.5 µm). As these particles are at the smaller end of the size range of dust particles, they remain suspended in the atmosphere for a longer period. When compared to larger dust particles, they can be transported by wind over a wider area. PM₁₀ and PM_{2.5} are small enough to be drawn into the lungs during breathing, which, in sensitive members of the public could have a potential impact on health. However, it is worth noting that, according to the IAQM Dust Guidance (IAQM, 2024), the majority of fugitive particulate emissions arising from construction sites are expected to relate to the coarser fractions (i.e. PM_{2.5-10}) with just 10-15% expected to comprise PM_{2.5}. The IAQM Dust Guidance (IAQM, 2024) therefore focusses on PM₁₀ for the purposes of assessment.
- 6.5.1. The IAQM approach to construction dust involves:
- The identification of emission sources and construction activities (including earthworks, construction and trackout) and the estimation of their potential emission magnitude;
 - The identification of sensitive receptors for air quality impacts and the assessment of the sensitivity of the area to dust and particulate matter emissions; and
 - The grading of the risk of impacts, considering the proximity of emission sources to the receptors and their magnitude.
- 6.5.2. The determined risk level is used to define appropriate and proportionate best practice mitigation measures as and where necessary. A summary of the IAQM assessment methodology is provided in **Appendix 6.1: Construction Dust Assessment Methodology (Document Reference: PW.3.3.6.1)**.
- 6.5.3. The IAQM Dust Guidance (IAQM, 2024) states that, given the wide range of potential activities and the nature of construction sites, the guidance cannot be wholly prescriptive and that it is necessary to apply professional judgement to the assessment.
- 6.5.4. Due to the narrow, linear design of the Red Line Boundary, construction activities are unlikely to affect air quality at a strategic level within the Study Area as a whole.
- 6.5.5. An assessment of the likely significant effects on local air quality due to the generation and dispersion of dust and PM₁₀, and emissions from construction plant during the Construction Stage has been undertaken using the relevant assessment framework published by the IAQM

(IAQM, 2024), the available information at this stage of the Padeswood Spur Pipeline Proposed Development, and professional judgement.

Assessment of Operational Gas Venting

- 6.5.6. The Padeswood Carbon Dioxide Spur Pipeline proposes planned venting of the Carbon Dioxide Pipeline under the scenarios described in **paragraph 6.4.5**.
- 6.5.7. Both pigging campaigns and manifold venting scenarios are highly infrequent. Pigging campaigns (four PIG runs over a two-week period) are not anticipated to take place more than once a year. Manifold venting is planned to occur once every five years.
- 6.5.8. The transportation of compressed CO₂ is not, at present, specifically addressed under the Health and Safety at Work Act 1974 and Pipelines Safety Regulations 1996. The Detailed Design of the Padeswood Spur Pipeline Proposed Development will, under these safety regulations, ensure that risks associated with the release of CO₂ from storage under pressure, including the formation of an asphyxiating atmosphere, are as low as reasonably practicable. Therefore, in line with Planning Policy, this air quality assessment does not directly address the impacts of the release of CO₂ itself, since as stated by Health and Safety Executive (HSE) (Health and Safety Executive, 2024) *“where the risks are properly controlled the likelihood of a major hazard incident is expected to be very low, as in other similar processes in the energy, chemical and pipeline industries”*.
- 6.5.9. The CO₂ within the Padeswood Carbon Dioxide Spur Pipeline may contain impurities, principally Hydrogen Sulphide (H₂S). H₂S has potential health effects and is also odorous. The H₂S content of the pipeline gas will, through design specification, be limited to 5ppm. That is not to say that the H₂S content will be at 5 ppm at all times, rather this is a maximum allowable concentration from an emitter.
- 6.5.10. The assessment of impacts of H₂S used the ADMS (Cambridge Environmental Research Consultants Ltd) dispersion model (Version 6.0). Full details of the methodology are provided in **Appendix 6.2: Operational Modelling (Document Reference: PW.3.3.6.2)**.

SIGNIFICANCE CRITERIA

Construction Stage

- 6.5.11. The IAQM assessment methodology recommends that the significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity with appropriate mitigation

measures in place. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

- 6.5.12. For the assessment of the impact of exhaust emissions from plant used on-site on local concentrations of NO₂ and particulate matter, the significance of residual effects has been determined using professional judgement and the principles outlined in the EPUK/IAQM guidance.

Operation Stage

- 6.5.13. There is no specific guidance available to assess the significance of potential effects arising from highly infrequent venting operations.
- 6.5.14. As such, the assessment of significance has been based on professional judgement taking into account;
- The frequency of venting operations;
 - The extent of the population potentially exposed to pollutant concentrations likely to give rise to health effects;
 - The reversibility of the potential health effects after exposure ceases;
 - The potential for odour nuisance, which takes into account the nature of the odour; and
 - The potential for mitigation.

ASSUMPTIONS AND LIMITATIONS

- 6.5.15. The following assumptions and limitations for the assessment process were identified:
- The design data used to inform the Construction Dust Assessment, in particular onsite plant requirements and traffic movements is indicative at this stage.
 - An assessment of emissions arising from construction traffic on the local road network has been scoped out on the basis that traffic flows do not exceed criteria set out in EPUK/IAQM (IAQM, EPUK, 2017) guidance.
 - The Construction Dust Assessment assumes that dust generating activities could occur anywhere within the Red Line Boundary. This is a worst-case assumption.
 - The design of the venting systems is being finalised and will ensure that the Padeswood Carbon Dioxide Spur Pipeline and associated infrastructure can be operated safely and with all risks associated with the release of emissions appropriately managed.

6.6. BASELINE CONDITIONS

- 6.6.1. The Padeswood Spur Pipeline Proposed Development is located within the jurisdiction of Flintshire County Council (FCC). Baseline information in this section is drawn from the Annual Status Reports (ASRs) for local air quality produced by FCC under the requirements of the Environment Act 1995 (Environment Act, 1995).
- 6.6.2. FCC has no declared Air Quality Management Areas (AQMAs) within its administrative boundary. FCC undertake passive NO₂ diffusion tube monitoring within their administrative boundary. The results of this monitoring are shown in **Table 6-3**.

Table 6-3: Annual Mean NO₂ Monitoring Results undertaken by FCC

Site ID	Easting (m)	Northing (m)	Monitored Annual Mean NO ₂ Concentrations (µg/m ³)				
			2019	2020	2021	2022	2023
ADDC-075	324281	364926	21.2	17.8	17.1	15.2	17.7
ADDC-081	326643	365550	20.8	8.4	9.6	17.3	19.2
ADDC-084	324375	365007	28.2	23.6	23.2	21.8	23.1
ADDC-089	326643	365550	35.9	26.3	24.9	28.6	30.4
ADDC-100	323500	363397	17.8	15.3	14.9	21.2	22.4
ADDC-107	323975	363794	-	7.8	8.2	7.7	8.1
ADDC-108	327843	363856	21.8	13.8	13.5	7.5	7.1
ADDC-109	324530	363839	10.4	8.6	8.6	8.3	9.1
ADDC-122	324562	363840	26.5	23.3	21.6	20.6	20.0
ADDC-123	324281	364926	23.2	15.8	17.3	17.5	18.3

- 6.6.3. The existing monitoring demonstrates that air quality at receptors in the vicinity of the Padeswood Spur Pipeline Proposed Development is good, with concentrations of pollutants well below the relevant air quality objectives that are set out in the Air Quality Standards Regulations 2010.

Future Baseline

- 6.6.4. The future baseline scenario has considered the Padeswood Cement Works Carbon Capture and Storage (CCS) Project as developed prior to the Padeswood Spur Pipeline Proposed Development commencing.
- 6.6.5. Pollutant concentrations are anticipated to decrease in the future, most notably at the roadside, but also at background sites. This is primarily influenced by the replacement of older, more polluting vehicles with newer, cleaner vehicles as emissions technologies

improve and with the introduction of electric vehicles into the fleet. The updates to the vehicle fleet will most strongly affect NO₂ concentrations (for which road transport is the most significant local emissions source) and weaker for particulate matter. Concentrations of both pollutants are expected to decrease across the Study Area, with a lower risk of exceedance of the air quality objectives.

6.7. SENSITIVE RECEPTORS

6.7.1. The following sensitive Receptors have been assessed and are displayed in Table 6-4 below.

Table 6-4: Sensitive Receptors

Value / Sensitivity	Receptor
High	Argoed Hall/ Cygnet
High	Mold
Low	Buckley
High	Mynydd Isa
Low	Northop Hall
High (Ecological)	Deeside and Buckley Newt Sites Special Area of Conservation
High (Ecological)	Maes y Grug Site of Special Scientific Interest
High (Ecological)	Ancient Woodland Habitats

6.8. PRELIMINARY ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

6.8.1. This Section details the preliminary assessment of predicted impacts and effects for the Padeswood Spur Pipeline Proposed Development during the Construction, Operational and Decommissioning Stages.

CONSTRUCTION STAGE

6.8.2. Construction activities that have the potential to generate and/or re-suspend dust and PM₁₀ include:

- Site clearance and preparation;
- Preparation of temporary access/egress to the Padeswood Spur Pipeline Proposed Development and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling and disposal;
- Use of crushing and screening equipment/plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;

- Construction of buildings, roads and areas of hardstanding alongside fabrication processes; and
- Site landscaping after completion.

6.8.3. Most of the releases are likely to occur during the 'working week'. However, for some of the potential release sources (for example exposed soil produced from significant earthwork activities), dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place, in the absence of dust control mitigation measures.

Construction Dust Assessment

6.8.4. The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM₁₀ sources: demolition, earthworks, construction and trackout.

6.8.5. The assessment was undertaken for the following construction activities proposed as part of the Padeswood Spur Pipeline Proposed Development:

- Open trench construction;
- Trenchless installation techniques; and
- AGI construction

6.8.6. The assessment considers three separate dust impacts from each of the activities:

- Annoyance due to dust soiling (e.g. dust deposition on windows)
- The risk of health effects due to an increase in exposure to PM₁₀; and
- Harm to ecological receptors

6.8.7. A summary of the risk of impacts is presented in **Table 6.5** below.

Table 6-5: Summary of the Risk of Impacts from Dust

Construction Activity	Potential Impact	Earthworks	Construction	Trackout
Pipeline Trench Digging	Dust Soiling	Low Risk	Low Risk	Medium Risk
	Human Health	Low Risk	Low Risk	Low Risk
	Ecological	Low Risk	Low Risk	Low Risk
Trenchless Installation	Dust Soiling	Medium Risk	Low Risk	Low Risk
	Human Health	Low Risk	Low Risk	Low Risk
	Ecological	Medium Risk	Low Risk	Medium Risk
AGI Construction	Dust Soiling	Low Risk	Negligible	Low Risk
	Human Health	Low Risk	Negligible	Low Risk
	Ecological	Low Risk	Negligible	Low Risk

- 6.8.8. The largest potential impacts from dust soiling will occur during the trackout for pipeline trench digging and trenchless installation techniques. This is a function of both the dust emission magnitude and sensitivity of the area being assigned **medium**.
- 6.8.9. Impacts are possible for dust soiling and deposition of dust on ecological sites during both open trenched and trenchless installation techniques. Earthworks for these activities were assigned a **medium** dust emission magnitude, which may occur in areas of **medium** sensitivity for dust soiling, and **medium** sensitivity for ecological sites.
- 6.8.10. For ecological impacts, the Deeside and Buckley Newt Sites SAC and several designated ancient woodland habitats are with 50 m of the Red Line Boundary. This results in a **high** risk of impacts during earthworks for these activities, and therefore a potentially significant effect.

Construction Plant Emissions

- 6.8.11. Only indicative information on the number and type of plant to be used during the Construction Stage of the Padeswood Spur Pipeline Proposed Development is available. However, during the various construction activities, it is estimated that fewer than ten items of plant will be active at any one time on each work front per activity. Due to the temporary nature of the Construction Stage, relatively low pollutant background concentrations and the low number of receptors in proximity to the works, it is unlikely that there will be a significant effect as a result of the construction plant works.

OPERATIONAL STAGE

- 6.8.12. The likely significant effects for air quality associated with the Operational Stage are set out below.
- 6.8.13. **Table 6.6** below presents the maximum modelled hourly H₂S concentration from the Northop Hall and Padeswood AGIs from the scenarios modelled. The scenarios modelled are further detailed in **Appendix 6.2: Operational Modelling**.
- 6.8.14. It should be noted that pigging and manifold venting campaigns are highly infrequent and relatively short-term events (compared to annual mean averaging periods) that will have a negligible impact on annual mean concentrations of H₂S.

Table 6-6: Manifold and Pigging Campaign Results from the Northop Hall and Padeswood AGIs

AGI Site	Process Description	Maximum Hourly H ₂ S Concentration (µg/m ³) ^a	Meteorological Condition ^b	Flow Condition ^c	Worst-case Odour Zone (m) ^d
Northop Hall	Manifold	18.6	G (Stable)	Average, Cold	20-70 m
	PIG Launcher	3.8	G (Stable)	Average, Cold	-
Padeswood	Manifold	17.4	G (Stable)	Average, Cold	20-70 m
	PIG Launcher	4.3	G (Stable)	Average, Cold	-

^a Concentrations emboldened represent an exceedance of the odour threshold of 7 µg/m³

^b Indicative meteorological conditions are modelled that represent the possible states of the atmosphere, termed A to G. These conditions range from unstable conditions (typical of sunny days with light winds, A to C) through neutral conditions (cloudy/windy periods, C to E) to stable conditions (clear nights with light winds, F to G)

^c Flow conditions refer to the state of the vented gas giving rise to maximum ground level concentrations defined as:

- Peak = Maximum flow sustained for the hour (usually occurring directly after opening the valve)
- Average = Average flow sustained for the hour
- Ambient = Temperature of the release is the same as the ambient air

Cold = Temperature of the releases is set to -60°C

^d Range given as a maximum over all flow and meteorological conditions. Zones marked with a (*) occur during peak flow conditions

- 6.8.16. With a 10 m temporary vent stack, the results of the modelling indicate that there is no risk of significant health effects in the vicinity of the AGIs during any of the scenarios presented in **Table 6-6**.
- 6.8.17. The highest Process Contribution (PC) (18.6 µg/m³) was modelled during the manifold venting at the Northop Hall AGI using an average, cold flow condition. The odour risk zones for both the Northop Hall and Padeswood AGIs occur from 20 m to 70 m of the point of release under stable meteorological conditions with a peak, cold condition for the venting.

- 6.8.18. There are no human receptors within the odour risk zone for Northop Hall or Padeswood AGI. It is anticipated that the odour zone will quickly decrease in size as the gas in the manifold empties. The closest human receptors to the AGIs are Highfield Hall (approximately 150 m from the Northop Hall AGI) and the existing Padeswood Cement Works (approximately 90 m from the Padeswood AGI).
- 6.8.19. It should be noted that there is a public access footpath located alongside the Padeswood AGI where users may enter the modelled odour zone and as such be briefly exposed to odour. Mitigation measures to reduce the likelihood of these impacts are presented below.
- 6.8.20. The risk of odours is limited to stability class G, which is representative of extremely stable conditions. These conditions are rare and will occur almost exclusively during the night. Typical conditions within the UK are stability class D, representing cloudy and/or windy conditions. There are no odours detected in meteorological conditions A-F during any of the venting scenarios.

DECOMMISSIONING STAGE

- 6.8.21. The likely significant effects for air quality associated with the Decommissioning Stage are set out below.
- 6.8.22. The IAQM Construction Dust Assessment methodology was used to assess the air quality effect of the Decommissioning Stage. There is no construction likely, only dismantling/demolition of the AGIs. As such, only impacts relating to demolition and trackout were assessed for this stage.
- 6.8.23. For demolition of the AGIs, there is expected to be less than 12,000m³ of building volume per site, therefore the dust emission magnitude is **small**.
- 6.8.24. For trackout, it is not currently known how many HDVs will be required however there are unlikely to be more than 50 HDVs leaving the site each day. Therefore the dust emission magnitude is **medium**

6.9. MITIGATION AND ENHANCEMENT MEASURES

- 6.9.1. This Section sets out the preliminary avoidance, mitigation and compensation measures which are likely to be required to address the significant effects as assessed in **Section 6-8**.

CONSTRUCTION STAGE

- 6.9.2. The following mitigation measures are based on the outcome of the Construction Dust Assessment. These measures apply to all general

construction work, sites and compounds and are included within the OEMP (Document Reference: PW.4.1).

- Record all dust and air quality complaints, identify causes, take appropriate practical measures to reduce emissions in a timely manner, and record the measures taken. Make this log available for the local authority if called upon;
- Record any exceptional incidents that cause dust and/or dust emissions (either on or off site) and any action taken to resolve the situation in a site log book;
- Undertake on and off-site inspections (up to a minimum of 50m from the site boundary), increasing the frequency of these inspections when site activities being undertaken have a high potential to produce dust;
- Agree a Dust Monitoring Plan with the local authority, using either dust deposition, dust flux or real-time PM₁₀ continuous monitoring at the Centralised Compound;
- Plan site layout so that machinery is located away from receptors so far as it is possible;
- Where construction is undertaken near sensitive receptors, such as residential properties and designated ecological sites (including ancient woodland), solid screens or barriers should be erected around activities likely to generate dust (such as concrete batching or digging in dry soils with a high clay content) or the site boundary that are at least as high as any stockpiles on site;
- Manage earthworks and exposed areas or soil stockpiles to prevent wind-borne dust using measures such as covering, seeding or water suppression;
- Ensure all vehicle engines are switched off when not in use and ensure there is no idling;
- Where reasonably practicable, more sustainable on-site energy generation should be investigated, rather than the use of diesel or petrol-powered generators;
- Impose and signpost a maximum speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced haul roads and work areas;
- The most practically sustainable form of transport for the delivery of goods and materials will be investigated and selected for use, so far as reasonably practical;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;

- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use covered skips;
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- There will be no bonfires or burning of waste materials;

6.9.3.

Table 6-7 sets out the measures that should be applied to specific phases of works undertaken on site.

Table 6-7: Mitigation measures specific to phases of work in the Construction Stage

Specific Works	Mitigation Measure
Earthworks	Following excavation works, return subsoil and topsoil at the earliest suitable time of year after construction has been completed.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	All construction plant and equipment will be maintained in good working order.
	Use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site.
	Avoid dry sweeping of large areas where possible.
	Ensure vehicles carrying materials are appropriately covered when entering and leaving sites to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable
	Record all inspections of haul routes and any subsequent action in a site log book
	Where works are undertaken in built-up areas, install haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned
	Where trackout is likely to occur, such as access points to the local highway near sensitive receptors, temporary hard surfacing will be prepared. Upon review of on-site activities, wheel washing facilities will be implemented where they are deemed to be required.

OPERATION STAGE

- 6.9.4. The modelling, based on design criteria of specific vent details indicates that there is a minor risk of odours during manifold venting at the Northop Hall and Padeswood AGIs. It is recommended that maintenance venting takes place during the day to avoid meteorological stability class G, thereby minimising the likelihood of odours.

- 6.9.5. In the case of Padeswood AGI, it is recommended that, when maintenance venting operations are planned to take place, signs will be placed on/near the nearby footpaths (301/55/10 and 301/56/10), warning of potential works and that odours may be experienced on the dates selected for maintenance venting

6.10. ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

- 6.10.1. This section details the assessment of significant effects taking account of the secondary and tertiary mitigation detailed in **Section 6.9** above.

CONSTRUCTION STAGE

- 6.10.2. The impact to air quality from the Construction Stage is considered **low**. However, through good site practise and the implementation of suitable mitigation measures, the impact of dust and PM₁₀ release will be reduced to negligible.

OPERATIONAL STAGE

- 6.10.3. With the implementation of suitable mitigation measures there are no likely significant effects anticipated during the Operation Stage of the Padeswood Spur Pipeline.

DECOMMISSIONING STAGE

- 6.10.4. With appropriate, industry best practice mitigation measures, the impact to air quality from the Decommissioning Stage is considered **negligible**.

6.11. MONITORING

- 6.11.1. The outcome of the Construction Dust Assessment indicates that monitoring of dust and particulate matter should be undertaken during the construction stage and form part of the mitigation measures presented in **Section 6.9**.
- 6.11.2. A monitoring regime of PM₁₀ should be agreed with the Local Authority. This monitoring should be undertaken in areas where the risk of impacts is considered high (i.e. key work/trackout areas near residential receptors and habitat sites)
- 6.11.3. On and off-site inspections of nearby sensitive receptors should take place at the frequency agreed within the Dust Management Plan, with an increased frequency around periods where activities with a high potential to generate dust occur.

6.12. RESIDUAL EFFECTS

6.12.1. **Table 6-8** below summarises the residual effects associated with the Padeswood Spur Pipeline Proposed Development during construction, operation and decommissioning.

Table 6-8: Summary of Residual Effects

Receptor	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Construction Stage			
Dust soiling effects during track-out for pipeline trench digging and trenchless installation	Moderate Adverse (Significant)	Mitigation measures described in Section 6.9	Negligible (Not Significant)
Dust soiling impacts during earthworks for trench digging and trenchless installation	Moderate Adverse (Significant)	Mitigation measures described in Section 6.9	Negligible (Not Significant)
Effects to ecological sites during earthworks for trench digging and trenchless installation	Moderate Adverse (Significant)	Mitigation measures described in Section 6.9	Negligible (Not Significant)
Operation Stage			
Odours from pigging/manifold venting	Minor Adverse (Not Significant)	Venting during the day and meteorological conditions should be checked before commencement of pipeline maintenance	Negligible (Not Significant)

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