



# **CAS-03463-R2W9C2 - Kronospan Low Carbon CHP Facility**

## **Environmental Statement**

### **Vol2: Chapter 11.0 – Population and Human Health**

Prepared for



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DNS5-2-011



# Document Control

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## CONTENTS

<b>11.0</b>	<b>POPULATION AND HUMAN HEALTH .....</b>	<b>1</b>
11.1	Introduction .....	1
11.2	Planning Policy, Legislation and Guidance .....	2
11.3	Consultation .....	4
11.4	Assessment Methodology .....	8
11.5	Baseline Environment .....	14
11.6	Initial Development Design and Impact Avoidance/Reduction Measures .....	14
11.7	Assessment of Potential Effects .....	15
11.8	Inter-Relationship of Potential Effects .....	24
11.9	Further Mitigation and Monitoring .....	25
11.10	Summary of Potential Residual Effects .....	25
11.11	Cumulative Effects .....	25
11.12	Enhancement Measures .....	27
11.13	Conclusions .....	27

## TABLES

Table 11.1 – Summary of (Population and Human Health) Scoping Direction Responses.....	5
Table 11.2 – Summary of Other Stakeholder Engagement .....	7
Table 11.3 – Summary of (Population and Human Health) Pre-Application Consultation Responses.....	7
Table 11.4 – Health Sensitivity Methodology Criteria.....	9
Table 11.5 – Health Magnitude Methodology Criteria.....	10
Table 11.6 – Level of Effect Matrix .....	11
Table 11.7 – Significance Conclusion and Reasoning Related to Public Health .....	11
Table 11.8 – Baseline Data Inputs for the Quantitative Health Assessment Relating to Changes in Air Quality.....	14
Table 11.9 – Maximum Change in Annual Mean Pollutant Concentrations .....	19
Table 11.10 – Changes in Health Outcomes Associated with the Average Change in Air Pollutant Annual Mean Concentrations.....	21

## APPENDICES

### Appendix 11A – Population and Health Baseline



## 11.0 POPULATION AND HUMAN HEALTH

### 11.1 Introduction

#### *Introduction*

- 11.1.1 This chapter of the Environmental Statement (ES), along with the accompanying Appendix, addresses the potential effects on population and human health during the construction, operation, and decommissioning of the Proposed Development. A description of the Proposed Development is provided in **ES Chapter 4.0 (Description of the Proposed Development)**.

#### *Competence*

- 11.1.2 This chapter has been prepared by Tara Barratt (Associate Director, Health and Social Impact at Savills). Tara has an MSc (DIC) in Environmental Technology with a focus in environmental epidemiology and BSc (Hons) in Geography. Tara has more than eight years' worth of dedicated health impact assessment experience on nationally significant infrastructure projects (DNS and DCO) across a range of sectors, including waste, energy and transport. Tara sits on the IEMA health in EIA Working Group and is acknowledged for her contribution in developing IEMA guidance for health in EIA effective scoping and significance criteria.
- 11.1.3 The chapter has been reviewed by Dr Andrew Buroni (Director of Health and Social Impact at Savills), who holds a Biological/Biomedical Science degree with honours, a Masters in Environmental Impact Assessment (EIA) and a PhD on International Health Impact Assessment (HIA) Methods and Best Practice. He has received formal training in Environmental Health Impact Assessment (EHIA) at the Caribbean Environmental Health Institute by the Pan American Health Organisation and Health Canada, and at the International Health Impact Assessment Consortium (IMPACT) at the University of Liverpool. Dr Buroni is an internationally recognised expert in health and social impact assessment with over 25 years of experience. Dr Buroni sits on the IEMA Health in EIA Working Group, provides Local Authority Training on behalf of the Office for Health Improvement and Disparities (OHID), is acknowledged in much of the UK HIA Guidance, and presented UK Health Assessment Best Practice with the RTPI for the American Planning Association (APA).



## 11.2 Planning Policy, Legislation and Guidance

### *National Planning Policy*

- 11.2.1 The following national planning policies are relevant to the assessment:
- 11.2.2 Planning Policy Wales Edition 12 (Welsh Government, 2024) aims to deliver the vision set out by the Well-being of Future Generation Act. As such, “promoting healthier places” is identified as one of several key themes which collectively contribute to placemaking in Wales. It is recognised that the built and natural environment is a key determinant of health and wellbeing, whereby the planning system, and planning authorities themselves, have a role to play in the prevention of physical and mental illnesses caused, or exacerbated by, a range of factors which determine health (e.g. pollution, disconnection of people from social activities, and promotion of travel patterns which facilitate active lifestyles). As a result, the planning system must consider the impacts of all proposed developments on existing communities to maximise health protection, wellbeing and safeguard amenity.
- 11.2.3 The “promoting healthier places” theme goes on to state that where significant effects on human health are likely to arise as a result of development plans or individual development proposals, environmental impacts should be considered in full knowledge of the likely consequences for health.
- 11.2.4 In addition, within Planning Policy Wales Edition 12 and in the context of the Proposed Development, health protection is mentioned in the context of specific determinants of health:
- Bullet one of paragraph 5.13.1 states that the management of waste should minimise adverse environmental impacts and avoid risks to human health.
  - Paragraph 6.7.2 states that National air quality objectives are not ‘safe’ levels of air pollution but rather represent a pragmatic threshold above which the government considers the health risks associated with air pollution to be unacceptable. Air just barely compliant with these objectives is not ‘clean’ and still carries long-term population health risks. Nitrogen dioxide and particulate matter, which are the pollutants of primary national concern from a public health perspective, currently have no safe threshold defined and therefore the lower the concentration of those pollutants the lower the risks of adverse health effects. It is desirable to keep levels of pollution as low as possible.

- Paragraph 6.7.3 states that problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Lower levels of noise can still be annoying or disruptive and impact on amenity and as such should be protected through the planning process wherever necessary.
- Paragraph 6.7.4 states that the planning system should consider long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.
- Paragraph 6.7.14 states that proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur.
- Paragraph 6.7.17 states that the location of potentially polluting development adjacent to sensitive receptors will be unacceptable where health and amenity impacts cannot be minimised through appropriate design and mitigation measures.

### ***Local Planning Policy***

#### ***Overview***

- 11.2.5 The adopted local development plan for Wrexham County Borough Council (WCBC) comprises the Wrexham Unitary Development Plan 1996-2011 (the UDP) which was adopted in February 2005. However, the local development plan has been through significant upheaval in recent years. WCBC adopted the Local Development Plan 2013-2028 (the LDP) on 20 December 2023, however, the decision to adopt the LDP has subsequently been quashed by a High Court Order issued on 12 June 2025. The LDP has therefore been returned to unadopted status and the UDP has been returned to being the adopted development plan. Further information regarding the status of the UDP and LDP is provided in the Planning Statement (**DNS4-001**).
- 11.2.6 In the above context, relevant policies from the UDP and LDP are set out below.



### *Wrexham Unitary Development Plan*

- 11.2.7 While there are references to “health” in the Wrexham Unitary Development Plan (UDP), these are in the context of healthcare infrastructure which is not relevant to the Proposed Development.

### *Wrexham Local Development Plan*

- 11.2.8 The following policies within the Wrexham Local Development Plan (LDP) are considered relevant to this assessment:
- 11.2.9 Policy SP13 (Health and Wellbeing) states that all development should seek to reduce health inequalities and provide opportunities for healthy lifestyles and improving health and well-being, including mental health, by addressing the physical, economic and social determinants of health.

### *Legislation and Guidance*

- 11.2.10 The following key pieces of legislation and guidance are considered relevant to this assessment:
- 11.2.11 Achieving a healthier Wales, whereby people’s physical and mental well-being is maximised and choices/behaviours that benefit future health are understood, is one of seven goals outlined in the Well-being of Future Generations (Wales) Act 2015 (Welsh Assembly, 2015).
- 11.2.12 The IEMA guidance on ‘Determining Significance for Human Health in EIA’ (IEMA, 2022) responds to gaps and inconsistencies across existing guidance as to how health, particularly regarding significance (including sensitivity and magnitude classifications), is assessed in EIA. This promotes greater consistency in the assessment process; particularly in how EIA health conclusions are reached, interpreted, defended and applied to the greatest positive effect.

## **11.3 Consultation**

### *EIA Scoping Direction*

- 11.3.1 In accordance with Regulation 14 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (The EIA Regulations), a formal request for a Scoping Direction was submitted to Planning and Environment



Decisions Wales (PEDW) on 30 May 2024 and was accompanied by a Scoping Report (**Appendix 1C**) which set out the proposed EIA scope of the Proposed Development.

- 11.3.2 A formal Scoping Direction (**Appendix 1D**) was issued by PEDW on 31 July 2024 which confirmed that the Proposed Development would fall under Schedule 1, Part 10 of the EIA Regulations (and would therefore require EIA) and provided PEDW's opinion regarding the proposed EIA scope of the Proposed Development.
- 11.3.3 A response to the Scoping Direction setting out how each matter is addressed in the ES and details of where areas of disagreement are clarified and/or resolved is provided at **Appendix 1G**.
- 11.3.4 A summary of the Scoping Direction responses (and the Applicant's response) relevant to population and human health is provided at **Table 11.1** below.

**Table 11.1 – Summary of (Population and Human Health) Scoping Direction Responses**

Consultee	Summary of Consultee Response	How Response has been Addressed in the ES
PEDW	The Applicant should ensure that the ES addresses any significant effects on population and human health, in light of the EIA Regulations 2017. This could be addressed under the separate topic chapters or within its own specific chapter.	Contrary to the approach defined in the Scoping Report, a standalone chapter is provided to assess in detail the potential population and human health effects.
PEDW	The Scoping Report confirms that human health impacts associated with noise, air quality and odour, and climate change would be addressed in the relevant chapters. Therefore, PEDW scope human health into the ES, but not as a standalone chapter. The topics noted above must include an assessment of impact for human health.	

### ***EIA Scoping Direction - Addendum***

- 11.3.5 Following receipt of the Scoping Direction (**Appendix 1D**), formal pre-application advice from PEDW (received 19 June 2024), further informal discussions with PEDW and informal pre-application discussions with WCBC, the Applicant issued (on 15 October 2024) a document to PEDW entitled 'EIA Scoping Direction Clarification and Update to the Proposed Development Design' (**Appendix 1E**). This document



provided details of the proposed changes to the Proposed Development which arose since the initial pre-application advice was sought, as well as setting out broad areas of agreement and disagreement/clarification with the EIA Scoping Direction referred to above. A summary of the main Proposed Development design changes made at this point is provided below:

- The status of the existing K7 Biomass Plant would change from ‘remaining in operation’ to ‘remain in situ but be used as a back-up biomass plant only’ – as a result, the existing K7 Biomass Plant feedstock would be re-directed for use in the proposed Low Carbon CHP Facility.
- A detailed review of CHP Facility feedstock generated on-site was undertaken to understand the maximum wood residue feedstock that would be generated from existing and planned manufacturing operations.
- The proposed use of Refuse Derived Fuel (RDF) was removed.

11.3.6 The proposed change to the Proposed Development design also confirmed that the proposed electrical generating capacity of the proposed Low Carbon CHP Facility would increase from 30 megawatts (MW) to 40MW.

11.3.7 An EIA Scoping Direction Addendum (see **Appendix 1F**) was issued by PEDW on 14 January 2025 and provides PEDW’s updated opinion regarding the proposed EIA scope of the Proposed Development.

11.3.8 A response to the Scoping Direction Addendum setting out how each matter is addressed in the ES and details of resolution of areas of disagreement is provided at **Appendix 1G**. The Scoping Direction Addendum states that PEDW concurs with the approach set out in the ‘EIA Scoping Direction Clarification Document and Notification of Formal Update to the Proposed Development Design’ document which proposed a standalone ES chapter on Population and Human Health.

#### ***Other Engagement with Stakeholders***

11.3.9 Ongoing consultation has been undertaken with relevant stakeholders as required to ensure that key issues were identified and discussed prior to the completion of the EIA. A summary of the stakeholder responses and how they have been addressed are provided in **Table 11.2** below.



**Table 11.2 – Summary of Other Stakeholder Engagement**

Consultee	Date	Summary of Response	How Response has been Addressed in the ES
Public Health Wales	07/01/2025	Meeting to discuss baseline data collection	Public Health Wales were able to provide guidance on the available baseline public health data to inform the quantitative exposure response assessment.

### ***Statutory Pre-Application Consultation***

- 11.3.10 Sections 7, 8, 9, and 11 of the Developments of National Significance (Procedure) (Wales) Order 2016 (as amended) ('the DNSPWO) and Section 61Z of the Town and Country Planning Act 1990 require the Applicant to undertake statutory consultation prior to submitting a Development of National Significance (DNS) application. The statutory pre-application consultation period was between (insert date) and (insert date). **THIS PARAGRAPH IS A PLACEHOLDER AND WILL BE FINALISED UPON COMPLETION OF PRE-APPLICATION CONSULTATION – THE PAC REPORT IS NOT YET AVAILABLE.**
- 11.3.11 A series of responses from consultees received in month 2024 identified issues relating to population and human health matters, as set out in **Table 11.3** below. Full consultee responses (and how each has been addressed) is provided in the Pre-Application Consultation (PAC) Report (**DNS4-009**). **THIS PARAGRAPH IS A PLACEHOLDER AND WILL BE FINALISED UPON COMPLETION OF PRE-APPLICATION CONSULTATION – THE PAC REPORT IS NOT YET AVAILABLE.**

**Table 11.3 – Summary of (Population and Human Health) Pre-Application Consultation Responses**

Consultee	Summary of Consultee Response	How Response has been Addressed in the ES

Consultee	Summary of Consultee Response	How Response has been Addressed in the ES

## 11.4 Assessment Methodology

### *Introduction*

- 11.4.1 The significance of an effect is typically determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied to characterise the sensitivity of receptors and the magnitude of potential impacts for the proposed assessment of health-related effects.

### *Sensitivity of Receptors*

- 11.4.2 Within a defined population, individuals will range in level of sensitivity due to a series of factors such as age, socio-economic deprivation and the prevalence of any pre-existing health conditions which could become exacerbated. These individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially), whereby they could experience disproportionate effects when compared to the general population.
- 11.4.3 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than for someone of working age who has good respiratory health. On the other hand, an individual who has been unemployed for a long period of time would benefit more from employment opportunities generated by the Proposed Development in comparison to an individual who is already employed.
- 11.4.4 The health sensitivity methodology criteria shown in **Table 11.4** has been used to inform the assessment of significance.

**Table 11.4 – Health Sensitivity Methodology Criteria**

Category/Level	Indicative Criteria
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

- 11.4.5 Extensive baseline data has been collected to interpret local health circumstance and consequent population sensitivity. This information is provided in **Appendix 11A**. Overall, it is concluded that baseline local health circumstance in the Study Area is better than or comparable to the national average.
- 11.4.6 As such, when looking at the population in general, the existing burden of poor health and sensitivity of the population within the Study Area is “low”. However, this does not exclude the probability that there will be individuals within a defined population who are particularly sensitive and could experience disproportionate effects.
- 11.4.7 To identify any particularly vulnerable groups which should be considered in the population and health assessment (for example, those using schools and care

homes) who are particularly sensitive and could experience disproportionate effects, an exercise was completed in QGIS using OS AddressBase data.

- 11.4.8 The exercise identified all registered receptors within 500m of the application boundary. The search results returned the following types of receptors: industrial, office, retail, utility, development, dwelling, house in multiple occupation, residential institution and place of worship. Of relevance to the assessment of vulnerable groups is the residential institution (Chirk Court Care Home), which will have elderly residents, and Chapel Lane Methodist Church, which according to their website, holds Sunday worship at 11.00 and 18.00.

### ***Magnitude of Impact***

- 11.4.9 The health magnitude methodology criteria shown in **Table 11.5** has been used to inform the assessment of significance.

**Table 11.5 – Health Magnitude Methodology Criteria**

Category/Level	Indicative Criteria
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

### **Significance of Effect**

11.4.10 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. The method employed for this assessment is presented in **Table 11.6**. Where a range of significance levels are presented, the final assessment for each effect is based upon evidence based expert judgment.

11.4.11 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect will be informed by professional judgment and underpinned by a narrative to explain the conclusions reached.

**Table 11.6 – Level of Effect Matrix**

		Sensitivity			
		High	Medium	Low	Very low
Magnitude	High	Major	Major / moderate	Moderate / minor	Minor / negligible
	Medium	Major / moderate	Moderate	Minor	Minor / negligible
	Low	Moderate / minor	Minor	Minor	Negligible
	Negligible	Minor / negligible	Minor / negligible	Negligible	Negligible

11.4.12 **Table 11.7** provides a description of each significance level. For this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

**Table 11.7 – Significance Conclusion and Reasoning Related to Public Health**

Category/Level	Indicative Criteria
Major (significant)	<p>The narrative explains that this is significant for public health because:</p> <ul style="list-style-type: none"> <li>Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect.</li> <li>Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable).</li> <li>There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and</li> </ul>

Category/Level	Indicative Criteria
	<p>scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes.</p> <ul style="list-style-type: none"> <li>In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the project.</li> </ul>
Moderate (significant)	<p>The narrative explains that this is significant for public health because:</p> <ul style="list-style-type: none"> <li>Changes, due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views.</li> <li>Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable).</li> <li>There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes.</li> <li>In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the project.</li> </ul>
Minor (not significant)	<p>The narrative explains that this is not significant for public health because:</p> <ul style="list-style-type: none"> <li>Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders.</li> <li>Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable).</li> <li>There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the project and changes to health outcomes.</li> <li>In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.</li> </ul>

Category/Level	Indicative Criteria
Negligible (not significant)	<p>The narrative explains that this is not significant for public health because:</p> <ul style="list-style-type: none"> <li>• Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders.</li> <li>• Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable).</li> <li>• There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes.</li> <li>• In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.</li> </ul>

### *Geographical Scope*

- 11.4.13 Environmental health determinants (such as changes to air quality and noise exposure) typically have a local distribution pattern, where the hazards are limited by their concentration and physical dispersion characteristics. Likewise, changes in transport nature and flow rate have a particular distribution on the local road network.
- 11.4.14 As baseline data is limited to administrative boundaries, collection of demographic and physical health data (relevant to environmental health determinants) focusses on all administrative areas that fall within 500m of the Proposed Development. This comprises: Wrexham 019 MSOA. It should be noted that trend data is not readily available at the MSOA level and therefore data presented in **Appendix 11A** primarily relates to Wrexham district, which are considered to be appropriately representative of the communities living in Wrexham 019 MSOA.
- 11.4.15 The Study Area defining the relevant sensitive receptors identified for assessment purposes is proposed to remain consistent with the inter-related technical aspects which inform the assessment of population and health.



## 11.5 Baseline Environment

- 11.5.1 Different communities have varying susceptibility to health and wellbeing effects (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstance.
- 11.5.2 The full baseline is provided in **Appendix 11A**. In summary, the population living in the Study Area is more elderly than the national average. Physical and mental health circumstance in the Study Area is generally comparable to or better than the Wales average. Lifestyle and behavioural risk factors show worse circumstance currently, but a fair amount of fluctuation. On this basis, and as previously stated, the sensitivity of the population within the Study Area is considered to be “low”.
- 11.5.3 **Table 11.8** outlines the specific baseline data that has been used within the quantitative assessment relating to changes in local air quality.

**Table 11.8 – Baseline Data Inputs for the Quantitative Health Assessment Relating to Changes in Air Quality**

Indicator	Rate (per 100,000 population)	Notes
All cause mortality	950 (per 100,000 population)	Wrexham 019 MSOA, 3-year average (2018-20)
Respiratory disease hospital admissions	1,506 (per 100,000 population)	Wrexham 019 MSOA, 3-year average (2018/19 to 2020/21)
Cardiovascular disease hospital admissions	1,492 (per 100,000 population)	Wrexham 019 MSOA, 3-year average (2018/19 to 2020/21)

## 11.6 Initial Development Design and Impact Avoidance/Reduction Measures

### Overview

- 11.6.1 General design measures to avoid or minimise the potential for significant effects are described in **ES Chapter 4.0 (Description of the Proposed Development)**.
- 11.6.2 Design measures to avoid or minimise the potential for significant population and human health effects are summarised below. It should be noted that mitigation measures adopted as part of the construction and operation of the project focus on

environmental precursors to adverse population and health outcomes, thereby providing an opportunity for intervention to prevent any manifest health outcome.

### ***Construction and Decommissioning***

- 11.6.3 A Framework Construction Environmental Management Plan (CEMP) (**DNS4-003**) is provided with this DNS application and presents the approach to and the application of environmental management and mitigation for the construction of the Proposed Development. A series of phase specific CEMP documents (as required) which define specific measures to be adopted during the construction of the various components of the Proposed Development would be produced (post-consent) by the Principal Contractor (PC). The Framework CEMP will control the generation or release of environmental pollutants with the potential to cause adverse population and health outcomes.
- 11.6.4 A Construction Traffic Management Plan (CTMP) would be implemented to manage disturbances to the local community during the construction period. The CTMP is anticipated to be secured via a planning condition and such measures would include, but is not limited to: construction phasing and timescales; restrictions on vehicle delivery hours; HGV routing strategy; and staff parking arrangements.

### ***Operation***

- 11.6.5 A Dust Management Plan (DMP) and Odour Management Plan (OMP) are in place for the existing Kronospan Facility, which have been developed in line with the requirements of NRW and include details of the management procedures, mitigation measures, monitoring, reporting, actions and identified improvements and a timeline for implementation. These management plans will be revised to include the proposed Low Carbon CHP Facility.

## **11.7 Assessment of Potential Effects**

### ***Introduction***

- 11.7.1 The following section sets out the assessment of effects taking into consideration the initial development design and impact avoidance/reduction measures detailed in **Section 11.6** above.



### ***Construction Phase***

#### *Health Effects from Changes in Air Quality*

- 11.7.2 As outlined in **ES Chapter 6.0 (Air Quality and Odour)**, there is the potential for changes in local air quality associated with dust from demolition, earthworks, on-site construction activities and trackout, and exhaust pollutants from construction-related traffic.
- 11.7.3 In terms of changes in local air quality from exhaust pollutants from construction-related traffic, as outlined in **ES Chapter 6.0 (Air Quality and Odour)**, the maximum number of vehicle movements during the construction phase would be lower than the operational phase. On this basis, please refer to the operation phase assessment for a worst-case assessment.
- 11.7.4 Regarding the potential for dust impacts, with the implementation of appropriate mitigation measures, the residual effect from dust at nearby receptors is expected not to be significant.
- 11.7.5 On the basis that dust emissions would be mitigated to a level which is not significant in air quality terms, and any potential changes would be temporary and short-term in nature, the magnitude of impact on population and human health would be negligible. Considering the low sensitivity of the general population, the resultant significance of effect is negligible (not significant).

#### *Health Effects from Changes in Noise Exposure*

- 11.7.6 As the construction works would typically take place during normal daytime operating hours, the potential for sleep disturbance and associated impacts on human health are limited. Therefore, the focus of this assessment is on annoyance during the daytime.
- 11.7.7 As outlined in **ES Chapter 5.0 (Noise and Vibration)**, there would be a range of on-site noise sources during the construction phase (e.g. excavators, haulage lorries, piling rigs, cranes, telehandlers, dumpers, concrete plant, diggers, power tools and road surfacing plant), the use of which would vary from day to day and may be in use at different stages of the construction period for relatively short durations.



- 11.7.8 The noisiest activities are expected to be generated during soil movement, piling and infrastructure work during the initial stages of construction when excavators, piling rigs, dozers, road construction and surfacing plant or similar may be in use. However, actual noise levels produced by construction work would vary at the nearest property boundary at any time depending upon several factors including the plant location, duration of operation, hours of operation, intervening topography and type of plant being used.
- 11.7.9 For the receptors assessed, predicted noise levels from on-site construction activities would not exceed the threshold value of 65 LAeq dB (this is the Significant Observed Adverse Effect Level (SOAEL), i.e. the level above which significant adverse effects on health and quality of life occur). As outlined in **ES Chapter 5.0 (Noise and Vibration)**, the majority of receptors would experience a negligible change in noise exposure; this is on the basis that they do not exceed the Lowest Observed Adverse Effect Level (LOAEL).
- 11.7.10 The exception to this is R12 (the Chirk Marina and canal which have live aboard boaters which use the canal and can also reside at the marina for periods), which would experience slight changes in noise exposure on the basis that noise levels during construction may be above or equal to the LOAEL and below the SOAEL. While this is the case, it should be noted that live aboard boaters would not reside in the affected area permanently and have the ability to move to a different location, which would reduce the potential for adverse population and health impacts.
- 11.7.11 In addition, there is potential for changes in noise exposure associated with construction traffic. While this is the case, the operation phase assessment is considered worst-case on the basis that the maximum number of vehicle movements during the construction phase would be lower than the operational phase.
- 11.7.12 Overall, changes in noise exposure would be negligible at the majority of receptors other than R12 (associated with on-site construction noise) whereby as live aboard boaters this receptor has the ability to move to another location. Furthermore, considering the temporary and short-term nature of construction noise impacts, it is not considered that there would be any change in health and wellbeing outcomes at the population level. As such, the magnitude of impact on population and human health would be negligible. Considering the low sensitivity of the general population, the resultant significance of effect is negligible (not significant).



### *Health Effects from Changes in Transport Nature and Flow Rate*

- 11.7.13 As outlined in the Transport Statement (**DNS4-005**), construction phase traffic impacts would be no greater than for the operation phase. On this basis, please refer to the operation phase assessment for a worst-case assessment.

### **Operation Phase**

### *Health Effects from Changes in Air Quality*

#### Introduction

- 11.7.14 As outlined in **ES Chapter 6.0 (Air Quality and Odour)**, there is the potential for changes in local air quality associated with exhaust pollutants from operational phase traffic, operational phase process emissions, and operational phase fugitive dust and odour emissions.

#### Traffic Emissions

- 11.7.15 Regarding operational traffic, the maximum additional number of vehicle movements during the operational phase is expected to be 14 two-way HGV movements per day, with only a small number of staff required which would likely comprise existing staff members. As this change in HGV movements is lower than the threshold for assessing air quality impacts, which indicates that the potential impacts from an air quality perspective would be negligible, the potential secondary impacts on human health would also be negligible.

#### Process Emissions

- 11.7.16 Air quality modelling results for changes in process emissions are provided in **Appendix 6D**, whereby the following scenarios have been assessed for the operational phase:
- normal operations;
  - MDF 2 offline;
  - MDF 1 offline; and
  - MDF 1 and 2 offline (proposed Low Carbon CHP Facility only).

11.7.17 The maximum change in annual mean pollutant concentrations outside of the site boundary for the scenarios above are summarised in **Table 11.9**. While there are some human receptors located close to the site boundary, it should be noted that the reported impacts are not the change in annual mean pollutant concentration at residential receptors and so is not representative of changes in exposure to human receptors.

**Table 11.9 – Maximum Change in Annual Mean Pollutant Concentrations**

Pollutant	Normal Operations	MDF1 Offline	MDF2 Offline	CHP Facility Only
Nitrogen dioxide	7.47	6.33	5.37	0.19
Particulate matter (excl. dust units)*	1.68	1.35	1.07	0.02
Particulate matter (incl. dust units)	10.02	10.02	10.02	N/A

\* The modelling assumes each item of plant (including all the dust units) operates at maximum capacity and emissions are at the relevant emission limit values (ELVs) (or guarantee in the case of the dust units), and in the case of particulate matter (PM) impacts the dust only consists of PM<sub>10</sub>, or PM<sub>2.5</sub>. As discussed in Appendix 6C although the Kronospan Facility operates on a 24-hour basis the operational loading of each process is well below 100%, and each source operates below the ELVs, and in some cases by a significant margin. Therefore, these results are considered to be extremely conservative.

11.7.18 The changes described above would not result in any exceedances of the relevant objective thresholds set to be protective of the environment and human health. While this is the case, a quantitative exposure response assessment has been undertaken to better understand the distribution of changes in air quality and potential effects on health outcomes across the population.

11.7.19 As the maximum change in annual mean pollutant concentrations varies by pollutant, the predicted impact on health outcomes from changes in air quality for each of the following scenarios were assessed, whereby the contribution of changes in air quality relating to the proposed Low Carbon CHP Facility only have been added to each:

- normal operations;
- MDF 1 offline; and
- MDF 2 offline.

11.7.20 The following health outcomes were assessed:

- annual all cause mortality;
- annual respiratory disease hospital admissions; and
- annual cardiovascular disease hospital admissions.

11.7.21 The quantitative relationship between additional incidence or risk of a health outcome and long-term exposure to a pollutant is described by a concentration response function (CRF).

11.7.22 To quantify the health impact associated with changes in exposure to air quality, CRFs (for the health outcomes defined in the bullets above) are applied with the change in air quality across representative residential receptor locations, population estimates (for the affected area, which comprises 15,364 people across 10 LSOAs), and locally-specific baseline health data for the assessed health outcomes in the Study Area (outlined in **Table 11.8**). The average change in pollutant concentration across each LSOA has been applied to the whole population in that LSOA to allow for a robust assessment.

11.7.23 It should be noted that the effect on health outcomes is observed across the population studied as a whole, and the final impact (be it mortality or morbidity) is one shared across a population of between 15,364 people. In this context, care should always be taken when considering the calculated mortality and morbidity impact, as they are not individual impacts, but an aggregation of an impact shared across an entire population.

11.7.24 **Table 11.10** shows the potential health outcomes associated with the predicted change in air pollutant exposure for NO<sub>2</sub> and PM combined (which adds an additional layer of conservatism to the assessment due to the overlap in health impacts associated with both these pollutants, and potential for double counting associated with this). The results indicate that the predicted changes in air quality will lead to an effect equivalent to less than one death or hospital admission brought forward across the population studied per annum (i.e. none).

**Table 11.10 – Changes in Health Outcomes Associated with the Average Change in Air Pollutant Annual Mean Concentrations**

Health Outcome	Number of Cases Brought Forward (normal operations)	Number of Cases Brought Forward (MDF1 offline)	Number of Cases Brought Forward (MDF2 offline)
All natural cause mortality	0.3	0.3	0.29
Respiratory disease hospital admissions	0.38	0.38	0.36
Cardiovascular disease hospital admissions	0.15	0.15	0.15

11.7.25 On this basis, the effect on health is not considered to be measurable and there would be no material change in the baseline health for the population living in proximity of the Proposed Development.

#### Dust and Odour

11.7.26 As stated in **ES Chapter 6.0 (Air Quality and Odour)**, the proposed Low Carbon CHP Facility would not significantly change the odour generating potential of activities at the existing Kronospan Facility as the feedstocks to be delivered to site will continue to be Grade C waste wood (as currently used in the existing K8 Biomass Plant).

11.7.27 The potential for dust and odour emissions is greatest when material is aggregated, such as during unloading. The area of unloading into the proposed Low Carbon CHP Facility is over 350m from any residential properties and there is a physical barrier (the existing Kronospan buildings and vegetation) between the unloading area and the residential receptors.

11.7.28 The mitigation measures included in the DMP and OMP for the existing Kronospan Facility which will be updated to include for the proposed Low Carbon CHP Facility will be suitable to minimise the potential for fugitive dust and odour emissions. Overall, it is not anticipated that there would be any material change to dust and odour emissions from the proposed Low Carbon CHP Facility in comparison to existing operations.



### Conclusion

- 11.7.29 On the basis that changes in health outcomes associated with process emissions would not alter population health outcomes, and there would be no material change to exhaust pollutants from operational traffic or the dust and odour environment when compared to existing operations, the magnitude of impact on population and human health would be negligible. Considering the low sensitivity of the general population, the resultant significance of effect is negligible (not significant).

### *Health Effects from Changes in Noise Exposure*

- 11.7.30 The Proposed Development would be operated 24/7, on which basis there is potential for daytime annoyance and sleep disturbance from operational plant and traffic.
- 11.7.31 As outlined in **ES Chapter 5.0 (Noise and Vibration)**, the nature of noise from the Proposed Development would be continuous and not impulsive in nature. With the application of BAT, the Proposed Development would eliminate, as far as practicable, the potential for tonal noise character. The following population and health assessment is based on this scenario (i.e. with additional mitigation measures).
- 11.7.32 As outlined in **ES Chapter 5.0 (Noise and Vibration)**, during the daytime period (07.00 to 23.00) and night-time period (23.00 to 07000), based on the difference between the predicted rating noise level and the contextual background sound level and the estimated background sound level at the receptor positions, the majority of receptors would experience a negligible change in noise exposure.
- 11.7.33 During the daytime, the exception to this is R12 whereby at the marina the impact would be negligible from a noise perspective, and at the canal towpath the impact would be slight from a noise perspective. The canal towpath would also experience a slight impact from a noise perspective during the night-time which indicates the potential for +1dB above representative background.
- 11.7.34 As previously stated, those residing at the marina or canal towpath would not do so permanently and have the ability to move to a different location, which would further lessen the potential for adverse population and health impacts.

- 11.7.35 Regarding changes in noise exposure from operational traffic, an increase in noise exposure of up to +0.1dB LA10 during daytime and up to +0.3dB LA10 during night-time is predicted, which is considered negligible from a noise perspective.
- 11.7.36 Overall, changes in noise exposure would be negligible at the majority of receptors other than R12 whereby as live aboard boaters this receptor has the ability to move to another location. On this basis, it is not considered that there would be any change in health and wellbeing outcomes at the population level and therefore, the magnitude of impact on population and human health would be negligible. Considering the low sensitivity of the general population, the resultant significance of effect is negligible (not significant).

*Health Effects from Changes in Transport Nature and Flow Rate*

- 11.7.37 As outlined in the Transport Statement (**DNS4-005**), once operational, the Proposed Development would generate seven HGVs per day (14 two-way movements).
- 11.7.38 While feedstock would be brought to the site 24 hours a day, seven days a week, to ensure a conservative assessment the predicted daily traffic flows are assumed to be distributed over a shorter 12-hour daytime period only. On this basis, it is anticipated that the Proposed Development would generate approximately one HGV trip (two two-way trips) during each of the traditional highway network peak hours (08.00-09.00 hours and 17.00-18.00 hours), equating to one additional HGV movement every 60 minutes on average.
- 11.7.39 Regarding staff movements, it is anticipated that only a small number of staff will be required to operate the Proposed Development and would likely comprise existing staff members at the existing Kronospan Facility.
- 11.7.40 Two scenarios have been included. Scenario 1 relates to the Proposed Development traffic flows considered against 2022 observed traffic data as this represents the greatest percentage change in network flows from the Proposed Development. Scenario 2 accounts for the cumulative impact of the Kronospan oriented strand board (OSB) Facility that is currently under construction.
- 11.7.41 For scenario 1, the resultant increase in total traffic flows during operation across all six road links analysed ranges from 0.0% to 0.2%. For HGVs only, the resultant

increase during operation across all six road links analysed ranges from 0.6% to 3.7%.

11.7.42 For scenario 2, the resultant increase in total traffic flows during operation across all six road links analysed ranges from 0.0% to 0.2%. For HGVs only, the resultant increase during operation across all six road links analysed ranges from 0.5% to 3.7%.

11.7.43 As outlined in the Transport Statement (**DNS4-005**), on the basis that such changes are well below the identified 5% link impact threshold, operation of the Proposed Development is considered to have a negligible impact on either the local or strategic highway network from a traffic perspective.

11.7.44 Such negligible changes transport nature and flow rate are not considered to result in any change in health and wellbeing outcomes at the population level. As such, the magnitude of impact on population and human health would be negligible. Considering the low sensitivity of the general population, the resultant significance of effect is negligible (not significant).

#### ***Decommissioning Phase***

11.7.45 Should the Proposed Development require decommissioning in the future, the potential population and human health effects would be comparable to those described during the construction phase. This is on the basis that the activities required would be similar.

### **11.8 Inter-Relationship of Potential Effects**

11.8.1 The population and health chapter draws from and builds upon technical outputs presented for a range of health determinants. As such, there are several inter-relationships between population and health, and the following technical disciplines: air quality, noise, and transport. A summary of these inter-relationships is provided below:

- health and traffic/transport – a change in transport nature (i.e. increasing presence of HGVs) and flow rate can cause negative mental and social health and wellbeing impacts through increasing perceptions of severance, reducing

pedestrian amenity (and potentially causing fear/intimidation effects) and increasing risk of accident and injury;

- health and air quality – there is a linear relationship between exposure to air pollutants and attributed health outcomes such as hospital admission/mortality rate from respiratory and cardiovascular diseases; and
- health and noise – there is a complex relationship between noise and attributed health outcomes such as hospital admission/mortality rate from cardiovascular disease and mental health conditions (e.g. depression, anxiety and dementia). Noise can affect health both directly (in extreme circumstances, which is less common), and indirectly (through annoyance or sleep disturbance). However, the health effects from noise can also be affected by tonality and type of noise (e.g. low frequency noise, infrasound and amplitude modulation).

11.8.2 As these health determinants detailed within the relevant technical disciplines have informed the population and health assessment, it can be concluded that all relevant inter-relationships have been fully considered within the population and health chapter.

## **11.9 Further Mitigation and Monitoring**

11.9.1 On the basis that no significant adverse population and human health effects are reported, no additional health-specific mitigation measures are proposed.

## **11.10 Summary of Potential Residual Effects**

11.10.1 On the basis that no additional health-specific mitigation measures are proposed, the residual population and human health effects remain the same as reported in the ‘assessment of potential effects’ section above.

## **11.11 Cumulative Effects**

11.11.1 There is the potential for the effects of the Proposed Development to interact with the effects of other projects or activities in the surrounding area. These are ‘inter-project’ cumulative effects and includes projects that are under construction, projects that are approved but awaiting implementation, and projects awaiting determination within the planning process with design information in the public domain. Such projects are required to be within a geographical scope where environmental impacts

could act together to create a more significant overall effect on a receptor and where sufficient environmental information is available.

- 11.11.2 The method for identifying other projects and activities is provided within **ES Chapter 2.0 (EIA Methodology)**; this includes a list of the specific projects and activities identified, which also takes into consideration the other Kronospan development proposals that are being progressed separately by the Applicant. The cumulative effects Study Area and the locations of the other projects and activities are illustrated on **Figure 2.1** and **Figure 2.2** respectively.
- 11.11.3 From a population and health perspective, there are potential for cumulative effects where a cumulative development is residential in nature and introduces new human receptors, or where a cumulative development contributes to changes in environmental and/or socio-economic determinants of health due to proximity to the Proposed Development.
- 11.11.4 Where there is potential overlap during the construction phase of the Proposed Development and cumulative developments, it is unlikely that significant cumulative dust or noise impacts would occur as each separate project would be required to control environmental pollution through standard mitigation measures. Any residual effects would be temporary, intermittent and short term in nature.
- 11.11.5 Similarly, traffic generated by cumulative developments during any potential construction phase overlap would be short term in nature and not of a level which would result in significant cumulative impacts with the Proposed Development.
- 11.11.6 The following cumulative developments listed in **Table 2.4** within **ES Chapter 2.0 (EIA Methodology)** would introduce new residential receptors:
- ID Ref 1.7 – Extension of existing caravan site, Lady Margarets Park.
  - ID Ref 1.8 – (180 dwellings assumed) LDP housing allocation off Holyhead Road, Chirk.
  - ID Ref 2.1 – 61 dwellings, The Sawmills, Weston Rhyn, Oswestry.
  - ID Ref 2.3 – 40 dwellings, land south of Aspen Grange, Weston Rhyn.
- 11.11.7 In total, it is estimated that the above residential developments would increase the local population by 674 people (assuming an average household size of 2.4 people).

This increase in population exposure to the negligible changes in air quality and noise would not alter the conclusions of the main assessment.

11.11.8 Furthermore, once operational, the contribution to changes in environmental determinants of health from the above projects would largely be limited to additional traffic and associated changes in air quality and noise. However, due to the relatively low traffic generation associated with these projects, the associated impacts on environmental determinants of health are anticipated to be minimal.

### **11.12 Enhancement Measures**

11.12.1 No enhancement measures are proposed in relation to population and human health.

### **11.13 Conclusions**

11.13.1 The assessment concludes that the proposed Kronospan Low Carbon Combined Heat and Power (CHP) Facility would not result in any significant adverse effects on population and human health during its construction, operation, or decommissioning phases.

11.13.2 Key findings of the assessment include:

- Air quality: changes in pollutant concentrations (NO<sub>2</sub> and PM) are predicted to remain within objective thresholds set to be protective of human health, whereby the quantitative exposure response assessment determines that there would be no measurable change to population level health outcomes associated with these changes.
- Noise exposure: noise impacts from construction and operation are predicted to be negligible for most receptors, with only slight impacts at one location (R12 – Chirk Marina and canal). Receptors at this location do not permanently reside there, and overall, there would be no measurable change to population level health outcomes.
- Transport: increases in traffic flow and HGV movements are minimal and fall below the relevant thresholds for health and wellbeing impacts to occur.

11.13.3 Overall, it is considered that the initial design and operational controls (e.g. DMP, OMP, Framework CEMP) are sufficient to avoid significant adverse health effects.



On this basis, no further health-specific mitigation or enhancement measures would be required.

# Appendix 11A – Population and Health Baseline

