OMEGA ZONE 8, ST HELENS

Omega St Helens Ltd / T. J. Morris Limited

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WSP

8 First Street
Manchester
M15 4RP

Phone: +44 161 200 5000

WSP.com

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16. CLIMATE

16.1. INTRODUCTION

16.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development upon climate. The focus is on Greenhouse Gas (GHG) emissions arising from both activities and traffic associated with the demolition/construction and operational stages. Furthermore, it is concerned with the identification, management and reduction of GHG emissions throughout the lifecycle of the Proposed Development.

16.1.2. The assessment of climate has established that the following additional mitigation measures are required:

- Manufacturer selection, to include options that use less energy intensive materials, more robust and durable components, recycled materials and minimising packaging and wasted materials;
- Supplier selection, including the use of local suppliers to minimise transport-related emissions;
- End-of-life use, including whether materials are reusable or recyclable;
- A Construction Environmental Management Plan (CEMP), designed to set out the standards of construction logistics and practices that will minimise, if not eliminate, the impacts of the proposed construction work on the local environment and local community surrounding the application site;
- The use of renewable technologies (Photovoltaic panels and Solar thermal systems) to generate 10% of the total energy consumption;
- A Travel Plan, to be used as a management tool to help promote sustainable transport for employees working within the Proposed Development;

16.1.3. The following residual effects have been identified:

- Embodied Carbon: The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate (**not significant**) following the implementation of mitigation measures.
- Construction Transport: The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a **minor adverse** residual effect on climate (**not significant**) following the implementation of mitigation measures.
- Operational Building: The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate (**not significant**) following the implementation of mitigation measures.
- Operational Transport: The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate (**not significant**) following the implementation of mitigation measures.

16.1.4. The following enhancement opportunities have been identified:

- Inclusion of EV points for freight vehicles, where available.
- Education of facilities managers on how to use the building systems in a mindful way and avoid overuse.

- Initiatives to inform employees on ways to reduce energy and water consumption.

16.1.5. The remainder of this chapter describes the assessment methodology and the baseline conditions relevant to the assessment, which have been used to reach these conclusions, as well as a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed. Opportunities for enhancement, where such opportunities exist, are also discussed.

16.1.6. This chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to **Chapter 17: Cumulative Impact Assessment**, where the cumulative effects associated with Climate Change have been considered within. Also, This Chapter uses data from the **Chapter 12: Transport Assessment** and the 'Unit 1 DPC.1 Sustainability Statement including BREEAM pre-assessment'.

16.2. SCOPE, METHODOLOGY AND SIGNIFICANCE CRITERIA

CONSULTATION UNDERTAKEN TO DATE

16.2.1. No consultation activities have been undertaken in support of the preparation of this assessment.

SCOPE OF THE ASSESSMENT

16.2.2. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 5: Approach to EIA**.

16.2.3. The assessment methodology follows the emerging best practice, as described in paragraphs 16.2.20-16.2.32. Initially the assessment sets out the boundaries of the calculations. All existing sources and removals of GHG emissions prior to construction and operation of the Proposed Development (i.e. without development) are identified to assess the current baseline. Following this, future sources and removals of GHG emissions scenarios are considered without development for the assessment of future baselines. Sources and removals of GHG emissions following the construction and during operation of the Proposed Development are then assessed, from which the significance, mitigation measures and residual effects are determined.

Elements scoped out of the assessment

16.2.4. The consideration of effects is consistent with the framework for the quantification of GHG emissions presented in BS EN 15978:2011 'Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method' and 'PAS 2080:2018 Carbon Management in Infrastructure'.

16.2.5. **Figure 16-1** describes typical emissions associated with different phases of a development's lifecycle. **Figure 16-1** is interpreted from the report on 'Low carbon construction' for HM Government by the Innovation and Growth Team (HM Government, 2010).

Figure 16-1. Typical emissions associated with different phases

16.2.6. **Figure 16-1** has been used as a basis of informing which elements of the overall lifecycle of the Proposed Development are considered unlikely to be significant. Using the principles set out in

PAS2050:2011, a material contribution to GHG emissions is described as being a contribution from any one source resulting in more than 1% of the total anticipated life cycle emissions. Under the threshold section of PAS2050:2011 it is stated that the assessment should include at least 95% of the anticipated life cycle GHG emissions and therefore the elements that can be excluded from the calculations as considered unlikely to be significant must not exceed more than 5% of the total emissions.

16.2.7. Specific elements of the project's lifecycle are therefore excluded from the total associated with the Proposed Development, as shown in **Table 16-1**. Those excluded consist of the Design, Distribution and Refurbish/Demolish elements, which individually produce no more than 1% of emissions and collectively produce less than 3% of overall emissions. Therefore, these elements have been scoped out. Even though Construction also only contributes 1% towards total emissions, it has been considered here as construction transport emissions are being accounted for alongside Manufacture and Operation elements.

Table 16-1 - Elements scoped out of the assessment

Element scoped out	Justification
Design elements	They individually produce no more than 1% of the project's carbon lifecycle emissions
Distribution elements	They individually produce no more than 1% of the project's carbon lifecycle emissions
Refurbish/Demolish elements	They individually produce no more than 1% of the project's carbon lifecycle emissions

Elements scoped into the assessment

Construction Phase

16.2.8. The following elements are considered to have the potential to give rise to likely significant effects during construction of the Proposed Development and have therefore been considered within this assessment:

- *Embodied Carbon*: The carbon emissions (CO_{2e}) associated with materials production, transport and assembly (construction phase) and
- *Construction Transport:* The carbon emissions (CO_{2e}) associated with transportation used during the construction stage.

Operation Phase

16.2.9. The following elements are considered to have the potential to give rise to likely significant effects during operation of the Proposed Development and have therefore been considered within this assessment:

- *Operational building emissions:* Carbon emissions (CO_{2e}) associated with the energy used for heating, cooling, lighting and ventilation (operational phase). Both regulated and unregulated emissions are included. Regulated energy is the result of fixed building services and fittings, including space heating and cooling, hot water, ventilation and lighting while unregulated energy

consists of sources not included within Building Regulations such as cooking and appliances. The calculation of both regulated and unregulated emissions have been based on the calculations carried out under 'The Building Regulations 2010, Approved Document L1A: conservation of fuel and power in new dwellings, 2013 edition with 2016 amendments' and 'The Building Regulations 2010, Approved Document L2A: conservation of fuel and power in new buildings other than dwellings, 2013 edition with 2016 amendments'; and

- *Operational transport*: Carbon emissions (CO_{2e}) associated with vehicles trips during the operational phase.

Extent of the Study Area

16.2.10. The GHG assessment considers the area of the application site and all land uses within the application site.

16.2.11. Significant emissions from construction are from the embodied carbon of materials and the vehicles used during the construction stage. For the operational phase, the assessment considers emissions related to building use throughout operation. The transport assessment considers the adjacent roads that will be affected by the Proposed Development. IEMA's (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance has been used as a guideline to define the study area of the assessment

Climate Projections

16.2.12. November 2018 saw the Met Office's release of UKCP18, the most comprehensive climate change projections of the UK to date. The results provide us with projections of how UK climate might change over the coming decades.

16.2.13. The highest emissions scenario, RCP8.5, signifies a 'Business as Usual' future, in which mean global temperatures can rise over 4°C by 2100. In this scenario:

- Summer temperatures could be up to 5.4 °C hotter by 2070, while winters could be up to 4.2°C warmer
- The chance of a summer as hot as 2018 is around 50% by 2050
- Sea levels in London could rise by up to 1.15 metres by 2100
- Average summer rainfall could decrease by up to 47% by 2070, while there could be up to 35% more precipitation in winter

16.2.14. UKCP18, compared with the 2009 projections, shows slightly greater warming in summer and slightly less warming in winter in South East England's RCP8.5 scenario.

16.2.15. These projections are used to inform us of the severity of climate changes and, although no changes have been made to the UK's carbon budget since they were released, they have influenced national, regional and local policy to focus on climate change mitigation.

Grid Decarbonisation

16.2.16. The amount of coal in the UK electricity mix has substantially decreased in recent years and low and zero carbon technologies (including PV, wind and nuclear energy) have been increasingly used to generate a larger portion of the UK's electricity. This has resulted in a reduction of carbon emissions generated from grid-supplied electricity.

16.2.17. As the grid decarbonises, the lower amounts of emissions created through using on-site electricity will result in a lower carbon impact. This is reflected in the new carbon factors released within the

new Standard Assessment Procedure SAP 10.0 (July 2018). **Table 16-2** demonstrates that carbon factors for both grid-supplied electricity and natural gas are proposed to reduce due to higher efficiencies and electricity grid decarbonisation:

Table 16-2 - Carbon Factors – Part L 2013 and SAP 10.0

Fuel Type	Part L 2013 (kg.CO_2/kWh)	SAP 10.0 (kg.CO_2/kWh)
Grid-Supplied Electricity	0.519	0.233
Natural Gas	0.216	0.210

METHOD OF BASELINE DATA COLLATION

Data Sources

16.2.18. Data has been sourced from the following locations and used for:

- Royal Institute of Chartered Surveyors (RICS), 2012 Methodology to calculate embodied carbon of materials;
- BRUKL Calculation output for Unit 1, conducted by CPWP;
- Sustainability Statement including BREEAM pre-assessment for Unit 1
- Transport Assessment, submitted as an Application Report;
- Department for Business, Energy & Industrial Strategy, 2018 Government GHG Conversion Factors for Company Reporting;
- Department for Business, Energy & Industrial Strategy, 2005 to 2016 UK local and regional CO2 emissions - data tables, 2018

Site Visit

16.2.19. For the purpose of this assessment, no site visit was carried out.

ASSESSMENT METHODOLOGY

Construction Phase Methodology

Embodied Carbon

16.2.20. To inform the assessment during the construction stage, an assessment of embodied carbon emissions has been undertaken.

16.2.21. The RICS Methodology to calculate embodied carbon of materials suggests that, for early stage projects (RIBA A (Appraisal)/B (Design Brief)/C (Concept)), the recommended methodology is to multiply the floor area of the Proposed Development by the benchmark values provided.

16.2.22. For later stages, the recommended methodology is more complex and requires the calculation/summing of the mass of construction materials and multiplying the results by the relevant embodied carbon factors, which can be sourced, for example, from the Institution of Civil Engineers database.

16.2.23. While the latter method should be used for increased accuracy, for the purposes of this report and understanding the scale of the carbon emissions, the former methodology has been used. The

closest match of building typology was used from the benchmark data (e.g. for medium rise apartment buildings, the benchmark value of 970 $kgCO_{2e}/m^2$ was considered appropriate).

Construction Transport Emissions

16.2.24. In order to calculate emissions arising from construction traffic, the predicted vehicle numbers and distances travelled have been multiplied by emissions factors for each key vehicle type using 2018 Defra emissions factors and data from the National Travel Survey 2016.

Operational Phase Methodology

Building Emissions

16.2.25. For the regulated carbon emissions from the new buildings during the operational stage, accredited Design SAP 10.0 software was used to model the annual energy consumption (BRUKL Report). The energy data were included in the Sustainability Statement.

16.2.26. For the pre-mitigation stage, building energy use has been assumed to be compliant with Part L 2013 (Conservation of Fuel and Power) of the Building Regulations. No improvements or consideration of renewables has been assumed at this stage. For the post-mitigation the effect of low and zero carbon technologies has been considered.

16.2.27. Mitigation of building emissions in the operational stage, including the low and zero carbon technologies, are discussed. The predicted decarbonisation of the grid has not been taken into account, which will likely cause the actual emissions from the Proposed Development to be lower than expected. As electricity generation becomes less carbon intensive, GHG emissions from electricity use will reduce while GHG emissions from gas would remain on-the-whole stagnant. In addition to this, the government has recently announced the Future Homes standard that proposes that no new gas boilers are installed in new homes by 2025, meaning that new homes will be heated solely by electric systems (such as heat pumps) or other alternatives, which will be low in GHG emissions following grid decarbonisation.

16.2.28. One limitation of the scope is that the predicted decarbonisation of the grid has not been considered and, as such, this will likely result in an overestimation of the actual emissions from the Proposed Development. This has not been considered due to the current uncertainty around this element and difficulties in obtaining credible data. As electricity generation becomes less carbon intensive, GHG emissions from electricity is projected to reduce while GHG emissions from gas will remain on-the-whole stagnant. In addition, changes to planning policy and potential implementation of the Future Homes standard intending for no new gas boilers to be installed in homes by 2025 have not been considered within this analysis for the same reasons.

Transport Emissions

16.2.29. To calculate the operational traffic associated with the Proposed Development, the vehicle numbers and distances have been multiplied by emissions factors for each key vehicle type. The 2019 Defra emissions factor selected for each vehicle type represents the closest match. This is summarised in **Table 16-3**. For the average trip length, data from the National Travel Survey 2016 was used.

16.2.30. The buses have been excluded from the scope of the assessment as:

- There are no bus services from St. Helens to the application site, despite that there is likely to be some demand

- The only bus connection to the application site is with two bus routes from Warrington. However, there no bus stop is currently positioned in a convenient walking distance from the Proposed Development and any mitigation measures would depend on initiatives of Warrington's local authorities.

16.2.31. Regarding rail, the nearest rail station (Sankey for Penketh) is located at a distance greater than 2km walking from the application site, so it has also been excluded from the scope.

Table 16-3 - Transport Emissions Calculation Methodology

Metric	Unit	Car	Heavy Goods Vehicle (HGV)	Bus	Rail
Total Distance (A)	km/year	A=CxD	A=CxD	A=BxD	A=BxD
Total Person Trips (B)	people trips/year	-	-	B	B
Total Vehicle Trips (C)	vehicle trips/year	C	C	-	-
Average Trip Length (D)	km/trip	8.4	8.4	3.5	28.6
Emissions Factor Description		Average car, unknown fuel, per km	Diesel HGV, Rigid (3.5-7.5 tonnes), per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions Factor Value (E)	$kgCO_{2e}/km$	0.17753	0.45835	0.12007	0.04424
Total (F)	$kgCO_{2e}$	F=AxE	F=AxE	F=AxE	F=AxE

16.2.32. For the operational phase, this approach only considers the GHG emissions from the Proposed Development once fully completed and using current emissions factors. The future baseline considers traffic flows in the opening year (2021) and a forecast year (2036) without the construction of the Proposed Development, which takes into consideration expected changes in population and car use trends. However, as this only takes into account the number of vehicles on adjacent roads, no analysis has been undertaken as to the long term increases in vehicle efficiency, switching to electric vehicles and possible increase in autonomous vehicle use. While these will likely reduce the total GHG emissions associated with the Proposed Development, projected uptake of these technologies is uncertain and varies considerably depending on the source cited.

Assessment Scenarios

16.2.33. The current best practice is described in IEMA's (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance, which is used as a guidance for this assessment. The followed approach is based on quantitative assessments based on the data sources described in paragraph 16.2.18. For the assessment, the following scenarios have been assessed for the operational stage:

Building emissions:

- Current baseline scenario (2019) - represents the present-day land use scenario;
- Future baselines scenarios - represents the future land-use scenario without the Proposed Development
- Development case scenarios - represents the future land-use scenario with the Proposed Development

Transport emissions:

- Current baseline scenario (2019): represents the present-day transport scenario;
- Future baselines scenarios - represents the future transport scenarios without the Proposed Development in:
  i. The Proposed Development opening year (2021); and
  ii. The forecast year (2036)
- Development case scenarios - represents the future transport scenarios with the Proposed Development in:
  i. The Proposed Development opening year (2021); and
  ii. The forecast year (2036)

16.2.34. The comparison between the baseline scenarios with the scenarios including the development provides the magnitude of impact. Following this, the significance of the effects is defined, as explained below in the paragraphs 16.2.34-16.2.40. Mitigation measures and residual effects are finally determined.

SIGNIFICANCE CRITERIA

Significance Level

16.2.35. The significance level attributed to each effect has been assessed based on the sensitivity/value of the affected receptor(s) and the magnitude of change arising from the Proposed Development, as well as a number of other factors that are outlined in more detail in **Chapter 5: Approach to EIA**. The sensitivity of the affected receptor is assessed on a scale of very high, high, medium, low and negligible, and the magnitude of change is assessed on a scale of high, medium, low, negligible and no change, as set out in **Chapter 5: Approach to EIA**.

16.2.36. As GHGs are an inherently global problem, all GHG emissions are considered very highly sensitive. This aligns with IEMA's guidance that states:

"*Therefore, in the absence of any significance criteria or a defined threshold, it might be considered that all GHG emissions are significant and an EIA should ensure the project addresses their occurrence by taking mitigating action*".

Magnitude of Impact

16.2.37. The magnitude of impact can be classified as: Large, Medium, Small or Negligible, as set out in **Chapter 5: Approach to EIA.** The classification is determined where available and appropriate by national and international standards or limits and professional judgement.

16.2.38. Currently there is no uniformed guideline for assessing the magnitude of impact of construction and operational phases. In this report, the RIBA 2030 Climate Challenge target metrics have been used to assess the magnitude of impact for the Embodied Carbon (construction phase). These are shown in **Table 16-4**.

Table 16-4 - RIBA 2030 Climate Challenge target metrics (for non-domestic buildings)

Target	Embodied Carbon rate ($kgCO_{2e}/m^2$)	Operational Energy Consumption rate ($kWh/m^2/year$)	Magnitude of Impact
Current Benchmarks	1100 (M4i benchmark)	225 (DEC D rated, CIBSE TM46 benchmark)	**Large**
2020 Targets	<800	<170 (DEC C rated)	**Medium**
2025 Targets	<650	<110 (DEC B rated)	**Small**
2030 Targets	<500	<0 to 55 (DEC A rated)	**Negligible**

16.2.39. Regarding the Transport Carbon emissions (construction and operational phase) and the Operational Building Emissions, their magnitude of impact has been assessed by comparing to the current regional emissions per sector of St. Helens Local Authority (2017 data) and by professional judgement.

Effect Significance

16.2.40. The following terms have been used to define the significance of the effects identified and apply to both beneficial and adverse effects. Since the significance of the GHG emissions is very high, an additional column has been added to the matrix of **Chapter 5: Approach to EIA**, to fulfil the needs of the assessment.

Table 16-5 – Significance Criteria

		Value/Sensitivity				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude	Large	Major	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Major	Moderate to Major	Moderate	Minor	Negligible
	Small	Moderate	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible
	No change	No change	No change	No change	No change	No change

- **Major effect**: where the Proposed Development could be expected to have a substantial improvement or deterioration on receptors
- **Moderate effect**: where the Proposed Development could be expected to have a noticeable improvement or deterioration on receptors;
- **Minor effect**: where the Proposed Development could be expected to result in a perceptible improvement or deterioration on receptors; and
- **Negligible**: where no discernible improvement or deterioration is expected as a result of the Proposed Development on receptors, including instances where no change is confirmed.

16.2.41. In **Chapter 5: Approach to EIA** it is explained the classification of the significance of the effects, based on the sensitivity of the receptor and the magnitude of the impact. As set out in the same chapter, the effects that are classified as **moderate or above** are considered **significant**, while effects classified as **minor** or below are considered **not significant**.

16.3. BASELINE CONDITIONS

CURRENT BASELINE

16.3.1. As the proposed application site is characterised as greenfield, there are no embodied or operational building emissions associated with it. Baseline GHG emissions are therefore considered to be zero.

16.3.2. Baseline transport emissions associated with the application site are shown in **Table 16-6** as per data received from Transport Assessment team of WSP. These cover Catalina Way, which is the road adjacent to the application site.

Table 16-6 – Baseline Transport GHG emissions (2019)

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	467,376	17,472	-	-
Total person trips	people trips/yr			-	-
Total vehicle trips	vehicle trips/yr	55,640	2,080		
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}$/km	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}$/km	0.17710	0.49215	0.12076	0.04115
Total Emissions	$kgCO_2e$	82,772	8,599	-	-
Overall Total Emissions	**tCO_2e**	**91**			

16.3.3. In terms of the baseline of the local area, the carbon emissions of St. Helens in 2017 are shown in **Table 16-7** per sector. **Table 16-7** is based on the data derived from the *'UK Local Authority and Regional Carbon Dioxide Emissions National Statistics: 2005 to 2017*' (BEIS, 2019).

Table 16-7 – Annual carbon emissions by sector, St. Helens, 2017

Sector	Carbon emissions per sector (tCO_2)
Industry and Commercial	575,200
Domestic	272,600
Transport	344,900

Sector	Carbon emissions per sector (tCO_2)
Total	**1,204,400**

FUTURE BASELINE

16.3.4. In the absence of the Proposed Development, the potential alternative use of the land has not been indicated. If the land use remains unchanged, we should assume that there are no GHG emissions associated with embodied carbon and that the operational emissions associated with the application site will also remain unchanged.

16.3.5. Transport emissions in future are expected to increase even in the absence of the Proposed Development. This is due to several reasons, including increased local population, increased car use and trends involving other developments in the area.

16.3.6. The future baseline for the transport emissions on the application site's adjacent road (Catalina Way) is therefore shown in **Table 16-8** and **Table 16-9** for the Proposed Development's opening year (2021) and the forecast year (2036), respectively. The data are derived from the Transport Assessment, conducted by WSP.

Table 16-8 – Future Baseline Transport GHG emissions – Opening year (2021)

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	3,024,840	168,168	-	-
Total person trips	people trips/yr			-	-
Total vehicle trips	vehicle trips/yr	360,100	20,020		
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}$/km	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}$/km	0.17710	0.49215	0.12076	0.04115
Total Emissions	$kgCO_{2e}$	535,699	82,764	-	-
Overall Total Emissions	**tCO_{2e}**	**618**			

Table 16-9 – Future Baseline Transport GHG emissions – Forecast year (2036)

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	3,046,680	170,352	-	-
Total person trips	people trips/yr			-	-
Total vehicle trips	vehicle trips/yr	362,700	20,280		

Metric	Unit	Car	HGV	Bus	Rail
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}$/km	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}$/km	0.17710	0.49215	0.12076	0.04115
Total Emissions	$kgCO_{2e}$	539,567	83,839	-	-
Overall Total Emissions	**tCO_{2e}**	**623**			

16.3.7. The opening year (2021) and the forecast year (2036) future baselines show a 0.153% and 0.154% increase on the current baseline (2019) respectively.

16.4. SENSITIVE RECEPTORS

16.4.1. The sensitive receptor which has been assessed is the Climate (through GHG emissions):

16.4.2. GHG emissions are considered to be very highly sensitive, as any GHG emissions at the application site will count towards the UK's climate budget and will also have an effect on the global climate.

16.5. LEGISLATIVE FRAMEWORK, POLICY AND GUIDANCE

LEGISLATIVE FRAMEWORK

16.5.1. The applicable legislative framework is summarised as follows:

- Climate Change Act 2008; and
- Building Regulations Part L 2013

POLICY

16.5.2. Relevant policy documents are summarised below:

- National Planning Policy Framework (2019); and
- St. Helens Borough Local Plan 2020-2035, Submission Draft (January 2019)

GUIDANCE

16.5.3. The following guidance documents have been used during the preparation of this chapter

- IEMA (2017), Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance;

16.5.4. This guidance document reflects current best practice and builds on IEMA's previous guide on Climate Change Resilience and Adaptation. This guidance advocates for a 'good practice' approach where GHG emissions are always considered and reported but at varying degrees of detail depending on the EIA project. In line with the guidance, this chapter sets out the methodological approach that has been taken to address GHG emissions associated with the Proposed

Development. This means providing the assessment approach, calculating the baseline, determining the significance of each GHG emission source and setting out strategies for mitigation.

16.5.5. In addition, this chapter has been prepared in accordance with the Government's National Planning Practice Guidance (NPPG).

16.6. ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION AND RESIDUAL EFFECTS

CONSTRUCTION PHASE

Embodied Carbon

Potential effects

16.6.1. GHG emissions (CO_{2e}) arise throughout a development lifecycle from the initial design to construction to the refurbishment or eventual demolition. These emissions can be identified and quantified to produce a carbon lifecycle footprint for a development, which can then be used to plan an effective reduction strategy.

16.6.2. Materials or product manufacture cradle to-gate emissions are those associated with the production of construction products/materials. The emissions arise from the energy used in extracting materials, refining them, transporting and processing them to produce a finished product. The GHG emissions resulting from these processes are often referred to as embodied carbon.

16.6.3. Emissions from the construction stage also include energy and fuel consumption during transportation of material to and from site, enabling works, remediation, clearance, ground improvements, earthworks and assembly.

16.6.4. Activities during the construction stage will generate GHG emissions, particularly from the manufacture of construction materials.

16.6.5. The calculations for the total embodied GHG emissions generated are provided in **Table 16-10**, while the Unit breakdown is shown in **Table 16-11.**

Table 16-10 – GHG Emissions – Embodied Carbon, summary

Use	Carbon emissions (tCO_{2e})
Total Office	4,150
Total B2 Manufacturing	26,818
Total B8 Logistics Warehouse	90,583
Overall Total	**121,550**

Table 16-11 – GHG Emissions – Embodied Carbon, by Unit

Unit 1					
Type	**Total area (m^2)**	**Building Type (from RICS benchmark values)**	**$kgCO_{2e}/m^2$ rate**	**Total $kgCO_{2e}$**	**Total tCO_{2e}**
B8 Logistics Warehouse	77,084	Warehousing/Logistics	410	31604440	31,604

Ancillary Office space	4,486	Low Rise Offices (1-4 storey building)	925	4149550	4,150
Units 2,3,4					
Type	**Total area (m^2)**	**Building Type (from RICS benchmark values)**	**$kgCO_{2e}/m^2$ rate**	**Total $kgCO_{2e}$**	**Total tCO_{2e}**
B2 Manufacturing	61,650	Small - medium light industrial	435	26817750	26,818
B8 Logistics Warehouse	143,850	Warehousing/Logistics	410	58978500	58,979

16.6.6. The benchmark values in **Table 16-11** have been sourced from the RICS Methodology to Calculate Embodied Carbon of Materials (2012). These figures should be updated as superseding values are developed.

16.6.7. The total tonnes of embodied carbon estimated to be generated by the Proposed Development is 121,550 tCO_{2e}. These figures only include the 'product stage' emissions as defined in the BS EN 15978:20114. Embodied carbon from materials is considered to cause a permanent effect on the GHG emissions of the Proposed Development due to continuous maintenance and refurbishment of building parts. To assess the magnitude of impact of the Proposed Development's embodied carbon, the RIBA 2030 Climate Challenge Targets for a non-domestic building of the same total area has been calculated, as shown in **Table 16-12**.

Table 16-12 – RIBA 2030 Climate Challenge target for non-domestic buildings – Embodied Carbon

Target	Magnitude of Impact	Embodied Carbon rate ($kgCO_{2e}/m^2$)	Total area of Proposed Development (m^2)	Embodied carbon emissions ($kgCO_{2e}$)	Embodied carbon emissions (tCO_{2e})
Current Benchmarks	High	1100	287,070	315,777,000	315,777
2020 Targets	Medium	800	287,070	229,656,000	229,656
2025 Targets	Low	650	287,070	186,595,500	186,596
2030 Targets	Negligible	500	287,070	143,535,000	143,535

16.6.8. The total tonnes of embodied carbon estimated to be generated by the Proposed Development is 121,550 tCO2e and is below the 2030 Target of RIBA 2030 Climate Challenge. Therefore, its magnitude of impact is considered negligible.

Additional mitigation

16.6.9. Mitigation opportunities for further reducing embodied carbon will need to be identified through all the life cycle stages of the Proposed Development. As most of the emissions associated with this stage are related to the Product and Use stages of BS EN 15978:20114 consideration should be given to:

- Manufacturer selection, to include options that use less energy intensive materials, more robust and durable components, recycled materials and minimising packaging and wasted materials;

- Supplier selection, including the use of local suppliers to minimise transport-related emissions; and
- End-of-life use, including whether materials are reusable or recyclable.

Residual effects

16.6.10. The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate (**not significant**) following the implementation of mitigation measures.

Construction Transport Emissions

Potential effects

16.6.11. The calculations for the GHG emissions generated from the transport emissions during construction are provided in **Table 16-13**. Construction transport data assumptions were provided by St James (Berkley Group). Emission Factor Values were derived from the UK Government (BEIS/Defra) GHG Conversion Factors for Company Reporting 2019.

Table 16-13 – GHG Emissions – Construction Transport

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	-	218,400	-	-
Total person trips	people trips/yr	-	-	-	-
Total vehicle trips	vehicle trips/yr	-	26,000	-	-
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}/km$	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}/km$	0.17710	0.49215	0.12076	0.04115
Total Emissions	$kgCO_2e$	-	107,486	-	-
Overall Total Emissions	**tCO_{2e}**	**107**			

16.6.12. Transport emissions related to the construction phase equates to 107 tCO2e per annum for the peak Construction Year. This figure consists 0.011% of the total life-cycle emissions, which is significantly lower than 1% and as such they could be omitted from the total calculation. However, these have been reported as requested in the Scoping Opinion for this assessment.

Additional mitigation

16.6.13. A Construction Management Plan (CEMP), is designed to set out the standards of construction logistics and practices that will minimise, if not eliminate, the impacts of the proposed construction work on the local environment and local community surrounding the application site.

16.6.14. The CEMP is designed to be a practical working document to be agreed with Warrington Council and any relevant statutory consultees. It will be updated for each stage of works to reflect The Contractors in house environmental policies, procedures, standards and proposed methodologies. The environmental issues relating to the works are considered systematically and procedures are outlined for dealing with issues as they arise during the course of the works. The aim of the CEMP is to ensure that potential impacts to the environment and sensitive local receptors resulting from the works are avoided or minimised, as far as reasonably practicable.

16.6.15. Mitigation measured proposed as part of the CEMP are:

- Management of logistics for the site is critical to ensure that disruption to local community is kept to a minimum, as well as ensuring that busy periods during start and end of the school days are not exacerbated by construction deliveries / vehicle movements.
- Delivery periods are planned to be accepted between 7:00am and 18:00 weekdays and 07.00 – 14.00 at weekends to ensure that this does not affect the busy periods. No deliveries will be made on Sundays or Bank Holidays.
- Site working hours will be 07.00am to 19.00 Monday to Friday and 07.00 to 14.00 Saturdays.
- All deliveries will be schedule through the site management team, with the Gateman being made aware prior to the arrival of deliveries, this is to ensure that a banksman is available to control the access and egress from the onsite zone 8 temporary haul road which is being used while the new infrastructure is being constructed.
- There will be no operatives or visitor parking on the surrounding highways
- The Contractor will manage waste and develop the Site Waste Management Plan (SWMP) in accordance with the waste hierarchy. Specifically, the amount of waste produced will be minimised by consideration in development of the design and, where produced, will be reused before recycling / disposal options are considered.
- The Contractor will record on site all waste generated on site in a Site Waste Management Plan (SWMP).
- Waste from construction activities will be disposed through an appointed waste management contractor, appointment will be on the basis of their performance of recycling of mixed waste, it is the Contractors target to achieve a 95% diversion from landfill.
  Waste from demolition will be limited to hardstanding, this will be segregated on site and sent for recycling.

Residual effects

16.6.16. The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate **(not significant)** following the implementation of mitigation measures.

OPERATIONAL PHASE

Building Emissions

Potential effects

Unit 1 (Detailed Planning Application Site)

16.6.17. The calculations for the energy consumption and the GHG emissions (regulated and unregulated) generated from the operational energy associated with the Unit 1 (B8 Logistics Warehouse and Office uses) were conducted by CPWP and included in the Sustainability Statement. The energy

consumption by end use of the notional building (pre-mitigation) are provided in **Table 16-14** (also refer to BRUKL report by CPWP), while the TER and annual carbon emissions are shown in **Table 16-15**.

Table 16-14 – Operational Energy Consumption – Unit 1 (Pre-Mitigation)

Energy Consumption by End Use (kWh/m^2)	
Heating	1.42
Cooling	0.51
Auxiliary	0.4
Lighting	35.86
Hot water	24.69
Total (for regulated carbon emissions)	**62.89**
Equipment	44.29
Total (for unregulated carbon emissions)	**44.29**

Table 16-15 – Operational Building Emissions – Unit 1 (Pre-Mitigation)

Unit 1				
Use	**Floor Area (m^2)**	**TER (kg CO_2/m^2/ year)**	**Carbon emissions (kg CO_2/year)**	**Carbon emissions (tCO_2/year)**
B8 Logistics Warehouse – Office (regulated)	81,570	24.3	1982151	**1,982**
B8 Logistics Warehouse – Office (unregulated)			1875010	**1,875**
Total:				**3,400**

16.6.18. The total tonnes of carbon estimated to be generated over the operational stage from Unit 1 is 3,400 tCO2/year (from both regulated and unregulated).

Units 2,3,4 (Outline Planning Application Site)

16.6.19. This part of the Proposed Development is at an early design stage currently, so not specific data were provided for the operational energy consumption and carbon emissions of Units 2-4. Therefore, benchmarks values (from TM46-Energy Benchmarks, CIBSE) were used for their calculation, as shown in **Tables 16-16** and **16-17** respectively.

Table 16-16 – Operational energy consumption and carbon emission rate – Units 2,3,4 (Pre-Mitigation)

	Energy benchmarks (kWh/m²)	Carbon factor (kgCO₂/kWh)	Carbon emission rate (kgCO₂/m²)
TM46 - Workshop Benchmark (27)			
Electricity kWh/m²	35	0.519	18.165
Fossil-thermal kWh/m²	180	0.216	38.88
Total carbon emission rate (kgCO₂/m²):			**57.045**
TM46 - Storage facility (28)			
Electricity kWh/m²	35	0.519	18.165
Fossil-thermal kWh/m²	160	0.216	34.56
Total carbon emission rate (kgCO₂/m²):			**52.725**

Table 16-17 – Operational Building Emissions – Units 2,3,4 (Pre-Mitigation)

Units 2,3,4

Unit	Floor Area (m²)	Carbon emission rate (kgCO₂/ m²/year)	Carbon emissions (kg CO₂/year)	Carbon emissions (tCO₂/year)
B2 Manufacturing	61,650	57.045	3,516,824.3	3,516.8
B8 Logistics Warehouse	143,850	52.725	7,584,491.3	7,584.5
			Total:	**11,101.32**

16.6.20. The total tonnes of carbon estimated to be generated over the operational stage from Units 2,3,4 is estimated to be 11,101 tCO_2/year.

All Units (Hybrid Planning Application)

16.6.21. The total tonnes of carbon estimated to be generated over the operational stage from all Units (1-4) is estimated to be 13,392 tCO_2/year. In the context of the overall industrial and commercial, emissions in the St. Helens Local Authority as reported in 2017 (575,200 tCO_{2e}/ annum), this represents a 2.3% increase.

Additional mitigation

Unit 1 (Detailed Planning Application)

16.6.22. The Sustainability Statement inc. BREEAM pre-assessment for the Proposed Development has been structured in accordance with the desire to achieve an energy efficient development. Mitigation measures to reduce the GHG emissions arising from operational energy have been identified according to the following Energy Hierarchy:

- *Reduce Energy Demand*:

The Proposed Development will implement a building fabric with good performance, complying with the limiting fabric requirements of Part L 2013, to reduce the energy demand for the Proposed Development.

- *Supply Energy Efficiently*:
  Currently, it is not viable that the Proposed Development is supplied directly by an existing district heating network or be served by CHP. Therefore, no measures are identified in this category.
- *Use Renewable Energy Technologies*:
  Renewable energy technologies can further reduce CO_2 emissions. The Proposed Development will include 2600 m^2 of Photovoltaic panels as well as 10m^2 of Solar thermal systems. In addition, it is proposing the use of Heat Pumps (HPs) capable of providing heating and/or cooling with no direct emissions. The heat pumps were allocated to a limited amount of spaces, so their reducing effect on the operational carbon emissions is limited. Therefore, it was excluded in the BRUKL report and consequently from this chapter. The target is to achieve at least 10% of the energy demand is met by renewable and/or other low carbon energy sources, to comply with Paragraph 4 of Policy LPA13 of St. Helens Borough Local Plan 2020-2035 (Submission Draft, January 2019). The PV panels and solar thermal systems achieve an energy consumption reduction by 9,84% and 0.2% respectively, leading to an overall energy consumption reduction of 10,2% which complies with the regulations. The energy and carbon savings achieved by Low/Zero Carbon Technologies are described in **Table 16-18**.

Table 16-18 – Energy and Carbon Savings from the use of Low/Zero carbon technologies (After Mitigation)

Technology and Description	Energy Saving (kWh/year)	Energy met by LZC technology (%)	CO_2 savings ($kgCO_2$/year)	CO_2 savings (%)
Solar Photovoltaic (2600 m^2 of roof mounted PV panels)	296,946	9,84%	154,115	13,95%
Solar Thermal (10 m^2 of roof mounter solar collectors)	6,091	0,2%	1,315.7	0,12%

16.6.23. After the application of the mitigation measures described above, the energy consumption and production from renewable technologies is shown in **Table 16-19** below.

Table 16-19 – Energy Consumption and Energy Production – Unit 1 (After Mitigation)

Energy Consumption by End Use (kWh/m^2)		Energy Production by Renewable Technologies (kWh/m^2) - After mitigation	
Heating	2.17	Photovoltaic Systems	5.85
Cooling	0.54	Solar thermal systems	0.12
Auxiliary	0.71	**Total**	5.97
Lighting	27.46		
Hot water	28.6		
Total (for regulated)	**59.48**		

Energy Consumption by End Use (kWh/m²)		Energy Production by Renewable Technologies (kWh/m²) - After mitigation
Equipment	44.29	
Total (for unregulated)	**44.29**	

16.6.24. The operational building emissions after the mitigation measures for Unit 1 are summarised in **Table 16-20**.

Table 16-20 – Operational Building Emissions – Unit 1 (After Mitigation)

Unit 1				
Use	**Floor Area (m^2)**	**BER ($kgCO_2/m^2$/ /year)**	**Operational Carbon emissions ($kgCO_2$/year)**	**Operational Carbon emissions (tCO_2/year)**
B8 Logistics Warehouse - Office	81,570	18.7	1525359	**1,525**

16.6.25. After the mitigation measures described above, the total tonnes of carbon estimated to be generated over the operational stage from Unit 1 is estimated to be 1525 tCO_2/year.

Units 2,3,4 (Outline Planning Application Site)

16.6.26. For Units 2,3,4, which are included to the outline part of the planning application, no Sustainability Statement was prepared to explore the energy related mitigation measures. Therefore, it is assumed that a series of renewable energy technologies will cover the 10% of energy demand, to align with the Paragraph 4 of Policy LPA13 of St. Helens Borough Local Plan 2020-2035 (Submission Draft, January 2019). Following this assumption, the new carbon emission rate and carbon emissions are estimated as shown in **Tables 16-21** and **16-22**.

Table 16-21 – Operational Energy consumption – Units 2,3,4 (After Mitigation)

	Energy benchmarks (kWh/m^2)	10% Energy demand reduction from renewable technologies	Carbon factor ($kgCO_2$/kWh)	Carbon emission rate ($kgCO_2/m_2$)
TM46 - Workshop Benchmark (27)				
Electricity (kWh/m^2)	35	31.5	0.519	16,35
Fossil-thermal (kWh/m^2)	180	162	0.216	34.99
Total carbon emission rate ($kgCO_2/m_2$):				**51.34**
TM46 - Storage facility (28)				
Electricity (kWh/m^2)	35	31.5	0.519	16.35

	Energy benchmarks (kWh/m^2)	10% Energy demand reduction from renewable technologies	Carbon factor ($kgCO_2$/kWh)	Carbon emission rate ($kgCO_2/m_2$)
Fossil-thermal (kWh/m^2)	160	144	0.216	31.10
Total carbon emission rate ($kgCO_2/m_2$):				**47.45**

Table 16-22 – Operational Building Emissions – Units 2,3,4 (Pre-Mitigation)

Units 2,3,4				
Unit	**Floor Area (m^2)**	**Carbon emission rate (kg CO_2/m^2/year)**	**Operational Carbon emissions (kg CO_2/year)**	**Operational Carbon emissions (tCO_2/year)**
B2 Manufacturing	61,650	51.3405	3,165,141.8	3,165.1
B8 Logistics Warehouse	143,850	47.45	6,826,042.1	6,826.0
			Total:	**9,991.18**

16.6.27. The total tonnes of carbon estimated to be generated over the operational stage from Units 2,3,4 is estimated to be 9,991 tCO_2/year.

All Units (Hybrid Planning Application)

16.6.28. The total tonnes of carbon estimated to be generated over the operational stage from all Units (1-4) is estimated to be 11,517 tCO_2/year. In the context of the overall industrial and commercial, emissions in the St. Helens Local Authority as reported in 2017 (575,200 tCO_2e/ annum), this represents a 2.0% increase.

Residual effects

16.6.29. The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate **(not significant)** following the implementation of mitigation measures.

16.6.30. However, this may change in future depending on the decarbonisation of the grid, lowering the emissions factor of electricity.

Transport Emissions

Potential effects

16.6.31. The calculations for the GHG emissions associated with transport are provided in **Table 16-23** for the opening year (2021) and **Table 16-24** for the forecast year (2036), respectively.

Table 16-23 – Transport GHG Emissions – Opening year (2021) – with development

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	10,620,792	1,841,112	-	-
Total person trips	people trips/yr			-	-
Total vehicle trips	vehicle trips/yr	1,264,380	219,180		
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}/km$	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}/km$	0.17710	0.49215	0.12076	0.04115
Total $kgCO_2e$		1,880,942	906,103	-	-
Overall Total Emissions	**tCO_2e**	**2,787**			

Table 16-24 – Transport GHG Emissions – Forecast year (2036) – with development

Metric	Unit	Car	HGV	Bus	Rail
Total distance	km/year	10,640,448	1,843,296	-	-
Total person trips	people trips/yr			-	-
Total vehicle trips	vehicle trips/yr	1,266,720	219,440		
Average Trip length	km/trip	8.4	8.4	3.5	28.6
Emissions factor description	$kgCO_{2e}/km$	Average car, unknown fuel, per km	Diesel HGV, Rigid (>3.5-7.5 tonnes), average laden, per km	Local bus (not London), per passenger km	National Rail, per passenger km
Emissions factor value	$kgCO_{2e}/km$	0.17710	0.49215	0.12076	0.04115
Total $kgCO_{2e}$		1,884,423	907,178	-	-
Overall Total Emissions	**tCO_{2e}**	**2,792**			

16.6.32. The total emissions associated with transport during the operational phase equate to 2,787 tCO_2e per annum for the opening year (2021), compared with 618 tCO_{2e} for the baseline case (no development, **Table 16-8**). In the context of the overall transport emissions in the St. Helens Local Authority as reported in 2017 (344,900 tCO_2e/ annum), this represents a 0.63% increase.

16.6.33. The total emissions associated with transport during operational phase equate to 2,792 tCO_{2e} per annum for the forecast year (2036), compared with 623 tCO_{2e} for the baseline case (no development, **Table 16-9**). In the context of the overall transport emissions in the St. Helens Local Authority as reported in 2017 (344,900 tCO_{2e}/ annum), this represents a 0.63% increase.

16.6.34. The assessment has been undertaken using traffic flow data provided by Transport Assessment team of WSP, as detailed in the Transport Assessment submitted in support of the planning application.

Additional mitigation

16.6.35. The Transportation Assessment has considered multiple transport modes, including car, bus, pedestrian and cycle trips and will be assessing the overall mode share. Having a multi-modal transport environment with high quality pedestrian and cycle routes can encourage people to use active forms of transport or public services, rather than personal vehicles, thereby lowering GHG emissions from surrounding transport. A Travel Plan is recommended by the Transportation Assessment, which is a management tool to help promote sustainable transport for employees working within the Proposed Development.

16.6.36. Finally, In the Transportation Assessment, a car sharing scheme is proposed to reduce the environmental impact of car travel whilst at the same time staff can still enjoy the convenience of a car vehicle.

Residual effects

16.6.37. The sensitivity of climate is very high, and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term **minor adverse** residual effect on climate **(not significant)** following the implementation of mitigation measures.

16.7. OPPORTUNITIES FOR ENHANCEMENT

16.7.1. Enhancement options selected for a development with regards to climate change should be relevant and appropriate to the type, size and activity of the development and the impacts of the development upon the local community. These may be based on through sustainable freight infrastructure and behavioural changes.

16.7.2. In terms of sustainable transport freight infrastructure, enhancement measures to be considered are:

- Inclusion of EV points for freight vehicles, where available.

16.7.3. In terms of behavioural change, enhancement measures to be considered are:

- Education of facilities managers on how to use the building systems in a mindful way and avoid overuse.
- Initiatives to inform employees on ways to reduce energy and water consumption.

16.8. LIMITATIONS AND ASSUMPTIONS

16.8.1. Benchmark values from RICS (2012), 'Methodology to calculate embodied carbon of materials' information paper have been used to calculate embodied carbon of the Proposed Development per use. This approach is the suggested on for RIBA Stage C Concept Stage Design, according to the same reference. In later stages (RIBA Stage D onwards), a detailed massing and calculations should be done in to calculate the embodied carbon more precisely.

16.8.2. Further improvements to vehicle fuel efficiency and electrification have not been considered; again, this is likely to result in reduced emissions compared to those contain within this Chapter.

16.8.3. The predicted decarbonisation of the grid has not been considered and, as such, this will likely result in an overestimation of the actual emissions from the Proposed Development. This has not been considered due to the current uncertainty around this element and difficulties in obtaining credible data. As electricity generation becomes less carbon intensive, GHG emissions from electricity is projected to reduce while GHG emissions from gas will remain on-the-whole stagnant. The operational building emissions have been based on the carbon factors of SAP 2012, which may be increasingly obsolete, but it is still in effect.

16.9. SUMMARY

16.9.1. This chapter reports the outcome of the assessment of likely significant environmental effects arising from the Proposed Development in relation to the climate. The focus is on GHG emissions arising from both the construction and operational stages.

16.9.2. The GHG emissions reported within this assessment have been split into four sources:

- Embodied carbon;
- Construction transport;
- Operational building; and
- Operational transport.

16.9.3. Emissions associated with other stages of the project lifecycle are considered unlikely to be significant and have therefore not been included in this assessment.

16.9.4. **Table 16-25** provides a summary of the findings of the assessment.

Table 16-25 – Summary of effects on climate

Area	Receptor	Potential Effects	Additional Mitigation	Residual Effects	Monitoring
Construction Phase					
Embodied Carbon	Climate	-The embodied carbon generated by the Proposed Development is 121,550 tCO2e and is below the 2030 Target of RIBA 2030 Climate Challenge.	-Manufacturer selection, to include options that use less energy intensive materials, more robust and durable components, recycled materials and minimising packaging and wasted materials; -Supplier selection, including the use of local suppliers to minimise transport-related emissions; and -End-of-life use, including whether materials are reusable or recyclable.	**Minor adverse (not significant)** P / D / LT	N/A
Construction Transport	Climate	Transport emissions related to the construction phase equates to 107 tCO2e per annum for the peak Construction Year. This figure consists 0.03% of the	-CEMP	**Minor adverse (not significant)** P / D / LT	N/A

Area	Receptor	Potential Effects	Additional Mitigation	Residual Effects	Monitoring
		total life-cycle emissions			
Operational Phase					
Building Emissions	Climate	-The operational carbon emissions stage from all Units (1-4) is estimated to be 13,083 tCO2/year. -2.3% increase on the overall industrial and commercial emissions in the St. Helens Local Authority (2017)	-Fabric aligned with Building Regulations Part L 2013 requirements -Low and Zero Carbon Technologies (2600 m^2 Photovoltaic panels and 10 m^2 Solar Thermal system)	**Minor adverse (not significant)** P / D / LT	N/A
Transport	Climate	-The operational transport emissions equate to 1,881 tCO2e per annum for the opening year (2021), compared with 618 tCO2e for the baseline case (204,19% increase to 2021 baseline) -The operational transport emissions equate to 1,885 tCO2e per annum for the forecast year (2036), compared with	-Development of a Travel Plan to encourage employees to adopt modes of transportation alternative to personal vehicle -Car sharing scheme	**Minor adverse (not significant)** P / D / LT	N/A

Area	Receptor	Potential Effects	Additional Mitigation	Residual Effects	Monitoring
		623 tCO2e for the baseline case (202.34% increase to 2036 baseline - 0.36% increase on the overall total emissions in the St. Helens Local Authority (2017)			

- Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable

16.10. REFERENCES

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