6. Air Quality

6.1 Introduction

Background to the Assessment

6.1.1 MVV Environment Limited (the Applicant) has submitted a full planning application for a Carbon Capture Retrofit Ready (CCRR) Energy from Waste Combined Heat and Power (EfW CHP) Facility at Canford Resource Park (CRP), off Magna Road, in the northern part of Poole. Together with the associated CHP Connection, Distribution Network Connection (DNC) and Temporary Construction Compounds (TCCs), these works are the Proposed Development.

6.1.2 The primary purpose of the Proposed Development is to treat Local Authority Collected Household (LACH) residual waste and similar residual Commercial and Industrial (C&I) waste from Bournemouth, Christchurch, Poole and surrounding areas, that cannot be recycled, reused or composted and that would otherwise be exported to alternative EfW facilities further afield, either in the UK or Europe or landfilled.

6.1.3 The Proposed Development would recover useful energy in the form of electricity and hot water from up to 260,000 tonnes of non-recyclable (residual), non-hazardous municipal, commercial and industrial waste each year. The Proposed Development has a generating capacity of approximately 31 megawatts (MW), exporting around 28.5 MW of electricity to the grid. Subject to commercial contracts, the Proposed Development will have the capability to export heat (hot water) and electricity to occupiers of the Magna Business Park and lays the foundations for a future CHP network to connect to customers off Magna Road.

6.1.4 The location and the extent of the Proposed Development is identified by the Red Line Boundary shown on **Figure 1.1**. In total, the Proposed Development covers an area of 10.1 hectares (ha).

6.1.5 A full description of the Proposed Development is provided in **ES Chapter 3: Description of the Proposed Development**. A list of terms and abbreviations can be found in **ES Appendix 1.1**.

6.1.6 This chapter of the ES has been produced by Savills (for the construction impacts) and Gair Consulting Limited (for the operational impacts) to assess the Proposed Development in relation to the effects it would have upon local air quality. The assessment has considered potential effects on human health and sensitive habitat sites.

6.1.7 The assessment is supported by the following appendices:

- **ES Appendix 6.1 – Operational Air Quality Assessment;**
- **ES Appendix 6.2 – Traffic-related Air Quality Assessment;** and
- **ES Appendix 6.3 - Human Health Risk Assessment.**

6.1.8 The Proposed Development is not located within or close to an Air Quality Management Area (AQMA). The Proposed Development is located within the administrative area of Bournemouth, Christchurch and Poole Council (BCP). BCP has declared two areas as AQMAs. One of these is located within and around Ashley Road, 4.6km to the south of the Proposed Development. The other (Poole AQMA) is located along Commercial Road and its junctions with Station Road and Curzon Road, 5.3km to the south of the Proposed Development. These are both declared due to exceedances of the annual mean air quality

objective for nitrogen dioxide (NO_2). At these distances it is unlikely that emissions from the EfW CHP Facility would have a significant impact on air quality within these AQMAs.

6.1.9 The nearest residential Receptors to the Proposed Development are located off Provence Drive, approximately 0.6km east of the EfW CHP Facility Site at the nearest point. Other sensitive Receptors close to the Proposed Development include the proposed Provence Drive business units (0.6km to the east) and Canford Sports Club (0.6km to the north-east).

6.1.10 Operational access to the EfW CHP Facility Site would be along Arena Way off Magna Road, the A341. A minor access to the DNC only would be provided off Provence Way.

Potential Air Quality Impacts

6.1.11 The potential air quality impacts arising from the Proposed Development are as follows:

- construction impacts including construction dust and emissions from on-site construction plant;
- traffic-related air quality impacts from vehicles accessing the Proposed Development during construction and operation; and
- emissions to air from the combustion sources associated with the Proposed Development.

6.1.12 Guidance is provided by the Institute of Air Quality Management (IAQM) on the assessment of dust from demolition and construction (published February 2016)[1]. As stipulated by the guidance, a dust assessment is required if there is a human Receptor within 350m of the boundary of the site or 50m of the trackout routes (up to 500m from the site entrance), or if there is an ecological Receptor within 50m of the boundary of the site entrance or trackout routes (up to 500m from the site entrance).

6.1.13 The Proposed Development includes two TCCs for consideration (i.e., TCC1 and TCC2), of which only one would be implemented by the Applicant for use during the construction programme. For TCC1, located off Arena Way, human Receptors are within 350m of its boundary and so an assessment is required for the scenario where TCC1 is used as the chosen TCC location. TCC2, located south of the EfW CHP Facility Site, is less than 50m from sensitive ecological Receptors, such as Canford Heath Site of Special Scientific Interest (SSSI), Dorset Heaths Special Area of Conservation (SAC), and Dorset Heathlands Special Protection Area (SPA), meaning an assessment of the effects of construction dust is required. Regardless of either TCC location, the EfW CHP Facility Site borders the sensitive environmental Receptors of Canford Health, Dorset Heaths and Dorset Heathlands, so a dust assessment is required for this part of the development.

6.1.14 Guidance is provided by the IAQM and Environmental Protection UK (EPUK) on indicative criteria for requiring a detailed traffic-related air quality assessment in their Land-use Planning Development Control: Planning for Air Quality (January 2017) [2]. For sites that are not located within an air quality management area, these are 500 light-duty vehicles (LDVs) AADT (annual average daily traffic) and/or 100 heavy-goods vehicles (HGVs) AADT.

6.1.15 The construction phase of the Proposed Development is anticipated to take 36-months, during which the HGVs and car numbers will vary depending on the particular activities, as noted in **ES Chapter 15: Traffic and Transport**. On average, over the 36-month construction period, 46 HGVs and 103 cars per day are expected, equating to 298 two-way

1 Institute of Air Quality Management: Guidance on the assessment of dust from demolition and construction (v1.1 01/06/16)
2 Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM (January 2017)

movements (i.e., 92 HGV and 206 car movements). These AADT flows would be well below the IAQM and EPUK threshold for further assessment.

6.1.16 During the peak month, represented by Month 21, it is expected that a maximum of 60 HGVs and 200 cars would arrive and depart daily, equating to 120 two-way HGV movements and 400 two-way car/LDV movements. These are peak-month values and do not represent annual average traffic flows.

6.1.17 Based on the traffic surveys, the baseline weekday AADT on Magna Road in 2022 was 16,692 vehicles. Therefore, the average daily construction traffic represents a 1.8% increase in flow on Magna Road, with an increase of 3.1% during the peak month.

6.1.18 As the AADT will be well below the threshold at which a detailed assessment is required, and both average and peak-month flows will be very small increases on the baseline Magna Park flows, construction-related traffic has been scoped out for further assessment. However, a Construction Traffic Management Plan (CTMP) will be prepared and form part of the Construction Environmental Management Plan (CEMP), an Outline CEMP is provided as part of the application (**ES Appendix 3.2**) in response to local community feedback.

6.1.19 As discussed in **ES Chapter 3: Description of the Proposed Development**, the construction phase is anticipated to utilise mobile and fixed plant. As noted in the IAQM guidance (published 2016), emissions from non-road mobile machinery on-site suggests that exhaust emissions are unlikely to make a significant impact on the local air quality and in the majority of the cases do not need to be quantitatively assessed. Given that the Proposed Development is not located within an AQMA, and the numbers of site plant and on-site traffic will not exceed the EPUK threshold, further detailed assessment is not warranted. As such, the emissions associated with the construction phase are scoped out.

6.1.20 During operation, the Proposed Development activities are expected to generate up to 162 HGV two-way movements per day. Around 68% of these movements (110 two-way movements) would access/egress the EfW CHP Facility Site in a westerly direction along Magna Road and 32% in an easterly direction (52 movements). Therefore, the number of vehicles movements along Magna Road travelling west would exceed the IAQM HGV criterion for requiring a detailed assessment. However, in practice many of these HGV and other waste vehicles are already on the local road network in the baseline scenario without the Proposed Development as they access existing waste management resources within CRP (Materials Recycling Facility (MRF) and Mechanical Biological Treatment (MBT) facility) which are adjacent to the Proposed Development.

6.1.21 The Traffic Consultants for the project (Paul Basham Associates) calculate that the Proposed Development would give rise to only a net addition of 90 new HGV two-way movements. Of the total 260,000 tonnes per annum (tpa) waste input to the Proposed Development, 30,000tpa would come from the adjacent MRF and 110,500tpa from the adjacent MBT. These would not be new traffic movements on the road network, as the facilities are already in operation. The remaining 119,500tpa (46% of the total waste input) would generate new vehicle movements on the local road network. On this basis, it is estimated that there would be 90 additional HGV movements on Arena Way, 52 movements on Magna Road west and 38 movements on Magna Road east. These are all below the IAQM criterion for requiring a detailed assessment (100 HGVs on a given road link). However, it is feasible that all of the traffic generated by the Proposed Development could comprise new vehicles and a detailed assessment of traffic-related air quality impacts for the operation of the Proposed Development is provided on the basis of this worst-case scenario.

6.2 Assessment Criteria & Methodology

Previous Assessment

6.2.1 There have been no previous air quality assessments carried out for an equivalent energy from waste facility within the Proposed Development Boundary. The EfW CHP Facility Site includes an implemented, but not operational, low carbon gasification and pyrolysis energy from waste facility. An air quality assessment for this facility was submitted to support the planning application. This assessment was undertaken more than ten years ago and is unlikely to have any relevance to the air quality assessment for the EfW CHP Facility.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

The European Directive on Ambient Air and Cleaner Air for Europe

6.2.2 European Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008, sets legally binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union's air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

6.2.3 The pollutants included are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter of less than 10 micrometres (µm) in aerodynamic diameter (PM_{10}), particulate matter of less than 2.5 µm in aerodynamic diameter ($PM_{2.5}$), lead (Pb), carbon monoxide (CO), benzene, ozone (O_3), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

Air Quality Strategy for England, Scotland, Wales and Northern Ireland

6.2.4 The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland published in July 2007[3], pursuant to the requirements of Part IV of the Environment Act 1995. The Air Quality Strategy sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The Air Quality Strategy is designed to be an evolving process that is monitored and regularly reviewed.

6.2.5 The Air Quality Strategy sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide, ozone and polycyclic aromatic hydrocarbons.

6.2.6 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

6.2.7 The air quality objectives are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO

3 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007

guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

6.2.8 For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO_2), the short-term standard is for a 1-hour averaging period, whereas for fine particles (PM_{10}) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Air Quality (England) Regulations

6.2.9 The Air Quality Standards (England) Regulations 2010[4] have adopted into UK law the limit values required by EU Directive 2008/50/EC[5] and came into force on the 10 June 2010. These regulations prescribe the 'relevant period' (referred to in Part I2V of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'.

6.2.10 Ozone is not included in the Regulations as, due to its transboundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

Local Air Quality Management (LAQM)

6.2.11 Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews are required to consider the present and future air quality and whether any air quality objectives prescribed in the Regulations are being achieved or are likely to be achieved in the future.

6.2.12 Where any of the prescribed air quality objectives are not likely to be achieved, the authority concerned must designate that part an AQMA.

6.2.13 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

Environment Act 2021

6.2.14 The Environment Act 2021[6] establishes a legally binding duty on the government to bring forward new air quality targets by 31 October 2022 for $PM_{2.5}$.

6.2.15 The proposed air quality targets currently under consultation (consultation closed on 27 June 2022) are:

- an Annual Mean Concentration Target - a maximum concentration of 10 µg/m^3 to be met across England by 2040; and
- a Population Exposure Reduction Target ('exposure target') - a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

4 The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001

5 Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008, on ambient air quality and cleaner air for Europe

6 Environment Act 2021, 2021 Chapter 30

6.2.16 Schedule 11 of the Environment Act 2021 also strengthens the Local Air Quality Management (LAQM) framework which was introduced by the Environment Act 1995. Schedule 11 requires the LAQM framework to be reviewed and where appropriate modified within 12 months of the Environment Act coming into force and every 5 years following the initial review. Schedule 11 also places a duty on the local authority to have regard to the LAQM framework when exercising a function which could affect air quality (i.e., determining a planning application with air quality implications).

Industrial Emissions Directive (IED)

6.2.17 The Industrial Emissions Directive (2010/75/EU) came into force on the 6 January 2011, replacing the seven existing Directives, including the Waste Incineration Directive (WID) and Large Combustion Plant Directive (LCPD), implemented through the Environmental Permitting Regulations (EPR).

6.2.18 The aim of the new Directive is to simplify the existing legislation and reduce administrative costs, whilst maintaining a high level of protection for the environment and human health. Permits will still be issued under EPR; however existing and new sites will be required to comply with the requirements of the IED, which places greater emphasis on new plant utilising best available techniques.

6.2.19 The IED has been transposed into UK law via the Environmental Permitting (England and Wales) (Amendment) Regulations 2013 (SI 2013 No, 390), which came into force on 27 February 2013. The design and operation of all new waste incinerations facilities must ensure compliance with emission limit values (ELVs) set out in the IED.

Best Available Techniques Reference Document for Waste Incineration

6.2.20 The European Union Best Available Techniques (BAT) Reference Document (BREF) for Waste Incineration was adopted in December 2019. The proposed EfW CHP Facility does not currently have an Environmental Permit. Therefore, it would be classed as a new plant.

6.2.21 The BREF provides BAT Associated Emission Levels (AELs) for new plants and existing plants. For the purposes of this assessment, it is assumed that the EfW CHP Facility will need to comply with the requirements for new plant and that for some pollutants the ELVs will be more stringent than those provided in the IED. For the majority of pollutants, the BAT-AELs are provided as a range of concentrations for each pollutant. In this assessment, the EfW CHP Facility has been assessed against the upper figure within the range for each ELV except for ammonia. For ammonia, a more stringent ELV has been adopted to minimise the impact of emissions on habitat sites. The ELVs adopted are provided in **Table 3.4** in **Section 3.4.3** of **ES Appendix 6.1: Operational Air Quality Assessment**.

Guidance Best Practice

LAQM Technical Guidance

6.2.22 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work[7]. This guidance, referred to as LAQM.TG(22), is designed for local authority use but provides methods and assessment criteria that are applicable to planning developments. The guidance has been used where appropriate in this assessment.

7 Department for Environment, Food and Rural Affairs (Defra), (August 2022): Part IV The Environment Act 1995 as amended by the Environment Act 2021, Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(22).

EPUK and IAQM Land Use Planning and Development Control

6.2.23 EPUK & IAQM published the Land Use Planning and Development Control Air Quality guidance in January 2017[8] to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

6.2.24 The guidance seeks to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts. This guidance has been used within this assessment.

IAQM Guidance on the assessment of dust from demolition and construction

6.2.25 IAQM published guidance on the assessment of dust from demolition and construction in February 2016[9]. The guidance provides an evaluation matrix to determine the potential risk of dust generation for demolition, earthworks, construction and trackout by assessing the dust emission magnitude and the sensitivity of the surrounding area. Recommended dust and air emissions mitigation measures are then presented, depending on the level of risk identified in previous steps. This guidance has been used within this assessment.

Baseline Data Collection

6.2.26 The assessment of impacts requires an analysis of the change in pollutant concentrations with the relevant air quality standard, considering the background concentrations of the pollutant. Background monitoring data is not always available locally, particularly in areas that have good air quality. However, it is normal practice to obtain data from a comparable location to describe the air quality at the site being assessed. Therefore, air quality at the Proposed Development has been characterised based on monitoring data and modelled data, obtained from national and local sources including the following:

- BCP Council's Annual Status Report;
- Defra UK Background Air Pollution Maps;
- Defra Acid Gases & Aerosol Network;
- UK Urban and Rural Heavy Metals Monitoring Networks;
- National Ammonia Monitoring Network; and
- Toxic Organic Micropollutants (TOMPs) Network.

6.2.27 For habitat sites, information on baseline concentrations and deposition rates for specific habitat sites has been obtained from the Air Pollution Information Service (APIS).

8 EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

9 IAQM: Guidance on the assessment of dust from demolition and construction (v1.1 01/06/16)

Assessment Methodology

Construction Phase

Approach

6.2.28 The purpose of this assessment is to identify the level of risk from dust and emissions associated with the construction activities and propose a suitable mitigation strategy to ensure negative impacts are controlled and minimised.

6.2.29 Dust from construction processes contains a range of particle sizes, types and compositions. These can cause annoyance from soiling, and long-term exposure can potentially have morbidity or mortality effects. The emissions for consideration in this assessment are particulate matter; PM_{10} and $PM_{2.5}$.

6.2.30 For this assessment, the IAQM guidance on the assessment of dust from demolition and construction (2016) was utilised to assess the potential impacts of dust during the construction phase of the Proposed Development. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation recommended. The main steps are as follows:

- screen the need for a detailed assessment;
- define the potential dust emission magnitude;
- define the sensitivity of the areas;
- assess the risk of dust impacts during the demolition, earthworks, construction and trackout phases;
- recommend site-specific mitigation; and
- determine significant effects.

6.2.31 The need for a detailed dust assessment is dependent on the presence of sensitive Receptors within a certain distance of the works. As discussed in **Section 6.1**, a dust assessment is required if there is a human Receptor[10] within 350m of the boundary of the site or 50m of the trackout routes (up to 500m from the site entrance), or if there is an ecological Receptor[11] within 50m of the boundary of the site entrance or trackout routes (up to 500m from the site entrance).

Magnitude of impact

6.2.32 For the dust assessment, a site is allocated to a risk category based on the potential dust emission magnitude as well as the sensitivity of the area. As outlined in the guidance, potential definitions for dust emission magnitude for all four construction activities (i.e., demolition, earthworks, construction, trackout) are provided, as seen in **Table 6.1**.

[10] any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the Air Quality Objectives
[11] any sensitive habitat affected by dust soiling, whether by direct impacts on vegetation or aquatic ecosystems of dust deposition, or the indirect impacts on fauna (e.g. on foraging habitats). This may include statutory and non-statutory designated sites depending on their sensitivity to dust and reason for designation.

Table 6.1: Potential Definitions for Dust Emission Magnitudes (IAQM, 2016)

Site Name	Large	Medium	Small
Demolition	Total building volume >50,000m^3, potentially dusty construction material (e.g,. concrete), on-site crushing and screening, demolition activities >20m above ground level	Total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10-20m above ground level	Total building volume <20,000m^3 , construction material with low potential for dust release (e.g., metal cladding or timber), demolition activities <10m above ground, demolition during wetter months
Earthworks	Total site area >10,000m^2 , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes	Total site area 2,500m^2 – 10,000 m^2 , moderately dusty soil type (e.g., silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes	Total site area <2 ,500m^2, soil type with large grain size (e.g., sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months
Construction	Total building volume >100,000m^3 , on site concrete batching, sandblasting	Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g., concrete), on site concrete batching	Total building volume <25,000m^3, construction material with low potential for dust release (e.g., metal cladding or timber).

a A vehicle movement is a one way journey, i.e. from A to B, and excludes the return journey
b HGV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

6.2.33 For the purposes of this assessment, to assess the risk of dust impacts for the construction activities, the scale of magnitude was conservatively identified as “large” overall due to the scale of the Proposed Development.

Sensitivity of Receptors

6.2.34 The guidance (IAQM, 2016) notes to consider sensitivity of the area by considering the following factors:

- the specific sensitivities of Receptors in the area;
- the proximity and number of those Receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

6.2.35 Through professional judgement, sensitivity of the area was conservatively classified as high due to the nature of sensitive Receptors in the vicinity of the Proposed Development boundary.

6.2.36 Overall, the conservative approach to identifying a large scale of magnitude and high sensitivity follows the precautionary principle to determine risk and associated mitigation measures for the worse-case scenario.

6.2.37 Details of sensitive Receptors that may be affected by the Proposed Development during the construction and operational phases are given in **Table 6.2** and **Table 6.3**. Only a small

number of these human and ecological Receptors are within 350m and 50m of the Proposed Development Boundary, respectively. The location of the sensitive Receptors are presented in **Figure 6.1** and **Figure 6.2.** Therefore, in line with the IAQM guidance, the sensitive Receptors identified for the construction phase are as follows, with reference to **Table 6.2** and **Table 6.3**:

- White House (D19) – Human Receptor in close proximity to TCC1;
- Canford Sports Club House (D9) – Human Receptor in close proximity to TCC1 and the EfW CHP Facility Site;
- Provence Drive (D10) – Human Receptor in close proximity to TCC1;
- Canford Heath SSSI (H4) – Ecological Receptor in close proximity to TCC2 and EfW CHP Facility Site;
- Dorset Heaths SAC (H1) – Ecological Receptor in close proximity to TCC2 and EfW CHP Facility Site; and
- Dorset Heathlands SPA (H1) – Ecological Receptor in close proximity to TCC2 and EfW CHP Facility Site.

Significance of effect

6.2.38 The IAQM guidance at Section 9 states that significance of effect should be determined after consideration of the committed mitigation, which should be defined based on the magnitude of dust risk and sensitivity of Receptors and secured through measures such as a Construction Environmental Management Plan (CEMP). The guidance provides recommended mitigation measures appropriate to different construction phases/activities and the pre-mitigation dust risk magnitude. The guidance indicates that the goal of identifying and securing implementation of these applicable and proportionate mitigation measures is to prevent significant effects from dust arising, which should normally be possible, and therefore the effect with committed mitigation in place will normally be determined as 'not significant'.

Operational Phase

Introduction

6.2.39 Emissions to air from the EfW CHP Facility have been modelled using the Atmospheric Dispersion Modelling System (ADMS) Version 5.2 and a five-year meteorological data set from Bournemouth Airport (2016 to 2020). Predicted concentrations are compared with air quality standards and objectives set for the protection of human health and critical levels for the protection of habitat sites. The assessment also provides predicted nutrient nitrogen deposition rates and acidification rates for comparison with habitat specific critical loads.

Sensitive Human Receptors

6.2.40 LAQM.TG(22) describes in detail the typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations *'where members of the public are regularly present'* should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

6.2.41 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standards (i.e., 15-minute mean or 1-hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards, owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

6.2.42 Initial results are presented as the maximum predicted within the modelling domain. However, this represents worst-case conditions. Therefore, to assess the impact at sensitive Receptor locations, the impact of emissions on selected discrete Receptors is also provided. The locations of the sensitive human Receptors considered for this assessment are provided in **Table 6.2** and presented in **Figure 6.1**.

Table 6.2: Description of Sensitive Human Receptors

Label	Receptor	Type	Eastings	Northings	Relevant for the Construction Phase	Relevant for the Operational Phase
D1	Viscount Walk	Residential	404335	96289	No	Yes
D2	Wheelers Lane (new dev.)	Residential	404370	96601	No	Yes
D3	Magna Road	Residential	404627	97138	No	Yes
D4	Waggy Tails Rescue	Residential/commercial	404443	97224	No	Yes
D5	The Hamworthy Club	Leisure	403684	97765	No	Yes
D6	Arrowsmith Road	Residential	403195	97447	No	Yes
D7	Maranello	Residential	402736	97100	No	Yes
D8	Magna Care Centre	Care home	402315	96929	No	Yes
D9	Canford Sports Club House	Leisure	403744	97351	Yes	Yes
D10	Provence Drive	Commercial	404100	96723	Yes	Yes
D11	Bearwood Primary School	School	404517	96776	No	Yes
D12	Ferndown	Residential	406923	98695	No	Yes
D13	Belben Road, Bournemouth	Residential	404124	95023	No	Yes
D14	Pilsdon Drive, Bournemouth	Residential	402507	95187	No	Yes
D15	Gravel Hill, Broadstone	Residential	401527	96002	No	Yes
D16	Egdon Drive, Merley	Residential	402314	97585	No	Yes

D17	Marpet Close, Bear Cross	Residential	405735	96637	No	Yes
D18	Knighton Lane, Knighton	Residential	404883	97432	No	Yes
D19	White House	Commercial	404311	97373	Yes	Yes

6.2.43 For the detailed traffic-related air quality (TRAQ) assessment, ten additional Receptors have been identified representative of roadside locations near to where traffic impacts are likely to be highest. These are provided along with those roadside Receptors provided in **Table 6.2**, in **Figure 2.1** in **ES Appendix 6.2: Traffic-related Air Quality Assessment**.

Sensitive Habitat Receptors

6.2.44 The Environment Agency's risk assessment guidance[12] states that the impact of emissions to air on vegetation and ecosystems should be assessed for the following habitat sites within 10km of the source:

- Special Areas of Conservation (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive;
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive; and
- Ramsar Sites designated under the Convention on Wetlands of International Importance.

6.2.45 Within 2km of the source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- local wildlife sites (Sites of Interest for Nature Conservation, SINC and Sites of Local Interest for Nature Conservation, SLINC); and
- Ancient Woodland (AW).

6.2.46 In response to EIA scoping, Natural England also requested that the impact of the Proposed Development should be considered for the following internationally designated sites and SSSIs:

- Dorset Heathlands SPA;
- Dorset Heathlands Ramsar;
- Dorset Heaths SAC;
- Dorset Heaths (Purbeck & Wareham) & Studland Dunes SAC;
- Poole Harbour SPA;

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

- Poole Harbour Ramsar;
- Canford Heath SSSI;
- Bourne Valley SSSI;
- Corfe & Barrow Hills SSSI;
- Turbary & Kinson Commons SSSI;
- Luscombe Valley SSSI;
- Slop Bog & Uddens Heath SSSI;
- Hurn Common SSSI;
- Parley Common SSSI;
- Holt & West Moors Heaths SSSI;
- Arne SSSI; and
- Moors River System SSSI.

6.2.47 Therefore, habitat Receptor designations and locations relevant to the assessment are presented in **Table 6.3** and the location of each is presented in **Figure 6.2**. Further details on the habitat sensitivities for each of these sites is provided in the **ES Chapter 8: Ecology and Nature Conservation**.

Table 6.3: Habitat Sites Considered for the Habitat Risk Assessment

Receptor	Primary Habitats	Relevant for the Construction Phase	Relevant for the Operational Phase
H1 Dorset Heaths SAC/SPA/Ramsar	Coniferous woodland, dwarf shrub heath and bogs	Yes	Yes
H2 Poole Harbour SPA/Ramsar	Supralittoral sediment (acidic type)	No	Yes
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	Bog woodland and bogs	No	Yes
H4 Canford Heath SSSI	Bogs and fen, marsh and swamp	Yes	Yes
H5 Turbary & Kinson Commons SSSI	Bogs and fen, marsh and swamp	No	Yes
H6 Hurn Common SSSI	Dwarf shrub heath and fen, marsh and swamp	No	Yes
H7 Slop Bog & Uddens Heath SSSI	Bogs and fen, marsh and swamp	No	Yes
H8 Parley Common SSSI	Bogs and fen, marsh and swamp	No	Yes

H9 Luscombe Valley SSSI	Acid grassland and fen, marsh and swamp	No	Yes
H10 Bourne Valley SSSI	Bogs and fen, marsh and swamp	No	Yes
H11 Holt & West Moors Heath SSSI	Fen, marsh and swamp	No	Yes
H12 Corfe & Barrow Hills SSSI	Fen, marsh and swamp	No	Yes
H13 Arne SSSI	Bogs	No	Yes
H14 Moors River System SSSI	Broadleaved deciduous woodland and acid grassland	No	Yes
H15 Knighton Heath GC SNCI	Dwarf shrub heath	No	Yes
H16 Alderney Waterworks SNCI	Acid grassland	No	Yes
H17 Haymoor Bottom SNCI	Dwarf shrub heath	No	Yes
H18 Arrowsmith Coppice SNCI/AW	Woodland and heathland habitats	No	Yes
H19 Delph Woods SNCI	Deciduous woodland	No	Yes
H20 Dunyeats Hill HRS	Dwarf shrub heath	No	Yes
H21 Moortown Copse SNCI	Deciduous woodland	No	Yes
H22 Canford Park SANG LCNR	Acid grassland	No	Yes
H23 Bearwood SNCI	Woodland/grassland	No	Yes
H24 Frogmoor Wood SNCI	Birch woodland and semi-acid grassland	No	Yes

6.2.48 Dorset Heaths SAC/SPA/Ramsar site (H1) and Frogmoor Wood SNCI (H24) have been included in the model as polygon features due to their extent and proximity to the Proposed Development. The model predicts the maximum concentration anywhere within these habitat sites and represents a worst-case.

6.2.49 There are no habitat Receptors adjacent to any road link that exceed the IAQM criterion for requiring a detailed TRAQ assessment. Therefore, the impact of traffic emissions on habitat Receptors has been screened out from the TRAQ assessment.

Dispersion Modelling of Emissions

6.2.50 The potential impact of emissions from the EfW CHP Facility has been assessed using a dispersion model to predict airborne ground level concentrations of pollutants emitted from the EfW CHP Facility's chimney.

6.2.51 The operational impacts from the emission sources have been assessed using the ADMS (Atmospheric Dispersion Modelling System) version 5.2 model. ADMS allows for the modelling of dispersion under convective meteorological conditions using a skewed Gaussian concentration distribution. It simulates the effects of terrain and building downwash simultaneously. It can also calculate concentrations for direct comparison with air quality standards or guidelines. It is used extensively in the UK for assessing the air quality impacts of industrial and other similar processes.

6.2.52 Emission parameters for the EfW CHP Facility are presented in **Table 3.4** in **ES Appendix 6.1**. This data has been provided by The Applicant. Except for NH_3, the adopted emission levels are based on the BAT-AELs for waste incineration (new plant). For NH_3, a lower emission concentration of 5 mg/Nm^3 has been adopted to minimise impacts on the adjacent European habitat site. Further details of the dispersion modelling methodology are provided in **Section 3** in **ES Appendix 6.1**.

Traffic-related Air Quality Assessment

6.2.53 Detailed air quality modelling has been undertaken using the Atmospheric Dispersion Modelling Systems Roads (ADMS Roads, Version 5.0) dispersion model and a suitable meteorological data set (Bournemouth Airport 2019). The assessment has considered the air quality impacts of the Proposed Development with respect to human health only as there are no habitat sites within 200 m of the road links that exceed the IAQM criterion. The assessment has considered emissions of NO_x, PM_{10} and $PM_{2.5}$.

6.2.54 As discussed in **Section 6.1**, guidance is provided by the IAQM/EPUK on indicative criteria for requiring an air quality assessment in their land-use planning development control: planning for air quality (January 2017). On the basis of these criteria, the following road links have been included in the assessment:

- Arena Way (site access road);
- Magna Road to the east of the site access road;
- Magna Road to the west of the site access road;
- A349 north of the Magna Road junction; and
- A349 south of the Magna Road junction.

6.2.55 Magna Road to the east of the site access falls below the IAQM criterion but has been included as there is a diffusion tube monitoring site on Magna Road to the north of Bearwood which can be used for model verification purposes. The A349 links also fall below the IAQM criterion but have been included in order to predict the impact at the A349/Magna Road junction where traffic emissions are likely to be higher.

6.2.56 A summary of baseline (2019), future (2027 including committed development) and future plus development traffic (2027) flows is presented in **Table 2.4** in **ES Appendix 6.2**. Traffic data have been provided by the Transport Consultants for the project (Paul Basham Associates). The 2019 baseline data is used for model verification purposes only. The 2027 plus committed development traffic data is representative of future traffic without the Proposed Development and the 2027 plus development is representative of future traffic with the Proposed Development.

6.2.57 Emissions for each road link were calculated using Defra's 2021 Emission Factor Toolkit (EFT V11.0). Emissions were calculated for the Do Minimum (DM, without the development) and Do Something (DS, with the development) scenarios. A precautionary approach was taken regarding the decrease in emissions in the future as historically vehicle emissions and background concentrations in urban areas have not decreased as predicted. Therefore, it was assumed for the 2027 scenario that vehicle emissions were as predicted by Defra for 2023 and will be higher than for the assumed operational year of 2027. Assumed background concentrations were based on the 2019 Defra mapped data (refer **Section 3.2.4** in **ES Appendix 6.2**). Therefore, for the detailed assessment, modelling was carried out for the following scenarios:

- Baseline 2019 scenario for model verification purposes (2019 emission factors and background concentrations); and
- Do Minimum and Do Something for 2027 (using 2023 emission factors and 2019 background concentrations).

Predicting Effects

Construction Phase

6.2.58 Based on the average daily construction traffic, a detailed assessment of the construction traffic and construction plant emissions has been scoped out. However, an Outline CTMP has been provided in response to local community feedback, along with an Outline CEMP.

6.2.59 As per the IAQM Dust Guidance (2016), there are four types of activities on construction sites:

- demolition;
- earthworks;
- construction; and
- trackout.

6.2.60 Potential dust impacts from the construction of the Proposed Development can arise from:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}; and
- harm to an ecological Receptor.

6.2.61 To predict effects, the risk of dust impacts must first be assessed. This is done through two stages; firstly, the potential dust emission magnitude for each of the four construction activities must be determined. Secondly, the sensitivity of the area must be defined. Sensitivities of people to dust soiling effects, to the health effects of PM_{10}, and the sensitivities of Receptors to ecological effects are all considered before reaching an overall sensitivity of the surrounding area for each of the four construction activities.

6.2.62 As discussed in **Section 6.2**, the dust emission magnitude is conservatively determined as "large", prior to consideration of mitigation, and the sensitivity of the area is considered as "high".

6.2.63 As per the guidance (IAQM, 2016), the risk of impacts with no mitigation applied can then be defined for each of the four construction activities, ranging between negligible risk and high risk, as shown in **Table 6.4**.

Table 6.4: Risks of Dust Impacts

Receptor Sensitivity	Dust Emission Magnitude (Demolition, Earthworks, Construction, Trackout)		
	Large	**Medium**	**Small**
High	High Risk	Medium risk	Medium risk
Medium	High Risk	Medium risk	Low Risk
Low	Medium risk	Low Risk	Negligible

6.2.64 As noted in the guidance (IAQM, 2016), IAQM recommends that significance be only assigned to the effects after considering construction activity with mitigation. As such, the implementation of the mitigation measures included in the Outline CEMP, which represent committed mitigation measures, will be considered in the assessment of significant effects.

Operational Phase

Impacts on Human Health – Planning

6.2.65 The EPUK & IAQM 2017 guidance[13] has been used to determine the significance of any air quality impacts. The impact descriptors for individual Receptors are presented in **Table 6.5.** Impacts can be described as being 'adverse' or 'beneficial' depending on whether the operation of the Proposed Development results in an increase or decrease in pollutant concentrations.

6.2.66 The change in percentage pollutant concentration figures are rounded to whole numbers; making it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0% (i.e. less than 0.5%) will be described as 'negligible'.

Table 6.5: Impact Description for Individual Receptors

Concentration with Development	Percentage Change in Air Quality Relative to the Air Quality Assessment Level (AQAL)			
	1%	**1 to 5%**	**6 to 10%**	**>10%**
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 to 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 to 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 to 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

13 Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM (January 2017)

6.2.67 In relation to short-term impacts, the EPUK & IAQM guidance states:

"6.39 Where such *peak short term concentrations from an elevated source are in the range 11-20% of the relevant AQAL, then their magnitude can be described as small, those in the range 21-50% medium and those above 51% as large. These are the maximum concentrations experienced in any year and the severity of this impact can be described as slight, moderate and substantial respectively, without the need to reference background or baseline concentrations. That is not to say that background concentrations are unimportant, but they will, on an annual average basis, be a much smaller quantity than the peak concentration caused by a substantial plume and it is the contribution that is used as a measure of the impact, not the overall concentration at a Receptor. This approach is intended to be a streamlined and pragmatic assessment procedure that avoids undue complexity."*

6.2.68 Therefore, the following descriptors for assessing the impact magnitude resulting from short term impacts are applied in this assessment:

- 10% or less: negligible;
- 11-20%: slight;
- 21-50%: moderate; and
- 51% or greater: substantial.

6.2.69 The assessment of significance is principally left to professional opinion and guidance is provided on the factors that need to be considered when judging significance and include the following:

- the existing and future air quality in the absence of a proposed development;
- the extent of current and future population exposure to impacts;
- the worst-case assumptions adopted when undertaking the prediction of impacts; and
- the extent to which a proposed development has adopted best practice to eliminate and minimise emissions.

Impacts on Human Health – Environment Agency

6.2.70 The Environment Agency's Environmental Management guidance for risk assessments specifies criteria to enable the potential significance of an impact to be determined[14]. For the process contribution (PC), the impact is deemed not significant if the annual mean PC is less than 1% of the environmental assessment level (EAL) and the short-term PC is less than 10% of the EAL. If either of these criteria is exceeded, they are potentially significant and it is then necessary to consider the total predicted environmental concentration (PEC, which is the PC plus the ambient background concentration).

6.2.71 For the annual mean, if the PEC is below 70% of the assessment criterion, then it is considered unlikely that an exceedance of the limit will occur and there should be no adverse impact. For short term concentrations, more detailed assessments are required where the short-term PC is greater than 20% of the short-term standard, minus twice the long-term background concentration.

6.2.72 Within the IED, emissions of metals are divided into three groups. The total emissions of metals within each group is not permitted to exceed the prescribed emission limit set for the group. For the purposes of the modelling, initially the assumption is made that each metal

14 https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

is emitted as 100% of the total emission for the group (referred to as Step 1). This allows the initial screening out of metals that do not pose a significant risk even based on worst-case assumptions. In reality, this assumption is clearly highly conservative and is likely to greatly overestimate the actual impacts associated with emissions of metals.

6.2.73 In accordance with Environment Agency guidance[15], where metals cannot be considered insignificant, a further step (Step 2), with a less conservative assumption is applied, whereby metals are assessed based on typical emissions of these metals derived from data from other operational facilities, as provided by the Environment Agency. The emissions data used for this purpose are presented in **Table 3.5** in **Appendix 6.1: Operational Air Quality Assessment**.

6.2.74 Where the typical emissions are applied, if the process contribution (PC) exceeds 1% of the long-term AQAL or 10% of the short-term AQAL then the total predicted environmental concentration (PEC) should be considered. The impact can be screened out where the PEC is less than 100% of the AQAL.

6.2.75 The Environment Agency also provides guidance on the assumptions relating to hexavalent chromium (CrVI) as a proportion of total chromium, the following is assumed:

- for initial screening, CrVI is assumed to comprise 20% of the Group 3 IED emission limit;
- for typical emissions, CrVI is assumed to comprise 0.03% of the Group 3 IED emission limit in accordance with the Environment Agency guidance; and
- background concentrations of CrVI are assumed to be 20% of the total chromium concentration.

Impacts on Habitat Sites

6.2.76 The Environment Agency's risk assessment guidance specifies criteria to enable the potential significance of an impact to be determined. For the PC, the impact is deemed not significant if the annual mean PC is less than 1% of the critical level (or critical load) and the short-term PC is less than 10% of the critical level (or critical load). If either of these criteria is exceeded, they are not necessarily significant but it is then necessary to consider the total predicted environmental concentration or deposition (PC plus the background contribution), as discussed above.

6.2.77 For local wildlife sites (SINCs, SLINC's, NNRs, LNRs and ancient woodland), a PC is considered not significant if:

- the long-term PC < 100% of the long-term critical level; or
- the short-term PC < 100% of the short-term critical level.

6.2.78 The IAQM has issued guidance on the assessment of air quality impacts on designated nature conservation sites[16]. It is the IAQM's opinion that the Environment Agency's 1% and 10% screening criteria should not be used rigidly and '*not to a numerical precision greater than the expression of the criteria themselves'.* Furthermore, the IAQM guidance suggests that local wildlife sites (LWS) should be treated in the same manner as SSSIs and European sites '*although the determination of the significance of an effect may be different*'.

6.2.79 Where the impact cannot be screened out using the Environment Agency criteria, an assessment of the effect of emissions on habitats is provided in **ES Chapter 8: Ecology and Nature Conservation.**

15 Environment Agency (June 2016) Guidance on Assessing Group 3 Metal Stack Emissions from Incinerators (Version 4)
16 A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites, IAQM (June 2019)

Geographical Scope

Construction Impacts

6.2.80 As described in **ES Chapter 3: Description of the Proposed Development**, there are four key elements to the Proposed Development (i.e., EfW CHP Facility, CHP connection, DNC and the TCC's). Specifically, two locations for TCCs are under consideration; TCC1 – the Arena Way site; and TCC2 – the 'Greenhouse' site. Assessment of construction impacts of dust has been performed for both TCC location scenarios, along with the other applicable elements of the Proposed Development.

Operational Impacts

6.2.81 The impact of operational emissions has been assessed over a 20km by 20km grid centred on the EFW CHP Facility Site and with a grid resolution of 160m. This is to ensure that the extent of any air quality impacts are identified, including impacts on habitat sites.

Temporal Scope

Construction Impacts

6.2.82 The assessment has been carried out based on the assumption that the earliest possible year of construction is Q1 2024 and construction activities will take 36 months to complete.

Operational Impacts

6.2.83 The operational impact assessment has provided predicted concentrations for varying averaging periods. These range between 15-minute averages to annual means. The averaging periods are selected such that they are consistent with the relevant air quality objectives, air quality standards, critical levels and critical loads.

Consultation

Statutory Consultation

6.2.84 Consultation with an Environment Officer from BCP Council was carried out in response to the Scoping Opinion issued by the Council. A letter was forwarded to BCP Council from Gair Consulting Ltd on 8 November 2022 responding to the points raised by the Council on air quality. In summary, agreement was made on the following:

- details of proposed air quality and noise Receptors;
- confirmation that an assessment of construction impacts would be provided and that this would define the mitigation measures to be included in the Outline CEMP;
- a summary of vehicles that would be generated by the Proposed Development was provided;
- a request for the provision of local air quality monitoring data obtained by BCP Council; and
- confirmation that the European habitat sites and SSSIs identified in the Scoping Opinion would be considered when assessing the impact of emissions to air.

Community Consultation

6.2.85 As part of the Applicant's commitment to engage with the local community, three public exhibitions were held between 12 and 14 January 2023. The exhibitions occurred at the Hamworthy Club, Magna Road and Bearwood Community Centre, King John Avenue. Feedback from these events is reported in the Statement of Community Involvement that accompanies the planning application.

6.2.86 Concerning air quality, feedback included:

- concern about emissions from the chimney;
- being close to schools and housing what is the impact on people's health?;
- worried about odour from the facility;
- scientific studies show incinerators release toxic material into the atmosphere; and
- what is released into the atmosphere.

6.2.87 Where appropriate, in undertaking this assessment, the community's feedback has been considered and a summary response provided in the **Statement of Community Involvement** that accompanies the planning application. Matters concerning health are addressed in **ES Chapter 14: Population and Health**.

Assumption and Limitations

Construction Impacts

6.2.88 The assessment assumes the following:

- the construction year starts in 2024 and will take 36 months to complete;
- the construction phase assesses impacts for a conservative scenario, where the Proposed Development is considered to match the definition of a 'large' dust emission magnitude site overall; and,
- all mitigation measures set out in **Section 6.4** will be implemented.

Operational Impacts

6.2.89 Due to the semi-rural nature of the location of the Proposed Development, information on baseline conditions were limited, since background air quality is generally good in the local area, as identified by the Defra background mapped data. Generally, monitoring is only carried out in areas of poor air quality. Background concentrations for some pollutants were obtained from monitoring sites in excess of 50km away from the Proposed Development Boundary and may not be entirely characteristic of the air quality environment around the Proposed Development. However, worst-case assumptions were adopted to avoid underestimating background pollutant concentrations.

6.2.90 To avoid underestimating predicted concentrations, worst-case assumptions were adopted and include:

- the EfW CHP Facility is assumed to operate continuously at full load;
- emissions were assumed to be at the maximum emission limit value (ELV) except for ammonia where a lower ELV has been adopted;

- the maximum predicted concentration (anywhere within the model domain) is presented; and
- results are presented for the worst-case meteorological year of the five years considered.

6.3 Baseline Conditions

Current Baseline

Human Health

6.3.1 For human health effects, baseline conditions within 3km of the Proposed Development Boundary have been defined.

6.3.2 A summary of the annual mean and short-term background concentrations assumed for the assessment is presented in **Table 6.6**. The source of background pollutant concentrations is discussed in Section 4 in **ES Appendix 6.1.** The relevant air quality assessment level (AQAL) for each pollutant and averaging period is also provided, these are discussed in more detail in Section 2.3 of **ES Appendix 6.1**. Background annual mean concentrations of hexavalent chromium (CrVI) are assumed to be 20% of the chromium concentration. Therefore, the annual mean CrVI concentration would be 0.22ng/m^3 and would be 110% of the AQAL of 0.2ng/m^3.

Table 6.6: Summary of Background Concentrations

Pollutant	Annual Mean	Annual Mean AQAL (a)	Short-term Mean (Hourly Unless Stated)	Short-term AQAL (a)
Particles (PM_{10})	18.7 µg/m^3	40	22.1 µg/m^3	50
Particles ($PM_{2.5}$)	12.8 µg/m^3	20	-	No AQAL
Nitrogen Dioxide (NO_2)	19.6 µg/m^3	40	39.2 µg/m^3	200
Sulphur Dioxide (SO_2)	6.6 µg/m^3	No AQAL	24- hour 7.8 µg/m^3 1-hour 13.2 µg/m^3 15- minute 17.7 µg/m^3	125 350 266
Carbon Monoxide (CO)	153 µg/m^3	No AQAL	8 – hour 214 µg/m^3 1 – hour 306 µg/m^3	10,000 30,000
Hydrogen Fluoride (HF)	0.5 µg/m^3	No AQAL	Weekly 0.5 µg/m^3 24 – hour 1.0 µg/m^3	16 160
Hydrogen Chloride (HCl)	0.26 µg/m^3	No AQAL	0.52 µg/m^3	750
Ammonia (NH_3)	1.3 µg/m^3	180	2.6 µg/m^3	2,500
Benzene	0.40 µg/m^3	5	24- hour 0.47 µg/m^3	30
Dioxins and Furans (PCDD/Fs)	3.2 fg/m^3	No AQAL	-	No AQAL

Pollutant	Annual Mean	Annual Mean AQAL (a)	Short-term Mean (Hourly Unless Stated)	Short-term AQAL (a)
Antimony (Sb)	No data	5000	No data	150,000
Arsenic (As)	0.64 ng/m^3	6	1.3 ng/m^3	15,000
Cadmium (Cd)	0.11 ng/m^3	5	-	No AQAL
Chromium (Cr)	1.1 ng/m^3	5,000	2.2 ng/m^3	150,000
Cobalt (Co)	0.050 ng/m^3	1,000	-	No AQAL
Copper (Cu)	2.7 ng/m^3	10,000	5.4 ng/m^3	200,000
Lead (Pb)	3.9 ng/m^3	250	-	No AQAL
Manganese (Mn)	2.6 ng/m^3	150	5.2 ng/m^3	150,000
Mercury (Hg)	No data	250	No data	7,500
Nickel (Ni)	0.66 ng/m^3	20	-	No AQAL
Thallium (Tl)	No data	1,000	-	No AQAL
Vanadium (V)	0.72 ng/m^3	5,000	0.85 ng/m^3	1,000
PAH, as BaP	0.078 ng/m^3	1	-	No AQAL
PCBs	0.027 ng/m^3	200	0.054 ng/m^3	6,000

(a) Units same as for measured concentrations.

6.3.3 Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ will include a contribution from road traffic and the contribution at any location will depend on the proximity to nearby roads as well as the traffic flow. For the assessment of traffic impacts it is necessary to determine the background concentration without the contribution from traffic. For each sensitive Receptor, annual mean NO_x, NO_2, PM_{10} and $PM_{2.5}$ background concentrations for 2019 have been obtained from the Defra UK Background Air Pollution Maps, these are considered to be representative of the worst-case as mapped concentrations for 2023 and beyond are lower.

Sensitive Habitats

6.3.4 Information on background nutrient nitrogen deposition, acidification and airborne concentrations of NO_x, NH_3 and SO_2 have been obtained from information provided by the Centre for Ecology and Hydrology (CEH) and are available on the APIS website. These are provided for each habitat Receptor and a summary of baseline conditions is provided in Section 5.2 of **ES Appendix 6.1**.

Future Baseline

6.3.5 Future air quality baseline conditions are expected to improve, particularly with improvements to the vehicle fleet. Therefore, it is assumed, as a worst-case, that there would be no change in baseline conditions from current levels.

6.4 Inherent Design Mitigation

Construction phase

6.4.1 Within the construction phase of the Proposed Development, there are several inherent mitigation measures, as explained in **ES Chapter 3: Description of the Proposed Development**. An Outline CEMP (**ES Appendix 3.2**), for the construction of the Proposed Development would be implemented to cover all aspects of construction. As explained in **ES Chapter 3: Description of the Proposed Development**, the key objectives of a CEMP are to:

- provide a mechanism for delivering many of the embedded environmental measures described in the ES;
- provide a framework for monitoring and compliance auditing and inspection to ensure the environmental measures included in the scheme are being implemented;
- ensure environmental best practices are adopted throughout the construction stage;
- provide a framework for dealing with adverse effects as they occur; and
- ensure a prompt response should unacceptable adverse effects be identified during the works.

6.4.2 Based on the construction phase assessment, the Outline CEMP (**ES Appendix 3.2**), sets out the IAQM (2016) recommended mitigation measures for each type of construction activity, which will be implemented to mitigate dust risk.

Operational phase

6.4.3 Details of the comprehensive air pollution control (APC) system are provided in **ES Chapter 3: Description of the Proposed Development**. The APC system ensures that emissions comply with the ELVs for release from the chimney. The process would be a dry APC system using hydrated lime and activated carbon.

6.4.1 Acid pollutants HCl, SO_2 and HF would be removed by a dry scrubbing and filtration system, using hydrated lime as the reagent.

6.4.2 A controlled amount of dry hydrated lime powder would be injected into the flue gas duct upstream of the reactor. Hydrated lime would mix with the flue gases in the flue gas duct and the downstream reactor, which is designed with sufficient residence time to ensure that the necessary chemical reactions are completed. A controlled amount of powdered activated carbon would also be injected into the flue gas, upstream of the reactor or fabric filter. The hydrated lime and activated carbon powders will form a “filter cake” on the “upstream” side of the fabric filter bags.

6.4.3 The primary method of minimising the release of dioxins and furans would be by careful control of the combustion conditions. The gas residence times and the temperatures in the combustion system will be such that dioxins/furans are efficiently destroyed. The secondary method is through flue gas temperature control at the end of the boiler; keeping it to well below 200°C to avoid re-formation by the de Novo Synthesis.

6.4.4 For additional removal of dioxins and furans, an activated carbon injection system would be used. The activated carbon adsorbs mercury and organic compounds including dioxins and

furans. Other heavy metals such as copper and cadmium will be filtered out as particles by the fabric filter.

6.4.5 Once the flue gas has been cleaned, it would be analysed using a comprehensive continuous emissions monitoring system (CEMS). Emissions would also be measured by periodic manual sampling. The treatment process would be adjusted to ensure that the emissions meet the strict emission limits that would be set out in the Environmental Permit regulated by the Environment Agency. Finally, the treated flue gases would be discharged to the atmosphere via the chimney.

6.5 Potential Environmental Impact and Effects

Construction phase

6.5.1 The dust emission magnitude and sensitivities of Receptors are typically defined to determine the overall risk of dust impacts of any one site. Due to the nature of the Proposed Development and the proposed construction programme discussed in **Chapter 3: Description of the Proposed Development** (e.g., the large amounts of excavation associated with the EfW CHP Facility Site and the CHP Connection route, preparation of the TCC by stripping and storing the topsoil, etc.), and the close proximity to human and ecological Receptors, the potential impact on dust soiling, human health and ecological Receptors were treated as being 'high risk' in order to apply the relevant highly recommended mitigation measures for the worst-case scenario which constitute good or best practice.

6.5.2 All construction related activities associated with the key elements of the Proposed Development (i.e., EfW CHP Facility, CHP Connection, DNC Corridor, TCC1 and TCC2) were assigned high risk classifications, to be conservative, as illustrated in **Table 6.7**. As such, relevant mitigation measures applicable to a high-risk sites will be implemented and are detailed in the Outline CEMP (**ES Appendix 3.2**).

Table 6.7: Assigned Risk for Construction Effects for the Proposed Development

Potential Impact	Risk			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	High Risk	High Risk	High Risk	High Risk
Human Health	High Risk	High Risk	High Risk	High Risk
Ecological	High Risk	High Risk	High Risk	High Risk

6.5.3 Although the assigned risk for all elements of the Proposed Development is classified as "High Risk", the mitigation measures to be applied, as included in the Outline CEMP , would avoid any adverse effects. As noted in the IAQM guidance at Section 9, through the implementation of mitigation measures, potential significant adverse effect will not occur and the residual effect will be "not significant". The required mitigation measures are detailed in the Outline CEMP within **ES Appendix 3.2.** These measures are equally

applicable to all key elements of construction of the Proposed Development, including both the TCC1 and TCC2 options.

Operational phase

Operational Impact on Human Health

Introduction

6.5.4 The predicted impact of emissions to air from the EfW CHP Facility are presented in **Table 6.8** and **Table 6.9**. Results are provided as the maximum predicted across the dispersion modelling domain. Results for each Receptor are also provided in Section 4 of **ES Appendix 6.1** for each pollutant.

6.5.5 For each averaging period (e.g., annual mean, maximum hourly mean etc.), the result presented is the maximum for the five years of meteorological data used for dispersion modelling purposes.

Long-term Impacts

6.5.6 A comparison of predicted long-term (annual mean) concentrations with the relevant air quality assessment levels (AQALs) is provided in **Table 6.8**. This provides the EfW CHP Facility contribution (PC) and the total concentration (PEC, background plus PC).

6.5.7 The results presented are the maximum predicted concentrations anywhere within the model domain. Furthermore, for the trace metals, each metal is assumed to be emitted at the ELV for the group. This assumption is clearly highly conservative and is likely to greatly overestimate the actual impacts associated with emissions of metals. For metals, where the impact cannot be screened out according to the Environment Agency guidance (refer **Section 6.2**), they are identified as requiring further assessment.

6.5.8 For non-metals, the impact is described based on the IAQM planning guidance.

Table 6.8: Maximum Predicted Long-term (Annual Mean) Concentrations

Pollutant	Units	AQAL	Facility Contribution (PC)	PC as %age AQAL	PEC (%age AQAL)	Impact Descriptor or Screened Out
PM_{10}	µg/m^3	40	0.019	0%	47%	Negligible
$PM_{2.5}$	µg/m^3	20	0.019	0%	64%	Negligible
NO_2	µg/m^3	40	0.31	1%	50%	Negligible
HF	µg/m^3		0.0037	0%	3%	Negligible
NH_3	µg/m^3	180	0.019	0%	1%	Negligible
VOCs (as benzene)	µg/m^3	5	0.037	1%	9%	Negligible
PAH	ng/m^3	1	0.00034	0%	8%	Negligible

Pollutant	Units	AQAL	Facility Contribution (PC)	PC as %age AQAL	PEC (%age AQAL)	Impact Descriptor or Screened Out
Dioxins/ furans	fg/m^3	N/A	0.15	-	-	-
Cadmium (Cd)	ng/m^3	5	0.075	1%	4%	Screened out
Thallium (Tl)	ng/m^3	1,000	0.075	0%	0%	Screened out
Mercury (Hg)	ng/m^3	250	0.075	0%	0%	Screened out
Antimony (Sb)	ng/m^3	5,000	1.1	0%	0%	Screened out
Arsenic (As)	ng/m^3	6	1.1	19%	29%	Screened out
Chromium (Cr)	ng/m^3	5,000	1.1	0%	0%	Screened out
Chromium VI	ng/m^3	0.2	0.22	112%	222%	Needs further assessment
Cobalt (Co)	ng/m^3	1,000	1.1	0%	0%	Screened out
Copper (Cu)	ng/m^3	10,000	1.1	0%	0%	Screened out
Manganese (Mn)	ng/m^3	150	1.1	1%	2%	Screened out
Nickel (Ni)	ng/m^3	20	1.1	6%	9%	Screened out
Lead (Pb)	ng/m^3	250	1.1	0%	2%	Screened out
Vanadium (V)	ng/m^3	5,000	1.1	0%	0%	Screened out
PCBs	ng/m^3	200	1.3 x 10^{-8}	0%	0%	Negligible

6.5.9 For all non-metals, the impact would be described as 'negligible' even for the worst-case assumptions adopted. For the metals, further assessment is required for chromium VI.

6.5.10 There are no assessment criteria for dioxins and furans. Compared with the background concentration (3.2 fg/m^3), the predicted impact of the Proposed Development represents 5% of the background concentration. Furthermore, it should be noted that health impacts from exposure to dioxins and furans can arise via inhalation and ingestion exposure. Therefore, the health impacts of the emissions of dioxins and furans and dioxin-like PCBs have been assessed in the human health risk assessment (HHRA) submitted in support of the planning application for the Proposed Development. The HHRA is provided in **ES Appendix 6.3.**

6.5.11 For the sensitive Receptors identified, detailed dispersion modelling results are provided in Section 4.3 in **ES Appendix 6.1.**

Short-term Impacts

6.5.12 For those pollutants that have short-term (e.g. hourly, 8-hourly, 24-hourly) AQALs, predicted maximum concentrations are presented in **Table 6.9**.

Table 6.9: Maximum Predicted Short-term Concentrations

Pollutant	Averaging Period	Units	AQAL	Facility Contribution (PC)	PC as %age AQAL	Impact Descriptor or Screened Out
PM_{10}	24-hour mean (90.4th%ile)	µg/m^3	50	0.068	0%	Negligible
NO_2	1-hour (99.8th %ile)	µg/m^3	200	2.3	1%	Negligible
SO_2	24-hour (99.2nd %ile)	µg/m^3	125	0.83	1%	Negligible
SO_2	1-hour (99.7th %ile)	µg/m^3	350	1.6	0%	Negligible
SO_2	15-minute (99.9th %ile)	µg/m^3	266	1.9	1%	Negligible
CO	8-hour	µg/m^3	10,000	2.5	0%	Negligible
CO	1-hour	µg/m^3	30,000	10.3	0%	Negligible
HF	1-hour	µg/m^3	160	0.21	0%	Negligible
HCl	1-hour	µg/m^3	750	1.2	0%	Negligible
NH_3	1-hour	µg/m^3	2,500	1.0	0%	Negligible
VOCs as benzene	24-hour	µg/m^3	30	0.37	1%	Negligible
Hg	1-hour	ng/m^3	7,500	4.1	0%	Screened out
Sb	1-hour	ng/m^3	150,000	61.7	0%	Screened out
As	1-hour	ng/m^3	15,000	61.7	0%	Screened out
Cr	1-hour	ng/m^3	150,000	61.7	0%	Screened out
Cu	1-hour	ng/m^3	200,000	61.7	0%	Screened out
Mn	1-hour	ng/m^3	1,500,000	61.7	0%	Screened out
V	24-hour	ng/m^3	1,000	11.0	1%	Screened out
PCBs	1-hour	ng/m^3	6,000	7.4 x 10^{-7}	0%	Negligible

6.5.13 For all pollutants, the maximum predicted short-term concentrations are less than 10% of the short-term AQALs and would be described as ‘negligible’ in accordance with the IAQM planning guidance. Therefore, the impact of emissions on short-term pollutant concentrations would be ‘not significant’.

Further Assessment for CrVI

6.5.14 For the Group III metals, on the basis of the Step 1 screening advice provided by the Environment Agency, further assessment is required for long term CrVI. Emissions of all

the remaining trace metals are considered to be not significant, or the air quality assessment level unlikely to be exceeded.

6.5.15 The EA guidance note for the assessment of Group III metals provides measured concentrations of emissions of metals from energy from waste facilities. In accordance with the guidance note, revised concentrations for CrVI have been predicted using the maximum measured emission concentration (0.00015 mg/Nm^3 for CrVI). For this typical emission concentration, maximum predicted ground level concentrations are as follows:

- the PC is 0.00056 ng/m^3 and is 0.3% of AQAL of 0.2 ng/m^3; and,
- the PEC is 0.221 ng/m^3 and is 111% of the AQAL.

6.5.16 Although the PEC exceeds the target value, this is due to the assumed worst-case background concentration. However, the EfW CHP Facility contributes less than 1% and would be assessed as not significant. Therefore, on the basis of Step 2 of the assessment, no further assessment is required for CrVI.

Traffic Impact on Human Health

6.5.17 The highest change in NO_2 concentrations as a result of the Proposed Development traffic emissions is 0.2 µg/m^3, 1% of the AQO of 40 µg/m^3. This is predicted for a number of Receptors located close to the site access/Magna Road junction, one property in close proximity to Magna Road and at the junction of Magna Road and the A349. The highest total annual mean NO_2 concentration also occurs at the junction of Magna Road and the A349 and at this Receptor is 25.4 µg/m^3 (64% of the AQO) and the impact of traffic emissions alone would be described as 'negligible' in accordance with the IAQM planning guidance.

6.5.18 Changes in PM_{10} as a result of the Proposed Development are very small (less than or equal to 0.1 µg/m^3, 0% of the AQO). The highest total annual mean PM_{10} concentration is 16.2 µg/m^3 and is 41% of the AQO of 40 µg/m^3. At this Receptor the Proposed Development contributes 0.0 µg/m^3. The impact at all Receptors from traffic emissions alone would be described as 'negligible' in accordance with the IAQM planning guidance.

6.5.19 Changes in $PM_{2.5}$ as a result of the Proposed Development are small (0.1 µg/m^3 or less). At all Receptors the impact of traffic emissions alone would be described as 'negligible' in accordance with the IAQM planning guidance.

Impact on Habitat Receptors

Introduction

6.5.20 This section provides an impact assessment of air emissions on habitat sites and has considered airborne NO_x, SO_2, NH_3 and HF, as well as acidification and nutrient nitrogen deposition. Results are presented for the meteorological year that gives rise to the highest concentration at each habitat site for the five years of meteorological data used. The average annual mean for the five years is 85% of the worst-case year. Therefore, the results are representative of a worst-case with respect to the meteorological data. Furthermore, it is assumed that the EfW CHP Facility operates continuously at the adopted maximum emission limit value for each pollutant.

6.5.21 Where predicted concentrations or deposition rates exceed the screening criteria (1% of the critical level/load for long-term impacts or 10% of the critical level or critical load for short-term impacts) an ecological interpretation of any effects is provided and is summarised in

the **ES Chapter 8: Ecology and Nature Conservation** provided by EDP (ecology specialists for the Proposed Development).

Airborne Concentrations of NO_x, SO_2, NH_3 and HF

NOx

6.5.22 Predicted maximum ground level concentrations of NOx, SO_2, NH_3 and HF at the identified habitat sites are compared with the relevant critical levels in **Table 6.10** to

6.5.23 **Table** 6.13. Predicted concentrations are compared to the relevant critical levels (CL).

Table 6.10: Predicted Maximum NO_x Concentrations (µg/m^3)

Habitat Site	Annual Mean		24-Hour Mean	
	PC (µg/m^3)	PC (% of CL)	PC (µg/m^3)	PC (% of CL)
H1 Dorset Heaths SAC/SPA/Ramsar	0.13	0.4%	4.4	5.9%
H2 Poole Harbour SPA/Ramsar	0.045	0.2%	0.84	1.1%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.028	0.1%	0.44	0.6%
H4 Canford Heath SSSI	0.073	0.2%	2.2	2.9%
H5 Turbary & Kinson Commons SSSI	0.087	0.3%	1.1	1.4%
H6 Hurn Common SSSI	0.057	0.2%	0.40	0.5%
H7 Slop Bog & Uddens Heath SSSI	0.043	0.1%	0.71	0.9%
H8 Parley Common SSSI	0.079	0.3%	0.64	0.9%
H9 Luscombe Valley SSSI	0.027	0.1%	0.40	0.5%
H10 Bourne Valley SSSI	0.057	0.2%	1.0	1.4%
H11 Holt & West Moors Heath SSSI	0.039	0.1%	0.47	0.6%
H12 Corfe & Barrow Hills SSSI	0.043	0.1%	1.2	1.7%
H13 Arne SSSI	0.027	0.1%	0.43	0.6%
H14 Moors River System SSSI	0.063	0.2%	0.51	0.7%
H15 Knighton Heath GC SNCI	0.11	0.4%	1.6	2.1%
H16 Alderney Waterworks SNCI	0.065	0.2%	1.3	1.8%
H17 Haymoor Bottom SNCI	0.077	0.3%	1.4	1.8%
H18 Arrowsmith Coppice SNCI/AW	0.076	0.3%	2.2	3.0%
H19 Delph Woods SNCI	0.065	0.2%	1.9	2.5%

Habitat Site	Annual Mean		24-Hour Mean	
	PC (µg/m^3)	PC (% of CL)	PC (µg/m^3)	PC (% of CL)
H20 Dunyeats Hill HRS	0.074	0.2%	2.0	2.7%
H21 Moortown Copse SNCI	0.21	0.7%	2.6	3.4%
H22 Canford Park SANG LCNR	0.13	0.4%	1.6	2.2%
H23 Bearwood SNCI	0.19	0.6%	2.3	3.1%
H24 Frogmoor Wood SNCI	0.0031	0.0%	0.45	0.6%
Critical Level	*30*		*75*	

6.5.24 For the European sites and SSSIs, predicted annual mean concentrations are less than 1% of the critical level and would be assessed as 'not significant'. For the locally designated sites, predicted annual mean and 24-hour mean concentrations of NO_x are less than 100% of the critical levels and would be assessed as 'not significant' in accordance with the Environment Agency guidance. Furthermore, the PCs for the locally designated sites are less than 1% and 10% of the critical levels. Therefore, it is concluded that the impact of emissions of NO_x at habitat sites would be 'not significant'.

SO_2

6.5.25 For sulphur dioxide, there are two critical levels (10 or 20 µg/m^3) depending on the presence of lichens. For screening purposes, the more stringent critical level of 10 µg/m^3 has been adopted for all habitats. A comparison of predicted concentrations with this more stringent critical level is provided in **Table 6.11**.

Table 6.11: Predicted Maximum SO_2 Concentrations (µg/m^3)

Habitat Site	Annual Mean PC SO_2 (µg/m^3)	Annual Mean %age Critical Level
H1 Dorset Heaths SAC/SPA/Ramsar	0.034	0.3%
H2 Poole Harbour SPA/Ramsar	0.011	0.1%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.007	0.1%
H4 Canford Heath SSSI	0.018	0.2%
H5 Turbary & Kinson Commons SSSI	0.022	0.2%
H6 Hurn Common SSSI	0.014	0.1%
H7 Slop Bog & Uddens Heath SSSI	0.011	0.1%
H8 Parley Common SSSI	0.020	0.2%
H9 Luscombe Valley SSSI	0.007	0.1%

Habitat Site	Annual Mean PC SO_2 (µg/m^3)	Annual Mean %age Critical Level
H10 Bourne Valley SSSI	0.014	0.1%
H11 Holt & West Moors Heath SSSI	0.010	0.1%
H12 Corfe & Barrow Hills SSSI	0.011	0.1%
H13 Arne SSSI	0.007	0.1%
H14 Moors River System SSSI	0.016	0.2%
H15 Knighton Heath GC SNCI	0.028	0.3%
H16 Alderney Waterworks SNCI	0.016	0.2%
H17 Haymoor Bottom SNCI	0.019	0.2%
H18 Arrowsmith Coppice SNCI/AW	0.019	0.2%
H19 Delph Woods SNCI	0.016	0.2%
H20 Dunyeats Hill HRS	0.018	0.2%
H21 Moortown Copse SNCI	0.053	0.5%
H22 Canford Park SANG LCNR	0.033	0.3%
H23 Bearwood SNCI	0.049	0.5%
H24 Frogmoor Wood SNCI	0.001	0.0%
Critical Level	*10*	

6.5.26 For the European sites and SSSIs, predicted annual mean concentrations are less than 1% of the most stringent critical level and would be assessed as 'not significant'. For the LWS, the PCs are all less than 100% of the critical level. Furthermore, the PCs for the locally designated sites are less than 1% of the critical level. Therefore, it is concluded that the impact of emissions of SO_2 at habitat sites would be 'not significant'.

NH_3

6.5.27 For ammonia, there are also two critical levels depending on the presence of bryophytes and lichens. For screening purposes, the more stringent critical level of 1 µg/m^3 has been adopted for all habitats. A comparison of predicted concentrations with this more stringent critical level is provided in **Table 6.12**.

Table 6.12: Predicted Maximum NH_3 Concentrations (µg/m^3)

Habitat Site	Annual Mean PC NH_3 (µg/m^3)	Annual Mean %age Critical Level
H1 Dorset Heaths SAC/SPA/Ramsar	0.0056	0.6%

Habitat Site	Annual Mean PC NH_3 ($\mu g/m^3$)	Annual Mean %age Critical Level
H2 Poole Harbour SPA/Ramsar	0.0019	0.2%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.0011	0.1%
H4 Canford Heath SSSI	0.0031	0.3%
H5 Turbary & Kinson Commons SSSI	0.0036	0.4%
H6 Hurn Common SSSI	0.0024	0.2%
H7 Slop Bog & Uddens Heath SSSI	0.0018	0.2%
H8 Parley Common SSSI	0.0033	0.3%
H9 Luscombe Valley SSSI	0.0011	0.1%
H10 Bourne Valley SSSI	0.0024	0.2%
H11 Holt & West Moors Heath SSSI	0.0016	0.2%
H12 Corfe & Barrow Hills SSSI	0.0018	0.2%
H13 Arne SSSI	0.0011	0.1%
H14 Moors River System SSSI	0.0026	0.3%
H15 Knighton Heath GC SNCI	0.0047	0.5%
H16 Alderney Waterworks SNCI	0.0027	0.3%
H17 Haymoor Bottom SNCI	0.0032	0.3%
H18 Arrowsmith Coppice SNCI/AW	0.0031	0.3%
H19 Delph Woods SNCI	0.0027	0.3%
H20 Dunyeats Hill HRS	0.0031	0.3%
H21 Moortown Copse SNCI	0.0088	0.9%
H22 Canford Park SANG LCNR	0.0055	0.6%
H23 Bearwood SNCI	0.0081	0.8%
H24 Frogmoor Wood SNCI	0.0001	0.0%
Critical Level	*1*	

6.5.28 For the European sites and SSSIs, predicted annual mean concentrations are less than 1% of the most stringent critical level and would be assessed as ‘not significant’. For the LWS, the PCs are all less than 100% of the critical level. Furthermore, the PCs for the locally designated sites are less than 1% of the critical level. Therefore, it is concluded that the impact of emissions of NH_3 at habitat sites would be ‘not significant’.

HF

6.5.29 A comparison of predicted weekly and 24-hour mean concentrations with the relevant critical levels for HF is provided in

6.5.30 **Table** 6.13.

Table 6.13: Predicted Maximum HF Concentrations (µg/m^3)

Habitat Site	Weekly Mean		24-Hour Mean	
	PC (µg/m^3)	PC (% of CL)	PC (µg/m^3)	PC (% of CL)
H1 Dorset Heaths SAC/SPA/Ramsar	0.0120	2.4%	0.0366	0.7%
H2 Poole Harbour SPA/Ramsar	0.0027	0.5%	0.0070	0.1%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.0014	0.3%	0.0036	0.1%
H4 Canford Heath SSSI	0.0049	1.0%	0.0180	0.4%
H5 Turbary & Kinson Commons SSSI	0.0033	0.7%	0.0088	0.2%
H6 Hurn Common SSSI	0.0017	0.3%	0.0034	0.1%
H7 Slop Bog & Uddens Heath SSSI	0.0016	0.3%	0.0059	0.1%
H8 Parley Common SSSI	0.0025	0.5%	0.0053	0.1%
H9 Luscombe Valley SSSI	0.0011	0.2%	0.0033	0.1%
H10 Bourne Valley SSSI	0.0026	0.5%	0.0086	0.2%
H11 Holt & West Moors Heath SSSI	0.0011	0.2%	0.0039	0.1%
H12 Corfe & Barrow Hills SSSI	0.0027	0.5%	0.0103	0.2%
H13 Arne SSSI	0.0015	0.3%	0.0036	0.1%
H14 Moors River System SSSI	0.0020	0.4%	0.0042	0.1%
H15 Knighton Heath GC SNCI	0.0045	0.9%	0.0131	0.3%
H16 Alderney Waterworks SNCI	0.0029	0.6%	0.0110	0.2%
H17 Haymoor Bottom SNCI	0.0041	0.8%	0.0113	0.2%
H18 Arrowsmith Coppice SNCI/AW	0.0043	0.9%	0.0185	0.4%
H19 Delph Woods SNCI	0.0036	0.7%	0.0157	0.3%
H20 Dunyeats Hill HRS	0.0070	1.4%	0.0170	0.3%
H21 Moortown Copse SNCI	0.0109	2.2%	0.0213	0.4%
H22 Canford Park SANG LCNR	0.0046	0.9%	0.0135	0.3%

Habitat Site	Weekly Mean		24-Hour Mean	
	PC (µg/m^3)	PC (% of CL)	PC (µg/m^3)	PC (% of CL)
H23 Bearwood SNCI	0.0071	1.4%	0.0194	0.4%
H24 Frogmoor Wood SNCI	0.0006	0.1%	0.0037	0.1%
Critical Level	*0.5*		*5*	

6.5.31 For the European sites and SSSIs, predicted concentrations are less than 10% of the critical levels and would be assessed as 'not significant'. For the LWS, the PCs are all less than 100% of the critical levels for HF. Furthermore, the PCs for the locally designated sites are less than 10% of the critical level. Therefore, it is concluded that the impact of emissions of HF at habitat sites would be 'not significant'.

Acidification

6.5.32 Deposition of sulphur and nitrogen compounds (from SO_2, NO_x and NH_3 emissions) cause acidification and have been considered in assessing the acidification impacts of the EfW CHP Facility emissions on habitat sites. The critical load for acidification is defined by three quantities CLmaxS, CLmaxN and CLminN. The critical load function tool provided by APIS has been used to assess the likelihood of exceedance of the critical load based on the nitrogen and sulphur PCs and PECs. For HCl, impacts are also included with the acidification assigned to sulphur. A summary of the predicted PCs is provided in Table 5.11 in **ES Appendix 6.1**. The predicted exceedance and deposition as a proportion of the critical load function is provided in **Table 6.14**.

Table 6.14: Predicted Exceedance and Deposition as a Proportion of the Critical Load Function

Habitat Site	PC	Background	PEC
H1 Dorset Heaths SAC/SPA/Ramsar			
Bog	1.9%	228%	230%
Dwarf shrub heath	1.2%	150%	151%
Acid grassland	1.8%	227%	228%
Coniferous woodland	2.1%	211%	213%
H2 Poole Harbour SPA/Ramsar	0.6%	205%	205%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.4%	174%	174%
H4 Canford Heath SSSI	1.0%	221%	222%
H5 Turbary & Kinson Commons SSSI	1.2%	221%	222%
H6 Hurn Common SSSI	0.7%	206%	207%
H7 Slop Bog & Uddens Heath SSSI	0.6%	205%	206%
H8 Parley Common SSSI	1.1%	222%	223%

Habitat Site	PC	Background	PEC
H9 Luscombe Valley SSSI	0.4%	215%	215%
H10 Bourne Valley SSSI	0.8%	214%	215%
H11 Holt & West Moors Heath SSSI	0.5%	234%	235%
H12 Corfe & Barrow Hills SSSI	0.6%	222%	223%
H13 Arne SSSI	0.4%	171%	171%
H14 Moors River System SSSI	0.8%	186%	187%
H15 Knighton Heath GC SNCI	1.4%	208%	209%
H16 Alderney Waterworks SNCI	0.8%	208%	209%
H17 Haymoor Bottom SNCI	1.0%	198%	199%
H18 Arrowsmith Coppice SNCI/AW	1.0%	208%	209%
H19 Delph Woods SNCI	1.0%	211%	212%
H20 Dunyeats Hill HRS	0.9%	208%	209%
H21 Moortown Copse SNCI	3.2%	211%	214%
H22 Canford Park SANG LCNR	0.2%	26%	26%
H23 Bearwood SNCI	3.0%	211%	214%
H24 Frogmoor Wood SNCI	0.0%	211%	211%

6.5.33 For all habitat sites, the background deposition flux exceeds the relevant critical load except at Canford Park SANG. At the European sites and the SSSIs, the maximum PC acid deposition rates arising from the Proposed Development exceed 1% of the critical load at Dorset Heaths SAC/SPA/Ramsar, Turbary & Kinson Commons SSSI and Parley Common SSSI. The predicted concentration at the Dorset Heaths European site is the maximum predicted anywhere within the habitat site. Furthermore, Turbary & Kinson Commons SSSI and Parley Common SSSI are co-located with the Dorset Heaths European site. The effect of these emissions on the integrity of these habitat sites is presented in **ES Chapter 8: Ecology and Nature Conservation.**

6.5.34 For the locally designated habitat sites, the PC is less than 100% of the respective critical loads but exceeds 1% at Knighton Heath Golf Club SNCI, Moortown Copse SNCI and Bearwood SNCI.

Nutrient Nitrogen Deposition

6.5.35 Predicted nutrient nitrogen deposition rates arising from emissions of NO_x and NH_3 from the proposed EfW CHP Facility are presented in Table 5.13 in **ES Appendix 6.1**. These are presented as a percentage of the relevant critical loads in **Table 6.15**.

Table 6.15: Maximum Predicted Nutrient Nitrogen Deposition as a Percentage of the Relevant Critical Load

Habitat Site	PC	Background	PEC
H1 Dorset Heaths SAC/SPA/Ramsar			
Heathland habitats	0.5%	137%	167%
Woodland habitats	0.8%	287%	288%
H2 Poole Harbour SPA/Ramsar	0.2%	205%	205%
H3 Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC	0.3%	288%	288%
H4 Canford Heath SSSI	0.5%	338%	339%
H5 Turbary & Kinson Commons SSSI	0.6%	330%	331%
H6 Hurn Common SSSI	0.2%	157%	157%
H7 Slop Bog & Uddens Heath SSSI	0.3%	338%	338%
H8 Parley Common SSSI	0.6%	326%	327%
H9 Luscombe Valley SSSI	0.1%	189%	189%
H10 Bourne Valley SSSI	0.4%	330%	330%
H11 Holt & West Moors Heath SSSI	0.1%	178%	178%
H12 Corfe & Barrow Hills SSSI	0.2%	172%	172%
H13 Arne SSSI	0.2%	288%	288%
H14 Moors River System SSSI	0.4%	159%	159%
H15 Knighton Heath GC SNCI	0.4%	167%	167%
H16 Alderney Waterworks SNCI	0.3%	208%	208%
H17 Haymoor Bottom SNCI	0.3%	166%	166%
H18 Arrowsmith Coppice SNCI/AW	0.5%	170%	170%
H19 Delph Woods SNCI	0.4%	291%	291%
H20 Dunyeats Hill HRS	0.3%	170%	170%
H21 Moortown Copse SNCI	1.3%	290%	291%
H22 Canford Park SANG LCNR	0.5%	170%	170%
H23 Bearwood SNCI	1.2%	287%	288%
H24 Frogmoor Wood SNCI	0.0%	288%	288%

6.5.36 The maximum PC nutrient nitrogen deposition rates arising from the EfW CHP Facility are low in comparison to the critical loads and the background deposition rates and the PCs are less than 1% of the lowest critical load for all European sites and SSSIs. For the LWS, the predicted PCs are less than 100% for LWS but greater than 1% for Moortown Copse SNCI and Bearwood SNCI.

Decommissioning Phase

6.5.37 For the purpose of the assessment, a working assumption has been made that the Proposed Development has an operational lifespan of 40-years. However, it should be noted that it is common for such developments to be operational for longer periods. It is anticipated that the process of decommissioning would involve the termination of operational activity, following which there would be electrical and process isolation and demolition activities. The EfW CHP Facility Site (including the CHP Connection) and the DNC would be left in a clear and secure condition in accordance with a Decommissioning Plan. The decommissioning process is anticipated to last for one year.

6.5.38 For the purposes of this assessment, the environmental effects associated with the decommissioning phase would be of a similar level to those reported for the construction phase works, albeit with a lesser duration, of one year.

6.6 Additional Mitigation

Construction phase

6.6.1 The relevant general mitigation measures for construction impacts appropriate for the 'High Risk' site, as proposed by the IAQM Dust guidance (2016), are applied for the Proposed Development and included in the Outline CEMP **ES Appendix 3.2**. As such, no additional mitigation is proposed on the basis that mitigation measures, highlighted in the Outline CEMP will be implemented.

Operational phase

6.6.2 Given the sensitivity of the area to habitat impacts, a chimney height of 110 m above ground level (154.65 m above ordnance datum) is proposed for the EfW CHP Facility. This takes account of the height of buildings associated with the Proposed Development.

6.6.3 To minimise the impact on habitat sites of airborne ammonia concentrations, nutrient nitrogen deposition and acidification, it is proposed that a lower emission limit value for ammonia should be adopted. The BREF provides a BAT-AEL for new plant and the ELV for ammonia is set at 10 mg/Nm^3. A more stringent ELV of 5 mg/Nm^3 has been adopted and will be agreed with the Environment Agency and be the adopted limit in the Environmental Permit for the Proposed Development.

6.7 Residual Effects

Construction phase

6.7.1 Assuming all mitigation measures included in the Outline CEMP are implemented, residual effects on both human and ecologically sensitive Receptors would be negligible and therefore not significant.

Operational phase

6.7.2 Mitigation measures were adopted to reduce the impact of emissions on habitat Receptors. Residual effects on human health would be negligible with or without these mitigation measures and the impact on sensitive human Receptors would be not significant.

6.7.3 Potential minor exceedances of relevant acid deposition screening thresholds for bog, acid grassland and dwarf shrub heath within Dorset Heaths SAC/SPA/Ramsar and constituent SSSIs will be mitigated through the provision of a Biodiversity Enhancement Contribution and Trickle Fund, in addition to a future monitoring strategy, to be secured through a Section 106 agreement (refer **Chapter 8: Ecology and Nature Conservation**). No residual effects are anticipated.

6.7.4 Potential minor exceedances of nitrogen and acid deposition screening thresholds for woodland within Moortown Copse SNCI and Bearwood SNCI, and minor exceedances of acid deposition screening thresholds for dwarf shrub heath within Knighton Heath Golf Club SNCI will be mitigated through the provision of a Biodiversity Enhancement Contribution and Trickle Fund, in addition to a future monitoring strategy, to be secured through a Section 106 agreement. No residual effects are anticipated.

6.8 Implications of Climate Change

Construction phase

6.8.1 As the construction phase is expected to be completed by 2027, there will be no material change due to climate change on dust emissions during the construction of the Proposed Development compared with the present day. The increase in precipitation during winter could help to reduce dust creation through wetting but could lead to additional run off that will need to be managed. Conversely, the decrease in precipitation during summer will increase dust creation and possibly dust dispersion, requiring additional water for damping down.

Operational phase

6.8.2 The UKCP18 projections indicate that summer and winter mean air temperatures will increase from the 2010 baseline with the 50th percentile in the 2050s being 2.6ºC higher in summer and 1.7ºC higher in winter. Dispersion of emissions from the chimney rely partly on the thermal buoyancy of the plume to increase the plume height. An increase in ambient temperature would decrease the difference between the temperature of the emission and the ambient temperature and may reduce the plume height resulting in the plume grounding earlier and closer to the source than would otherwise be expected. This would likely result in a small increase in predicted ground level concentrations. However, the assessment provided has used a precautionary approach and adopted worst-case assumptions with respect to meteorological conditions and the assumption that the EfW CHP Facility operates continuously at the maximum permissible emission limits. Therefore, it is concluded that the impact of these changes in temperature would be not significant.

6.8.3 The projections suggest that precipitation (rainfall) will decrease in the summer (by 22.9% as the 50th percentile in the 2050s) but will increase in the winter (by 11.5%). Therefore, there is likely to be an overall decrease in rainfall. In terms of emissions to air, precipitation will only likely affect wet deposition processes and acidification impacts on habitat sites. Wet deposition is only considered for HCl since the chemical transformations required for wet deposition of other pollutants do not occur in the short range. Consequently, the increase in precipitation may give rise to a small increase in acidification impacts. However, these increases are relatively small and as discussed for temperature effects, unlikely to be

significant taking into consideration the precautionary approach adopted for the assessment.

6.8.4 There are also projections for changes in wind speed, but these are relatively small (at most -1.0% to 0.2% of the 2010 baseline levels. These changes would be unlikely to alter the predicted effects.

6.9 Cumulative Effects

Construction phase

6.9.1 As presented in **ES Chapter 5: Approach to Assessment**, there are a wide range of permitted developments that have the potential to influence construction dust and emissions. The following table identifies the list of existing or approved schemes that produce an uplift of more than 1,000 sqm of mixed-use floor space or over 80 residential units.

Table 6.16 Cumulative development short-list

Site Name	Address	Application Ref	Units	Distance (m)	Details	Included/Excluded from cumulative assessment
Magna Road, Bournemouth	Magna Business Park, Land south of Magna Road, Bournemouth, Dorset, BH11 9NB	APP/21/01186/F	3	99	Industrial Unit	Included
Wheelers Lane, Bournemouth	Land off Neville Gardens, Wheelers Lane, Bournemouth, Dorset, BH11 9UL	APP/21/00620/F	45	372	45 Houses	Included
Arena Way, Wimborne	Energy Site Control Centre, Arena Way, Wimborne, Dorset, BH21 3BW	APP/21/00400/F	N/A	399	Solar Farm	Included
Vantage Way, Poole	Fulcrum Business Park, Vantage Way, Poole, Dorset, BH12 4NU	APP/20/00252/F	1	1581	Light Industrial & Office/ Warehouse	Excluded- not anticipated to contribute significantly to dust emissions

Site Name	Address	Application Ref	Units	Distance (m)	Details	Included/Excluded from cumulative assessment
Vantage Way, Poole	Unit 1, The Fulcrum Centre, Vantage Way, Poole, Dorset, BH12 4NU	APP/20/00418/F	3	1631	Office/Light Industry/Storage	Excluded- not anticipated to contribute significantly to dust emissions
Mannings Heath Road, Poole	14 and land adjacent, Mannings Heath Road, Poole, Dorset, BH12 4NQ	APP/21/00309/F	10	2111	10 Industrial/Warehouse Units	Excluded- not anticipated to contribute significantly to dust emissions
Leigh Road, Wimborne	Land South of Leigh Road, Wimborne, Dorset, BH21 2DA	3/21/1566/RM	174	2312	174 Houses	Excluded- not anticipated to contribute significantly to dust emissions
Leigh Road, Wimborne	Park Farm, Leigh Road, Wimborne, Dorset, BH21 2DA	3/21/0840/FUL	75	2494	63 Houses & 12 Flats	Excluded- not anticipated to contribute significantly to dust emissions
Station Terrace, Wimborne	Wimborne Market, Station Terrace, Wimborne, Dorset, BH21	3/21/1556/FUL	101	3080	66 Sheltered Flats/32 Bungalows/ 9 Houses	Excluded- not anticipated to contribute significantly to dust emissions
Hillbourne Site	Kitchener Crescent, Poole, Dorset, BH17 7HX	APP/21/00748/F	110	3454	81 Houses & 29 Sheltered Flats	Excluded- not anticipated to contribute significantly to dust emissions
81 Sopers Lane, Poole	81 Sopers Lane, Poole, Dorset, BH17 7EN	APP/21/00497/F	3	3779	Industrial/Warehouse/Office	Excluded- not anticipated to contribute significantly to dust emissions
Cobham Road, Wimborne	North Peartree Business Centre, Ferndown Industrial Estate, Vulcan Way, Wimborne,	3/21/0674/OUT	26	3928	26 Industrial Units	Excluded- not anticipated to contribute significantly to dust emissions

Site Name	Address	Application Ref	Units	Distance (m)	Details	Included/Excluded from cumulative assessment
	Dorset, BH21 7PT					
23 Whittle Road, Wimborne	Whittle Power, Land on 23 Whittle Road, Ferndown Industrial Estate, Wimborne, Dorset, BH21 7RP	3/20/1945/FUL	N/A	4173	Energy Facility	Excluded- not anticipated to contribute significantly to dust emissions
15 Whittle Road, Wimborne	15 Whittle Road, Ferndown Industrial Estate, Wimborne, Dorset, BH21 7RL	3/21/0740/FUL	2	4249	2 Starter Industrial Units	Excluded- not anticipated to contribute significantly to dust emissions
35 Cobham Road, Wimborne	35 Cobham Road, Ferndown Industrial Estate, Wimborne, Dorset, BH21 7PF	3/20/0880/FUL	2	4525	Warehouse & Office	Excluded- not anticipated to contribute significantly to dust emissions
Chapel Lane	Eco Sustainable Solutions Ltd, Chapel Lane, Parley Christchurch, BH23 6BG	8/21/0207/FUL	N/A	6267	Energy Recovery Facility	Excluded- not anticipated to contribute significantly to dust emissions

6.9.2 As per **Table 6.16**, only three out of the 16 developments are within the 350m study area for dusk risk or would overlap with the 350m zone of the Proposed Development Boundary. Similar to the implementation of a CEMP for the Proposed Development, it is anticipated that the three projects within 350m or overlapping with the dust risk study area will also have implemented mitigation measures as a best-practice approach. Hence, the cumulative effects are not anticipated to be significant. The closest sensitive human Receptor (i.e., residents) associated with a permitted development is approximately 372m away from the Proposed Development. Significant cumulative effects to sensitive Receptors are not likely to arise due to the implementation of the CEMP associated with the Proposed Development.

6.9.3 Additionally, of those projects located at a distance greater than 350m, the cumulative impact of dust on sensitive Receptors would not be significant due to their separation distance from the EfW CHP Facility (which impacts dust dispersion).

6.9.4 The impact of construction-related traffic emissions from the Proposed Development was screened out using the IAQM screening criteria. Additionally, as noted in **ES Chapter 15: Traffic and Transport,** the cumulative impacts on the local highway network were assessed by incorporating committed development flows within the Traffic assessment. **ES Chapter 15: Traffic and Transport** incorporated the traffic flows from the following schemes:

- UE1 North of Merley – 600 dwellings & 62 bed care home (19/00955/P);
- UE2 North of Magna Road – 695 dwellings, community hub & 60 bed care home (19/00237/P);
- Land west of Wheelers Lane – 45 dwellings (21/00620/F);
- Canford Paddock – 324 dwellings (17/00008/F); and
- Canford Magna Golf Club – Bournemouth FC Training Ground (17/01196/F).

6.9.5 Based on the baseline weekday AADT on Magna Road in 2022 of 16,692 vehicles, the average daily construction traffic represents a 1.8% increase in flow on Magna Road, with an increase of 3.1% during the peak month. As such, the contribution of emissions associated with the Proposed Development is negligible and cumulative impacts associated with construction traffic are not anticipated.

Operational phase

Impact on Human Health

Road Traffic Emissions

6.9.6 The principal air pollutants associated with traffic emissions are nitrogen dioxide (NO_2) and fine particles (PM_{10} and $PM_{2.5}$). Therefore, to allow for potential increases in pollutant concentrations as a result of this and other permitted developments, a precautionary approach was taken when selecting background pollutant concentrations for NO_2, PM_{10} and $PM_{2.5}$. (refer to Sections 2.5.2 and 2.5.3 in **ES Appendix 6.1**). The adopted background PM_{10} and $PM_{2.5}$ concentrations were around 50% higher than the Defra mapped background concentrations.

6.9.7 The TRAQ assessment provided in **ES Appendix 6.2** indicates that at worst the traffic generated by the Proposed Development would contribute 0.2 µg/m^3 to NO_2 concentrations and 0.1 µg/m^3 to PM_{10} and $PM_{2.5}$ concentrations. Therefore, it is concluded that the adopted background concentrations for these pollutants adequately allows for cumulative traffic impacts for this and other permitted developments within the immediate area.

Other Combustion Sources

Other On-site Emissions

6.9.8 The EfW CHP Facility will include a diesel generator that would be used during emergency conditions. This would be used for a maximum of 50 hours per annum (h/a) mainly during testing of the generator. Testing would take place fortnightly for a duration of 30 minutes. Emergency use would occur very infrequently and only during complete loss of electrical power to the EfW CHP Facility. At MVV's Devonport facility there have been no 'black site' incidents within the last five years. However, MVV has indicated that an emergency condition, should it occur, may continue for up to three hours.

6.9.9 Emissions data for the emergency diesel generator (EDG) are provided in Table 6.1 in **ES Appendix 6.1**. Long-term NO_x emissions (for calculating annual mean concentrations) have been pro-rated by the number of operational hours (i.e. 3.98 g/s x 50/8760). For testing, the generator will only operate for 30 minutes and the hourly average short -term emission would be 1.99 g/s (3.98 x 30/60).

6.9.10 For predicting annual mean concentrations of NO_2, the long-term emission rate has been used, and for short-term (hourly means) the testing emission rate has been used. For long-term impacts on habitat sites, the long-term emission rate is used for predicting annual mean impacts. For the prediction of 24-hour mean NO_x concentrations, it is assumed that the generator operates for 3 hours at the short-term emission rate of 3.98 g/s averaged over a day (3.98 x 3/24).

6.9.11 For short-term predictions (hourly and 24-hourly means), it is assumed that the EDG operates continuously at this emission so as to ensure operation during the worst-case meteorological conditions. Therefore, results are representative of the worst-case.

Off-site Emissions

6.9.12 There are two permitted developments that have been identified that have combustion related emissions. These are as follows:

- Eco Sustainable Solutions (ESS) Ltd, Chapel Lane, Parley, Christchurch is an Energy Recovery Facility (planning reference 8/21/0207/FUL); and
- Whittle Power (WP), Ferndown Industrial Estate, Wimborne is an energy generating facility (planning reference 3/20/1945/FUL).

6.9.13 These are located some distance from the proposed EfW CHP Facility as indicated in Figure 6.1 in **ES Appendix 6.1**.

6.9.14 Emissions data for these emission sources have been obtained from the air quality assessments provided in support of the respective planning applications. These data are summarised in Table 6.2 in **ES Appendix 6.1**. For assessing human health impacts, emissions of NO_x from all facilities have been included within the model. For habitat sites, emissions of NO_x, NH_3, SO_2, HCl and HF have been assessed to determine the cumulative impact of airborne concentrations, nutrient nitrogen deposition and acidification.

Predicted Impact of NOx Emissions on Human Health

6.9.15 Predicted annual mean and hourly mean (as the 99.8th percentile) NO_2 concentrations arising from all emissions are presented in **Table 6.17** and **Table 6.18**, respectively. Results are presented for the discrete sensitive Receptors identified in close proximity to the Proposed Development and are representative of the highest impact from the EfW CHP Facility.

Table 6.17: Cumulative Impact of NO_2 Emissions on Human Health – Annual Mean Concentrations

	Annual Mean NO_2 Concentrations ($\mu g/m^3$)			
	All Sources	**EfW CHP Facility (including EDG)**	**ESS**	**WH**
D1. Viscount Walk	0.12	0.092	0.005	0.029
D2. Wheelers Lane (new dev.)	0.17	0.14	0.005	0.031
D3. Magna Road	0.31	0.28	0.005	0.037
D4. Waggy Tails Rescue	0.36	0.32	0.005	0.037
D5. The Hamworthy Club	0.16	0.12	0.004	0.038
D6. Arrowsmith Road	0.11	0.082	0.004	0.032
D7. Maranello	0.063	0.032	0.004	0.029
D8. Magna Care Centre	0.078	0.050	0.003	0.027
D9. Canford Sports Club House	0.085	0.054	0.004	0.036
D10. Provence Drive	0.13	0.10	0.005	0.032
D11. Bearwood Primary School	0.21	0.18	0.005	0.033
D12. Ferndown	0.17	0.10	0.008	0.071
D13. Belben Road, Bournemouth	0.074	0.048	0.005	0.022
D14. Pilsdon Drive, Bournemouth	0.092	0.068	0.004	0.021
D15. Gravel Hill, Broadstone	0.082	0.060	0.003	0.022
D16. Egdon Drive, Merley	0.062	0.033	0.003	0.031
D17. Marpet Close, Bear Cross	0.13	0.098	0.006	0.040
D18. Knighton Lane, Knighton	0.31	0.28	0.005	0.041
D19. White House	0.30	0.26	0.005	0.039
Maximum Receptor (PC)	*0.36*	*0.32*	*0.008*	*0.071*
Maximum as percentage of AQAL	*0.9%*	*0.8%*	*0.0%*	*0.2%*

6.9.16 For the annual mean, highest concentrations are predicted for the EfW CHP Facility and EDG combined since Receptors are located in close proximity to the Proposed Development Boundary. The ESS and WP facilities are located at some distance (in excess of 5 km) from the Proposed Development Boundary and contribute very little to the annual

mean concentration of NO_2. Predicted annual mean concentrations for all sources are less than 1% of the annual mean AQAL of 40 µg/m^3 and the cumulative impact would be assessed as 'negligible'.

6.9.17 Highest predicted concentrations of NO_2 arising from the Proposed Development emissions (EfW CHP Facility and other on-site emissions) are predicted at Receptor D4 at 0.32 µg/m^3 for the Proposed Development and 0.36 µg/m^3 when off-site emissions are also included. The addition of a further 0.2 µg/m^3 from traffic emissions would result in a contribution of 0.52 µg/m^3 from the Proposed Development and 0.56 µg/m^3 when off-site emissions are included. Therefore, the combined predicted annual mean concentration for all sources is 1% of the annual mean AQAL of 40 µg/m^3 and the cumulative impact of all sources including traffic emissions would be assessed as 'negligible'.

Table 6.18: Cumulative Impact of NO_2 Emissions on Human Health – Hourly Mean Concentrations

	99.8th Percentile of Hourly Means Mean NO_2 Concentrations (µg/m^3)			
	All Sources	**EfW CHP Facility (including EDG)**	**ESS**	**WH**
D1. Viscount Walk	14.1	14.1	0.11	0.72
D2. Wheelers Lane (new dev.)	15.3	15.3	0.11	0.76
D3. Magna Road	5.2	5.2	0.10	0.80
D4. Waggy Tails Rescue	5.5	5.5	0.10	0.80
D5. The Hamworthy Club	10.1	10.1	0.10	0.80
D6. Arrowsmith Road	17.6	17.6	0.09	0.74
D7. Maranello	16.6	16.6	0.10	0.70
D8. Magna Care Centre	10.8	10.8	0.11	0.64
D9. Canford Sports Club House	6.0	6.0	0.10	0.75
D10. Provence Drive	23.3	23.3	0.10	0.69
D11. Bearwood Primary School	12.7	12.7	0.10	0.75
D12. Ferndown	1.7	1.6	0.17	1.46
D13. Belben Road, Bournemouth	7.2	7.2	0.13	0.65
D14. Pilsdon Drive, Bournemouth	4.1	3.6	0.11	0.56
D15. Gravel Hill, Broadstone	6.0	5.9	0.10	0.58
D16. Egdon Drive, Merley	7.9	7.9	0.08	0.75

	99.8th Percentile of Hourly Means Mean NO_2 Concentrations (µg/m³)			
	All Sources	**EfW CHP Facility (including EDG)**	**ESS**	**WH**
D17. Marpet Close, Bear Cross	5.4	5.4	0.12	0.90
D18. Knighton Lane, Knighton	3.7	3.7	0.11	0.99
D19. White House	4.9	4.9	0.10	0.82
Maximum Receptor (PC)	*23.3*	*23.3*	*0.17*	*1.5*
Maximum as percentage of AQAL	*11.7%*	*11.7%*	*0.1%*	*0.7%*

6.9.18 Short-term concentrations are dominated by emissions from the EfW CHP Facility due to the proximity to Receptors. The maximum predicted concentration for all sources is 23.3 µg/m³ (11.7% of the AQAL of 200 µg/m³). However, this assumes, as a worst-case, that the EDG operates continuously.

6.9.19 Therefore, it is concluded that the cumulative impact of emissions on local air quality would be 'not significant'.

Impact on Habitat Receptors

Introduction

6.9.20 The impact of the combined emissions of NO_x, SO_2, NH_3, HF and HCl from the EfW CHP Facility and EDG and the two off-site developments (ESS and WP) is provided. The effect of these combined emissions on habitat sites is presented in **ES Chapter 8: Ecology and Nature Conservation.**

NOx

6.9.21 Predicted maximum concentrations of NO_x, SO_2 and NH_3 as a percentage of the most stringent critical level are presented in **Table 6.19** to **Table 6.22**, respectively. Results are only presented for those habitats where predicted concentrations exceed 1% of the respective critical levels as the annual mean and 10% for the 24-hour mean. It should be noted that the maxima for each source do not occur at the same location. Therefore, the impact for all sources is not the sum of the maxima for the individual sources.

Table 6.19: Maximum Predicted Annual Mean NO_x Concentrations as a Percentage of the Critical Level – Cumulative Impact

	All Sources	**EfW CHP Facility (including EDG)**	**ESS**	**WH**
H1 Dorset Heaths SAC/SPA/Ramsar	2.3%	0.5%	1.0%	2.1%

	All Sources	EfW CHP Facility (including EDG)	ESS	WH
H7 Slop Bog & Uddens Heath SSSI	1.8%	0.1%	0.0%	1.7%

Table 6.20: Maximum Predicted 24-Hour Mean NO_x Concentrations as a Percentage of the Critical Level – Cumulative Impact

	All Sources	EfW CHP Facility (including EDG)	ESS	WH
H1 Dorset Heaths SAC/SPA/Ramsar	37.1%	36.7%	3.4%	9.9%
H4 Canford Heath SSSI	11.5%	11.5%	0.1%	0.8%
H24 Frogmoor Wood SNCI	27.8%	27.8%	0.1%	0.7%

6.9.22 Highest annual mean NO_x concentrations at the Dorset Heaths European site occur as a result of emissions from the Whittle Power facility and are 2.1% of the critical level. Combined, the maximum impact from all sources is 2.3% of the critical level. Combined with the EDG, the EfW CHP Facility contributes at most 0.5% to the critical level at the Dorset Heaths habitat site. At the location of the maximum impact within the Dorset Heaths SAC/SPA/Ramsar site, the contribution from each is as follows:

- EfW CHP Facility 0.1%;
- ESS 0.1%; and
- Whittle Power 2.1%.

6.9.23 Maximum predicted 24-hour mean NO_x concentrations are highest for the EfW CHP Facility and EDG combined but are mainly due to emissions from the EDG. This is assumed to operate for 3 hours per day to correspond with the worst-case meteorological conditions. In reality, operational situations requiring the use of the EDG for extended periods would be very rare and would occur very infrequently. Furthermore, it is assumed that the EfW CHP Facility operates at the same time as the EDG. Therefore, the results are representative of an extreme worst-case. Nevertheless, although the predicted concentration exceeds 10% of the critical level at these nearby habitat sites, there is no predicted exceedance of the critical level for the very worst-case assumptions adopted.

SO_2

6.9.24 A comparison of predicted concentrations with the more stringent critical level is provided in **Table 6.21** for those habitat Receptors where the impact is greater than 1% of the critical level. Results are presented for the EfW CHP Facility and the ESS only, as the Whittle Power facility does not have significant emissions of SO_2.

Table 6.21: Maximum Predicted Annual Mean SO_2 Concentrations as a Percentage of the Critical Level – Cumulative Impact

	All Sources	EfW CHP Facility (including EDG)	ESS
H1 Dorset Heaths SAC/SPA/Ramsar	2.1%	0.3%	2.0%

6.9.25 The ESS contributes 2.0% of the most stringent critical level at the Dorset Heaths SAC which increases to 2.1% for combined emissions with the EfW CHP Facility. At the location of the maximum impact within the Dorset Heaths SAC/SPA/Ramsar site, the contribution from each is as follows:

- EfW CHP Facility 0.1%; and
- ESS 2.0%.

NH_3

6.9.26 A comparison of predicted concentrations with the more stringent critical level is provided in **Table 6.22** for those habitat Receptors where the impact is greater than 1% of the critical level. Results are presented for the EfW CHP Facility and the ESS only, as the Whittle Power facility does not have significant emissions of NH_3.

Table 6.22: Maximum Predicted Annual Mean NH_3 Concentrations as a Percentage of the Critical Level – Cumulative Impact

	All Sources	EfW CHP Facility (including EDG)	ESS
H1 Dorset Heaths SAC/SPA/Ramsar	1.6%	0.6%	1.3%

6.9.27 The ESS contributes 1.3% of the most stringent critical level at the Dorset Heaths SAC which increases to 1.6% for combined emissions with the EfW CHP Facility. At the location of the maximum impact within the Dorset Heaths SAC/SPA/Ramsar site, the contribution from each to the critical load is as follows:

- EfW CHP Facility 0.2%; and
- ESS 1.3%.

HF

6.9.28 Predicted concentrations of HF for the combined emissions from the EfW CHP Facility and the ESS facility are less than 10% of the weekly mean and 24-hour mean critical levels at all habitat sites and would be assessed as ‘not significant’.

Acidification

6.9.29 The combined contribution of the emission sources to acidification impacts is presented in **Table 6.23** where the impact is greater than 1% of the respective critical load. Predicted deposition rates exceed 1% of the respective critical loads at the Dorset Heaths European

site and a number of the SSSIs/LWS. For the Dorset Heaths European site, the biggest contributor is the ESS facility.

Table 6.23: Maximum Predicted Acidification as a Percentage of the Critical Load – Cumulative Impact

	All Sources	EfW CHP Facility (including EDG)	ESS	WH
H1 Dorset Heaths SAC/SPA/Ramsar				
Bog	9.0%	1.9%	7.6%	1.2%
Dwarf shrub heath	5.9%	1.2%	5.0%	0.8%
Acid grassland	8.8%	1.8%	7.5%	1.2%
Coniferous woodland	10.1%	2.1%	8.5%	1.3%
H5 Turbary & Kinson Commons SSSI	1.4%	1.2%	0.2%	0.1%
H6 Hurn Common SSSI	2.7%	0.7%	1.8%	0.1%
H7 Slop Bog & Uddens Heath SSSI	1.5%	0.6%	0.1%	0.9%
H8 Parley Common SSSI	1.8%	1.1%	0.6%	0.1%
H14 Moors River System SSSI	2.1%	0.8%	1.3%	0.1%
H15 Knighton Heath GC SNCI	1.6%	1.4%	0.1%	0.1%
H17 Haymoor Bottom SNCI	1.2%	1.0%	0.1%	0.1%
H20 Dunyeats Hill HRS	1.1%	0.9%	0.1%	0.1%
H21 Moortown Copse SNCI	3.2%	3.2%	0.1%	0.1%
H23 Bearwood SNCI	3.3%	3.0%	0.2%	0.1%

6.9.30 At the location of the maximum impact within the Dorset Heaths SAC/SPA/Ramsar site, the contribution from each is as follows:

- EfW CHP Facility - 0.8% for bog, 0.5% for dwarf shrub heath, 0.8% for acid grassland and 0.9% for coniferous woodland;
- ESS - 7.6% for bog, 5.0% for dwarf shrub heath, 7.5% for acid grassland and 8.5% for coniferous woodland; and
- Whittle Power - 1.2% for bog, 0.8% for dwarf shrub heath, 1.2% for acid grassland and 1.3% for coniferous woodland.

Nutrient Nitrogen Deposition

6.9.31 The combined contribution of the emission sources to nutrient nitrogen deposition is presented in **Table 6.24**. Predicted deposition rates exceed 1% of the respective critical loads at the Dorset Heaths European site, the Slop Bog & Uddens Heath SSSI and two of

the LWS. For the Dorset Heaths European site, the biggest contributors are the ESS and WH facilities.

Table 6.24: Maximum Predicted Nutrient Nitrogen Deposition as a Percentage of the Critical Load – Cumulative Impact

	All Sources	EfW CHP Facility (including EDG)	ESS	WH
H1 Dorset Heaths SAC/SPA/Ramsar				
Heathland habitats	1.4%	0.5%	1.1%	0.9%
Woodland habitats	2.4%	0.8%	1.9%	1.8%
H7 Slop Bog & Uddens Heath SSSI	1.8%	0.3%	0.0%	1.5%
H21 Moortown Copse SNCI	1.4%	1.3%	0.0%	0.2%
H23 Bearwood SNCI	1.4%	1.2%	0.1%	0.2%

6.9.32 At the location of the maximum impact within the Dorset Heaths SAC/SPA/Ramsar site, the contribution from each is as follows:

- EfW CHP Facility – 0.3% for woodland habitats and 0.2% for heathland habitats;
- ESS - 1.9% for woodland habitats and 1.1% for heathland habitats; and
- Whittle Power – 0.2% for woodland habitats and 0.1% for heathland habitats.

6.10 Summary

6.10.1 A summary of the assessment is set out in **Table 6.25** overleaf.

Construction phase

6.10.2 To address the risk of dust impacts for construction related activities (i.e., demolition, earthworks, construction and trackout), including use of either TCC1 and TCC2, relevant mitigation measures for construction impacts appropriate for 'High Risk' effects, as proposed by the IAQM Dust guidance (2016), will be applied and are presented in the Outline CEMP included in **ES Appendix 3.2**. Treating the Proposed Development as being 'high risk' and therefore implementing the stronger mitigation measures is a best-practice approach. With effective implementation of these measures, there are predicted to be negligible residual effects to human and ecological Receptors, which are 'not significant'.

Operational phase

6.10.3 A precautionary approach was adopted in selecting baseline concentrations for NO_2, PM_{10} and $PM_{2.5}$ (main pollutants associated with traffic emissions). This allowed for potential cumulative impacts arising from this and other developments. In addition, as the number of HGV movements on some road links exceed the IAQM criterion for requiring a detailed TRAQ assessment, the impact of traffic on roadside Receptors was provided. This indicated

that the impact of the additional traffic on the local road network would be 'negligible' even when combined with other on-site and off-site emission sources.

6.10.4 Detailed air quality modelling of emissions from the EfW CHP Facility using the UK ADMS dispersion model has been undertaken to predict the impacts associated with the EfW CHP Facility emissions and the emergency diesel generator. Emissions from the EfW CHP Facility have been assumed to occur at the highest BREF daily emission limit values for new plant, except for NH_3 where a reduced limit of 5 mg/Nm^3 was adopted to minimise impacts on adjacent sensitive habitat sites.

6.10.5 For a proposed chimney height of 110m above ground level (154.65m above ordnance datum), predicted maximum off-site concentrations are assessed as 'not significant' and well below the relevant air quality standards for the protection of human health for all pollutants considered.

6.10.6 The predicted process contributions are 'not significant' compared with the critical levels for NO_x, SO_2, NH_3 and HF and critical loads for nutrient nitrogen deposition for European designated sites and nationally and locally designated habitat sites. However, predicted acidification impacts at the Dorset Heaths European site and some of the SSSIs could not be screened out as 'not significant'. Therefore, the impact of emissions on the integrity of these sites is provided in **ES Chapter 8: Ecology and Nature Conservation**.

Table 6.25: Summary of Effects

Receptor	Sensitivity of Receptor	Nature of potential impact	Proposed mitigation	Residual effect	Significant/ not significant
Construction phase					
Human	High	Exposure to construction dust	Mitigation Measures as part of Inherent Design.	Negligible	Not significant
Ecological	High	Exposure to construction dust	Mitigation Measures as part of Inherent Design.	Negligible	Not significant
Operational phase					
Human Receptors	High	Exposure to airborne pollutants from the EFW CHP Facility	Adopted chimney height of 110 m	Negligible	Not significant
Human Receptors	High	Exposure to traffic emissions	None	Negligible	Not significant
Habitat Receptors	Statutory and Non-statutory sites	Exposure to airborne pollutants	Adopted chimney height of 110 m. Reduction in emission limit value for NH_3.	Predicted impacts less than 1% and 10% of critical levels	Not significant
Habitat Receptors	Statutory and Non-statutory sites	Nutrient nitrogen deposition during normal operation	Adopted chimney height of 110 m. Reduction in emission limit value for NH_3.	None	Not significant
Habitat Receptors	Local designation	Degradation of habitats through nitrogen deposition from the emergency diesel	Landscape, Ecology and Arboricultural Management Plan – enhancement of retained habitats	Small positive effect at a Site level only	Not significant

Receptor	Sensitivity of Receptor	Nature of potential impact	Proposed mitigation	Residual effect	Significant/ not significant
		generator - significant at a Site level.	and sensitive long-term management of new habitats to achieve 10% BNG.		
Habitat Receptors	Statutory and Non-statutory sites	Acidification impacts - potential for reversible habitat degradation through increased acid deposition - significant at a County (for SAC/SPA/Ramsar) and Local level (for SSSIs).	Adopted chimney height of 110 m. Reduction in emission limit value for NH_3. Contributions to monitoring and management – to be agreed with NE/LPA and delivered through a S106.	None	Not significant

6.11 Mitigation Commitments Summary

Table 6.26 : Summary for Securing Mitigation

Identified Receptor	Type and purpose of additional mitigation measure (prevent, reduce, offset, enhance)	Means by which mitigation may be secured (e.g., planning condition / legal agreement)	To be delivered by	Auditable by
Construction				
Human	No additional mitigation proposed.	-	-	-
Ecological	No additional mitigation proposed.	-	-	-
Operation				
Human and habitat Receptors	Reduce impact by ensuring sufficiently high chimney (110m) for the EfW CHP Facility to aid dispersion and minimise impact at ground level.	Planning condition	Applicant/ EPC Contractor	BCP Council
Habitat Receptors	Reduce emissions of ammonia to minimise airborne ammonia concentrations, nutrient nitrogen deposition and acidification impacts at habitat sites. Proposed reduction from 10 mg/Nm^3 to 5 mg/Nm^3.	Environmental permit condition	Applicant/ EPC Contractor	Environment Agency