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GridLink Interconnector

Air Quality Impact Assessment Report

GridLink Interconnector Ltd

October 2020

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Revision	Revision date	Details	Authorized	Name	Position
1	18/06/2020	Addition of Construction Traffic Emissions Assessment		Gareth Collins	Regional Director
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1. Introduction

1.1.1 AECOM has been commissioned by GridLink Interconnector Ltd (the Applicant) to prepare an outline planning application and environmental report for the construction and operation of a converter station and associated underground electricity cables at Kingsnorth in Kent (hereafter referred to as the 'Proposed Development').

1.1.2 The Proposed Development forms part of the GridLink Interconnector Project (hereafter referred to as 'GridLink'). GridLink is a 1.4 Gigawatt (GW) electricity interconnector between the UK and France. In the UK, GridLink will comprise 108 kilometres (km) of submarine High Voltage Direct Current (HVDC) cable, less than 100 metres (m) of underground HVDC cable, a converter station and 1.5km of underground High Voltage Alternating Current (HVAC) cable from the converter station to the existing National Grid Kingsnorth substation.

1.1.3 The Proposed Development comprises the converter station building(s), outdoor equipment, internal roads, car parking and associated landscaping, and underground HVDC cable from the converter station to Mean High Water Springs (installed by Horizontal Directional Drilling). The submarine HVDC cable below Mean High Water Springs is subject to a Marine Licence granted by the Marine Management Organisation (MMO), therefore it is not included in the Proposed Development. In addition, the underground HVAC cable that will link the converter station to the National Grid Kingsnorth substation is considered to be permitted development and, therefore, it does not form part of the Proposed Development.

1.1.4 The interconnector will enable the UK and France to share electricity, so that any surpluses in power generation can be exported to each other and unexpected interruptions to the national grids can be mitigated to ensure security of supply. This is particularly important as the amount of renewable energy supply to the networks increases, because it is more variable and unpredictable due to weather conditions. To encourage renewable energy, GridLink provides a way to fully utilise high production from renewable sources of electricity and also a means of compensating for periods of low production. The efficient use of renewable energy and security of supply means that both the UK and France will realise environmental and economic benefits from the interconnector.

1.1.5 The European Commission has awarded GridLink the status of Project of Common Interest (PCI). This recognises the project's key contribution to realising Europe-wide goals related to energy policy and climate change. As a PCI, GridLink has been successful in securing a development funding grant of up to €15.2 million from the Connecting Europe Facility, a European funding initiative developed to direct investment into strategic infrastructure projects.

1.1.6 In accordance with Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest (known as the 'TEN-E Regulation'), each country connected by GridLink has nominated a National Competent Authority (NCA) responsible for overseeing the implementation of PCIs. The UK NCA for GridLink is delegated by the Department of Business, Energy and Industrial Strategy (BEIS) to the Marine Management Organisation (MMO). The MMO will be responsible for coordinating the procedures for the development consents and permits required to implement GridLink, including the planning application to Medway Council.

1.1.7 The Site covers approximately 6.2ha of brownfield land at the former Kingsnorth Power Station site, within which the new converter station (4.95ha) and access road (1.25ha) will be constructed. A temporary construction laydown area (1.6ha) will also be located next to the converter site during the construction phase.

1.1.8 This Report summarises the findings of an assessment of the likely significant effects on air quality as a result of the proposed construction.

1.1.9 The potential for air quality effects on sensitive receptors during the construction phase of the Proposed Development and combined cumulative effects of the Proposed Development with other development schemes are discussed in this report.

1.1.10 It is anticipated that the operation of the Proposed Development will generate limited traffic due to the low number of operatives on-site. There is no proposal for any on-site power generation within the

Proposed Development, and therefore no combustion related emissions from use of fossil fuels (although there will be a diesel standby generator for providing power in the event of an emergency / grid failure). Therefore, the operation of the Proposed Development is not anticipated to give rise to any significant air quality effects and scoped out of further assessment.

2. Legislation and Policy

2.0.1 There are national, regional (i.e. Kent) and local policies for the control of air pollution, as well as local action plans for the management of local air quality in Medway. The compliance with such policies and plans are matters that may be a material consideration for planning authorities, when making decisions for individual planning applications.

2.1 National Legislation

The Air Quality Standards Regulations (2010) and The Air Quality Standards (Amendment) Regulations (2016)

2.1.1 The principal air quality legislation within the United Kingdom (UK) is the Air Quality Standards Regulations 2010 (Ref 1) and the 2016 amendment (Ref 2), which transposes relevant EU Air Quality Directives into national legislation.

The Environment Act (1995)

2.1.2 The Environment Act 1995 (Ref 3) requires the Government to produce a national Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (Ref 4) containing standards, objectives, and measures for improving ambient air quality and to keep the policies identified under review.

The Air Quality Strategy (2000, 2003, 2007)

2.1.3 The 2000 AQS (Ref 4) established the framework for achieving further improvements in ambient air quality in the UK in 2003 and beyond. The AQS identified actions at local, national and international levels to improve air quality. It was followed by an Addendum in 2003 (Ref 5) which tightened several of the objectives and introduced one new objective (for Polycyclic Aromatic Hydrocarbons (PAHs)). The 2007 AQS (Ref 6) superseded the previous AQS and set out the UK Government and devolved administrations' air quality objectives and the measures selected to achieve the desired improvements in air quality.

2.1.4 The 2007 AQS requires that local authorities undertake a tiered assessment of air quality within their area of jurisdiction to determine whether or not the objectives established in the AQS are being achieved. Where the objectives are likely to be exceeded, the local authority must designate an Air Quality Management Area (AQMA) and establish an Air Quality Action Plan (AQAP), which outlines measures to be taken to achieve the objectives.

2.1.5 The current assessment criteria applicable to the protection of human health and Local Air Quality Management (LAQM) are set out within the UK's latest AQS.

The Clean Air Strategy 2019

2.1.6 In 2019, the UK Government released its much-anticipated Clean Air Strategy 2019 (Ref 7), part of its 25 Year Environment Plan (Ref 8). The Strategy places greater emphasis on improving air quality in the UK than has been seen before and outlines how it aims to achieve this (including through the development of new enabling legislation).

2.1.7 Air quality management focus in recent years has primarily related to one pollutant, nitrogen dioxide (NO_2), and its principal source in the UK, road traffic. However, the 2019 Strategy broadens the focus to other sources, including domestic emissions from wood burning stoves and from agriculture. This shift in emphasis is part of a goal to reduce the levels of fine particulate matter ($PM_{2.5}$) in the air to below the World Health Organisation guideline level (annual mean 10 µg/m^3) (Ref 9), which is presently lower than the current EU limit value. However, at the time of writing, these policies have not

yet been transposed into UK law. The objective values for the pollutants of relevance to this assessment are summarised in *Table 1*.

Table 1. Key AQS Objectives (2019)

Pollutant	Objective (µg/m^3)	Averaging Period	Not to be Exceeded More Than
Nitrogen dioxide (NO_2)	200	1-hour	18 times per year (i.e. 99.79th percentile)
	40	Annual	Not applicable
Particulate matter (PM_{10})	40	Annual	Not applicable
	50	24-hour	35 times per year (i.e. 90.4th percentile)
Particulate matter ($PM_{2.5}$)	25	Annual	Not applicable

2.2 National Planning Policy

National Planning Policy Framework (2019)

2.2.1 The National Planning Policy Framework (NPPF) (Ref 10) was published on 27th March 2012 and updated on 19th February 2019 (Ref 11), which outlines the Government's environmental, economic and social policies for England. The NPPF sets out a presumption in favour of sustainable development which should be delivered with three main dimensions: economic; social and environmental (Paragraphs 7 and 14). The NPPF aims to enable local people and their councils to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.

2.2.2 Paragraph 103 of the NPPF states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."*

2.2.3 Air quality is considered to be an important element of the natural environment. On conserving and enhancing the natural environment, Paragraph 170 states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by: …e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"*

2.2.4 Air quality in the UK is managed through the LAQM regime using national objectives. The effect of a development on the achievement of such policies and plans may be a material consideration by planning authorities when making decisions for individual planning applications. Paragraph 181 of the NPPF states that:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality*

Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.2.5 The different roles of a planning authority and a pollution control authority are addressed by the NPPF in paragraph 183:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

National Planning Practice Guidance (2019)

2.2.6 The Planning Practice Guidance (PPG) (Ref 12) states that the planning system should consider the potential effect of new developments on air quality where relevant limits have been exceeded or are near the limit. Concerns also arise where the development is likely to adversely affect the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife). In addition, dust can also be a planning concern, for example, because of the potential effect on local amenity.

2.2.7 When deciding whether air quality is relevant to a planning application the PPG states that a number of factors should be taken into consideration including if the development will:

- *"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.2.8 When determining the level of detail required for an air quality assessment, the PPG states:

> *"Assessments need to be proportionate to the nature and scale of the development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned... Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented."*

A Green Future: Our 25 Year Plan to Improve the Environment (2018, last updated 2019)

2.2.9 The 25 Year Environment Plan, published in January 2018, sets out the actions the UK Government will take to help the natural world regain and retain good health (Ref 8). This references several actions that are being taken to improve air quality, most notably the publication of the Clean Air Strategy (referred to above) and tighter controls on Medium Combustion Plant. Focus also centres on the 'Future of Mobility', in the establishment of flexible regulatory framework to encourage new modes of transport, and the encouragement of opportunities to move toward zero emission transport.

2.2.10 The 25 Year Environment Plan reinforces the demand for high environmental standards for all new builds. Resilient buildings and infrastructure will more readily adapt to a changing climate, and by extension have a lesser impact on local air quality.

2.3 Regional Planning Policy and Guidance

Kent and Medway Air Quality Partnership: Air Quality Planning Guidance (2015)

2.3.1 The Kent and Medway Air Quality Planning Guidance (Ref 13 & 14) has been developed in response to the changes in national planning policy, through the NPPF (Ref 10). The intention is to provide consistency as far as is practicable across the Kent and Medway area in terms of the approach to air quality in the planning regime. The document deals primarily with the air quality impacts from road traffic emissions. The assessment and control of dust impacts during demolition and construction is also considered. Two versions of the guidance have been produced (Option A and Option B), which differ only in terms of their approach to mitigation:

- Option A – standard mitigation for all development.
- Option B – standard mitigation for all development and all developments within or close to an AQMA.

2.3.2 The standard mitigations approach of Option A should be considered for the Proposed Development.

2.3.3 The approach in this document seeks to minimise road transport emissions wherever practicable to sustainable levels, by securing reasonable emission mitigation whilst also seeking to counter the cumulative impacts arising from all developments. A key theme of the NPPF (Ref 10) is that developments should enable future occupiers to make green vehicle choices and it explicitly states that low emission vehicle infrastructure, including electric vehicle (EV) re-charging facilities, should be provided. This document seeks to develop consistent EV re-charging standards for new developments across Kent.

2.3.4 The air quality assessment process, as set out in the guidance document, follows a staged process:

1. Using the 'Screening checklist' to determine whether the proposal qualifies as a 'major development';

2. Determining whether the development requires an air quality assessment or emissions assessment using the 'Air Quality and emission mitigation assessment checklist';

3. Determining whether an air quality assessment is required to assess the impact on public health and/or the local environment as well as the significance of a development on local air quality;

4. Determining whether an application should be refused on air quality grounds or what mitigation measures are required to make the development acceptable on air quality grounds.

2.4 Local Planning Policy and Guidance

Medway Air Quality Planning Guidance 2016

2.4.1 The planning guidance (Ref 15) was produced in conjunction with the Kent and Medway Air Quality Partnership. The document developed to improve air quality across Kent and Medway and encourage emissions reductions to improve the environment and health of the population.

2.4.2 The document aims to provide consistency and practicable approach to air quality in the planning regime across the Kent and Medway area. The document deals with air quality impacts from traffic emissions and use of biomass boilers.

2.4.3 The document also considered the assessment and control of dust impacts during demolition and construction.

Medway Local Plan 2003

2.4.4 Medway Local Plan 2003 (Ref 16) Policy BNE2, relates to the localised amenity considerations of airborne emission.

2.4.5 Policy BNE2 states

> *"Development likely to result in airborne emissions should provide a full and detailed assessment of the likely impact of these emissions. Development will not be permitted when it is considered that unacceptable effects will be imposed on the health, amenity or natural environment of the surrounding area, taking into account the cumulative effects of other proposed or existing sources of air pollution in the vicinity."*

2.4.6 In addition, the 2003 Local Plan, Policy T14, states that travel plans are required for certain developments:

> *"Travel Plans will be required for all developments which require a transport assessment or as otherwise required by the Council's vehicle parking standards, including the following:*
>
> *(i) all substantial developments comprising employment, retail, leisure and/or service floorspace;*
>
> *(ii) smaller developments in category (i) which would generate additional traffic movements in or near to air quality management areas or other areas specifically targeted for a reduction in road traffic;*
>
> *(iii) new or expanded educational facilities;*
>
> *(iv) where a local traffic problem would otherwise lead to a refusal of planning permission."*

Medway Local Plan 2019-2037

2.4.7 Medway Council are currently working on a new Local Plan, Future Medway, which will replace the 2003 Medway Local Plan. The document is seeking comments until April 2020 and will be adopted in 2021 (Ref 17).

2.4.8 Chapter 7 Natural Environment and Green Belt of the Local Plan sets out the policy approach on air quality:

> *"The council seeks to reduce exposure to areas of poor air quality, maintain areas of good air quality, and where possible improve air quality through restricting development or requiring acceptable and effective mitigation measures. All proposals should take account of the Medway Council Air Quality Planning Guidance that sets out a screening checklist for major size development and proposed development within, or close to an AQMA. Depending on the scale of development, the Local Planning Authority may*

require the submission of an Air Quality Assessment and/or an Emissions Mitigation Assessment. The guidance also advocates mitigation measures for all development. Where mitigation is not integrated into a scheme, the Local Planning Authority will require this through a planning condition(s). If on site mitigation is not possible, then the Local Planning Authority may seek contribution to wider air quality mitigation measures through a planning obligation."

Medway Local Transport Plan 2011-2026

2.4.9 The Medway Local Transport Plan (Ref 18) has set out five priorities. Priority 2 specifically targets air quality:

"To support a healthier natural environment by contributing to tackling climate change and improving air quality."

2.4.10 The Strategy sets out a framework of actions delivered through a set of five Transport Objectives. These actions will significantly contribute to the Plan priorities. Whilst the strategy includes a wide package of measures, the objective relevant to air quality is objective 1:

"More efficient management of the highway network and car parks, together with highway improvements that focus on congestion and air quality hotspots, thereby improving the reliability and environmental impact of the transport network."

Medway Air Quality Action Plan 2015

2.4.11 This AQAP (Ref 19) describes the air quality assessment process that has taken place in Medway to date, identifies the role of traffic in the current problem and sets out a range of transport focussed measures that could help improve air quality. In total, twelve measures have been recommended for implementation or further feasibility studies. The focus is to improve air quality at the Central Medway AQMA, Pier Road, Gillingham AQMA and High Street and Rainham AQMA. The measures include: Improving movement of freight, encouraging public transport use and traffic management schemes.

2.4.12 The Four Elms Hill AQMA in Chattenden was declared in November 2017, after this AQAP was published. Medway Council are currently developing a new AQAP for the Four Elms Hill AQMA. The publishing of the AQAP has been delayed with the approval of Defra, to allow the Plan to be released in conjunction with the new Medway Local Plan.

Medway Air Quality Communications Strategy 2017

2.4.13 This Strategy (Ref 20) details a series of recommended communications activities to increase the awareness of the health impacts of air pollution amongst key stakeholders and specific local groups affected by air pollution. It also aims to stimulate changes in the way people and organisations view air pollution and empower them to take action to address this complex challenge.

2.4.14 The communication activities outlined in the Report include:

- increasing the number of people signed up for the KentAir email forecast service;
- implementation of a Clean Air Day campaign in Medway;
- an anti-idling campaign aimed at targeted drivers in the Medway area; and
- using interactive toolkits in schools.

2.5 Other Relevant Policy and Guidance

Local Air Quality Management

2.5.1 Under the requirements of Part IV of the Environment Act (1995) (Ref 3), Medway Council has carried out a phased Review and Assessment of local air quality within the Borough since 1998. In 2004 Medway Council declared six AQMAs and then in August 2010, following further consideration of air quality results, the Council consolidated the existing AQMAs along with newly identified areas into three AQMAs. These areas were designated as Central Medway AQMA: Pier Road, Gillingham AQMA and High Street and Rainham AQMA. In November 2017 an additional AQMA was declared, part of

Four Elms Hill, Chattenden. All were declared due to exceedances of the annual NO_2 air quality objective.

Defra LAQM Technical Guidance 2016 (Revised 2018)

2.5.2 The guidance (Ref 22) issued under Part IV of the Environment Act 1995 is designed to help local authorities with their LAQM duties. The guidance sets out the general approach to use and detailed technical guidance to guide local authorities through the Review and Assessment process.

EPUK / IAQM Land Use Planning & Development Control (2017)

2.5.3 This guidance, jointly issued by Environmental Protection United Kingdom (EPUK) and the Institute of Air Quality Management (IAQM) (Ref 23) has been produced to ensure that air quality is adequately considered in the land use planning and development control processes by relevant officers within local authorities, developers, and consultants involved in the preparation of development proposals and planning applications. This document is best practice guidance and has no formal or legal status.

IAQM Guidance on the Assessment of Dust from Demolition and Construction (2016)

2.5.4 This document (Ref 30) provides guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks). The impacts of dust depend on the mitigation measures adopted. The emphasis in this document is therefore on classifying the risk of dust impacts from a site, which will then allow appropriate mitigation measures to be identified.

3. Methodology

3.0.1 There is currently no statutory guidance on the methodology for air quality impact assessments. Several bodies have published their own guidance relating to air quality and development control, such as that by the Department for Environment, Farming and Rural Affairs (Defra) (Ref 22), EPUK and the IAQM for the construction (Ref 24) and operational phases (Ref 23) of developments. These have been used in the preparation of this Report.

3.0.2 A screening exercise was also undertaken in accordance with the Medway Council's Air Quality Planning Guidance (2016). Based on the Medway Council Air Quality Planning Guidance "Screening checklist", the Proposed Development does not meet the requirement for further assessment or emission mitigation assessment. Details of the screening process are presented in Appendix A.

3.0.3 Receptors potentially sensitive to changes in air quality have been identified through review of mapping and aerial photography of the area surrounding the Proposed Development.

3.0.4 This section presents the methodology used to assess the potential effects on air quality during the construction phase and the operational phase of the Proposed Development.

3.0.5 This section will explain the methods used to assess the potential effect of:

- Fugitive emissions of particulate matter from the construction activities;
- Traffic associated with the construction activities to represent peak activities; and
- Emissions from traffic trip generation during the operational phase.

3.0.6 Detailed information relating to the scenarios to be considered for the assessment of the emissions for the construction and operational phases are described in the following sections.

3.0.7 The methods used to determine the significance of effects associated with air quality impacts are also described in the following section 'Significance Criteria'.

3.1 Description of Pollutants Assessed

Construction Phase Fugitive Emissions of Particulate Matter

3.1.1 Fugitive emissions (i.e. emissions which are not associated with a single fixed release point) of airborne particulate matter are readily produced through the action of abrasive forces on materials and therefore a wide range of construction activities have the potential to generate this type of emission, including:

- Earthworks, including the handling, working and storage of materials;
- Construction activities; and
- Transfer of dust-making materials from the Site onto the local road network ("trackout").

3.1.2 Particulate matter in the air is made up of particulates of a variety of sizes, and the concept of a 'size fraction' is used to describe particulates with sizes in a defined range. These definitions are based on the collection efficiency of specific sampling methods and each of the size fractions is especially associated with different types of impacts. In this assessment the term 'dust' is used to mean particulate matter in the size fraction 1 µm – 75 µm in diameter, as defined in BS 6069:1994 (Ref 25).

3.1.3 The size fraction called 'PM_{10}' is composed of material with an aerodynamic diameter of less than 10 µm in diameter and overlaps with the size fraction for dust. The ambient dust relevant to health outcomes will be that measured as PM_{10}, although most of this will be in the coarse ($PM_{2.5-10}$) fraction, rather than the $PM_{2.5}$ fraction. Research suggests that 85% to 90% by weight of the fugitive dust emissions of PM_{10} from construction sites are $PM_{2.5-10}$ and 10% to 15% are in the $PM_{2.5}$ fraction. Air quality objectives for PM_{10} have been set for the protection of human health and the term PM_{10} is only used in this assessment when referring to the potential impact of emissions of particulate matter from demolition and construction activities on human health. The short-term, 24-hour mean objective for airborne concentrations of PM_{10} is the appropriate AQS Objective for assessing the potential impact on health of short-term fugitive emissions from demolition and construction sites.

3.1.4 Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces. The IAQM adopts a broad definition of dust that includes the potential for changes in airborne concentration, changes in deposition rates and the risk to human health and public amenity, when considering the significance of effects from emissions of fugitive particulate matter. In this assessment, specific reference is made to the impacts associated with specific size fractions (dust, PM_{10}), before considering the overall effect on receptors using an approach that is consistent with the IAQM's Guidance (Ref 24).

3.1.5 The nature of particulate impact for construction works varies between different types of receptor and is summarised within Table 2 below. In general, receptors associated with higher baseline dust deposition rates are less sensitive to impacts, such as farms, light and heavy industry or outdoor storage facilities. In comparison some hi-technology industries or food processing plants operate under clean air conditions and increased airborne particulate matter concentrations may have an increased economic cost associated with the extraction of more material by the plants air filtration units.

Table 2. Types of Impacts from Emissions of Particulate Matter

Nature of Impact	Receptor Type Affected	Relative Sensitivity
Change in 24-hour mean PM_{10} concentrations	Residential properties, Schools, Hospitals and clinics	Receptor sensitivity was considered according to the Air Quality Objective Value (Table 1)
Changes in rate at which air filtration units require maintenance	Hospitals and clinics	High
	Hi-tech industries	High
	Food processing industries	High
Change in rate at which material accumulates on glossy surfaces, such as glass or paint work	Painting and furnishing operations	High
	Residential properties	Medium
	Schools	Medium

Nature of Impact	Receptor Type Affected	Relative Sensitivity
	Food retailers	Medium
	Offices	Medium
	Museums and galleries	Medium
	Glasshouses	Medium
Change in the rate at which property or products becomes soiled by deposited material	Food processing industries	High
	Painting and furnishing operations	High
	Museums and galleries	High
	Residential properties	High
	Food retailers	Medium
	Offices	Medium
	Horticultural land	Medium
Change in the rate at which mineral material is deposited onto vegetation	Ecological sites	Medium - Low
	Horticultural land	Medium - Low
	Agricultural land	Low
Change in chemical composition of mineral material deposited	Ecological sites	Medium - Low
	Outdoor storage	Medium - Low
	Horticultural land	Low
	Recreational green space	Low

Construction Phase Non-Road Mobile Machinery

3.1.6 Emissions from construction Non-Road Mobile Machinery (NRMM) will have the potential to increase NO_2 and PM_{10} concentrations locally when in use on the construction site associated with the Proposed Development.

3.1.7 In order to reduce emissions from NRMM, this equipment will need to meet set emission standards, based upon engine emissions standards set in EU Directive 97/68/EC (Ref 25) and its subsequent amendments (Ref 26).

3.1.8 The Local Planning Authorities (LPAs) are responsible for the application and enforcement of this policy through the planning process, and the developers, as part of their Air Quality Dust Risk Assessment, will be required to provide a written statement of their commitment and ability to meet the NRMM standards.

3.1.9 Emissions from NRMM will be temporary and localised and will be controlled via the application of the NRMM standards and through best practice construction methods. For that reason, the construction phase NRMM emissions are considered not to be significant. These emissions have not been modelled and are not considered any further in this assessment.

Construction Phase Road Traffic Emissions

3.1.10 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide (SO_2), carbon monoxide (CO), PM10 and $PM_{2.5}$ (aerodynamic diameter less than 2.5 µm) in exhaust emissions. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

3.1.11 Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated effects on local air quality is not considered relevant in the context of this assessment. This is because road traffic emissions of these substances have been reviewed by Medway Council as part of their LAQM obligations since the introduction of Part IV of the Environment Act (1995), and nowhere within the administrative area is at risk of exceeding these objectives. Emissions of SO_2, CO, benzene and 1,3-butadiene from road traffic are therefore not considered further within this assessment.

3.1.12 At high temperatures and pressures found within vehicle engines, some of the nitrogen in air and fuel is oxidised to form NO_x, mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere. The presence of NO_2 in the atmosphere is associated with adverse effects on human health. Vehicle emissions can also result in the exposure at sensitive receptors to concentrations of particulate matter (PM_{10} and $PM_{2.5}$).

3.1.13 Vehicle trip generation is anticipated to exceed the EPUK/IAQM criteria (Ref 23) for requiring assessment of potential effects on air quality. Therefore, the potential for significant adverse impacts to occur on nearby sensitive receptors as a result of changes in road traffic movements during the construction phase has been assessed.

3.1.14 The Proposed Development results in an exceedance of EPUK/IAQM criteria on roads leading into, through, and out of Four Elms Hill road. An assessment was therefore undertaken at this location. The affected road network as well as the existing levels of NO_2 presented in the latest Medway Council's (MC) Annual Status Report, can be seen in Figure ***1***.

3.1.15 The air quality assessment was undertaken using the Design Manual for Roads and Bridges simple assessment approach (Ref 30) to determine the future annual mean NO_2 concentrations at locations/receptors anticipated to experience the largest impacts due to the Proposed Development, and already experience, or are close to, an exceedance of the national Air Quality Objectives (AQOs).

3.1.16 The outputs of the assessment were verified using the latest available monitored data by MC (Ref 30). The potential changes in annual mean NO_2 concentrations has been determined for a number of scenarios:

- Baseline 2018
- Future Year 2023 with the baseline year traffic flows (Future Base)
- Future year 2023 without the Proposed Development traffic flows (DM)
- Future Year 2023 with the Proposed Development traffic flows (DS)

Operational Road Traffic Emissions

3.1.17 The Proposed Development will be operated with a small number of on-site operatives and the associated vehicle trip generation (maximum 20 two way movements per day) is anticipated to be minimal and will be below the EPUK/IAQM criteria (Ref 23) for requiring detailed assessment of potential effects on air quality. Therefore, the potential for significant adverse impacts to occur on nearby sensitive receptors as a result of changes in road traffic movements during the operational phase is considered to be negligible and further assessment of this effect has been scoped out from this assessment.

Operational Emissions

3.1.18 The Proposed Development will not incorporate any power generation or other combustion processes.

3.1.19 The Proposed Development will not incorporate any diesel-fired or gas-fired boilers for hot water heating and space heating.

3.1.20 However, a diesel backup generator will be installed for use as an emergency energy supply. The operation hours are anticipated to be less than 50 hours per year for testing and maintenance. As a consequence of the infrequent and short-term use, no significant effects from the emissions of the backup generator are considered likely, and a detailed assessment of the emissions has been scoped out.

3.2 Determination of Baseline Conditions

3.2.1 A review of existing baseline air quality has been undertaken using information presented within the "Medway Council Air Quality Annual Status Report 2019" (Ref 21). The Environment Agency's Pollution Inventory (Ref 28) and Defra's background maps (Ref 29) have also been considered in this assessment.

3.3 Sensitive Receptors

Construction Phase Sensitive Receptors

3.3.1 As described in the IAQM Guidance on the Assessment of Dust from Demolition and Construction (Ref 24), a receptor sensitive to dust is defined as:

> *"a location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust."*
>
> *When assessing the impact of dust emissions generated during demolition and construction works, receptors are defined as the nearest potentially sensitive receptor to the boundary of the site in each direction. These receptors have the potential to experience impacts of greater magnitude due to emissions of particulate matter generated by the works, when compared with other more distant receptors, or less sensitive receptors. Moreover, receptors located within 50m of routes to be used by demolition and construction vehicles might be impacted by dust originating from the trackout of material onto the road, and as such have been considered in this assessment."*

3.3.2 There are no residential receptors that are sensitive to dust in the immediate vicinity of the Proposed Development or along construction traffic routes. The closest residential areas are approximately 2.9 km to the west of the Site at Hoo St Werburgh, together with the town of Gillingham located approximately 4 km to the south. A small number of individual residential properties are present on the edge of the Kingsnorth industrial area, with the nearest property at 1.3 km to the west of the Site.

3.3.3 The IAQM (Ref 24) guidance provides criteria in order to determine the sensitivity of the area to dust soiling effects and the sensitivity of people to health effects of PM_{10}. In terms of sensitivity of the receptors, residential properties located in proximity of the Proposed Development are considered as high sensitivity receptors for both amenity and health effects. All other potential receptors (commercial and offices) in the study area can be considered as Medium sensitivity receptors for amenity and health effects.

3.3.4 Taking into account the proximity of sensitive receptors, up to 350m from site boundary, to the Proposed Development, and existing PM_{10} concentrations in the study area, the study area is considered to be of low sensitivity to dust soiling effects on people and property, and human health.

3.3.5 An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). For locations with a statutory designation, e.g. Special Areas of Conservation and Sites of Special Scientific Interest (SSSIs), consideration should be given as to whether the particular site is sensitive to dust and this will depend on why it has been designated.

3.3.6 The identification of potential ecologically sensitive receptors has been undertaken in line with current guidance (Ref 24). Although the Proposed Development is not located within an environmentally "sensitive area" (as defined by the EIA Regulations) (Ref 31), it is located within 50m of environmentally sensitive areas.

3.3.7 The Site is 90 m from Damhead Creek to the north and 50 m from the Medway Estuary to the south, where intertidal mudflats form part of the Medway Estuary and Marshes SSSI, Special Protection Area (SPA) and Ramsar site. Dust soiling can result in localised adverse effects on vegetation. Therefore, the study area is considered to be of Medium sensitivity to dust soiling effects on ecological receptor sites.

3.3.8 For the assessment on construction traffic effects, worst-case receptor locations were selected within the Four Elms Hill AQMA.

3.3.9 A total of four receptors were selected which comprise monitoring locations situated within the AQMA. These locations represent worst-case receptor locations based on their close proximity to the kerb and correspond to residential receptors by being located at the front of existing residential properties.

3.3.10 Further details about the selected receptors is provided in Table 3.

Table 3. Assessed Receptors

ID	In AQMA?	Location	X	Y	Height (m)	Distance from Relative Exposure (m)
DT22	Yes	Joy Lodge, Four Elms Hill	575488	171616	1.2	Eastbound: 15.2 Westbound: 27.5
DT24	Yes	Sign post RS106 adjacent 1A Main Road, Chattenden	575948	171847	2.6	Eastbound: 4.5 Westbound: 16.1
DT32	Yes	Lamp post FEA016 adjacent 6 Balls Cottages, Main Road, Chattenden	575903	171802	2.4	Eastbound: 19.35 Westbound: 3.40
DT33	Yes	Lamp post FEA20 adjacent 2 Broadwood Road, Chattenden	575971	171833	2.6	Eastbound: 14.75 Westbound: 3.7

Operational Phase Sensitive Receptors

3.3.11 The detailed assessment of air quality impacts associated with the operational phase of the Proposed Development has been screened out. Therefore, no existing receptors are considered for the assessment.

3.4 Construction Effects

3.4.1 A qualitative assessment has been undertaken to assess the significance of any effects on sensitive receptors associated with the construction phase. The assessment is based on the IAQM (Ref 24) guidance and considers potential sources of emissions on the basis of the following activity groups:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

3.4.2 The Site is currently vacant; consequently, no demolition is associated with the Proposed Development.

3.4.3 For each activity group the following steps are applied with respect to identifying the potential effects, before coming to an overall conclusion about the significance of the effects predicted..

3.4.4 The approach to the assessment involves the following process:

- Identify the nature, duration and the location of activities being carried out;
- Establish the risk of significant effects occurring as a result of these activities;
- Review the proposed or embedded mitigation against good site practice;
- Identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- Summarise the overall effect of the works with respect to fugitive emissions of particulate matter and then report the significance of the effects.

3.4.5 The emphasis of the regulation and control of construction dust should be the adoption of good working practices as standard. Good practice is a process that is informed by the assessment, which seeks to avoid the potential for adverse effects. This approach assumes that this environmental management will be implemented during works to ensure potential significant adverse effects do not occur.

3.4.6 Examples of accepted good site practice include the IAQM guidance and Building Research Establishment (BRE) guidance (Ref 30). It has been assumed that good site practices will be utilised on-site when assessing potential dust impacts.

Construction Phase Road Traffic Emissions

3.4.7 The project transport consultants provided Annual Average Daily Traffic flows and Heavy Goods Vehicle (HGV) percentages of those flows, for roads around the expected HGV route and the AQMA that falls within this route. Further details about the traffic data used in the assessment is shown in Table 4.

Table 4. Daily Traffic Data for Assessed Scenarios

Location	Direction	Speed Limit [mph]	2018			2023			2023 + Development		
			Total Flow	HGVs	HGV [%]	Total Flow	HGVs	HGV [%]	Total Flow	HGVs	HGV [%]
A228 Peninsular Way west of Bells Lane	Eastbound	70.00	8667	1079	12.5%	9379	1167	12.5%	9450	1180	12.5%
	Westbound	70.00	8711	1069	12.3%	9427	1157	12.3%	9498	1169	12.3%
Four Elms Hill	Eastbound	40.00	15923	708	4.5%	17231	766	4.5%	17303	779	4.5%
	Westbound	40.00	17193	669	3.9%	18606	724	3.9%	18677	736	3.9%
A289 east of Dillywood Lane	Eastbound	70.00	25748	1764	6.9%	27864	1909	6.9%	27919	1921	6.9%
	Westbound	70.00	26926	1622	6.0%	29139	1755	6.0%	29194	1768	6.0%

3.4.8 In 2023, there is expected to be an increase of 143 vehicles per day due to the Proposed Development.

Background Pollutant Concentration Data

3.4.9 To obtain predictions for pollutant concentrations at receptors, the assessment outputs of road contributions of NO_2 must be combined with background concentrations. Background concentrations are those from many sources which individually may not be significant, but collectively, over a large area, need to be considered. Background concentrations were obtained from Defra, which provides modelled estimations of background air pollutant concentrations for each 1 km square in the UK using a baseline of 2017 (Ref 29).

Conversion of NO_X to NO_2

3.4.10 The proportion of NO2 in nitrogen oxides (NO_X) varies greatly with location and time according to a number of factors including the amount of oxidant available and the distance from the emission source. NO_X concentrations are expected to decline in future years due to falling emissions, therefore NO_2 concentration will not be limited as much by ozone and consequently it is likely that the NO_2/NO_X ratio will in the future increase. In addition, a trend has been noted in recent years whereby roadside NO_2 concentrations have been increasing at certain roadside monitoring sites, despite emissions of NO_X falling. The direct NO_2 phenomenon is having an increasingly marked effect at many urban locations throughout the UK and must be considered when undertaking modelling studies.

3.4.11 In this study, modelled Road NOX concentrations have been converted to total NO_2 concentrations using Defra's 'NOX to NO2' calculator (V7.1) (Ref 35), released in April 2019. The year and region for which the modelling has been undertaken are specified, and the appropriate Defra background NO2 concentrations at each receptor. The calculation then uses an appropriate factor of NO_X emitted as NO_2.

3.5 Operational Effects

3.5.1 The operational phase air quality effects are considered to be negligible on the existing receptors.

3.5.2 The suitability of the site for future use will be evaluated qualitatively based on the nature of the Proposed Development and local information on air quality including local monitoring data and projection, and Defra background pollutant mapping data.

3.6 Significance Criteria

Construction Phase

3.6.1 For effects on amenity (including those associated with dust), the aim is to bring forward construction phase, including mitigation measures if necessary, that avoids the potential for adverse environmental impacts as a result of the Proposed Development.

3.6.2 Experience in the UK (Ref 24) is that good site practice is capable of mitigating the impact of fugitive emissions of particulate matter effectively, so that in all but the most exceptional circumstances, effects at sensitive receptors can be controlled to ensure that effects are of negligible or minor adverse significance (i.e. 'not significant') (see Table 5).

3.6.3 The scale of the risk of adverse effects occurring due to each type of construction activity, with mitigation in place is described using the terms 'high', 'medium' and 'low' risk. The basis for the choice of description is set out for each activity, comprising earthworks, construction and trackout, and is consistent with the IAQM's Guidance (Ref 24).

Table 5. Descriptors Applied to the Predicted Effects of Fugitive Emissions of Particulate Matter

Significance of Effect at Single Receptor	Description
Major	A significant effect that is likely to be a material consideration in its own right.
Moderate	A significant effect that may be a material consideration in combination with other significant effects, but is unlikely to be a material consideration in its own right.
Minor	An effect that is not significant but that may be of local concern.
Negligible	An effect that is not significant change.

3.6.4 Construction dust effects generally occur when high risk dust generating activities coincide with adverse meteorological conditions. Therefore, even without mitigation, any impact would be limited to events that are infrequent and short-term in nature.

Construction Phase Road Traffic Emissions

3.6.5 Air quality effects may be considered to be significant if AQOs are predicted to be breached or if the Proposed Development leads to significant changes in air quality due to road traffic emissions at sensitive receptors. According to IAQM/EPUK Guidance there is a two-stage process to be followed in the assessment:

- Magnitude
  - a qualitative or quantitative description of the impacts on local air quality arising from the Proposed Development; and
- Significance
  - a judgement on the overall significance of the effects of any impacts.

3.6.6 The EPUK/IAQM guidance states that a meaningful description to the degree of an impact is to express the magnitude of incremental change as a proportion of a relevant assessment level (for example an AQO), and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion.

Table 6. Description of Impacts

Long term average concentration at receptor in assessment year	% change in concentration relative to air quality assessment level			
	<2	2 – 5	6 – 10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76% - 94% of AQAL	Negligible	Slight	Moderate	Moderate
95% - 102% of AQAL	Slight	Moderate	Moderate	Substantial
103% - 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Source: EPUK/IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' (Ref 23)

3.6.7 An air quality effect can be described as 'significant' or 'not significant'. The impact descriptors in Table 6 are intended for application at the sensitive receptors and whilst there may be a 'slight', 'moderate' or 'substantial' impact at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances. Any judgement on the overall significance of the effects of the Proposed Development will need to consider such factors as:

- The existing and future air quality in the absence of the Proposed Development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Overall Assessment of Significance

3.6.8 The significance of the reported effects is considered for the Proposed Development in overall terms. The potential for the Proposed Development to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principal focus is in determining the significance of any change to the likelihood of future achievement of the air quality objective values set out in Table 1 for NO_2, PM_{10} and $PM_{2.5}$.

3.7 Limitations and Assumptions

3.7.1 The assessment of the construction and operational phase of the Proposed Development has adopted the following limitations and assumptions:

- Information on construction activities and traffic have been estimated, which may be subject to minor amendments according to the final construction programme and methodology.

Sensitivity Testing

3.7.2 A key element of the local air quality impact assessment is the rate of improvement in air quality over time as cleaner vehicles enter the national vehicle fleet. There is inherent uncertainty in making these predictions. For this assessment, Defra's predicted fleet compositions, as incorporated in the emission factor toolkit (EFT v9.0) (Ref 36), was used.

3.7.3 Trends in annual mean NO_2 concentrations across the assessed area indicated that concentrations have been decreasing slightly since 2015. Sensitivity tests were undertaken in order to determine the worst-case scenarios of the current assessment. The examined scenarios can be seen below in Table 7, and further details are presented in Appendix F.

Table 7. Sensitivity Testing

Test Version	Details
Sensitivity Test 1	2018 EFT emission factors and national fleet composition across all assessed scenarios 2018 NO_x to NO_2 calculation regional concentrations and fractions 2018 NO_2 backgrounds across all scenarios
Sensitivity Test 2	Minimum distance to exposure (kerbside) for all assessed locations.
Sensitivity Test 3	2018 EFT emission factors and national fleet composition across all assessed scenarios 2018 NO_x to NO_2 calculation regional concentrations and fractions 2018 NO_2 backgrounds across all scenarios Minimum distance to exposure (kerbside) for all assessed locations

4. Baseline

4.0.1 To assess the significance of any new development proposal (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area. This provides a reference against which any potential changes in air quality can be assessed. Since air quality is predicted to change in the future (mainly because of changes to vehicle emissions), the baseline situation is extrapolated forward to the planned opening year of the Proposed Development (a future baseline scenario).

4.0.2 To identify the existing air quality conditions, a review of publicly available information has been undertaken, including the latest local authority air quality reports, local air quality monitoring data, and background concentration maps. This section presents the results of the review.

Sensitivity Testing

4.0.3 When forecasting concentration changes due to changes in road traffic emissions, it is necessary to make a comparison between the results and available roadside monitoring data, to ensure that the assessment is reasonably reproducing actual observations, and factoring the results to better match the monitoring data if necessary. The accuracy of the future year results is relative to the accuracy of the base year results, therefore greater confidence can be placed in the future year concentrations if good agreement is found for the base year.

4.0.4 For this purpose, annual mean NO2 concentrations were predicted at all of the Medway Council's monitoring locations presented in Table 3.

4.0.5 The adjustment factor between modelled and monitored NOx roads concentrations was found to be 2.00. This factor was then applied to all modelled Road NOX contributions at modelled receptor locations considered in this assessment, before being converted into total NO2 concentrations.

4.0.6 Further details are provided in Appendix F.

4.1 Industrial Sources

4.1.1 Environment Agency records the pollution released into the atmosphere by industrial sites under the EC Integrated Pollution Prevention and Control Directive (Ref 28). The 2018 Pollution Inventory data indicates that there is one installation, Kingsnorth Oil Treatment Plant (QP3138AA), within 1km of the Site. The pollutants released are all below the applicable thresholds.

4.1.2 The Medway Council Annual Status Report 2019 (Ref 21) identified two industrial installations in 2018, either new or with significantly increased emissions. Sicame UK Ltd, P/B/071/P2 – Di-isocyanate storage and Tarmac Trading Ltd, P/B/073 – Cement batching. Neither required a screening assessment, any changes to monitoring or fast track AQMA declaration.

4.2 Local Air Quality Management

4.2.1 The Proposed Development is located in Medway and the baseline assessment includes a review of Medway Council's LAQM Annual Status Report (Ref 21).

4.2.2 Medway has declared four AQMAs (Central Medway AQMA, High Street, Rainham AQMA, Pier Road, Gillingham AQMA and Four Elms Hill, Chattenden AQMA), all for exceedances of the annual mean NO_2 objective. The Site is approximately 4.5 km from Pier Road, Gillingham AQMA, 5.2 km from Four Elms Hill, Chattenden AQMA, 6 km from Rainham AQMA; and 7.3 km from Central Medway AQMA. The 2015 AQAP and the 2017 Air Quality Communication Strategy set out measures to improve air quality in Medway.

4.2.3 The main source of air pollution in the district is road traffic emissions from major roads, notably the M2, A2, A228, A229, A230 and A289. Medway suffers from significant congestion, particularly in the town centres.

4.2.4 Whilst a weak trend of decreasing concentrations of NO_2 is apparent at most monitoring sites from 2011 to 2018, monitoring results for 2018 demonstrate that air quality within Medway continues to exceed the annual mean NO_2 objective at some locations adjacent to roads covered by the Central Medway AQMA. No exceedances have been recorded at the other three AQMAs (when distance-corrected to represent relevant exposure). Measured pollutant concentrations remain below the national objectives at all monitoring sites located outside the declared AQMAs, and numerous sites within them.

4.3 Defra's Background Pollutant Concentration Mapping

4.3.1 Defra background maps (Ref 28) indicate that background pollutant concentrations in the vicinity of the Proposed Development are below the respective annual mean objectives for NO_2, PM_{10}, and $PM_{2.5}$. Details of background concentrations are shown in Table 8.

Table 8. Defra 2020 Annual Mean Background Concentrations

Defra OS Grid	NO_2 (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
581500, 172500	11.5	14.0	9.5

4.3.2 Background concentrations of NO_2, PM_{10}, and $PM_{2.5}$ are currently well within the objective thresholds and it is anticipated that they should reduce over time due to the expected reduction in emissions from the majority of emission sources.

4.3.3 The estimated background concentrations of NO_2 related to the road section or the Four Elms Hill AQMA can be seen in Table 9 for each of the relevant scenario years.

Table 9. Annual Mean Background Pollutant Concentrations for the Assessment Scenarios

Grid Square	Background NO_2 Concentration (µg/m^3)	
	2018	2023
575500, 171500	17.79	14.74

4.3.4 Annual mean background concentrations of NO_2 are well below the AQO in 2018 and are predicted to trend downwards due to the renewal of the vehicle fleet with cleaner vehicles over time.

4.4 APIS Background Pollutant Concentration Mapping

4.4.1 Air Pollution Information System (APIS) (Ref 32) provides the background deposition and concentration datasets of a 3-year average for 2016-2018, within the specific content of sensitive ecological features / habitats. The background pollutant concentrations at the Proposed Development are below the respective critical level for NO_X, and critical loads for nitrogen deposition are shown in Table 10.

Table 10. APIS 2016-2018 Averaged Annual Mean Background Concentrations

Grid Reference	Pollutant	Annual Mean Concentration / Deposition Rate	Air Quality Critical Level / Critical Load
TQ81777261	NOx	19.45 µg/m^3	30 µg/m^3
TQ81777261	N Deposition	12.32 kg N/ha/year	Pioneer, low-mid, mid-upper saltmarshes: 20 - 30 Kg N/ha/year

4.4.2 Background concentrations of NO_X and N deposition are currently within the relevant critical level and critical load.

4.5 Local Air Quality Monitoring

4.5.1 Whilst Medway Council monitor air quality at two automatic monitoring sites, located in Chatham (urban centre) and Rochester Stoke (rural). Medway Council also monitors annual mean concentrations of NO_2 using passive diffusion tubes at 38 sites in their administrative area. The closest monitoring location to the Proposed Development is the Rochester Stoke automatic monitoring site, 4.1km to the north-east. This station records concentrations of NO_2, PM_{10} and $PM_{2.5}$. The measured annual mean concentrations for pollutants in the past five years are presented in Table 11. These are well below the respective objectives for NO_2, PM_{10} and $PM_{2.5}$.

Table 11. Rochester Stoke Monitor Measured Annual Mean Concentrations

Pollutant	Objective	2014	2015	2016	2017	2018
NO_2	40	14.1	13.0	13.3	14.7	13.0
PM_{10}	40	17.6	18.5	19.1	21.6	23.7
$PM_{2.5}$	25	15	8.9	11.3	9.7	10.1

4.5.2 There is also a diffusion tube measurement site co-located at Rochester Stoke. The measured 2018 annual mean NO_2 concentration was 13.1 µg/m^3, which is below the corresponding air quality objective.

4.5.3 The nearest diffusion tube monitoring site to the Proposed Development is at 24 Pier Road, approximately 4.6km from the Site. The annual mean NO_2 concentration in 2018 was 27.9 µg/m^3, which is below the corresponding air quality objective.

4.5.4 The locations of Medway Council monitoring sites are presented in Figure ***1***. The local monitoring that was taken into consideration for the construction phase vehicle emission assessment can be seen below in Table 12.

Table 12. Local Air Quality Monitoring

ID	Within AQMA?	Annual Mean NO_2 Concentration (µg/m^3) Bias Adjusted and Annualised				
		2014	2015	2016	2017	2018
DT22	Y	-	31.0	29.0	31.0	28.0
DT24	Y	-	**52.0**	**50.9**	**50.8**	**47.4**
DT32	Y	-	-	-	**47.5**	**46.3**
DT33	Y	-	-	-	**43.5**	**41.6**

Exceedances of the national AQO for NO_2 are marked in bold.

Figure 1. Medway Council Air Quality Monitoring Sites

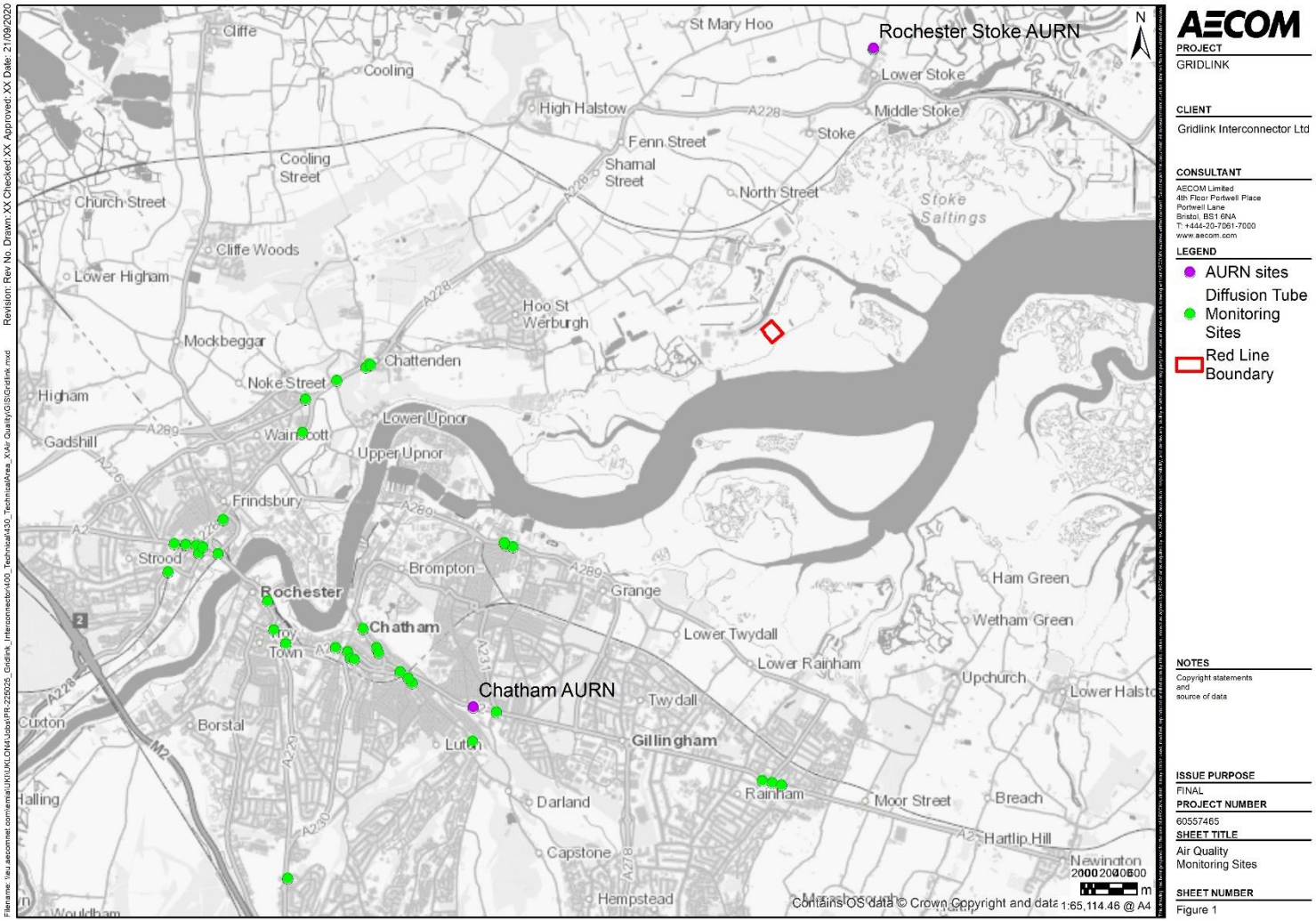

Figure 2. NO_2 Levels around Four Elms Hill

AECOM

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Project Title:

GRIDLINK

Client:

GridLink Interconnector Ltd

AECOM Internal Project No: 60557465

Drawing Title:
Figure 2: NO_2 Levels Around the intersected designated AQMAs

LEGEND

Medway Council Monitoring 2018 NO_2 [µg/m³]

- < 36.00
- 36.00 to 40.49
- 40.49 to 44.00
- 44.00 to 48.00
- > 48.00
- UK AQMAs

Scale at A3: 1:30,227

Drawing No:			Rev:
FIGURE 2			0
Drawn:	**Chk'd:**	**App'd:**	**Date:**
DE	MC	MC	11/06/2020

5. Assessment of Effects

5.1 Effects During Construction

5.1.1 Although there are no human receptors located within 350m of the Proposed Development, there is an ecological receptor, Medway Estuary and Marshes (SSSI, SPA and Ramsar site), within 50m of the Proposed Development. As a result, an assessment is required in accordance with the IAQM guidance (Ref 24).

5.1.2 The potential impacts are considered at the identified receptors using a risk-based approach. The potential identified effects are:

- Effects on amenity and property including changes to the rate of deposition of particulate matter onto glossy surface and other property; and
- Likely changes in 24-hour mean concentrations that might increase the risk of exposure to PM_{10} at levels that could exceed the 24-hour air quality objective.

Potential Construction Activity Effects

5.1.3 The early phases of the works will likely involve site clearance works, excavations and earthworks, and temporary stockpiling of potentially dusty materials. These activities are likely to primary sources of dust during the early phases. The potential for stockpiles of materials to generate dust is dependent on the nature of the material; earth is soft and friable, but hardcore has a lower moisture content. Consequently, both pose a potential source of dust that may impact the ecological receptors.

5.1.4 Since there are no sensitive receptors such as residential properties, schools, office and car parks within 350m of the Site boundary, the effects of dust soiling and human health impacts from the early phase of the works are likely to be negligible.

5.1.5 During the middle phase where buildings are erected, the principal sources of dust are from the cutting and grinding of materials, and the movement of construction related road vehicles. Dust emissions from construction give rise to elevated dust deposition and PM_{10} concentrations, however these effects are generally short-lived episodes over a few hours or days. This poses a potential source of dust that may impact the ecological receptors.

5.1.6 The movement of construction vehicles could lead to a trackout of materials, generating dust emissions. However, although the majority of surfaces on the construction site are likely to be unpaved, the site traffic will travel for approximately 1.9km on the internal paved site roads of the former Kingsnorth Power Station before entry onto the public highway (Eschol Road, that links to the A289 and A228). As trackout related impacts potentially occur up to 500m from the Site, where sensitive receptors are presented within 50m of roadside, potential impacts of dust and PM_{10} to human receptors due to trackout are negligible.

5.1.7 Once the majority of building and infrastructure is complete, the principal sources of dust during these latter stages will be the storage, handling and movement of materials. This poses a potential source of dust that may impact the ecological receptors.

5.1.8 Appendix A presents the Air Quality and Dust Risk Assessment methodology and Appendix C presents the Air Quality and Dust Risk Assessment. The assessment has been carried out in line with the IAQM's Guidance on the assessment of dust from demolition and construction.

5.1.9 Following the IAQM guidance, the dust risk for the construction phase of the Proposed Development is deemed a Medium risk for ecological receptors due to the location of the Medway Estuary and Marshes SSSI, SPA and Ramsar site at 50 m from the Site boundary.

5.1.10 The dust risk for the construction phase of the Proposed Development is deemed as negligible for impacts to human health and dust soiling at human receptors due to the distance of 1.3km to the nearest residential receptor and that construction traffic will travel along 1.9km of paved internal site roads before reaching the public roads.

5.1.11 A summary with the dust risk for each activity to define the proportionate level of mitigation according to the IAQM Significance Criteria is presented below. No risk level is presented for demolition, as there will not be any demolition undertaken as part of the proposals.

Table 13. Summary Table of Dust Risk to Define Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	-	Not applicable	Not applicable	Negligible
Human Health	-	Not applicable	Not applicable	Negligible
Ecological	-	Medium Risk	Medium Risk	Medium Risk

5.1.12 By implementing the appropriate mitigation measures (see Appendix D), as set out in the IAQM guidance, the ecological impacts of the construction phase will be reduced to a negligible level.

Potential Construction Traffic Effects

5.1.13 The predicted annual mean concentrations of NO_2 at the selected sensitive receptors in the four assessed scenarios are listed in Table 14 and Table 15.

Table 14. Predicted Annual Mean NO_2 Concentrations (µg/m^3)

Receptor	Base 2018	Future Base 2023	Without Development 2023 (DM)	With Development 2023 (DS)
DT22	**42.1**	27.0	29.2	29.4
DT32	**52.5**	33.7	36.5	36.6
DT24	**55.1**	35.4	38.3	38.5
DT33	**55.5**	35.7	38.6	38.8

Exceedances of the AQO are indicated in bold

Table 15. Predicted Changes in Annual Mean NO_2 Concentrations between Scenarios (µg/m^3)

Receptor	Change between 2023 With Development and Without	
DT22	0.1	Negligible
DT32	0.2	Negligible
DT24	0.2	Negligible
DT33	0.2	Negligible

5.1.14 The predicted changes in annual mean concentrations of NO_2 at the selected sensitive receptors are negligible in accordance with IAQM Guidance.

5.2 Effects Once the Proposed Development is Completed and Occupied

5.2.1 The Proposed Development will generate very few car trips associated with the Site. These are anticipated to be below the IAQM screening threshold for assessment. The Proposed Development will therefore be unlikely to give rise to any significant changes in traffic volumes or speed. It is concluded that the impact on air quality of the operational phase of the Proposed Development is likely to be not significant.

5.2.2 The Proposed Development will not incorporate any power generation or combustion processes or diesel-fired or gas-fired boilers for hot water heating and space heating. However, a diesel backup generator will be installed for use as an emergency energy supply. The operation hours are anticipated to be less than 50 hours per year for testing and maintenance. As a consequence of the infrequent use, no significant effects from the emissions of the backup generator are considered likely, and a detailed assessment of the emissions has been scoped out.

6. Mitigation

6.1 Mitigation Measures for Construction Phase

6.1.1 The main mitigation measures recommended to be implemented to reduce air quality impacts from construction phase activities are set out in Appendix D.

6.1.2 No additional mitigation measures are considered to be required for the management of construction traffic emissions.

6.2 Mitigation Measures for Operational Phase

6.2.1 It is recommended that operation of the diesel backup generator be minimised to the extent reasonably possible (nominal 50 hour per year, allowing for testing and maintenance only).

6.2.2 No additional mitigation measures are considered to be required.

7. Conclusions

7.0.1 In general, construction activities have the potential to generate fugitive dust emissions as a result of construction, earthworks and trackout of material.

7.0.2 For the Proposed Development, emissions of particulate matter generated by these activities will be controlled by incorporating mitigation measures into on-site management practices such that impacts to local air quality are anticipated to be temporary, of short- to medium-term duration, and of negligible to minor adverse significance. The impact of fugitive emissions of dust is considered to be not significant at relevant sensitive receptors.

7.0.3 The impact of construction phase traffic emissions is negligible.

7.0.4 The assessment demonstrated that the impact from operational traffic and point sources of emissions on air quality are considered to be negligible.

7.0.5 Overall the construction and operational air quality effects of the Proposed Development are not considered to be significant.

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Appendix A Medway Air Quality Planning – Screening

The screening assessment was undertaken in according to the Medway Air Quality Planning Guidance 2016 to identify the need of air quality assessment and information required.

Following the Guidance's Checklist 1, as below Table A-1, it is considered that the Proposed Development is not likely to have a significant effect on local air quality and therefore, do not require further assessment.

Table A-1 Checklist 1: Screening Checklist

Screening Checklist	Yes	No	Recommendations	Justification
Q1. Is the proposed development categorised as a major size development*?			If yes, go to Checklist 2. If no, go to Q2.	No – The proposed land use is sui generis and does not met the criteria for major sized category.
Q2. Is the proposed development within, or close to an AQMA **?			If yes, go to Checklist 2. If no, no mitigation is required.	No – the Proposed Development is not within or close to an AQMA.

*Major sized category defined by Department for Transport indicative thresholds for transport assessment (see Guidance's Appendix 2)

** AQMA location is available at www.thanet.gov.uk/airquality or Guidance's Appendix 1.

Appendix B IAQM Construction Dust Risk Assessment Methodology

Screening (Step 1)

As 'ecological receptors' were identified within 50m of the boundary of the site and within 50m of the route(s) to be used by construction vehicles, a detailed risk assessment was undertaken. Human receptors are included for comparison, although the nearest residential property is 1.3km away and the public road is 1.9km away (the internal site road from the construction site to the public highway is paved).

Dust Emission (Step 2A)

The potential dust emission magnitude for different activities have been defined based on the criteria listed in Table B-1.

Table B-1 Potential Dust Emission Magnitude Criteria

Stage	Description	Large	Medium	Small
Demolition	Definitions for demolition are:	Total building volume >50,000 m^3 Potentially dusty construction material (e.g. concrete) On-site crushing and screening Demolition activities >20 m above ground level	Total building volume 20,000 m^3 – 50,000 m^3 Potentially dusty construction material (e.g. concrete) Demolition activities 10 – 20 m above ground level	Total building volume <20,000 m^3 Construction material with low potential for dust release (e.g. metal cladding or timber) Demolition activities <10 m above ground, demolition during wetter months
Earthworks	Earthworks will primarily involve excavating material, haulage, tipping, and stockpiling. This may also involve levelling the site and landscaping.	Total site area >10,000 m^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 2,500 m^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 <2,500 m^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	The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials, and duration of build.	Total building volume >100,000 m^3 On-site concrete batching and sandblasting	Total building volume 25,000 m^3 – 100,000 m^3 Potentially dusty construction material (e.g. concrete) On-site concrete batching	Total building volume <25,000 m^3 Construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology, and duration. Only receptors within 50 m of the routes used by vehicles on the public	>50 HDV (>3.5 tonnes) outward movements in any one day Potentially dusty surface material (e.g. high clay content) Unpaved road length >100 m	10-50 HDV (>3.5 tonnes) outward movements in any one day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50 m – 100 m	<10 HDV (3.5 tonnes) outward movements in any one day Surface material with low potential for dust release Unpaved road length <50 m

highway and up to 500 m from the site entrances are considered to be at risk from the effects of dust.

Sensitivity of the Area (Step 2B)

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

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of 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.

Table B-2 provides guidance on the sensitivity of different types of receptor.

Table B-2 Sensitivities of People to Dust Soiling Effects, Health Effects of PM10, and Sensitivities of Receptors to Ecological Effects

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics, or value of their property would be diminished by soiling The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land Indicative examples include dwellings, museums, and other culturally important collections, medium, and long-term car parks, and car showrooms	Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect a to enjoy the same level of amenity as in their home The appearance, aesthetics, or value of their property could be diminished by soiling The people or property wouldn't reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land Indicative examples include parks and places of work	The enjoyment of amenity would not reasonably be expected; or Property would not reasonably be expected a to be diminished in appearance, aesthetics, or value by soiling There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short-term car parks, and roads
Sensitivities of People to the Health Effects of PM_{10}	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment	Locations where the people exposed are workers d, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks, and shopping streets
Sensitivities of Receptors to Ecological Effects	Locations with an international or National	Locations where there is a particularly important plant	Locations with a local designation where the

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
	designation and the designated features may be affected by dust soiling Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings	species, where its dust sensitivity is uncertain or unknown Locations with a National designation where the features may be affected by dust deposition Indicative example is a SSSI with dust sensitive features	features may be affected by dust deposition. Indicative example is a local Nature Reserve with dust sensitive features

Full details of the sensitivities of receptors are provided in the Supplementary Planning Guidance.

Table B-3, Table B-4, and Table B-5 show how the sensitivity of the area has been determined for dust soiling, human health, and ecosystem impacts respectively.

These tables take account of a number of factors which may influence the sensitivity of the area. The highest level of sensitivity from each Table has been recorded.

Table B-3 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B-4 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors [d]	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors [d]	Distance from the Source (m)				
			<20	<50	<100	<200	<350
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table B-5 Sensitivity of the Area to Ecological Impact

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The highest level of sensitivity from each Table has been recorded. Professional judgement has been used to determine alternative sensitivity categories with consideration of additional factors, such as any pre-existing screening between the source and the receptors, the season during which the works will take place, and duration of the potential impact.

Risk of Impact Definition

The dust emission magnitude (Step 2A) was combined with the sensitivity of the area (Step 2B) to determine the risk of impact with no mitigation applied. Table B-6 – Table B-9 provide the method of assigning the level of risk of each activity and used to determine the level of site-specific mitigation.

Table B-6 Risk of Impact – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	High risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Table B-7 Risk of Impact – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table B-8 Risk of Impact – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table B-9 Risk of Impact – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Appendix C Construction Dust Risk Assessment

Table C-1. Air Quality and Dust Risk Assessment

STEP 1 – SCREENING

1a.	Is a human receptor site within:	
	50m of site boundary	No
	50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)	No
1b.	Is an ecological receptor site within:	
	50m of the site boundary	Yes
	50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)	Yes
IF ANSWERS TO 1A OR 1B ARE 'YES' COMPLETE 1C AND COMPLETE THE ASSESSMENT		
1c.	*Provide a description of the proposed demolition and construction activities, their location and duration and any phasing of the development, including:* • *The proximity and number of receptors;* • *The specific sensitivity of the receptor(s), e.g. a primary school or hospital;* • *The duration for which the sources of dust emissions may be close to the sensitive receptors; and* • *In the case of PM_{10} the local background concentration.* The works will comprise of earthworks, the construction of new buildings and trackout of materials. The greatest potential for dust effects is likely to occur during the construction. The Site is located in a rural area and consequently there are no residential or human health receptors in proximity to the Site (350m of Site) that may be affected by the works. However, an ecological receptor, medium sensitivity receptors, are within 50m of the Site.	

STEP 2 – ASSESS THE RISK OF DUST IMPACTS

STEP 2A – Define the Potential Dust Emission Magnitude

EARTHWORKS PHASE

2a(i)	Is the scale of the earthworks:	
	Large • Total site area >10,000m^2; or • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size); or • >10 heavy earth moving vehicles active at any one time on-site; or • Formation of stockpile enclosures >8m in height; or • Total material moved >100,000 tonnes (where known).	No
	Medium • Total site area 2,500m^2-10,000m^2; or • Moderately dusty soil type (e.g. silt); or • 5-10 heavy earth moving vehicles active at any one time on-site; or • Formation of stockpile enclosures 4-8m in height; or • Total material moved 20,000-100,000 tonnes (where known).	Yes

	Small • Total site area <2,500m^2; or • Soil type with large grain size (e.g. sand); or • <5 heavy earth moving vehicles active at any one time on-site; or • Formation of stockpile enclosures <4min height; or • Total material moved <10,000 tonnes (where known), or earthworks during wetter months.	Yes
CONSTRUCTION PHASE		
2a(ii)	Is the scale of the works:	
	Large • Total building volume >100,000m^3; or • Piling; or • On-site concrete batching; or • Sandblasting.	No
	Medium • Total building volume 25,000m^3-100,000m^3; or • Potentially dusty construction material (e.g. concrete); or • On-site concrete batching.	Yes
	Small • Total building volume <25,000m^4; or • Construction material with low potential for dust release (e.g. metal cladding or timber).	No
TRACKOUT		
2a(iii)	Only receptors within 50m of the route(s) used by vehicles on the public highway and up to 500m from the site entrance(s) are considered to be at risk from the effects of dust. Will the trackout be:	
	Large • >50 HDV (>3,5t) outward movements in one day; • Potentially dusty surface material (e.g. high clay/silt content); or • Unpaved road length >100m.	No
	Medium • 10-50 HDV (>3,5t) outward movements in any one day; • Moderately dusty surface material (e.g. high clay content); or • Unpaved road length 50-100m (high clay content).	Yes
	Small • <10 HDV (>3.5t) trips in any one day; • Surface material with low potential for dust release; or • Unpaved road length <50m.	No
STEP 2B – Define the Sensitivity of the Area		
Define the Receptor Sensitivity		
2b(i)	Sensitivity of People to Dust Soiling Effects (Construction and Earthwork)	
	Is the location a:	
	• High sensitivity receptor	No
	• Medium sensitivity receptor	No
	• Low sensitivity receptor	No
2b(i)	Sensitivity of People to Dust Soiling Effects (Trackout)	
	• High sensitivity receptor	No.
2b(ii)	Sensitivity of People to Health Effects of PM_{10}	
	Is the location a:	
	• High sensitivity receptor	No

	• Medium sensitivity receptor	No
	• Low sensitivity receptor	No
	Annual Mean PM_{10} Concentration (2018)	<24 µg/m^3
2b(iii)	Sensitivity of Receptors to Ecological Effects – As identified there are nationally or European designated ecological receptors within 50m of the Site boundary, within 50m from a route used by construction vehicles on the public highway or up to 500m from the Site entrance. Therefore, the risk of dust effects at a nationally or European designated ecological receptor site is considered as Medium.	

Estimate the number of receptors and the distance:

There are estimated to be one ecological receptor within 50m of the site.

There are estimated to be no human receptors within 50m of the route used by construction vehicles on the public highway within 500 m of the Site.

Combined Sensitivity of the area for Dust Soiling Effects = High

Combined Sensitivity of the area to Human Health Impacts = Low

Combined Sensitivity of the area to Ecological Impacts = Medium

Summary Appraisal and Conclusion of Site-Specific Dust Risk

Table C-2. Summary of Dust Emission Magnitude for the Site (Step 2a)

Activity	*Dust Emission Magnitude*
Demolition	-
Earthworks	Medium
Construction	Medium
Trackout	Medium to High

Table C-3. Summary of Site Sensitivity

Receptor Sensitivity	*Sensitivity of the Surrounding Area*			
	Demolition	*Earthworks*	*Construction*	*Trackout*
Dust Soiling	-	Not applicable	Not applicable	Not applicable
Human Health	-	Not applicable	Not applicable	Not applicable
Ecological	-	Medium	Medium	Medium

Table C-4. Summary of Site-Specific Dust Risk

Potential Risk	*Risk*			
	Demolition	*Earthworks*	*Construction*	*Trackout*
Dust Soiling	-	Not applicable	Not applicable	Not applicable
Human Health	-	Not applicable	Not applicable	Not applicable
Ecological	-	Medium Risk	Medium Risk	Medium Risk

Appendix D Construction Phase Mitigation Measures

Summary of Mitigation Measures for the Site, as set out in IAQM Guidance on the Assessment of Dust from Demolition and Construction

Key:

- XX = Highly Recommended
- X = Desirable
- **Bold** for determined risk level
- Green are measures committed to by the Applicant

Table D-1 Summary of Site-Specific Dust Risk

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Site management			
Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site.		**XX**	XX
Develop a DMP.		**XX**	XX
Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	XX	**XX**	XX
Display the head or regional office contact information.	XX	**XX**	XX
Record and respond to all dust and air quality pollutant emissions complaints.	XX	**XX**	XX
Make a complaint-log available to the local authority when asked.	XX	**XX**	XX
Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.	XX	**XX**	XX
Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.	XX	**XX**	XX
Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.	XX	**XX**	XX
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.			XX
Preparing and maintaining the site			
Plan site layout: machinery and dust causing activities should be located away from receptors.	**XX**	**XX**	XX
Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on-site.	**XX**	**XX**	XX
Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	**X**	**XX**	XX

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.		**X**	X
Avoid site runoff of water or mud.	**XX**	**XX**	XX
Keep site fencing, barriers and scaffolding clean using wet methods.	**X**	**XX**	XX
Remove materials from site as soon as possible.	**X**	**XX**	XX
Cover, seed or fence stockpiles to prevent wind whipping.		**XX**	XX
Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.		**XX**	XX
Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.			X
Agree monitoring locations with the local authority.		**XX**	XX
Where possible, commence baseline monitoring at least three months before phase begins.		**XX**	XX
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.			XX
Operating vehicle/machinery and sustainable travel			
Ensure all vehicles switch off engines when stationary – no idling vehicles.	XX	**XX**	XX
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.	XX	**XX**	XX
Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	X	X	XX
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.		**XX**	XX
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	XX	**XX**	XX
Operations			
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	XX	**XX**	XX
Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).	XX	**XX**	XX
Use enclosed chutes, conveyors and covered skips.	XX	**XX**	XX
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	XX	**XX**	XX
Ensure equipment is readily available on-site to clean any dry spillages; and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.		**XX**	XX
Waste management			
Reuse and recycle waste to reduce dust from waste materials.	XX	**XX**	XX
Avoid bonfires and burning of waste materials.	XX	**XX**	XX
MEASURES SPECIFIC TO EARTHWORKS			

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces.		**X**	XX
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil.		**X**	XX
Only remove secure covers in small areas during work and not all at once.		**X**	XX
MEASURES SPECIFIC TO CONSTRUCTION			
Avoid scabbling (roughening of concrete surfaces) if possible.	X	**X**	XX
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	X	**XX**	XX
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.		**X**	XX
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.		**X**	X
MEASURES SPECIFIC TO TRACKOUT			
Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	X	**XX**	XX
Avoid dry sweeping of large areas.	X	**XX**	XX
Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	X	**XX**	XX
Record all inspections of haul routes and any subsequent action in a site log book.		**XX**	XX
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.		**XX**	XX
Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;		**XX**	XX
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	X	**XX**	XX
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.		**XX**	XX
Access gates to be located at least 10m from receptors where possible.		**XX**	XX
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.		**X**	XX

Appendix E Assessment Verification

The tubes located within the section of the expected HGV route for the construction related traffic which intersects the Medway Council's Four Elms Hill AQMA were vetted for suitability for use in the emission assessment's verification. The results of this analysis are presented in Table E-1. The model was therefore verified by comparison with the NO_2 diffusion tubes.

These monitoring locations were modelled and processed by converting raw Road NO_X contribution outputs to total NO_2 concentrations using the NO_X to NO_2 Calculator, with the appropriate Defra background concentrations added. As shown in Table E-2, the model over-estimated concentrations when compared to the monitoring data of DT22 and under-estimated for tubes DT32, DT24 and DT33. The results for NO_2 were adjusted in accordance with the procedure detailed in technical guidance LAQM.TG(16).

Table E-1. Analysis of Suitability of Local Monitors for the Assessment Verification

Site ID	Suitable	Monitor Type	Monitored Total NO_2 2018 [µg/m^3]	Estimated Total NO_2 2018 [µg/m^3]	% Difference
DT22	Y	Diffusion Tube	28.0	28.3	0.9
DT32	Y	Diffusion Tube	46.3	30.7	-33.7
DT24	Y	Diffusion Tube	47.4	31.3	-34.0
DT33	Y	Diffusion Tube	41.6	31.4	-24.5

Adjustment is performed on Road NO_X contributions. This is the raw model output, but must be calculated from the monitored total concentration using the NO_X to NO_2 Calculator. Road NO_X contributions are shown in Table E-2.

Table E-2. Comparison of Road NO_X [µg/m^3] Concentrations, Pre-Adjustment

Monitor	Monitored Road NO_X	Modelled Road NO_X	% Difference
DT22	20.5	21.1	3.0%
DT32	63.0	26.3	-58.0%
DT24	65.8	27.6	-58.0%
DT33	51.3	27.8	-46.0%

The adjustment factor for each site was calculated from a linear regression analysis of NO_X [monitored, traffic contribution] / NO_X [modelled, traffic contribution]. The adjustment factor was found to be 2.00. The application of this factor resulted in better agreement between modelled and monitored concentrations, as shown in Table E-2.

The comparison of the post adjustment estimated and monitored NO_2 levels are presented in Table E-3.

Table E-3. Comparison of Modelled and Monitored Total NO_2 [µg/m^3] Concentrations, Post Adjustment

Monitor	Monitor Type	Monitored Total NO_2	Modelled Total NO_2	% Difference
DT22	Diffusion Tube	28.0	37.7	34.8
DT32	Diffusion Tube	46.3	42.1	-9.1
DT24	Diffusion Tube	47.4	43.2	-8.9
DT33	Diffusion Tube	41.6	43.3	4.1

Appendix F Sensitivity Testing

As presented in Tables F-1, F-2 and F-3, 3 further scenarios have been assessed in order to define the worst-case scenario for the potential construction phase related vehicle emissions within Medway Council's Four Elms Hill AQMA. The results of each respective scenario can be found below, with the exceedances of the AQO being noted with a bold font. However, it should be noted that these cases are highly unlikely to occur and do not represent the anticipated impacts from the Proposed Development. They simply represent the maximum potential worst-case scenario and are provided as a proof that the most extreme detrimental impacts related to the Proposed Development would still translate to negligible effects (change <0.4 µg/m^3).

Table F-1. Sensitivity Scenario 1

Receptor ID	X	Y	Base 2018	Future Base 2023	DM 2023	DS 2023	Change [µg/m^3]	Change [%]
DT22	575488	171616	37.7	37.7	39.2	39.3	0.1	0.3
DT32	575903	171802	**42.1**	**42.1**	**43.8**	**44.0**	0.1	0.3
DT24	575948	171847	**43.2**	**43.2**	**45.0**	**45.1**	0.1	0.3
DT33	575971	171833	**43.3**	**43.3**	**45.1**	**45.3**	0.1	0.3

Table F-2. Sensitivity Scenario 2

Receptor ID	X	Y	Base 2018	Future Base 2023	DM 2023	DS 2023	Change [µg/m^3]	Change [%]
DT22	575488	171616	**40.5**	30.1	31.2	31.3	0.1	0.2
DT32	575903	171802	**41.3**	30.7	31.9	32.0	0.1	0.3
DT24	575948	171847	**41.4**	30.7	32.0	32.0	0.1	0.2
DT33	575971	171833	**41.8**	31.1	32.3	32.4	0.1	0.3

Table F-3. Sensitivity Scenario 3

Receptor ID	X	Y	Base 2018	Future Base 2023	DM 2023	DS 2023	Change [µg/m^3]	Change [%]
DT22	575488	171616	**40.5**	**40.5**	**42.1**	**42.2**	0.1	0.3
DT32	575903	171802	**41.3**	**41.3**	**43.0**	**43.1**	0.1	0.3
DT24	575948	171847	**41.4**	**41.4**	**43.1**	**43.2**	0.1	0.3
DT33	575971	171833	**41.8**	**41.8**	**43.6**	**43.7**	0.1	0.3

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