AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 1 – Chapter 23 Air Quality

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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23. AIR QUALITY

23.1. SCOPE OF THE ASSESSMENT

23.1.1. INTRODUCTION

23.1.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development upon air quality in accordance with Advice Note 6 from the Planning Inspectorate (Planning Inspectorate, 2016) ('PINS'). The Proposed Development that forms the basis of this assessment is described in Chapter 3 (Description of the Proposed Development) of the Environmental Statement ('ES') Volume 1 (APP-118).

23.1.1.2. The air quality assessment considers the potential impacts associated with the following specific activities:

- Construction works at the Converter Station Area, including all earthworks and the works to construct the Converter Station and all associated equipment and the construction of the Access Road;
- Horizontal Directional Drilling ('HDD'), trenching and ducting for the Onshore Cables, which will emit fugitive dust and exhaust gases from on-site vehicles and plant, and on-road vehicles for the entire Proposed Development;
- The use of on-road construction vehicles which are a source of exhaust gas emissions;
- The effects of the traffic management proposals in connection with the construction of the Onshore Cables, which will cause the redistribution of general traffic;
- Combustion emissions from diesel fuelled local power generation plant required in connection with HDD operations for drilling, mud recycling and pumping along the Onshore Cable Route; and
- Combustion emissions from backup diesel fuelled local power generation plant in connection with the operation of the Converter Station and the Optical Regeneration Station ('ORS').

23.1.1.3. This chapter assesses the impacts arising from the Onshore Components of the Proposed Development. References to the Order Limits and the Site in this chapter is in relation to the Order Limits and the Site as applicable to the Onshore Components as illustrated in Figure 3.9 of the ES Volume 2 (APP-154).

23.1.2. STUDY AREA

23.1.2.1. The study area and identified sensitive receptors with respect to air quality in relation to each Section of the Proposed Development is shown in Figure 23.1 of the ES Volume 2 (APP-323 Rev02). A description of the potential impact within each Onshore Cable Corridor Section is provided below following guidance presented in Section 23.2.4 Guidance. Constraints to air quality have been identified within 350 m of the Order Limits in accordance with the Institute of Air Quality Management ('IAQM') Construction Dust Risk Assessment guidance (Institute of Air Quality Managment, 2016) described in Section 23.2.4 Guidance.

Section 1 – Lovedean (Converter Station Area)

23.1.2.2. Section 1 is characterised by its location in proximity to the South Downs National Park ('SDNP') as shown within Figure 23.1. Within 350 m of the Order Limits are scattered human receptors, the western edge of Lovedean and four areas of designated ancient woodland.

Section 2 – Anmore

23.1.2.3. Section 2 passes through an area of arable agricultural land. There are a small number of human receptors in this area, with the majority of receptors being present within 350 m of the southern extents of this section in the Anmore area.

Section 3 – Denmead/Kings Pond Meadow

23.1.2.4. Section 3 passes through Anmore and Denmead where substantial numbers of human receptors are present within 350 m of the Order Limits.

Section 4 – Hambledon Road to Farlington Avenue

23.1.2.5. Section 4 is one of the longest sections of the route, and passes through the residential settlements of Stakes, Waterlooville, Purbrook Heath. Substantial numbers of human receptors are within 350 m of the Order Limits along with Waterloo School, Mill Hill Primary School, and Purbrook Junior and Infant School.

Section 5 – Farlington

23.1.2.6. Section 5 passes through the residential areas of Drayton and Farlington. Substantial numbers of human receptors are present within 350 m of the Order Limits, as are Solent Infant School and Solent Junior School.

Section 6 – Zetland Field and Sainsbury's Car Park

23.1.2.7. This Section is characterised by residential areas to the east of the A2030 and a commercial area to the west of the A2030. Also present are the Alexandra Rose Nursing Home and Springfield School.

Section 7 – Farlington Junction to Airport Service Road

23.1.2.8. Section 7 crosses under the A27 (underground works) to the west of the junction with the A2030 and passes directly underneath the ecological receptors of Langstone Harbour Site of Special Scientific Interest ('SSSI'), Chichester and Langstone Harbours Special Protection Area ('SPA') and Wetland of International Importance ('RAMSAR'), and the Solent Marine Special Area of Conservation ('SAC'). It also passes within 350 m of the Farlington Marshes Local Nature Reserve ('LNR').

Section 8 – Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way

23.1.2.9. Section 8 runs along Eastern Road, directly adjacent to the ecological receptors of Langstone Harbour SSSI, Chichester and Langstone Harbours SPA and RAMSAR, and the Solent Marine SAC. Within 350 m of the Order Limits are a large number of human receptors along with St. Mary's Hospital, St. James Hospital, Miltoncross Academy, Portsmouth College, and the University of Portsmouth Langstone Student Village. This section also includes the option to either trench along the A2030 Milton Road that is within Portsmouth Air Quality Management Area ('AQMA') No.9 or HDD under Milton Common.

Section 9 – Moorings Way to Bransbury Road

23.1.2.10. This Section passes through a densely inhabited area of the City of Portsmouth, with a large number of human receptors within 350 m of the Order Limits in addition to:

- Wimborne Junior School;
- Wimborne Infant School;
- Meon Junior School;
- Meon Infant School;
- The Harbour School;
- University of Portsmouth/Langstone Student Village;
- St James Hospital;
- Moorings Way Infant School;
- The Harbour School;
- Miltoncross Academy;
- Meon Junior School;
- Mary Rose Academy; and
- Milton Park Primary School.

Section 10 – Eastney (Landfall)

23.1.2.11. Section 10 passes through residential areas and coastal leisure areas. The Solent Marine SAC ecological receptor is within 50 m of the Order Limits.

23.1.2.12. Table 23.1 provides a summary of the potential impacts anticipated at each of the Onshore Cable Corridor Sections.

Table 23.1 - Potential Construction Air Quality Impacts Per Onshore Cable Corridor Section

Impact	1 – Lovedean (Converter Station Area)	2 – Anmore	3 – Denmead/Kings Pond Meadow	4 – Hambledon Road to Farlington Avenue	5 – Farlington	6 – Zetland Field Sainsbury's Car Park	7 – Farlington Junction to Airport Service Road	8 – Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way	9 – Moorings Way to Bransbury Road	10 – Eastney (Landfall)
Construction Dust Nuisance **Impacts from generated construction dust from construction, earthworks and vehicle trackout impacting on air quality, human health and amenity and ecological receptors.**	●	●	●	●	●	●	●	●	●	●
Construction Vehicle Emissions **Impacts on air quality from the emissions of construction vehicles on the public highway**	●	●	●	●	●	●	●	●	●	●
Diverted Traffic Emissions **Air quality impacts from emissions resulting from diverted, slow moving and queueing traffic on the public highway**	●	●	●	●	●	●	●	●	●	●
Local Power Generation (HDD Drilling) **Impacts on air quality and human health resulting from the emissions of plant used for local power generation for drilling equipment**			●			●	●	●	●	●
Operational Back-up Power Generation **Impacts on air quality and human health resulting from the emissions of plant used for emergency back-up power generation**	●									●

23.2. LEGISLATION, POLICY AND GUIDANCE

23.2.1.1. This assessment has considered the current legislation, policy and guidance relevant to air quality. These are listed below.

23.2.2. LEGISLATION

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

23.2.2.1. The Directive (European Parliament, Council of the European Union, 2008) consolidates and simplifies ambient air quality legislation, including setting out the limit values for selected pollutants and the agreed obligations for national governments with regards to improving and maintaining the quality of air. The objective of ambient air quality legislation is to improve air quality by reducing the impact of air pollution on human health and ecosystems.

The Air Quality Standards Regulations 2010

23.2.2.2. The Air Quality Standards Regulations 2010 (HM Government, 2010) and subsequent amendments transpose EU Directive 2008/50/EC into English law. The Regulations set out the requirements for exposure reduction of $PM_{2.5}$ within the general population and the requirements for action to be taken when levels of air pollutants persistently exceed the limit values.

Environment Act 1995

23.2.2.3. The Environment Act 1995 (HM Government, 1995) requires the UK Government and Devolved Administrations to produce the national Air Quality Strategy for England, Scotland, Wales and Northern Ireland ('AQS') (Department for Environment, Food and Rural Affairs, 2007) containing standards, objectives and measures for improving air quality, and to keep these policies under review. The objectives and standards applied in this assessment are shown in Table 23.2.

Table 23.2 – National Air Quality Limits and Objective Values

Pollutant	Objective/ Target Value*	Measure as	Date to be achieved by and maintained thereafter		
			AQS	Regulations	2008/50/EC
Particulate matter (mean aerodynamic diameter ≤10µm) (PM_{10})	50 µg/m^3 Not to be exceeded more than 35 times a year	24-hour mean	31-Dec-04	31-Dec-04	1-Jan-05

Pollutant	Objective/ Target Value*	Measure as	Date to be achieved by and maintained thereafter		
			AQS	Regulations	2008/50/EC
	40 µg/m^3	Annual mean	31-Dec-04	31-Dec-04	1-Jan-05
Particulate matter (mean aerodynamic diameter ≤2.5µm) ($PM_{2.5}$)*	Stage 1: 25 µg/m^3	Annual Mean	31-Dec-20	1-Jan-15	1-Jan-10
	Stage 2: 20 µg/m^3	Annual Mean	-	-	1-Jan-20
Nitrogen dioxide (NO_2)	200 µg/m^3 Not to be exceeded more than 18 times a year	1-hour mean	31-Dec-05	31-Dec-05	1-Jan-10
	40 µg/m^3	Annual mean	31-Dec-05	31-Dec-05	1-Jan-10
Nitrogen oxides (NO_X)	30 µg/m^3	Annual mean	31-Dec-00	31-Dec-00	19-Jul-01
Carbon monoxide (CO)	10 mg/m^3	Maximum daily running 8-hour mean	31-Dec-03	31-Dec-03	01-Jan-05
Benzene (C_6H_6)	16.25 µg/m^3	Running annual mean	31-Dec-03	-	-
	5 µg/m^3	Annual mean	31-Dec-10	31-Dec-10	01-Jan-10

23.2.2.4. The Environment Act also revised the original 1949 legislation for National Parks, setting two statutory purposes:

- Conserve and enhance the natural beauty, wildlife and cultural heritage; and
- Promote opportunities for the understanding and enjoyment of the special qualities of national parks by the public.

23.2.2.5. When National Parks carry out these purposes they also have a duty to seek to foster the economic and social well-being of local communities within the National Park.

Environmental Protection Act 1990

23.2.2.6. Fugitive emissions are controlled via the Environmental Protection Act 1990 ('EPA') (HM Government, 1990) as a statutory nuisance. The following relevant matters as identified as giving rise to statutory nuisances in accordance with section 79 of the EPA:

- Smoke emitted from premises so as to be prejudicial to health or a nuisance;
- Fumes or gases emitted from premises so as to be prejudicial to health or a nuisance;
- Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance; or
- Any accumulation or deposit which is prejudicial to health or a nuisance.

23.2.2.7. Statutory nuisance can be detected as a result of periodical inspection by the local authority as part of their statutory duty, or as a result of a complaint investigated by the local authority. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or reoccur, then it may serve an Abatement Notice requiring that the nuisance activity ceases, or that works to facilitate its abatement are untaken, and stipulate the time period in which this should be completed.

23.2.3. PLANNING POLICY

23.2.3.1. The following provides a summary of the relevant national planning policy.

National Policy

National Policy Statement

23.2.3.2. The Overarching National Policy Statement for Energy (EN-1) (Department for Energy and Climate Change, 2011) ("NPS") identifies at paragraph 5.2.1 that infrastructure development can have adverse effects on air quality as the construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside.

23.2.3.3. The NPS provides that where a project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of their ES an this should describe:

- any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;
- the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;
- existing air quality levels and the relative change in air quality from existing levels; and
- any potential eutrophication impacts.

23.2.3.4. With regard to decision making, the NPS identifies that the Infrastructure Planning Commission ('IPC') [now the Secretary of State 'SoS'] should generally give air quality considerations substantial weight where a project would lead to a deterioration in air quality in an area, or leads to a new area where air quality breaches any national air quality limits. Air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits. In the event that a project will lead to non-compliance with a statutory limit the IPC [now SoS] should refuse consent.

National Planning Policy Framework

23.2.3.5. The National Planning Policy Framework (Ministry of Housing, Communities & Local Government, 2019), whilst not containing policies specific to major energy projects to be consented via the Planning Act 2008, may still be of relevance to the determination of an application by the SoS.

23.2.3.6. The NPPF provides that planning policies and decisions should sustain and contribute towards compliance with the relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs and Clean Air Zones ('CAZ'), 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.

Clean Air Strategy 2019

23.2.3.7. The UK Government produced a Clean Air Strategy (Department for Environment, Food and Rural Affairs, 2019). The strategy set out the actions the government would take to help ensure the delivery of clean air to the relevant EU standards within the shortest possible timeframe. In the strategy the government committed to improving energy efficiency and shifting to cleaner power source s to reduce emissions of air pollution as well as carbon dioxide. This includes the phasing out fossil fuel power generation, in particular coal-fired power stations.

Local Policy

23.2.3.8. The following provides a summary of the relevant local planning requirements for each of the local authorities affected.

Portsmouth City Council

23.2.3.9. Policy PCS14 of the Local Plan (Portsmouth City Council, 2012) states that "The council will work to create a healthy city and improve the health and well-being of its residents by… improving air quality in the city through implementing the councils Air Quality and Air Pollution Supplementary Planning Document ('SPD') and Air Quality Action Plan".

23.2.3.10. The Local Plan states that air quality has improved in the city with eight of the city's 13 Air Quality Management Areas revoked since 2006.

23.2.3.11. The Air Pollution SPD (Portsmouth City Council, 2006) outlines the requirement for an air quality assessment where a development may have an effect on local air quality. The SPD specifically refers to the development phase where the effects of demolition and construction may have a temporary effect on local air quality, however does not go into detail on the required level of assessment.

Havant Borough Council

23.2.3.12. The Local Plan (Core Strategy) (Havant Borough Council, 2011) and the Local Plan (Allocation) (Havant Borough Council, 2014) details air quality in policy DM10 Pollution and states development proposals will be permitted where:

- Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met:
    - 1. The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk.
    - 2. National air quality standards or objectives would not be breached.
    - 3. The water environment would not be detrimentally affected.
    - 4. It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.
    - 5. External lighting is of the minimum level of illumination and duration required for security and operational purposes.
    - 6. External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.

Winchester City Council

23.2.3.13. The Winchester District Local Plan (Winchester City Council and South Downs National Park Authority, 2013) policy DS1 states that development will be expected to demonstrate that it can address the impact on air quality in order to be considered for approval by the council. Reference is made to air quality specifically in relation to traffic impacts.

East Hampshire District Council

23.2.3.14. The East Hampshire Joint Core Strategy (East Hampshire District Council and the South Downs National Park Authority, 2014) refers to air quality specifically in relation to traffic pollutants. As part of Policy CP27 Pollution, any development that may have a negative effect on an EU designated ecological site should be subject to an appropriate assessment under the Habitats Regulations (HM Government, 2017), and will require a monitoring programme to be set up as part of the mitigation measures.

Hampshire County Council

23.2.3.15. Air quality issues are devolved to district councils, and as such, Hampshire County Council ('HCC') has no policies with respect to air quality.

23.2.3.16. HCC is currently running a Commission of Inquiry into the issues facing the county up to the year 2050, in which air quality is mentioned under the theme of Environment and Quality of Place with reference to improving public health.

23.2.4. GUIDANCE

23.2.4.1. The following guidance has been used to screen and assess potential impacts resulting from the Proposed Development:

- **Advice Note Six:** Preparation and submission of application documents (Planning Inspectorate, 2016).
- **Guidance on the assessment of dust from construction and demolition v1.1** (Institute of Air Quality Managment, 2016). The guidance provides an advised procedure for a semi-quantitative dust risk assessment and screening criteria for the activities undertaken on-site. Mitigation measures are suggested based on the assessed risk, and these should be added to a Dust Management Plan, for which content is also suggested.
- **Guidance on Monitoring in the Vicinity of Demolition and Construction Sites v1.1** (Moorcroft, et al., 2018). This guidance from Environmental Protection UK and the IAQM provides on the appropriate level of monitoring relevant to the specific site characteristics and the assessed dust risk of the works. Different types of monitor are discussed along with advised levels of action in respect of monitored concentrations.
- **Land Use Planning and Development Control: Planning for Air Quality** (Moorcroft, et al., 2017). The guidance from the IAQM provides screening criteria and content advice for detailed assessments. The guidance also provides criteria for the measurement of significance of impacts from based on baseline air quality, pollutant limit values and predicted changes in concentrations.

- **A guide to the assessment of air quality impacts on designated nature conservation sites v1.0** (Holman, et al., 2019). The guidance from the IAQM clearly separates the roles of the air quality specialist and ecologist in the activities involved during the assessment of impacts and effects of air quality on designated sites. Screening criteria for different types of assessment are outlined, along with the steps to be taken at each stage of the assessment. Whilst the precautionary approach is advised, assessments should also be appropriate to the risk involved.
- **Local Air Quality Management Technical Guidance (TG16)** (Department for Environment Food and Rural Affairs, 2018). The guidance from Defra covers all aspects of Local Air Quality Management and includes technical details on management, manipulation of input and output data and processing model results.
- **Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air (AQTAG06)** (Environment Agency, 2006). The guidance from the Environment Agency contains details on the calculation of nutrient deposition from airborne pollutants.
- **Air emissions risk assessment for your environmental permit** (Environment Agency, 2019) The Environment Agency guidance provides screening criteria with reference to short-term impacts, i.e. those of less than one day.

23.3. SCOPING OPINION AND CONSULTATION

23.3.1. SCOPING OPINION

23.3.1.1. As detailed within Chapter 4 (EIA Methodology) of the ES Volume 1 (APP-119), a Scoping Opinion was received by the Applicant from PINS (on behalf of the SoS) on 7th December 2018. The key points raised in the Scoping Opinion with regard to the assessment of impacts on air quality were as follows:

- PINS agreed that an operational traffic emissions assessment could be scoped out of the ES;
- PINS noted that only a qualitative assessment of construction impacts was proposed and that emissions from construction vehicles was scoped out. PINS agreed with this opinion on the basis that if screening revealed that construction traffic exceeded the Institute of Air Quality Management ('IAQM') screening criteria (Institute of Air Quality Managment, 2016), then a quantitative assessment of those impacts should be undertaken.

23.3.1.2. Following the receipt of the Scoping Opinion from PINS, more detailed information has become available regarding the exact nature of the construction and operation of the Proposed Development. Following screening and analysis of this data, quantitative assessment is now being undertaken on the effects of construction traffic and local power generation, and operational backup power generation effects.

23.3.1.3. Appendix 23.1 (Consultation Responses) of the ES Volume 3 (APP-454) includes the full responses to the PINS EIA Scoping Opinion request.

23.3.1.4. East Hampshire District Council ('EHDC'), Winchester City Council ('WCC'), Havant Borough Council ('HBC') and Portsmouth City Council ('PCC') were consulted on the content of the EIA Scoping Opinion request. The responses of each are reported in Appendix 23.1 (Consultation Responses) and are summarised as follows:

- EHDC - no further comments to add.
- WCC – agreement with scope contained in the EIA scoping report.
- HBC – no further comments to add.
- PCC – Environmental Health Officer ('EHO') agreed that there will be no Operational Stage emissions to air, and the council ecologist requested that air quality impacts on ecologically sensitive receptors are captured beyond 50 m of the site boundary and construction traffic routes in the assessment. Subsequent consultation discussed the potential for operational emissions from backup generators and the EHO requested that this assessment be undertaken.

23.3.1.5. In response, it was determined that, following this assessment, general measures to mitigate emissions and the introduction of potential pollutants during the Construction Stage will be presented in the Onshore Outline Construction Environmental Management Plan ('Onshore Outline CEMP') (APP-505 Rev002). Specific measures to mitigate in accordance with the general measures detailed in the Onshore Outline CEMP will be detailed in the Construction Management Plans for the individual phases of the Proposed Development.

23.3.2. PEIR CONSULTATION

23.3.2.1. Appendix 23.1 (Consultation Responses) includes a description of the responses received in relation to the information relating to the assessment of air quality impacts presented within the PEIR, a summary of which is provided below:

- Denmead Parish Council – regarding information provided about what will be emitted to air from the Converter Station;
- Historic England – impact on dust emissions on amenity in local Conservation Areas;
- EHDC – the assessment of impacts to ancient woodland from construction dust, trackout emissions and an assessment update;
- HCC – traffic impacts and intra-project effects; and
- PCC – compliance with air quality criteria on the routes A3 and A2047 which are subject to ministerial directives and the need to consider alternative construction traffic routes.

23.3.3. POST PEIR CONSULTATION

23.3.3.1. Appendix 23.1 (Consultation Responses) includes a description of the consultation completed with the local planning authorities ('LPAs') following the receipt of responses in relation to the information presented with the PEIR relating to the assessment of air quality, a summary of which is provided below:

- EHDC – confirmation that the assessment of concentration changes from diverted traffic and construction traffic should be included;
- WCC - no comment on the proposal sent following screening of the traffic dataset to assess emissions from construction and diverted traffic;
- HBC – specific areas within the borough were identified as key receptors for inclusion in the assessment of construction and diverted traffic. These are:
    - Numbers 2 and 4 Bedhampton Hill as representative of the area around Portsdown Road;
    - 262 Stakes Hill Road, as representative of the area around Stakes Road/Stakes Hill Road/Crookhorn Lane/Purbrook way;
    - 32 Hurstville Drive as representative of the area around Hurstville Drive/Stirling Avenue; and
    - 54 Westbrook Road, representative of the area around Aldermoor Road/Woodlands Grove/Elizabeth Road.
- PCC – provided comments on the proposal to assess emissions from construction and diverted traffic and requested an assessment of operational

emissions from the back-up generators associated with the ORS, with the results described in Section 23.6.8.

23.3.3.2. Full details of consultation undertaken to date is presented within the Consultation Report (AS-004).

23.3.4. ELEMENTS SCOPED OUT OF THE ASSESSMENT

23.3.4.1. The elements shown in Table 23.3 were not considered to give rise to likely significant effects at Scoping as a result of the Proposed Development and have therefore not been considered within the ES.

Table 23.3 – Topics and elements scoped out of the assessment at Scoping

Element Scoped Out	**Justification**
Operation Traffic Effects	Operational traffic effects are scoped out on the basis that there will be minimal traffic associated with the operation of the Proposed Development. Traffic associated with the maintenance and operation of the Converter Station is not expected to be significant.
Operational Odour Emissions	Operational odour emissions are scoped out on the basis that the Proposed Development does not cause any odorous emissions to occur. Emissions of sulphur hexafluoride (SF_6), used in Gas Insulated Switchgear, are addressed in Chapter 28 (Carbon and Climate Change) of the ES Volume (APP-143).
Construction Stage Non-Road Mobile Machinery (NRMM)	Emissions associated with NRMM are not specifically assessed which follows government guidance (LAQM.TG(16)) stating that their impact on local air quality is generally negligible. Mitigation for the operation of NRMM is nonetheless presented as part of the IAQM Dust Risk Assessment process.

23.3.5. IMPACTS SCOPED IN TO THE ASSESSMENT

Construction Stage

23.3.5.1. A review of the evolving Construction Stage methodology since the PEIR has yielded new details of the plant and equipment likely to be employed by the appointed contractor during the installation of the Onshore Cable (including HDD operations). Consequently, it was determined that local power generation, fuelled through the combustion of diesel, is a potentially significant source of local air pollution with the potential to impact human health and the potential impacts as a result of emissions from local power generation has since been scoped into the assessment.

23.3.5.2. The following impacts are considered to have the potential to give rise to significant effects during construction of the Proposed Development and have therefore been considered within the ES:

- Amenity, human health and ecological effects resulting from the fugitive nuisance dust from the following construction activities:
    - Demolition (Any activity involved with the removal of an existing structure (or structures). This is taken to include removal of any solid surface material, e.g. asphalt or concrete, as part of trenching works);
    - Earthworks;
    - Construction; and
    - Trackout.
- Human and ecological health effects resulting from combustion related emissions from the following construction activities:
    - Diverted Traffic emissions from traffic using alternative routes as a result of diversions, road closures and other traffic management; and
    - Generated construction traffic emissions using prescribed routes required to complete on-site activities.
- Combustion of diesel as fuel to power generators required to support the following HDD operations:
    - Drilling (380 kVA rig);
    - Small Drilling Rig (104 kW);
    - Mud recycling (350 kVA generator);
    - High pressure pumping (540 kVA); and
    - Welfare (50 kVA).

Operational Stage

23.3.5.3. The following impacts are considered to have the potential to give rise to likely significant effects during operation of the Proposed Development and have therefore been considered within the ES:

- Human and ecological health impacts resulting from the combustion of diesel as fuel for generators required to provide backup power (2 x 200 kVA) for the ORS and the Converter Station (2x 800 kVA). The operation of these is expected to be no more than six occasions per year for no more than 24 hours at a time, with a single annual test for one hour to ensure efficient operation of the backup generators.

Decommissioning Stage

23.3.5.4. With the exception of the Onshore Cable Route where it is anticipated the cable ducts will be left in-situ and the cables removed via the Joint Bays resulting in a much lower level of potential impact, as a worst-case impacts during decommissioning are expected to be of a similar magnitude to the construction of the Proposed Development, as the works will be of a similar type and scale.

23.3.5.5. Any assessment of the decommissioning of the Proposed Development will be governed by the prevailing legislation and guidance at that time, and as such cannot by reasonably predicted at this time.

23.4. ASSESSMENT METHODOLOGY

23.4.1.1. The main air quality effects of the Proposed Development are expected to be temporary in nature and largely limited to construction effects only. However, the proposed use of back-up power generators at the ORS and at the Converter Station during operation means that a methodology for assessing permanent effects has also been applied.

23.4.1.2. Save for in relation to the decommissioning of the Onshore Cables where it is anticipated the cable ducts will be left in-situ and the cables removed via the Joint Bays resulting in a much lower level of potential impact, decommissioning is expected to have similar temporary effects on air quality and so is considered to be of a similar nature to the construction effects, as described in Section 23.6. Therefore, no assessment methodology specific to decommissioning was required.

23.4.2. BASELINE DATASETS

Publicly Available Datasets

23.4.2.1. The following, freely available datasets were used in the assessment of temporary and permanent effects:

- Background air quality from the Defra Background air quality archive (Department for Environment, Food and Rural Affairs, 2019);

- Air quality monitoring data collected by PCC and HBC;
- Local Air Quality Management ('LAQM') reports from PCC, HBC, EHDC and WCC;
- British Geological Society 1 km Soil Parent Material spatial dataset (British Geological Society, 2019) as part of the construction dust assessment;
- Natural England ecologically designated area spatial datasets for Ramsar Sites, SPA, SAC, SSSI, LNR and National Parks (Natural England, 2019); and
- Background nutrient deposition data from the Air Pollution Information System ('APIS') website and the Concentration Based Estimated Deposition ('CBED') model (Levy, et al., 2020) from the Centre for Ecology and Hydrology.

Ordnance Survey

23.4.2.2. Data on the spatial extents of the works and methodologies used were obtained from Chapter 3 (Description of the Proposed Development).

23.4.2.3. The following Ordnance Survey ('OS') datasets were then used to identify receptors for the assessment:

- OS AddressBase Plus; and
- OS Mastermap Topography.

Traffic Data

Temporary Diverted Traffic

Solent Sub-Regional Transport Model

23.4.2.4. Diverted traffic impacts resulting from the Proposed Development is modelled using the Solent Sub-Regional Transport Model ('SRTM'), which is a multi-modal strategic transport model for Hampshire, the Isle of Wight and Portsmouth. The model was developed and is operated by the Systra consultancy under contract to Solent Transport. The model includes calibrated 2015 baseline flows and contains a number of committed development sites within the study area and outside of it, which increase traffic flows and alter traffic patterns in the local area as described in Chapter 22 (Traffic and Transport) of the ES Volume 1 (APP-137).

Assessment Year

23.4.2.5. The traffic flows for a peak traffic year of 2026 have been used in the assessment as described in Chapter 22 (Traffic and Transport). The anticipated peak year for construction activity is defined as 2022, with a duration of 66 weeks between 2021 and 2023. Therefore, emissions factors from the EFTv9 and background pollutant concentrations for the year 2022 have been applied to the peak traffic flow data from 2026 so as to ensure the potential emission are not under reported due to anticipated

advancements in engine technology between 2022 and 2026. This is considered to represent a robust worst-case assessment.

23.4.2.6. Where additional programming optimisation is required as a result of local or seasonal restrictions all works will seek to be scheduled at an appropriate time in accordance with the programme information provided, as described in Chapter 22 Traffic and Transport.

23.4.2.7. To set the traffic flow baseline against which predicted impacts of the Proposed Development are to be assessed, a baseline year of 2018 was used in order to match the latest available monitoring data from the four local authorities in whose areas the Proposed Development is located, and the latest available meteorological data. A de-growth factor from the UK Government Trip End Model Presentation Program (TEMPro v7.2) was applied to the 2026 modelled peak traffic flow data in order to derive 2018 traffic flows. The emission factors for 2018 were applied to the data using EFTv9 and the 2018 background concentrations were applied to the predicted concentrations.

Traffic Assessment Study Area

23.4.2.8. The traffic assessment study area incorporates an approximate 5 km area around the Order Limits, incorporating Denmead, Southwick and Cosham to the west and the A3(M) corridor to the east between Junction 1 (Horndean) and where it meets the A27 (Bedhampton). To provide a robust assessment the study area also includes all of Portsea Island and motorway between M27 Junction 12 to the west and A27 junction with A3(M) to the east. This data was screened against the IAQM assessment criteria as detailed in Appendix 23.3 (Air Quality Traffic Modelling) (APP-456 Rev002).

Generated Construction Traffic

23.4.2.9. The construction traffic assessment was undertaken based on information in Chapter 22 Traffic and Transport and Appendix 22.2 (Framework Construction Traffic Management Plan ('CTMP')) of the ES Volume 3 (APP-450). Construction site activity data was screened for inclusion in the assessment according to the IAQM dust assessment guidance criteria. Construction traffic data was screened for inclusion against the IAQM planning guidance criteria as advised in the IAQM dust assessment guidance.

23.4.3. CONSTRUCTION STAGE

Construction Site Activities

23.4.3.1. Construction Stage effects from construction dust were assessed following the IAQM Guidance on the assessment of dust from demolition and construction (Institute of Air Quality Managment, 2016). This is an iterative, semi-quantitative approach based on baseline parameters such as background air quality, underlying soil type, cumulatively banded numbers of receptors at set distances from the Proposed

Development, the estimated scale of the works and the construction methodology for the various stages of the works.

23.4.3.2. Emissions from Non-Road Mobile Machinery ('NRMM') that is commonly used on construction sites was not specifically assessed following the guidance in LAQM.TG(16) which states that NRMM is unlikely to have a significant effect on local air quality provided suitable mitigation measures are in place. Such measures might include:

- Ensuring all NRMM is compliant with the latest emissions standards;
- Fitting of abatement technology such as Diesel Particulate Filters ('DPF');
- Enforcement of a no-idling policy;
- Use of mains electricity where the use of combustion engines can be avoided; and
- Enforce maximum site speed limits.

23.4.3.3. The IAQM dust risk assessment procedure involves five specific steps aimed at identifying site specific criteria in order to assign a semi-quantitatively determined risk to the activities being undertaken on site. The five steps are as follows:

- Step 1 is to screen the requirement for a detailed assessment.
- Step 2 is to assess the risk of dust impacts, which is done for each of the four types of activity undertaken on-site (demolition, earthworks, construction and trackout), and is broken down into three elements:
    - Step 2A is an assessment of the scale and nature of the works;
    - Step 2B assesses the potential sensitivity of the area; and
    - Step 2C determines the risk of dust impacts for each of the four activities undertaken on site, and the provides an overall dust risk. Dust risks are described as low, medium or high risk for each of the four activity categories. Where there is uncertainty regarding the level of risk associated with the activity, a precautionary approach is taken with the higher risk category being applied.
- Step 3 is to determine site specific mitigation for each of the activities assessed at Step 2;
- Step 4 is to examine the residual effects and determine whether or not these are significant; and
- Step 5 is to prepare a dust management plan, which will be incorporated as part of this document.

23.4.3.4. A detailed assessment is required where a sensitive human receptor is located within 350 m from the site boundary, within 50 m of the route(s) used by vehicles on the public highway and/or up to 500 m from the site entrance(s).

23.4.3.5. A detailed description of the IAQM Dust Risk Assessment procedure applied in the assessment is provided in Appendix 23.2 (IAQM Construction Assessment) of the ES Volume 3 (APP-455 Rev002).

Diverted Traffic

23.4.3.6. To assess the impact of diversions, road closures and other traffic management on air quality and compliance with Directive 2008/50/EC for the Portsmouth Urban Area Agglomeration Zone (UK0012), modelling was completed using SRTM traffic flow data provided by Systra (2026) and used in the assessment of traffic and transport related impacts in the Transport Assessment (APP-448) and Chapter 22 (Traffic and Transport) for the 2026 Do-Minimum scenario and two 2026 Do-Something scenarios.

Generated Construction Traffic

23.4.3.7. To assess the impact of generated construction traffic on air quality, modelling was completed using the data for diversions, road closures and other traffic management added to flow volumes and routes for construction traffic from Chapter 22 (Traffic and Transport).

23.4.3.8. It is assumed that all traffic related construction impacts will occur in the 2020 peak year. Construction is predicted to take place between 2021 and 2023.

Traffic Data Screening

23.4.3.9. Traffic flows relating to diversions, road closures and other traffic management and construction traffic were screened against the criteria from the IAQM planning guidance (Moorcroft, et al., 2017) as detailed in Table 23.4.

Table 23.4 - IAQM Traffic Screening Criteria

Vehicle Type	Flow Change	Flow Change within or adjacent to Air Quality Management Area ('AQMA')
Light Duty Vehicle ('LDV') <3.5t	500	100
Heavy Duty Vehicle ≥3.5t ('HDV')	100	25

23.4.3.10. However, a decision was taken to model all of the construction traffic routes regardless of flow changes due to air quality sensitivities within the City of Portsmouth. These are shown with their relevant study area in Figure 23.3 of the ES Volume 2 (APP-325).

23.4.3.11. The impacts arising from diverted traffic and construction traffic activities are presented separately in Appendix 23.3 (Air Quality Traffic Modelling), due to the differing spatial nature of their impacts and the relation of construction traffic to the construction dust risk assessment.

23.4.3.12. The study area for diverted traffic covers a large part of the City of Portsmouth, including five out of six AQMAs, and specific areas of Havant and East Hampshire that are out of the study area for the construction dust risk assessment and construction traffic assessment. This is shown in Figure 23.4 of the ES Volume 2 (APP-326).

23.4.3.13. The results of these assessments are used to make the final judgement of significance for traffic emissions resulting from the Construction Stage of the Proposed Development.

23.4.3.14. Three scenarios are provided from Chapter 22 (Traffic and Transport) (APP-137) using 2026 peak traffic year flows. These were modelled for the peak construction year 2022 by applying the 2026 peak traffic flows with the 2022 EFTv9.0 emissions and 2022 Defra background mapped datasets. The scenarios are summarised as follows:

- 2026 Do Minimum (DM): Base future year, as modelled with no interventions. This scenario is included for comparative purposes (2026 flows using 2022 emissions and backgrounds);
- 2026 Do Something 1 (DS1): Traffic Management is in place at the six specified locations but on the A2030 Eastern Road a lane closure applies to the southbound carriageway only (2026 flows using 2022 emissions and backgrounds); and
- 2026 Do Something 2 (DS2): Traffic Management is in place at the six specified locations but on the A2030 Eastern Road a lane closure applies to the northbound carriageway only (2026 flows using 2022 emissions and backgrounds).

23.4.3.15. A fourth scenario representing a 2018 baseline was modelled for the purpose of verifying the performance of the model against current local authority air quality monitoring. This was derived using the 2026 Do-Minimum traffic flows with a reduction factor applied to represent 2018 flows. The reduction factor was determined using the Department for Transport Trip End Model Presentation Program ('TEMPro') v7.2, which uses data from the UK Government National Trip End Model ('NTEM'). Emission factors and Defra backgrounds from 2018 were applied to this scenario to

be consistent with the year of monitored air quality data and meteorological data used in the assessment.

23.4.3.16. Traffic data representing the Do-Minimum and both Do-Something scenarios, were modelled using Cambridge Environmental Research Consultants ('CERC') Atmospheric Dispersion Modelling System for roads ('ADMS-Roads') version 4.1.1, emission rates derived from the Department for Transport Emissions Factor Tables ('EFT') v9 and geographical locations for each road link taken from the modelling spatial data provided by Systra. Further discussion on the vehicle emission rates applied in the assessment is provided in Appendix 23.3 (Air Quality Traffic Modelling).

23.4.3.17. Concentrations were modelled at representative receptor points at distances of 4m (for EU compliance), 20 m, 70 m, 115 m and 175 m from each link, and receptors from the OS AddressBase Plus dataset assigned a representative receptor according to their nearest traffic link and their location within distance bandings of 50 m, 100 m, 150 m and 200 m from each link. Beyond a distance of 200 m, pollutants resulting from traffic flows are expected to have dispersed such that concentrations are at background levels.

23.4.3.18. A detailed description of the modelling procedure for diversions, road closures and other traffic management and construction traffic is provided in Appendix 23.3 (Air Quality Traffic Modelling) including meteorological data, NO_X to NO_2 conversion, background data and model verification.

Local Power Generation for HDD Operations

23.4.3.19. The evolving construction programme does not include specific information about the power generation and HDD equipment that would be used on-site at this time. Furthermore, any appointed drilling contractor might sub-contract or hire bespoke equipment for the smaller drilling operations. Therefore, the High Voltage Direct Current ('HVDC') Cabling Team and a drilling specialist were consulted to determine the likely power generation and HDD equipment and associated emissions data.

23.4.3.20. Modelling was undertaken using information described in detail in Appendix 23.4 (Air Quality Generator Emissions Modelling) of the ES Volume 3 (APP-457 Rev002) based on information in Chapter 3 Description of the Proposed Development.

23.4.3.21. Emissions data are shown in Table 1 of Appendix 23.4 (Air Quality Generator Emissions Modelling) and pollutant concentrations were predicted at the discrete receptors described in Section 1.3 of that Appendix. The locations of power generation equipment are shown in Figure 23.17 of the ES Volume 2 (document reference 6.2.23.17).

23.4.3.22. Guidance is provided by the Environment Agency (Environment Agency, 2019) with reference to screening criteria for impacts over short-term averaging periods, i.e. less than one day. In this instance, the following criterion is applied:

- The short-term PC is less than 10% of the short-term environmental standard.

23.4.3.23. If the above criterion is met, then no further assessment is necessary. However, given the sensitivity of the area discussed in Section 23.4.7, concentrations were nonetheless reported.

23.4.3.24. The following pollutants were modelled in the assessment:

- Nitrogen oxides ('NO_X');
- Nitrogen dioxide ('NO_2');
- Carbon monoxide ('CO');
- Particulate matter ('PM_{10}'); and
- Total hydrocarbons ('THC').

23.4.3.25. Sulphur Dioxide (SO_2) is not assessed because ultra-low sulphur diesel will be used. All fuel must be compliant with BS EN590 for on-road use and BS EN2869 for off-road use.

23.4.3.26. Exhaust gas concentrations of general particulate matter were provided which was modelled as PM_{10}. Concentrations of $PM_{2.5}$ were derived from this using a UK national conversion factor of 0.642 obtained from the Defra Damage Cost Guidance.

23.4.3.27. As no objective or limit value exists for THC, these pollutants were modelled as the constituent hydrocarbon pollutant benzene. Benzene was selected to represent THC for modelling as a limit value is prescribed for this particular hydrocarbon as shown in Table 23.2. Benzene is the only constituent part of THC for which there is a strict legislative limit given its toxicity. For this reason, the results of modelling this pollutant should be considered to carry a very high degree of conservatism, with actual benzene concentrations being far lower than those predicted in this assessment.

23.4.3.28. It should be noted that the toxicity of benzene in air is of a different nature to THC, particularly as benzene is a documented carcinogen (Chilcott, 2007). Therefore, the equivalent level of carcinogenesis should not be inferred from the results presented here.

23.4.3.29. **Amalgamated effects** are defined as local air quality impacts created by the following activities associated with the Proposed Development:

- Diverted Traffic;
- Construction Traffic; and
- Local Power Generation.

23.4.3.30. The amalgamated effects assessment, therefore, considers the effect produced by the simultaneous release of emissions these air pollutant sources.

Cumulative Effects

23.4.3.31. Cumulative effects are defined as impacts on local air quality created by Proposed Development and other submitted applications in the study area. The assessment of impacts from Diverted Traffic is inherently cumulative as the SRTM includes committed developments as described in Chapter 22 (Traffic and Transport).

23.4.4. OPERATIONAL STAGE

ORS Back-Up Power Generation

23.4.4.1. Detailed information regarding the installation of the backup power generators at the ORS was unavailable due to the stage of the design. Specifications for the backup generators ranged from two 50 kVA generators to two 200 kVA generators. Modelling was undertaken for two 200 kVA generators as a conservative approach. Plant locations are shown in Figure 23.5.

23.4.4.2. The maximum emissions data from the EU Stage VI Q emissions standards were used, as shown in Appendix 23.4 (Air Quality Generator Emissions Modelling) Table 2. The generators are assumed to be new installations for commissioning in 2024 as outlined in Chapter 3 (Description of the Proposed Development), the generator will be required to meet this standard as a minimum, assuming no more stringent emissions standards during the intervening period are introduced. All new generators on sale must meet the latest EU Emissions Stage standard.

Converter Station Back-Up Power Generation

23.4.4.3. Consent is sought for installation of up to two standby back-up diesel generators with a capacity of up to 800 kW at the locations shown in Figure 23.13 of the ES Volume 2 (document reference 6.2.23.13), A sample specification for this size of generator was used for the modelling exercise as discussed in Appendix 23.4 (Air Quality Generator Emissions Modelling) Section 1.2.3.

23.4.4.4. Whilst the size of the generating capacity specified would normally require a permit under the Medium Combustion Plant Directive, these units are considered exempt on the basis that they should not exceed a running time of 500 hours per year on a 3-year rolling average.

23.4.4.5. Additional modelling at the ancient woodland sites adjacent to the Order Limits at the Converter Station was undertaken for NO_X concentrations, nutrient N deposition and N acid deposition. Three transects were placed across the ancient woodland sites, one covering Stoneacre Copse, one covering Crabdens Copse, and one covering both areas associated with Crabdens Row. Modelling points were placed at 10 m intervals.

Operating hours

23.4.4.6. For the Operational Stage, the model has been constructed to output short-term (1-hour) pollutant concentrations. This is consistent with the expected short-term operation of the backup generators at the ORS and the Converter Station which could occur at any time in the year. In order to obtain the absolute worst-case outputs for comparison with the short-term limit and objective values (1-hour), the units are modelled as running continuously for 8,760 hours per year (8,784 in a leap year). By predicting a concentration for every hour of the year, the concentration corresponding to the worst hourly pollutant dispersion conditions can be determined. This produces a realistic, but nevertheless conservative result as the backup generators are unlikely to operate during the specific hour corresponding to the worst pollutant dispersion conditions.

23.4.4.7. The long-term outputs from this modelling are also compared to the long-term limit and objective values in order to undertake calculations on the nearby designated ecological sites.

23.4.4.8. This is considered a highly conservative approach due to the anticipated short-term operation of the units in their capacity to provide backup power in the case of a mains outage only.

23.4.5. DESIGNATED ECOLOGICAL SITES

23.4.5.1. An assessment of air quality impacts on the relevant designated ecological sites was undertaken following the IAQM designed site assessment guidance (Holman, et al., 2019). Transects of 200 m in length were selected according to the prevailing wind directions with points modelled at 10 m intervals along the 200 m transects.

23.4.5.2. Sites were selected according to their designated status and local concern. The Chichester and Langstone Harbour Ramsar/SPA/SSSI is within the study area for the ORS backup generators. There are no designated sites within the study area for the Converter Station backup generators, however the ancient woodland Habitats of Principal Importance at Crabdens Copse, Crabdens Row and Stoneacre Copse are located directly adjacent to the Order Limits and are assessed due to locality.

Critical Loads and Critical Levels

23.4.5.3. The impacts of air pollution on vegetation are assessed using two metrics: critical loads and critical levels:

- Critical Loads are defined as: " a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge" (Source: https://www.icpmapping.org/Definitions_and_abbreviations).
- Critical levels are defined as "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants,

ecosystems or materials, may occur according to present knowledge". (Source: https://www.icpmapping.org/Definitions_and_abbreviations).

23.4.5.4. Critical loads are assigned to specific habitats, whereas critical levels cover broad vegetation types. These are derived from field experiments and observations.

23.4.5.5. One of the fundamental differences between critical loads and critical levels is their temporality (Cape, et al., 2009). In general, critical levels are expressed in terms of threshold concentrations not to be exceeded over 1-hour, 1 day, 1 month or 1 year, whereas critical loads are defined in terms of long-term potential effects, i.e. decadal or longer periods. This is because critical loads are usually seen as operating through soil and water rather than directly on vegetation, whereas critical levels refer to direct effects of airborne gases on the vegetation.

23.4.5.6. As such, in determining critical loads and levels, the effects of peak exposures are explicitly included within critical levels (through consideration of exposures over various timescales from hourly to annually), whilst they are not required in the setting of critical loads.

23.4.5.7. Whilst a long-term critical level for NO_x is considered most appropriate for the assessment of effects on habitats, a short-term 24-hour critical level for NO_x of 200µg/m³ will be used for the assessment in accordance with the advice provided in the IAQM guidance for the assessment of the impacts on ecologically designated sites. A lower critical level of 75µg/m³ has been used in the past, however this was generally where higher background levels of SO_2 were present in the atmosphere, which is no longer the case in the UK due to the vast reductions in burning of coal and the UK Government mandating of low sulphur diesel fuel to meet BS EN590 for on-road use and BS EN2869 for non-road use. Given the predicted short-term operation of the backup generators and the low background levels of SO_2 in the UK, the critical level of 200µg/m³ for NO_x is appropriate.

Eutrophication

23.4.5.8. N is a nutrient to terrestrial ecosystems. Eutrophication can occur in terrestrial ecosystems when the critical load for N is exceeded over a long period and the ability of the habitat to remove excess nitrogen through leaching, fixation or other means is decreased to the point where excess nutrient begins to accumulate. Typically, ecologically designated areas are characterised by low levels of nutrients when compared to areas of human-managed land for amenity or crops. An excess level of nutrient N in such designated areas can cause slower growing species accustomed to nutrient poor habitats to be out-competed by weed species that favour nutrient rich habitats. As such, designated habitats, and the fauna that depend upon them, can be highly affected by a change in species balance as a result of eutrophication.

Acidification

23.4.5.9. Acidification can occur from the deposition of oxidised N compounds as a result of a reduction in the ability of soil to neutralise acids. This can lead to a reduction in the breakdown of biological litter and an increase in the dominance of acid tolerant plant species as the soil pH drops.

Deposition Assessment

23.4.5.10. The deposition assessment has been undertaken according to the methodology and conversion factors described in the Environment Agency AQTAG06 (Environment Agency, 2006). Background deposition levels were obtained from the from the UK CBED model (Levy, et al., 2020). Critical Load information and Critical Level information were obtained from the APIS website.

23.4.5.11. The outputs from air quality modelling for the transect discrete, ground-level receptor points was processed using the following factors:

- Calculation of the proportional annual average Process Contribution ('PC') and Predicted Environmental Concentration ('PEC') following Environment Agency guidance, using the predicted hours of operation and the number of hours in one year:

$$\frac{Predicted\ Operational\ Hours}{N°\ Hours\ in\ 1\ Year}$$

- Calculation of the dry deposition flux from the PC NO_2 concentrations using the conversion factors for:
  - Forest: 0.003
  - Grassland: 0.0015
- Calculation of the nutrient nitrogen deposition from the dry deposition flux using the conversion factor of 95.9 for NO_2.
- Calculation of acidification from the dry deposition flux using the conversion factor of 6.84 for NO_2.

23.4.5.12. The results were compared to the APIS critical loads and critical levels for the relevant habitats.

23.4.6. DECOMMISSIONING

23.4.6.1. The methodology for assessing the air quality effects of decommissioning will be determined by relevant legislation at the time. At present, there is no known precedent for the decommissioning of this type of infrastructure. As a worst-case scenario it is assumed to be the same as that described for the Construction Stage, however the assessment of any impact will be dependent upon the future, prevailing legislation.

23.4.6.2. It is anticipated that the HVDC Cable's operational lifetime will exceed that of the Converter Station equipment, however at the end of the HVDC Cable's asset life, the options for decommissioning will be evaluated according to the prevailing legislation. The preferred option with the least environmental impact is to leave the cable in-situ within the buried ducts as described in Chapter 3 (Description of the Proposed Development).

23.4.7. SIGNIFICANCE CRITERIA

23.4.7.1. In determining the significance of a potential effect, the magnitude of impact arising from the Proposed Development is correlated with the sensitivity of the particular environmental attribute or process under consideration.

Magnitude

23.4.7.2. The magnitude relates to the level at which the receptor will be impacted, using the duration of the impact, timing, scale, size and frequency to determine the magnitude of the impact to each receptor. Magnitude of impact is evaluated in accordance with the definitions set out in Table 23.5 below. The definitions of magnitude are generic and may be more specific for some receptors. Any deviations from these definitions included in this assessment chapter has been explained where relevant.

Table 23.5 - Definitions of 'magnitude' of impact

Magnitude of Impact	Definition
High (Substantial)	Total loss or major alteration to key elements/features of the baseline (i.e. pre-development) conditions.
Medium (Moderate)	Partial loss or alteration to one or more key elements/features of the baseline (i.e. pre-development) conditions.
Low (Slight)	Minor shift away from baseline (i.e. pre-development) conditions.
Negligible	Very slight change from baseline (i.e. pre-development) conditions.

23.4.7.3. Specific to air quality is the use of impact descriptors from the IAQM Planning guidance (Moorcroft, et al., 2017). These are assigned based on the predicted long-term pollutant concentration at the receptor as a percentage of the limit value for the relevant pollutant (Air Quality Assessment Limit ('AQAL')) and the percentage change in predicted pollutant concentration as a percentage of the AQAL. These are detailed in Table 23.6.

Table 23.6 - IAQM Impact Descriptors (Annual Mean Average Concentrations)

Long-term average concentration at receptor in assessment year	Percentage change in concentration relative to AQAL			
	1	**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

23.4.7.4. Where short-term averages are reported, the matrix in Table 23.6 is not appropriate for use and the IAQM guidance provides further criteria to describe the impact magnitude:

- **Small** - process contribution is in the range 11-20% of the AQAL the magnitude;
- **Medium** - process contribution is in the range 21-50% of the AQAL; and
- **Large** - process contribution is above 51% of the AQAL.

Value/Sensitivity

23.4.7.5. As described within Chapter 4 (EIA Methodology), sensitivity is a means to measure how sensitive an affected receptors/processes and/or the receiving environment is to change. The sensitivity is assigned at the receptor/process level. This may be defined in terms of quality, value, rarity or importance, and be classed as negligible, low, medium, or high.

23.4.7.6. With particular reference to air quality, all receptors that are exposed to air pollutants for a period commensurate with the relevant limit or objective value for a pollutant are considered highly sensitive receptors. Whilst the legal limit values and AQS objective values are in place, it is widely recognised that pollutants related to construction and the products of combustion can be considered non-threshold pollutants, i.e. there is no safe exposure limit below which there is no potential for any kind of health impact.

23.4.7.7. Receptors that are considered for this assessment include:

- Residential receptors;
- Commercial receptors, e.g. places of work;
- Community receptors, e.g. churches, community centres; and

- Ecological receptors.

23.4.7.8. Receptors that merit particular attention due to the relative vulnerability of people who may occupy them include:

- Medical Institutions;
- Hospices;
- Residential care homes; and
- Schools, nurseries, and other places of education where children or young people are present.

Significance

23.4.7.9. For the assessment of temporary effects from construction site activities, the IAQM (Institute of Air Quality Managment, 2016) recommends that significance is only assigned to the effect after considering the construction activity with mitigation. With the implementation of effective mitigation commensurate to the risk, the guidance states that residual effects are normally insignificant.

23.4.7.10. For the assessment of construction traffic and combustion plant emissions (construction and operation), the significance of effects is guided using the matrix shown in Table 23.7 which takes into account the assignment of magnitude detailed in Table 23.5 and Table 23.6 as appropriate for the impacts to be determined and the sensitivity of the particular receptors affected. Effects deemed to be significant for the purpose of assessment are those which are described as 'major' and 'moderate/major'. In addition, 'moderate', ‘slight’ and ‘negligible’ effects can also be deemed as significant. Whether they do so is determined by a qualitative analysis of the specific impact to the environment and the specific sensitivities of the receiving environment. This decision will be based on professional judgement and the basis for any judgement will be outlined.

Table 23.7 - Matrix for classifying the significance of effects

		Sensitivity of receptor/receiving environment to change			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	High/Substantial/Large	Major	Major to Moderate	Moderate	Negligible
	Medium/ Moderate	Major to Moderate	Moderate	Minor to Moderate	Negligible
	Low/Slight/Small	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

23.4.8. ASSUMPTIONS AND LIMITATIONS

23.4.8.1. The following assumptions and limitations apply to the assessment of construction effects:

- The assessment was undertaken using the Order Limits;
- The assessment is based on information provided by the engineering teams and obtained from drawings and engineering documents produced up to the end of May 2020, including;
    - Order Limits;
    - Sample 200kW generator specifications;
    - Sample 800kW generator specifications;
    - Backup generator operating assumptions
    - HDD plant and supporting plant specifications;
    - HDD plant indicative locations and operating times; and
    - Trenching works durations.
- The assessment of construction traffic effects is based on the data used for the purpose of the Transport Assessment (APP-448) and discussed in Chapter 22 (Traffic and Transport);

- For temporary diverted traffic, peak year 2026 traffic flows have been used to represent flows in peak construction year 2022. This represents a conservative approach because some local traffic growth is likely between 2022 and 2026;
- The 2026 traffic data has been produced based on the assumption that six construction gangs will be in operation at all times;
- The assessment assumes that queueing and congestion is represented in the Systra SRTM traffic data through variations in link flow average daily speeds on the approach to junctions and roundabouts;
- Defra EFTv9.0, which has been used to represent vehicle emissions does not include for the imposition of tighter emission standards associated with buses, coaches, taxis, private hire and HGVs under the Class B CAZ mandated in Portsmouth for the end of 2021. The potential beneficial effects of the CAZ regulations in Portsmouth are therefore not included in this assessment producing an over-estimation of the impact;
- Road traffic emissions from generated construction traffic and diverted traffic have the potential to be mutually exclusive at different location and points in time throughout the duration of the works. The results of the assessment of construction traffic include the effects of diverted traffic, however they are presented separately from the effects of diverted traffic to reflect the potential mutual exclusivity;
- Counts of affected receptors are based on the accuracy of available OS data;
- The calculation of emissions from the HDD related generators is based on a 12–hour working day, between the hours of 0700 and 1900 for all sources, except where 24-hour operation will be undertaken at the Eastney Landfall and Langstone Harbour as described in the Onshore Outline CEMP;
- Emissions calculations for the HDD generators were based on the information supplied. Where this was insufficient for assessment, assumptions were made based on information supplied for other generators involved in the HDD operation;
- Operational emissions from the backup power generators were based on EU Stage V emissions or sample emissions as appropriate;
- Assessment of the operational emissions from the ORS and converter station backup generators was based on continuous operation in order to derive 24-hour and 1-hour maximum possible concentrations;

- A conservative assumption for modelling of 24-hour running for 365 days of the year is assumed for the back-up generators. The generators have an annual test for 1 hour per year and are not expected to be active for more than six separate 24-hour occasions, therefore actual emissions will be many times lower.
- Environment Agency guidance was applied for the calculation of nutrient N and N acid deposition calculation whereby a factor was applied to the annual average from continuous operation of the backup generators at the ORS and converter station. This factor was calculated from the predicted hours of operation against the total number of hours in one year. This is considered a proportional approach.

23.5. BASELINE ENVIRONMENT

23.5.1. LOCAL AIR QUALITY MANAGEMENT

Hampshire County Council

23.5.1.1. HCC has no direct role in the regulation of air quality within the County Council area and acts as an overseeing stakeholder for the District and Borough Councils who have statutory requirements for reporting to the UK Government on the status of air quality within their local authority area.

Portsmouth City Council

23.5.1.2. The 2019 Air Quality Annual Status Report ('ASR') (Portsmouth City Council, 2019) states that concentrations of NO_2 within the city are a significant concern, with Portsmouth identified by the UK Government as one of eight local authorities with persistent long term exceedances of the limit and objective values for NO_2. In order to address this, the council has produced the Portsmouth Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019) which sets out the actions taken to construct the plan and the recommendations for action to help the city achieve compliance with the limit and objective values for air quality. These recommendations include the creation of a CAZ of the Class B charging type which aims to introduce limitations on buses, coaches, HGVs, and taxis and other private hire vehicles.

23.5.1.3. The city has declared five AQMA for exceedances of the NO_2 limit and objective values. These are:

- AQMA6 - which extends north along Fratton Road from Fratton Bridge to Kingston Road, continuing into London Road until the roundabout junction with Stubbington Avenue;
- AQMA7 - covering Hampshire Terrace and the St Michael's Road gyratory;

- AQMA9 - covering the southernmost section of Eastern Road from Sword Sands Road south into Velder Avenue and its junction with Milton Road;
- AQMA11 - which extends from Rudmore Roundabout south to Church Street roundabout; and
- AQMA12 - encompassing the greater part of Queen Street from The Hard to St James's Street and Gladys Avenue.

23.5.1.4. A further two areas of the A3 are also projected to exceed the limit and objective values for NO_2. These are:

- A3, Alfred Road between Hope Street roundabout and the Queen Street / Anglesea Road / Alfred Road intersection; and
- A3, Mile End Road between the southern end of the M275 and Church Street roundabout (located within AQMA 11).

23.5.1.5. There are a number of traffic flow, sustainable transport route development, and travel options measures planned or in place to help the city achieve compliance with the limit and objective values referred to in the ASR.

23.5.1.6. PCC has now been subject to four ministerial directions regarding air quality, with the latest requiring that a Class B CAZ should be implemented by November 2021 covering an area in the west of the city (Portsmouth City Council, 2020). Air quality modelling relevant to the proposed CAZ is currently being undertaken by PCC with the results due to be delivered to Defra in November 2020. As such, the specific conditions that the Portsmouth CAZ may introduce cannot be taken into account in this assessment due to the information not yet being available.

23.5.1.7. The Outline Business Case for the Air Quality Action identifies a number of measures to improve air quality in the city which include, but are not limited to:

- Class B Charging Clean Air Zone (CAZ);
- Changes to parking capacity and pricing south of the city centre;
- Improvements to strategic cycling routes;
- Changes to Alfred Road traffic signals;
- Progressive tightening of taxi licensing rules;

- Rapid charging points at taxi ranks;
- Reduced fee/ free residents parking permits for low emission vehicles;
- Travel planning and behaviour change measures; and
- Targeted communications and marketing initiatives.

23.5.1.8. PCC considers that a variety of measures working in harmony will be sufficient to bring air quality in compliance with Directive 2008/50/EC within the shortest possible time scale.

East Hampshire District Council

23.5.1.9. The EHDC 2019 Air Quality ASR (East Hampshire District Council, 2019) reports generally good air quality within the local authority area, and as such no AQMA are declared. The report also notes that all areas of the local authority area are likely to meet the targets for compliance with the limit and objective values for NO_2 prescribed by Defra. Nevertheless, the local authority has a number of measures in place or in development that will improve local air quality.

Havant Borough Council

23.5.1.10. The Havant Borough Council 2019 Air Quality ASR (Havant Borough Council, 2019) states that NO_2 has been identified as the pollutant of concern with the local authority area, and that concentrations of all pollutants within the local authority area are expected to be compliant with the relevant limit and objective values at relevant reporting locations.

23.5.1.11. The report does however note that there are elevated concentrations of NO_2 in areas where the road network and strategic highway network are constrained by building, historic and topographic features, in particular the A3 and A27 roads. In a few isolated areas exceedances of the NO_2 limit and objective value has been identified at kerbside, and as a result monitoring is in place at these locations. Havant town centre and Hayling Island are two such locations specifically identified for action.

23.5.1.12. Due to the generally good air quality in the local authority area, all of the actions to improve air quality in HBC are generally more passive, of the policy type that encourages travel planning and modal shift rather than the type that targets direct action on specific streets.

Winchester City Council

23.5.1.13. WCC administers the City of Winchester and the wider district area. The 2019 Air Quality ASR (Winchester City Council, 2019) refers to a number of areas where the objective and limit values are exceeded within the City of Winchester where one AQMA is declared, however these areas are remote from the areas relevant to the Proposed Development and thus not relevant to this assessment.

23.5.1.14. Outside of the areas of concern within the City of Winchester air quality is generally good.

23.5.2. COMPLIANCE WITH DIRECTIVE 2008/50/EC

23.5.2.1. The Proposed Development covers two of the reporting zones for UK compliance with Directive 2008/50/EC. These are described in Table 23.8 along with the results reported in the Defra Air Pollution in the UK 2018 report (Department for Environment Food and Rural Affairs, 2019).

Table 23.8 - Relevant Compliance with Directive 2008/50/EC

Zone	ID	NO2 1-hour mean	NO2 Annual Mean	NOx Annual Mean
Portsmouth Urban Area Zone	UK0012	Within Limit Value	Above Limit Value	n/a
South East Non-agglomeration	UK0031	Within Limit Value	Above Limit Value	Within Limit Value

23.5.2.2. Table 23.8 shows that both the Portsmouth Urban Area zone and the South East Non-agglomeration zone do not currently comply with the limit values for annual NO_2 concentrations described in Directive 2008/50/EC.

23.5.3. BACKGROUND POLLUTANT CONCENTRATIONS

23.5.3.1. Modelled background pollutant concentrations for NO_2, NO_X, PM_{10} and $PM_{2.5}$ were obtained from the Defra Background Air Quality archive (Department for Environment, Food and Rural Affairs, 2019) using the latest available 2017-base year maps. Data was obtained for the years 2018 as the baseline for verification of the traffic model, and 2022 as the year of peak construction activity.

Current Baseline Conditions

23.5.3.2. Information regarding baseline NO_X and NO_2 is presented across the whole of the modelled traffic study area for air quality in the following Plates:

23.5.3.3. The 2018 baseline modelled background for NO_2 is presented in Plate 23.21 on the page below.

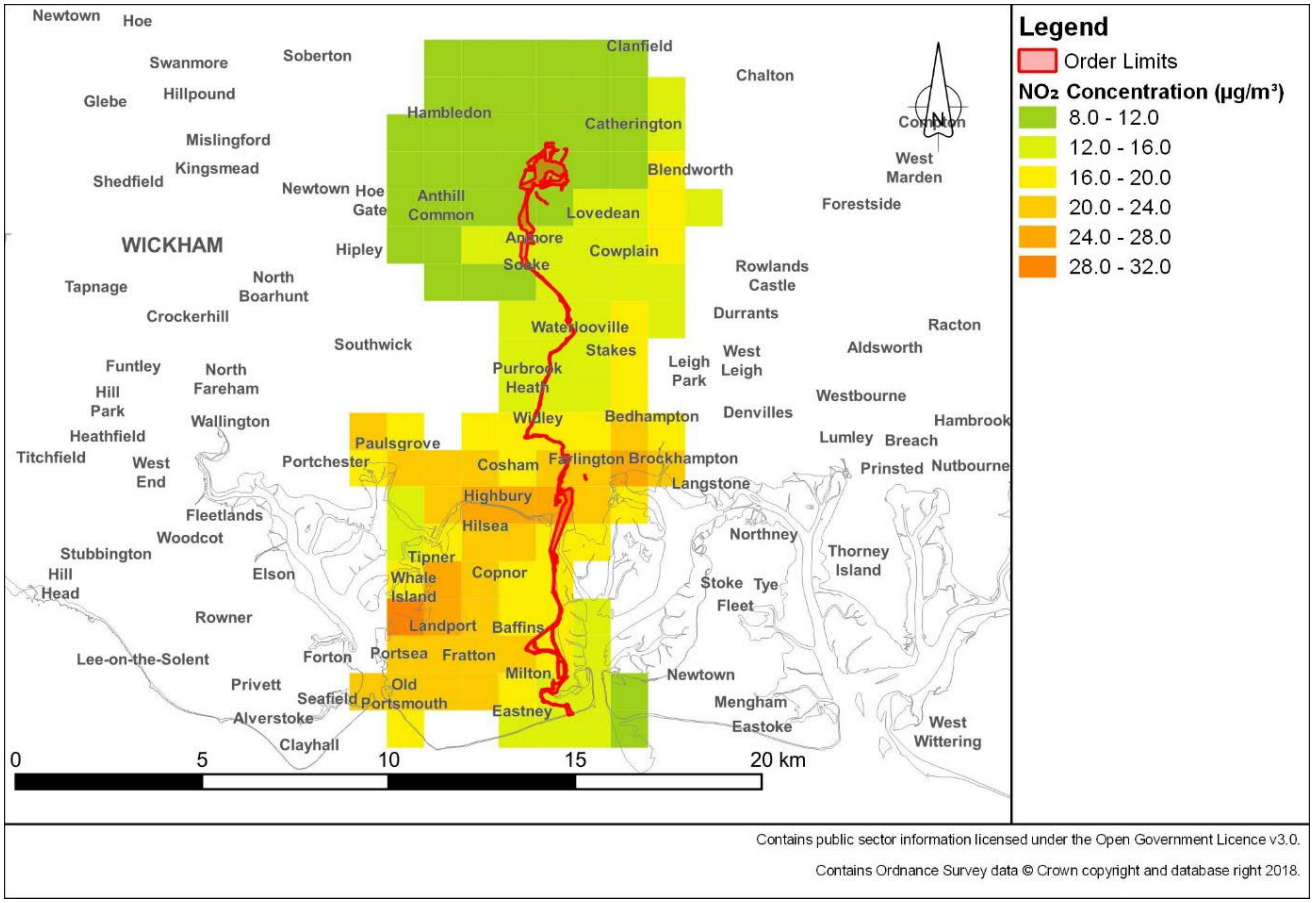


Plate 23.1 - 2018 Modelled NO_2 Background

23.5.3.4. The background concentrations of NO2 shown in Plate 23.1 show elevated concentrations over the City of Portsmouth, A27/M27 areas, and the A3(M), with lower concentrations over rural areas and Hayling Island.

23.5.3.5. The Portsmouth Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019) reports a number of areas where concentrations of NO_2 expected to remain in excess of the limit value of 40 µg/m³ for NO_2 beyond 2020. The Do-minimum scenario modelling for this assessment used the worst-case traffic volumes within the construction period. Under this scenario no compliance locations were specifically modelled as exceeding the Defra limit value at modelled receptors. Modelled concentrations were close to the limit value at A3 Mile End Road, between the southern end of the M275 and Church Street roundabout (PCM link 48196), but were below the limit value at all other locations.

23.5.3.6. Using PCM modelling, some locations were predicted to continue to exceed the limit, and these are detailed in Section 23.6.2.57.

23.5.3.7. The 2018 baseline modelled background for NO_X is presented in Plate 23.2.

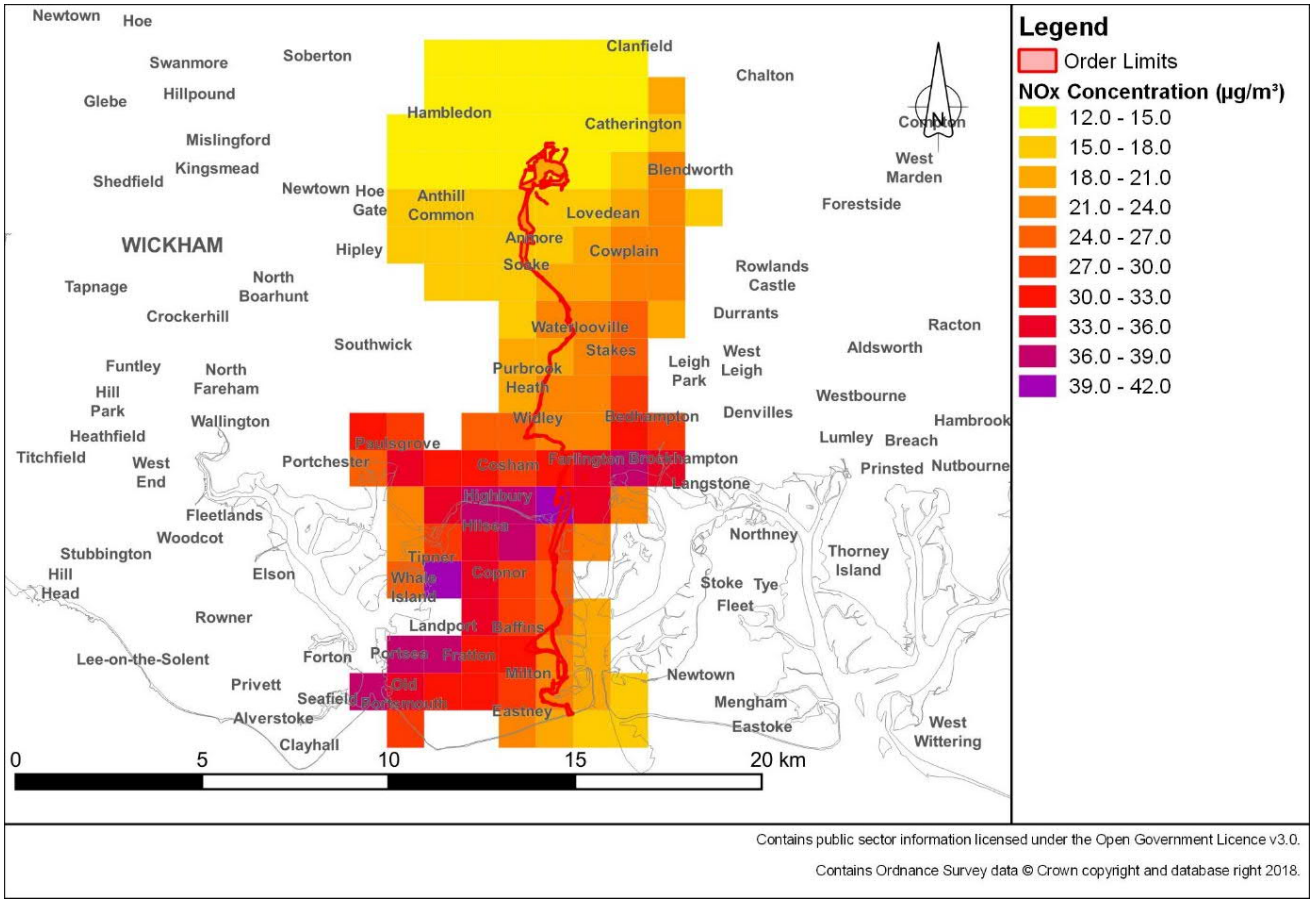


Plate 23.2 - 2018 Modelled NO_X Background

23.5.3.8. The background NOx concentrations presented in Plate 23.2 show elevated concentrations over the City of Portsmouth, where the coastal regions border statutory designated ecological sites.

Diverted Traffic and Construction Traffic

23.5.3.9. The study area was divided into the model Verification Zones as shown in Figure 23.12 of the ES Volume 2 (APP-334). The specific representative receptors assessed within each Verification Zone are shown in Table 2 of Appendix 23.3. These receptors were selected following the processing of model outputs as those with the highest concentrations in a verification zone or the largest change in concentrations in a verification zone.

23.5.4. FUTURE BASELINE

23.5.4.1. The Future Baseline scenario as the peak year for construction activity is relevant to the assessments of diverted traffic and construction traffic and is referred to as the Do-Minimum scenario in line with the traffic flow data. The background concentration

data for the Construction Dust Risk Assessment were coordinated with the data used for the traffic assessments.

2022 Do-Minimum

23.5.4.2. The 2022 modelled background for NO_2 is presented in Plate 23.23.

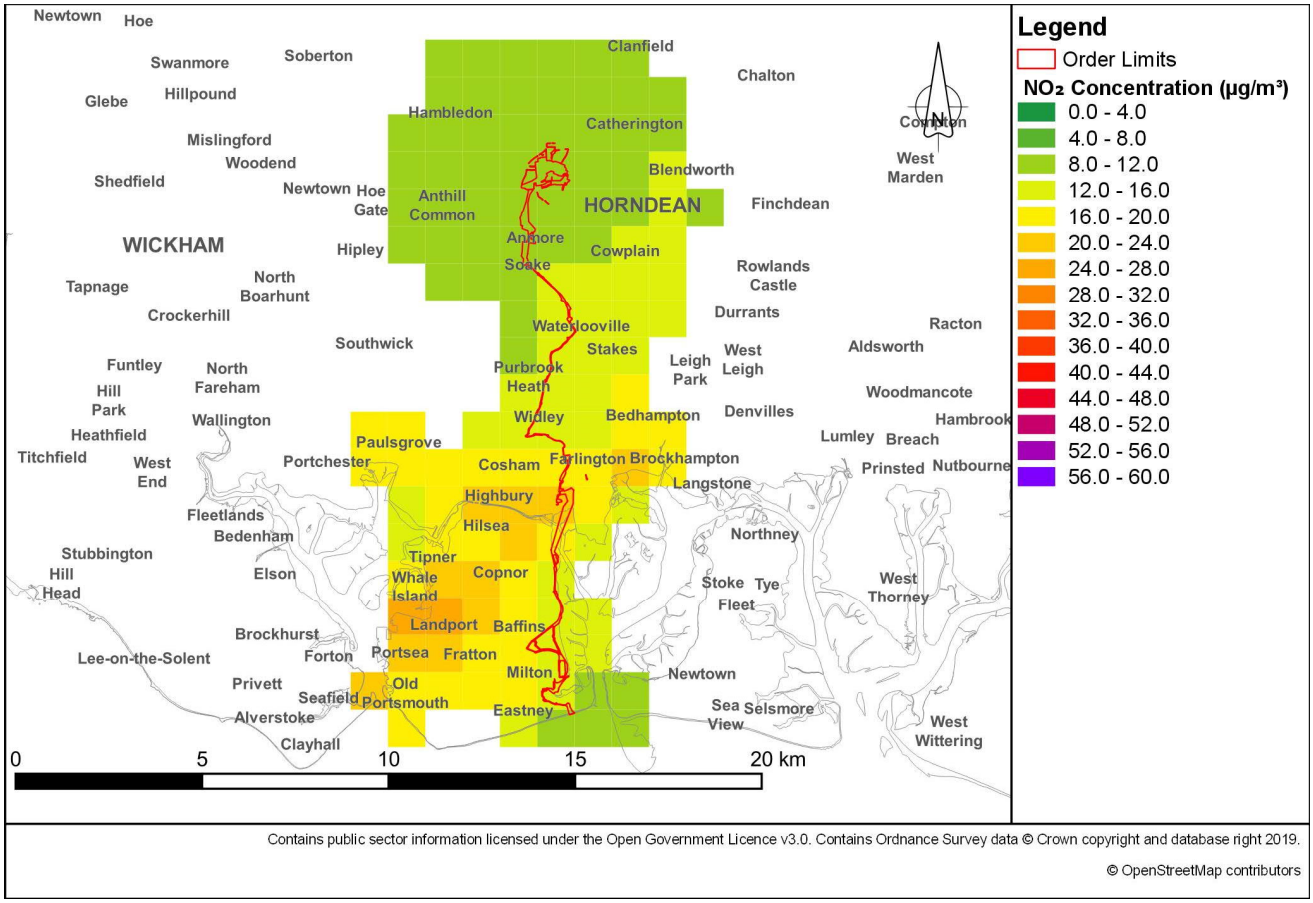


Plate 23.3 - 2022 Modelled NO_2 Background

23.5.4.3. Plate 23.3 shows that future modelled NO_2 background concentrations are predicted to be low in the Horndean and Lovedean areas of the Proposed Development and elevated in the City of Portsmouth area and around key junctions of the A27.

23.5.4.4. The 2022 modelled background for NO_X is presented in Plate 23.4 (see page below).

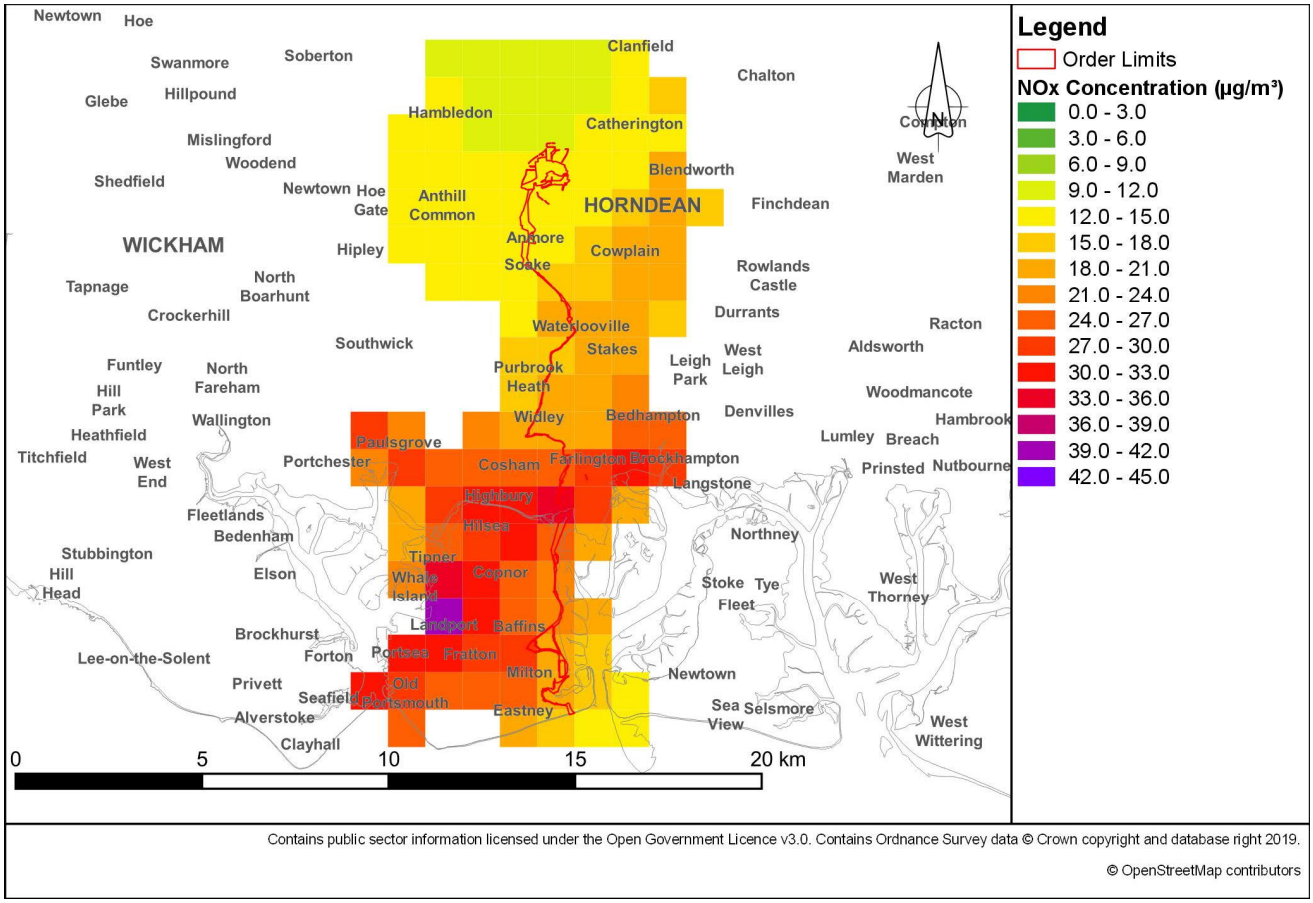


Plate 23.4 - 2022 Modelled NO_X Background

23.5.4.5. Plate 23.24 shows low future modelled concentrations of NO_X in the Horndean and Lovedean areas, with elevated concentrations at the southern extents of the Proposed Development. Of note are the high concentrations in the west of the City of Portsmouth that are in excess of the limit value of 30 µg/m³ for the protection of vegetation.

Construction Site Activities

23.5.4.6. An average for the relevant 2022 background pollutant concentrations for PM_{10} and $PM_{2.5}$ has been taken within a 600 m buffer of the of the Order Limits for each relevant Onshore Cable Corridor Section.

23.5.4.7. The Defra background concentration data show that a large proportion of the background particulate concentrations are made up from secondary produced particulates and sea salt.

Section 1 – Lovedean (Converter Station Area)

23.5.4.8. Modelled background concentrations of PM_{10} are shown in Plate 23.5, below.

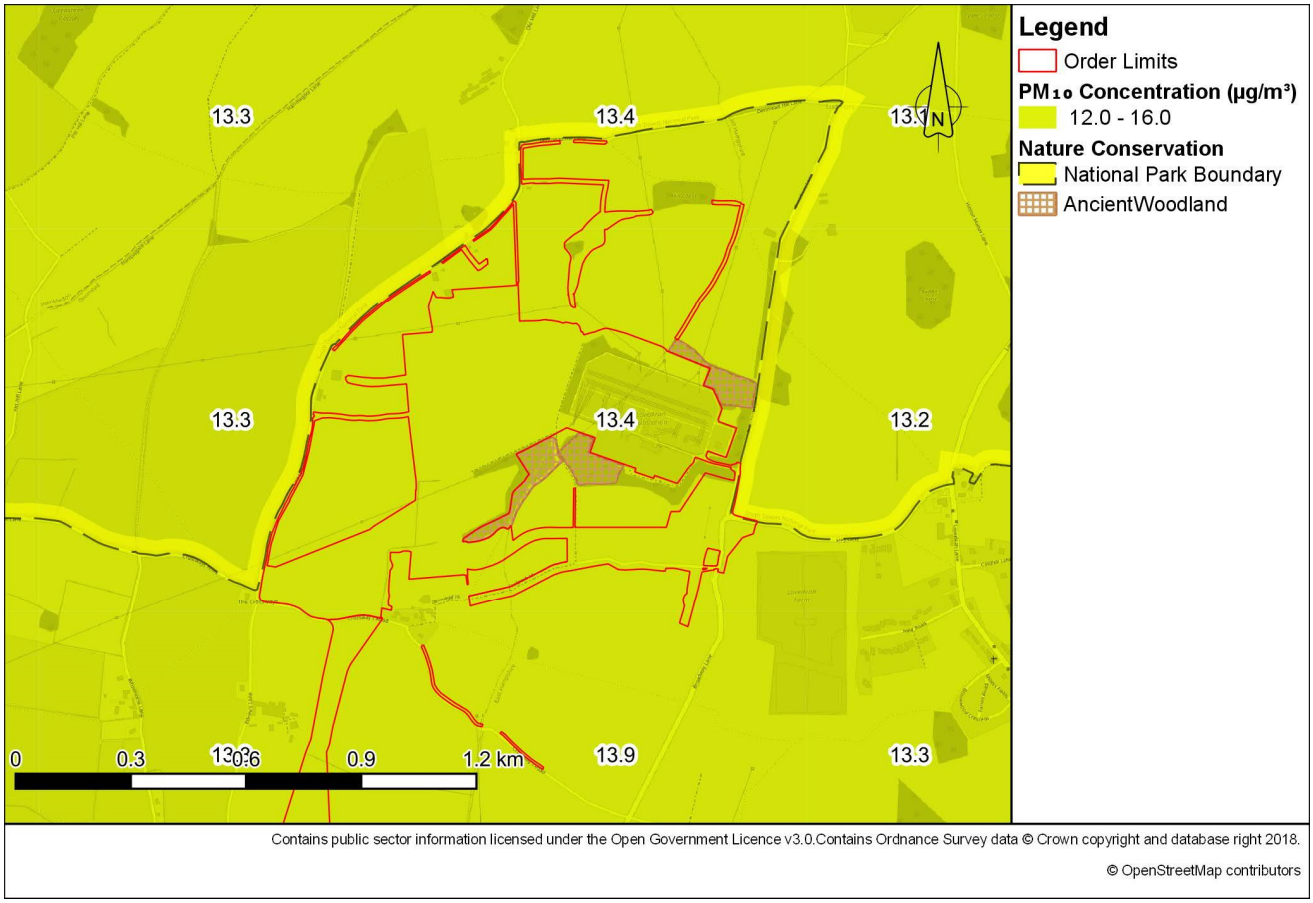


Plate 23.5 – Section 1 PM_{10} Concentrations

23.5.4.9. Plate 23.5 shows that background concentrations of PM_{10} are generally low, being below 50 % of the objective and limit value. The average concentration over this section is 13.3 µg/m³.

23.5.4.10. Modelled background concentrations of $PM_{2.5}$ are shown in Plate 23.6.

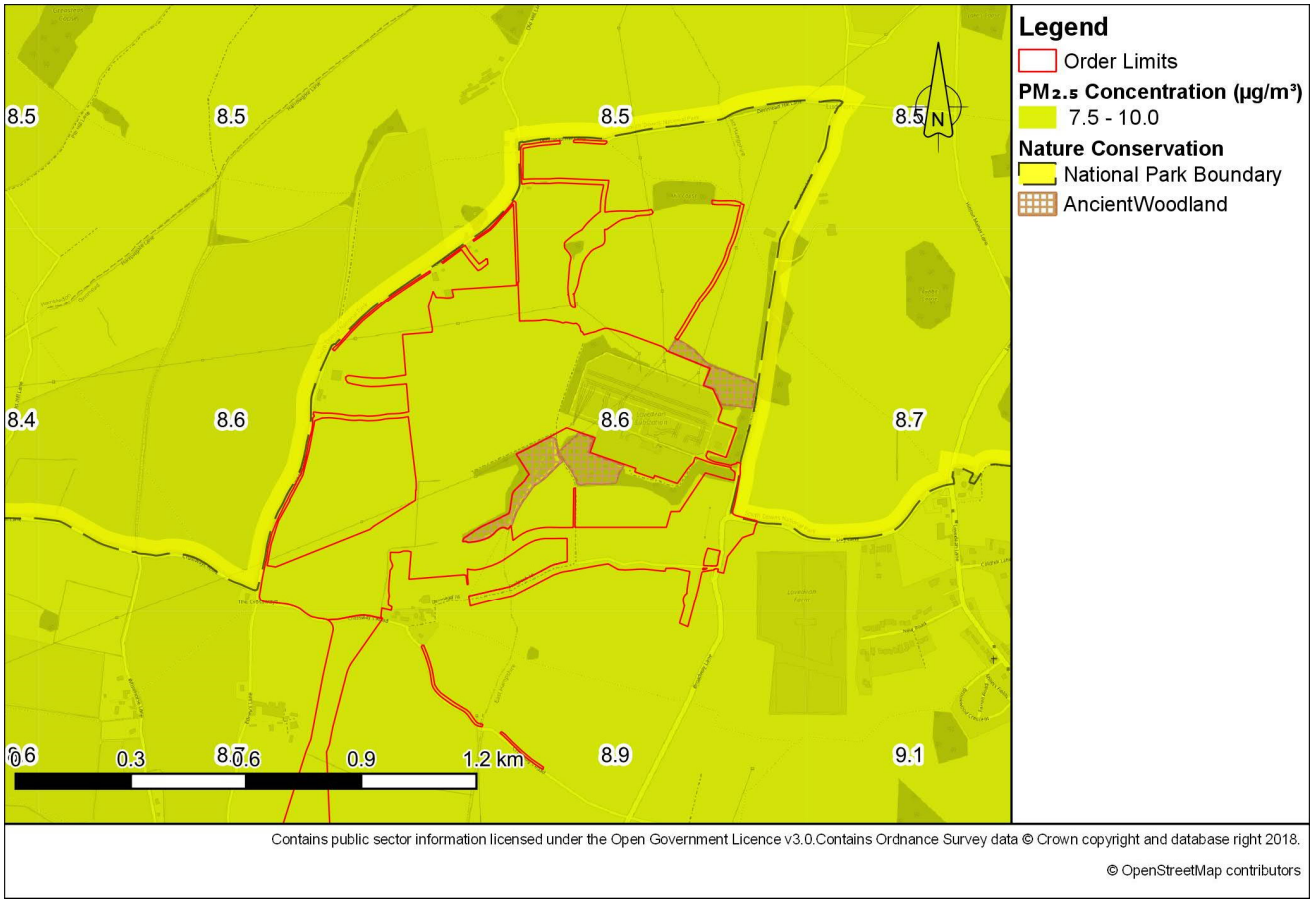


Plate 23.6 – Section 1 $PM_{2.5}$ Concentrations

23.5.4.11. Plate 23.6 shows that background concentrations of $PM_{2.5}$ are generally low, being below 50 % of the limit value. the average concentration of $PM_{2.5}$ over this section is 8.7 µg/m³.

23.5.4.12. The surrounding land at this Section is predominantly arable agricultural leading to the possibility of temporarily elevated concentrations of coarse particulate matter resulting from agricultural activity.

23.5.4.13. There are four areas designated as Ancient Woodland that are directly adjacent to the Order Limits for this Section. These are:

- Crabdens Copse (ID 1490538);
- Crabdens Row (ID 1490537);
- Crabdens Row (ID 1490461); and
- Stoneacre Copse (ID 1490442).

23.5.4.14. Whilst ancient woodland would not normally be included in a construction dust assessment, the proximity of these areas to an area of substantial works merits their inclusion.

23.5.4.15. Cumulative banded receptor counts for this section are shown in Table 23.9.

Table 23.9 - Cumulative Receptor Counts for Section 1

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	11	23	25	29	41	7
Community	0	0	0	0	0	0
Commercial	1	1	1	2	2	1
Total	12	24	26	31	43	8

23.5.4.16. Due to the presence of residential receptors in a largely rural area where a reasonable level of amenity can be assumed and the aesthetics of the area may be diminished by nuisance dust, using the criteria in Appendix 23.2 (IAQM Construction Assessment) the sensitivity of the area to both dust soiling and the health effects of PM_{10} is considered to be **high** for earthworks, construction and trackout activities.

Section 2 – Anmore

23.5.4.17. Modelled background concentrations of PM_{10} are shown in Plate 23.7.

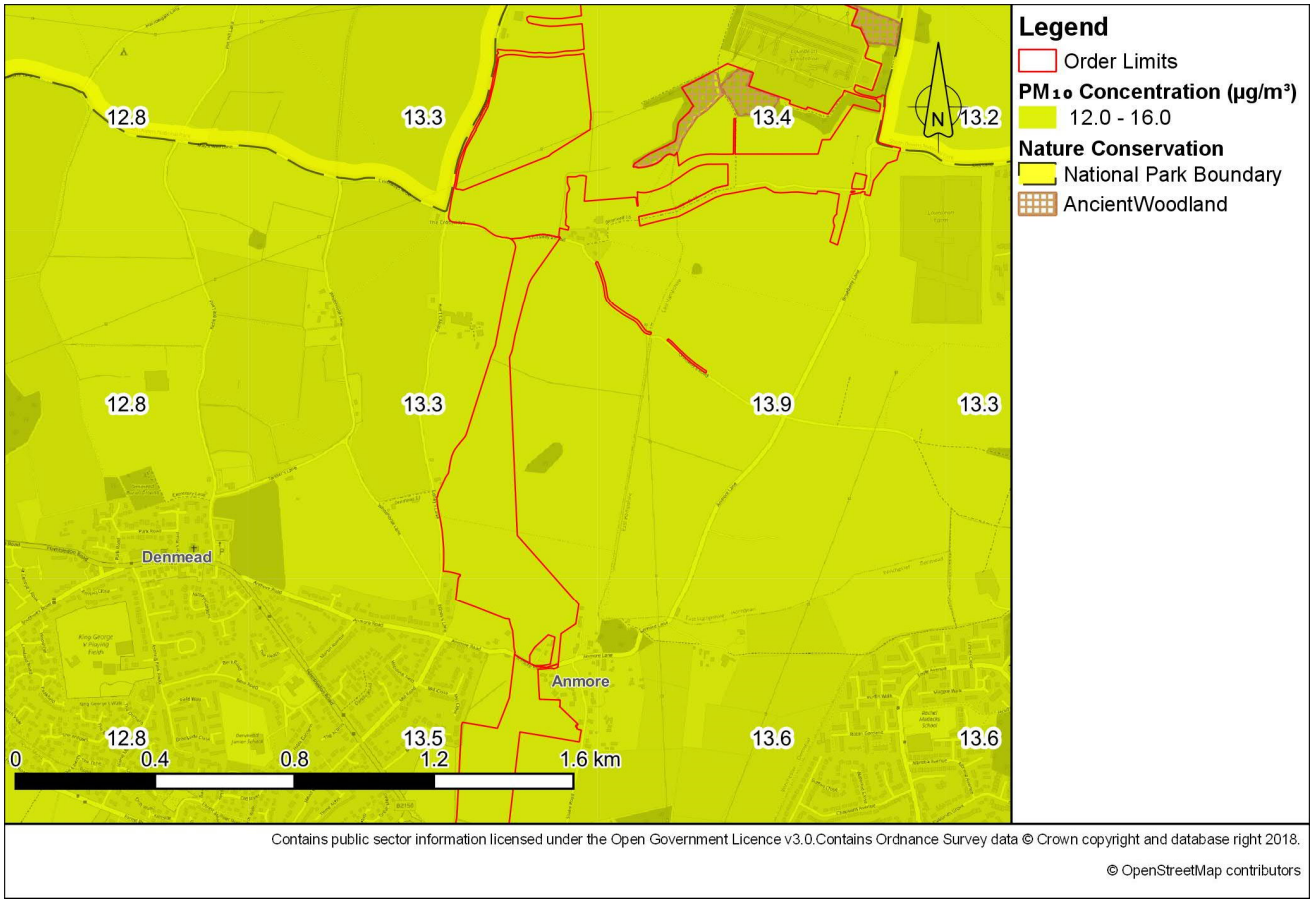


Plate 23.7 – Section 2 PM_{10} Concentrations

23.5.4.18. Plate 23.7 shows that background concentrations of PM_{10} in Section 2 are generally low, with an average concentration of 13.5 µg/m³.

23.5.4.19. Modelled background concentrations of $PM_{2.5}$ are shown in Plate 23.8.

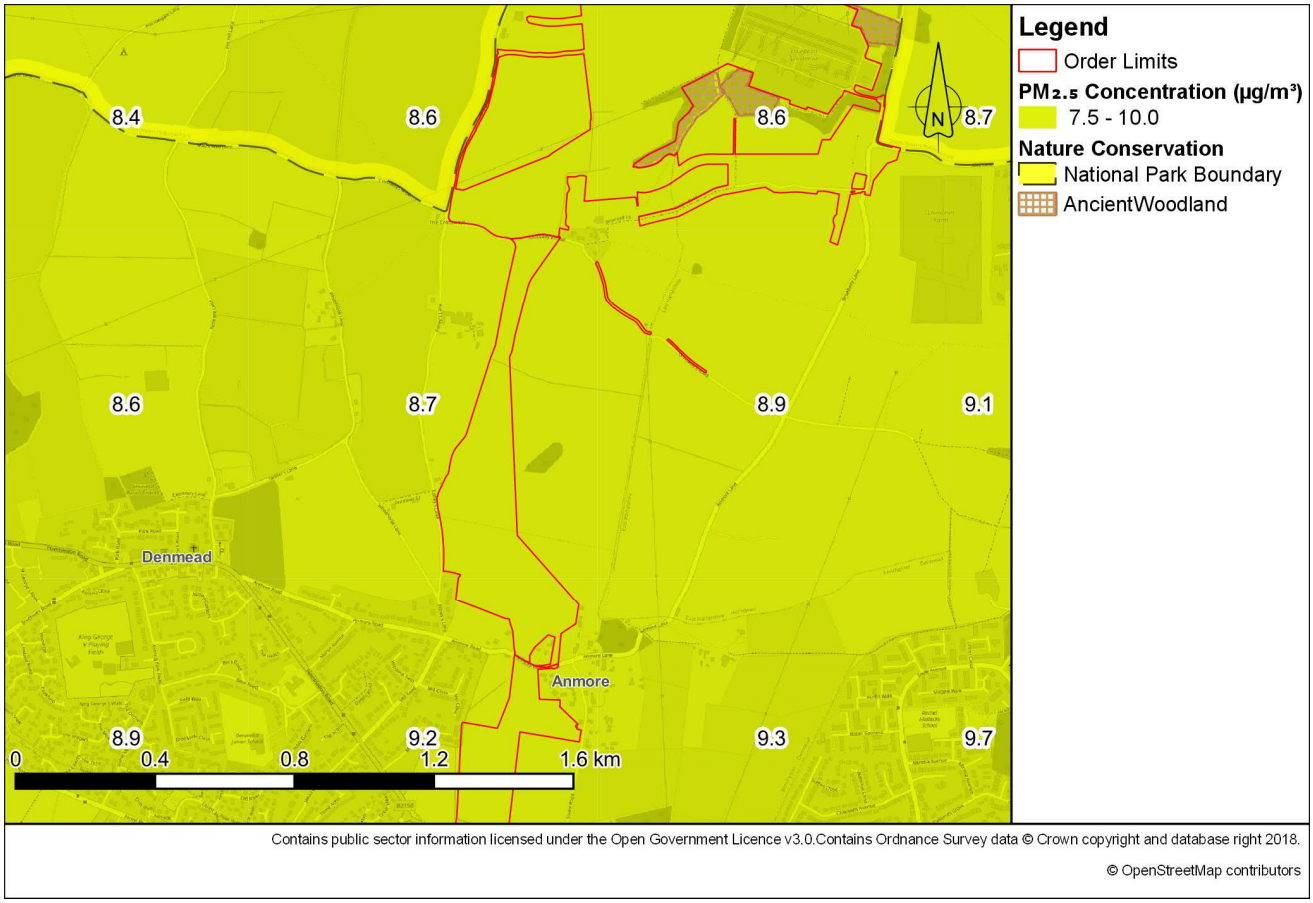


Plate 23.8 – Section 2 $PM_{2.5}$ Concentrations

23.5.4.20. Plate 23.8 shows generally low background concentrations of $PM_{2.5}$, with the average concentration for this section at 8.9 µg/m³.

23.5.4.21. The surrounding land is mainly arable agricultural, which may create seasonal peaks in coarse particulate matter, with the settlement of Denmead to the immediate south-west.

23.5.4.22. Cumulative banded receptor counts for this section are shown in Table 23.10.

Table 23.10 - Cumulative Receptor Counts for Section 2

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	9	19	41	114	289	0
Community	0	0	0	0	0	0
Commercial	1	1	1	1	2	0
Total	10	20	42	115	291	0

23.5.4.23. There is one local Site of Importance for Nature Conservation (SINC) adjacent to the Order Limits for this section:

- Kings Pond Meadow SINC.

Section 3 – Denmead/Kings Pond Meadow

23.5.4.24. Modelled background concentrations of PM_{10} are shown in Plate 23.9.

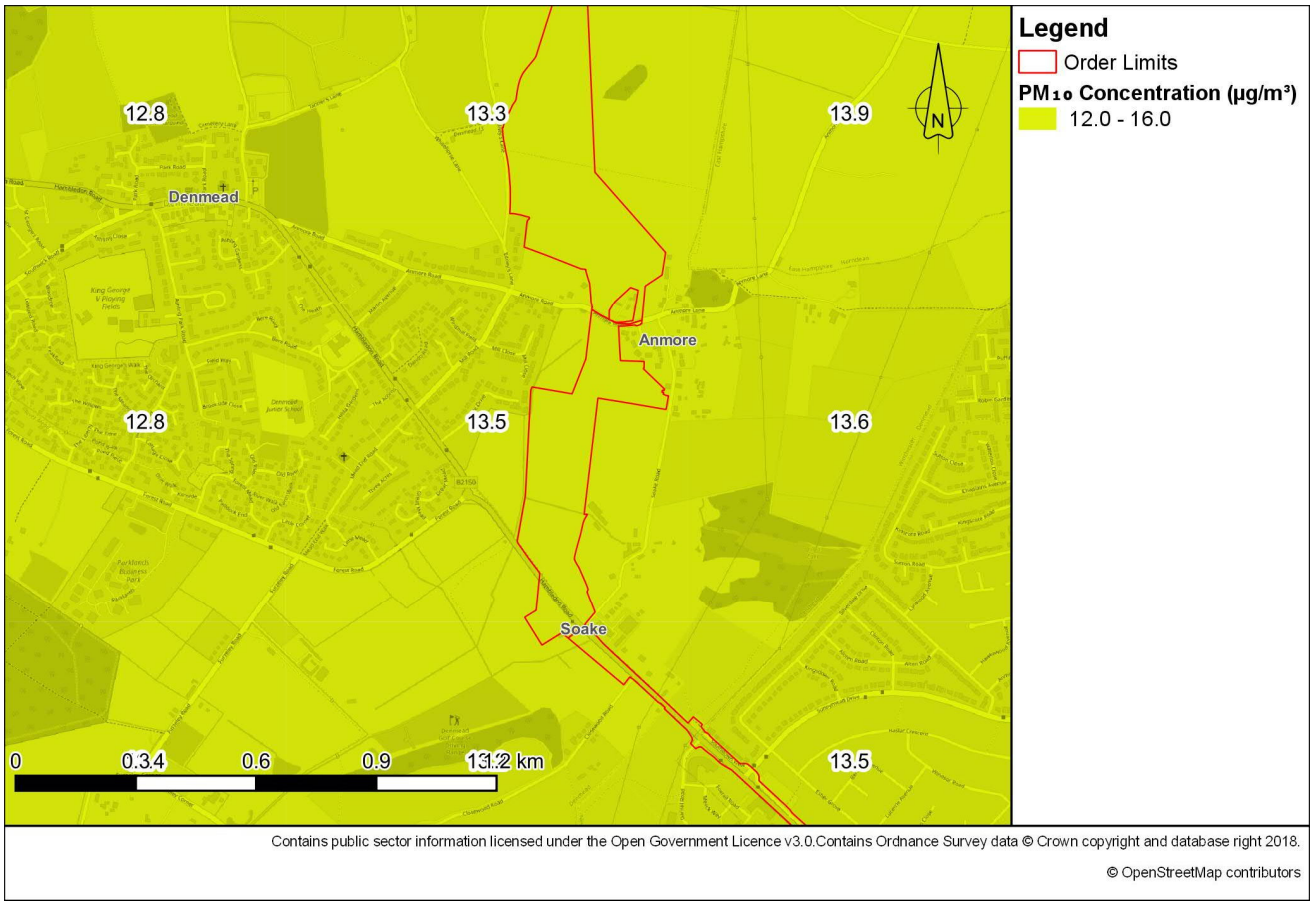


Plate 23.9 – Section 3 PM_{10} Concentrations

23.5.4.25. Plate 23.9 shows generally low concentrations of PM_{10} for this Section. The average concentration for this section is 13.5 µg/m³.

23.5.4.26. Modelled background concentrations of $PM_{2.5}$ are shown in Plate 23.10.

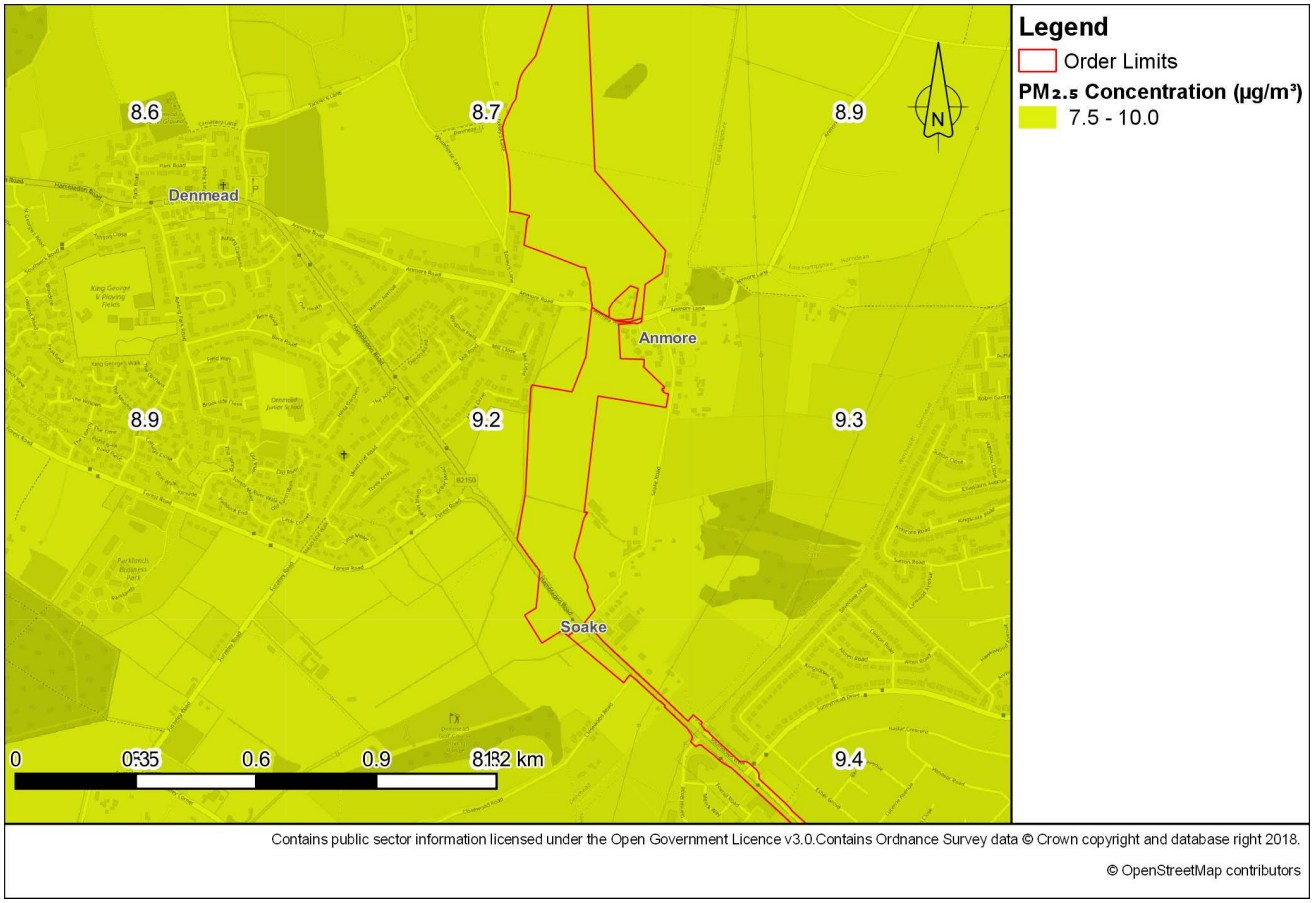


Plate 23.10 – Section 3 $PM_{2.5}$ Concentrations

23.5.4.27. Plate 23.10 shows that background concentrations of $PM_{2.5}$ are generally low for this section, with the average concentration being 9.0 µg/m³.

23.5.4.28. The surrounding land is a mix of arable agricultural, woodland and the settlement of Denmead, with local B class roads passing through the Order Limits.

23.5.4.29. Cumulative banded receptor counts for this section are shown in Table 23.11.

Table 23.11 - Cumulative Receptor Counts for Section 3

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	16	36	79	194	424	0
Community	0	0	0	0	1	0
Commercial	1	3	6	9	10	0
Total	17	39	85	203	435	0

23.5.4.30. The Denmead Dental Surgery is within 350 m of this section.

23.5.4.31. There is one designated ecological site within the Order Limits for this section:

- Kings Pond Meadow SINC.

Section 4 – Hambledon Road to Farlington Avenue

23.5.4.32. Modelled background concentrations of PM_{10} are shown in Plate 23.11.

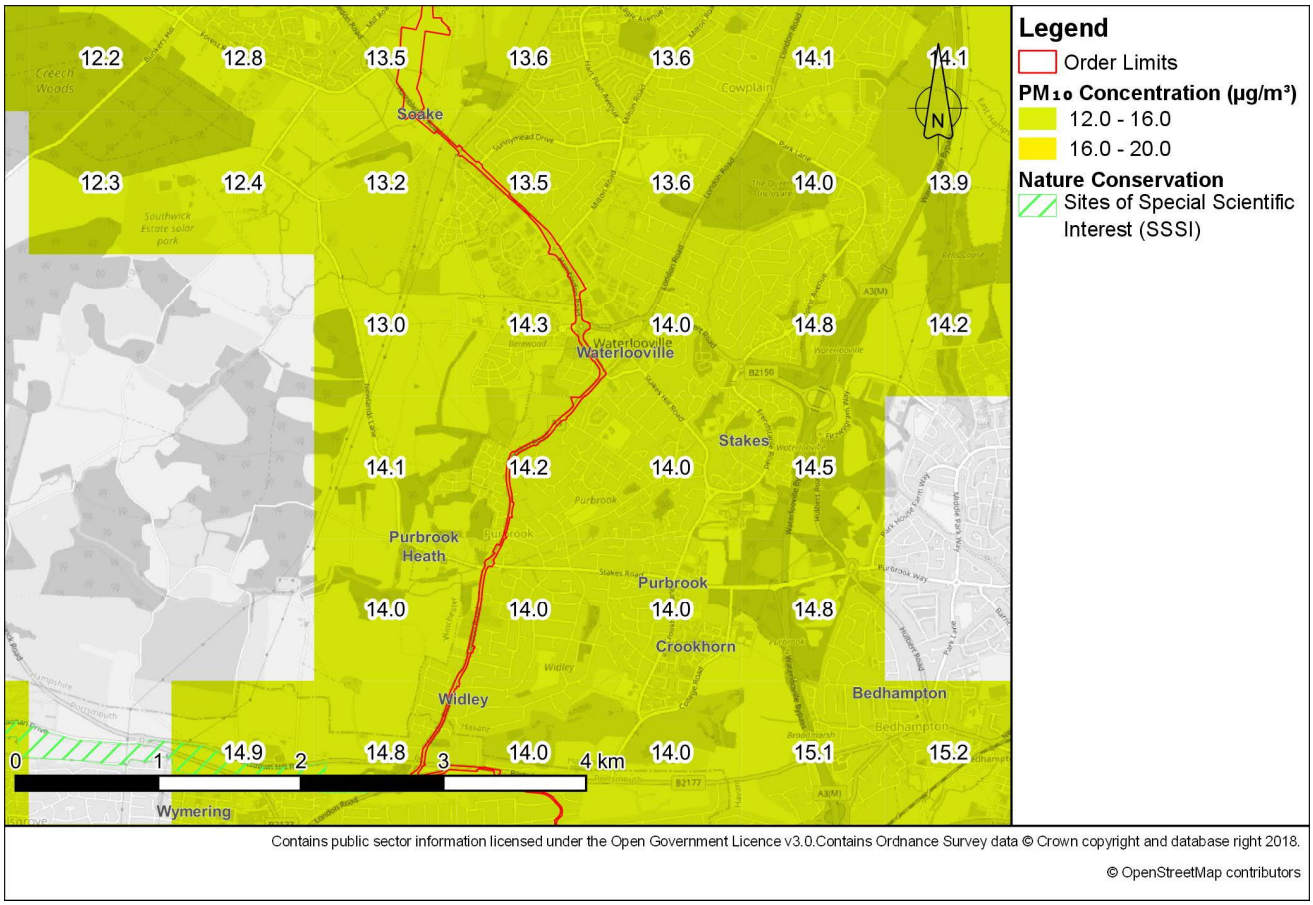


Plate 23.11 – Section 4 PM_{10} Concentrations

23.5.4.33. Plate 23.11 shows that concentration of PM_{10} increase from north to south across this section. The average concentration of PM_{10} for this section is 14.1 µg/m³.

23.5.4.34. Modelled background concentrations of $PM_{2.5}$ are shown in Plate 23.12.

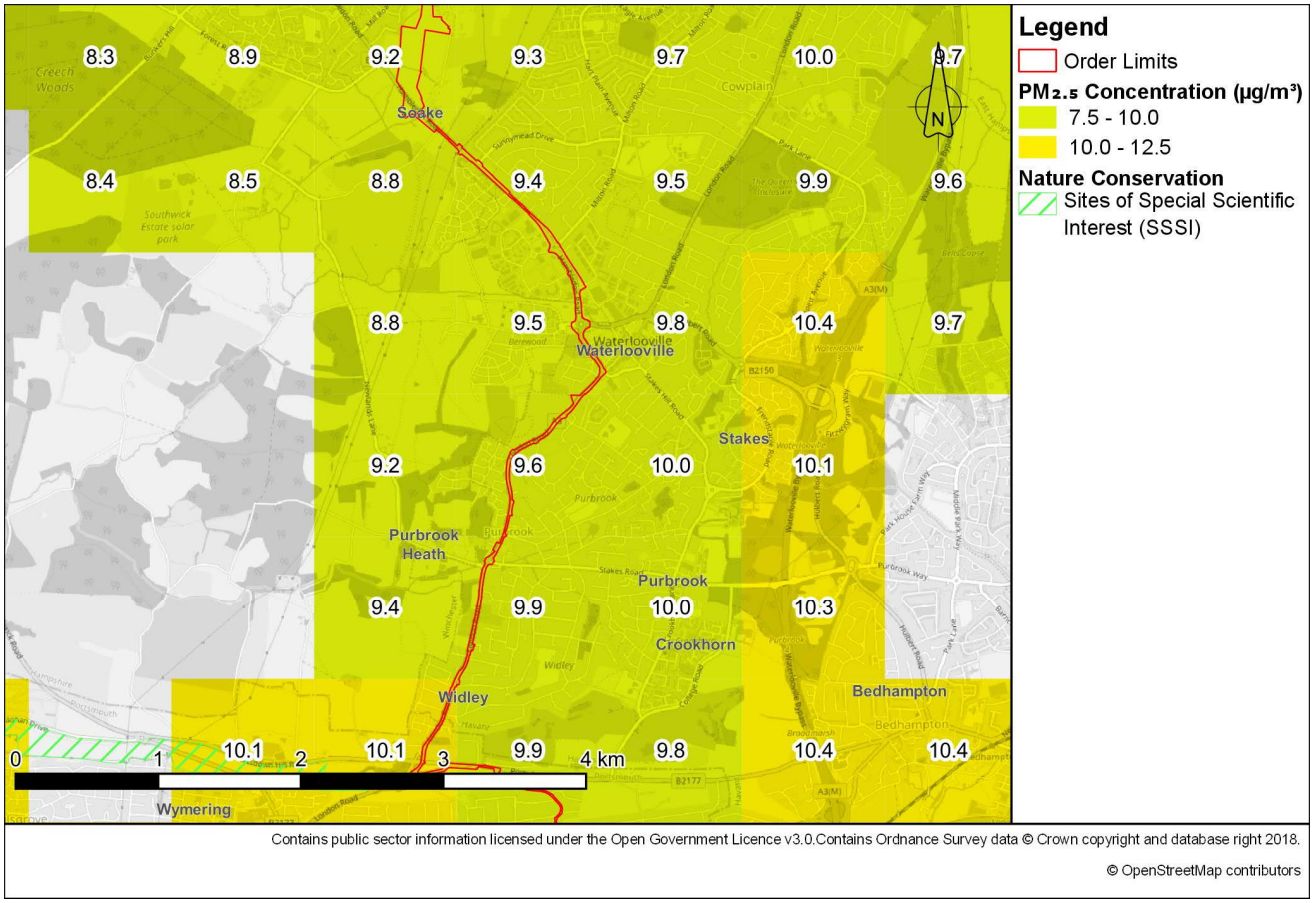


Plate 23.12 – Section 4 $PM_{2.5}$ Concentrations

23.5.4.35. Plate 23.12 shows that concentrations of $PM_{2.5}$ also increase from north to south across this section. The average concentration of $PM_{2.5}$ is 9.7 µg/m³.

23.5.4.36. This section passes through Waterlooville, and to the west of the Stakes, Purbrook and Widley urban areas. The land to the west of the route is a mix of grassland, woodland and arable agricultural, whilst the areas to the east of the route are dense suburban settlements.

23.5.4.37. Cumulative banded receptor counts for this Section are shown in Table 23.12.

Table 23.12 - Cumulative Receptor Counts for Section 4

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	595	979	1724	3,515	5,697	774
Community	6	8	13	19	27	5
Commercial	89	123	162	389	649	91
Total	690	1,110	1,899	3,923	6,373	870

23.5.4.38. Education facilities within 350 m of this Section are:

- Little Acorns Nursery School;
- Woodside House School;
- The Waterloo School;
- Mill Hill Early Years Centre;
- Mill Hill Primary School;
- Purbrook Infant School; and
- Parklands Day Nursery.

23.5.4.39. Medical facilities within 350 m of this Section are:

- Forest End Surgery; and
- The Rowans Hospice.

23.5.4.40. There are a number of ecologically designated sites within or adjacent to the order limits:

- London Road Fen SINC;
- Land to the south of Portsdown Hill Road SINC;
- Meadow west of Farlington Avenue SINC; and
- Farlington Avenue SINC.

Section 5 – Farlington

23.5.4.41. Modelled background concentration of PM_{10} are shown in Plate 23.13.

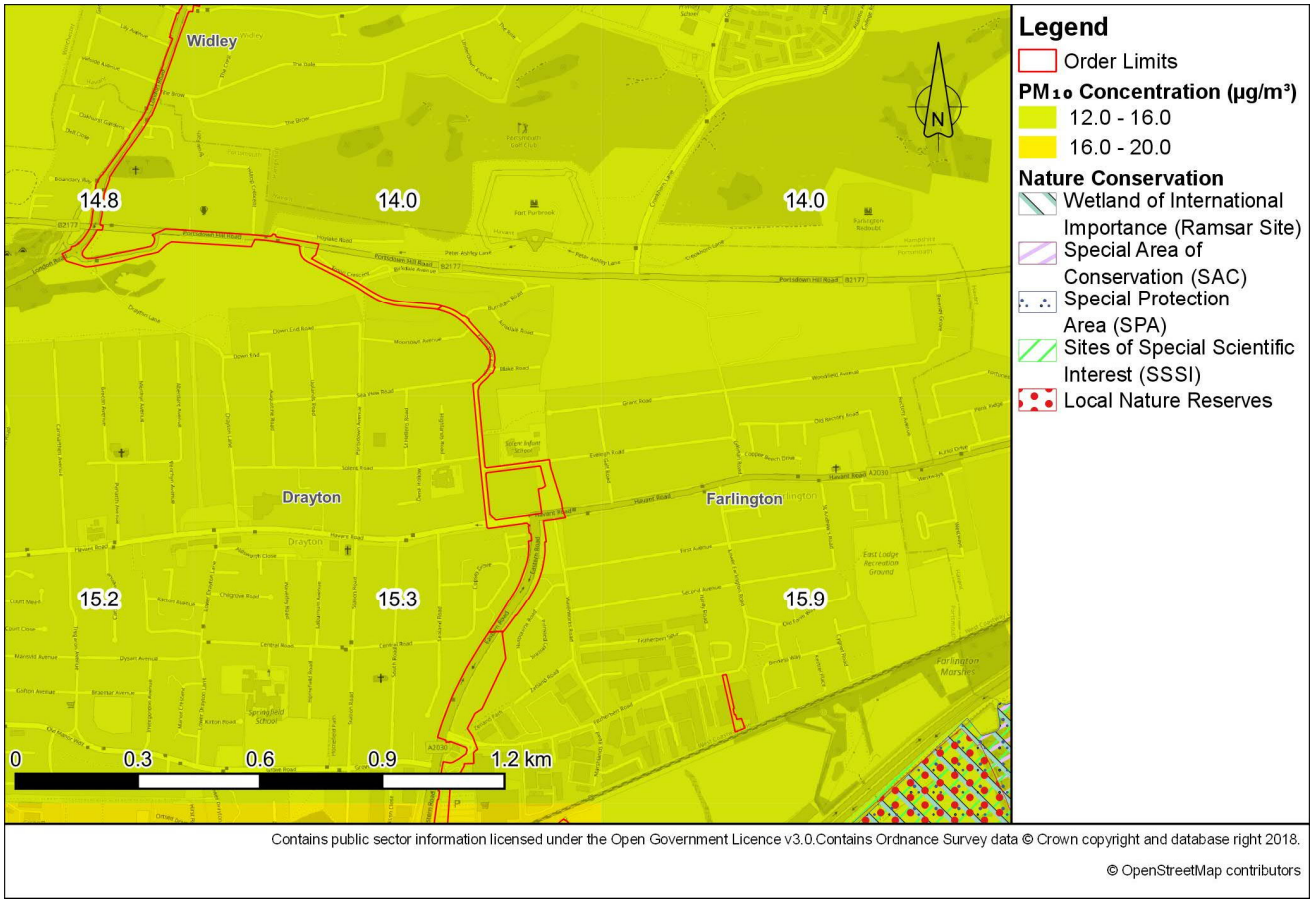


Plate 23.13 – Section 5 PM_{10} Concentrations

23.5.4.42. Plate 23.13 shows that concentrations of PM_{10} are still below 50 % of the limit value in this section. The average PM_{10} concentration for this section is 14.8 µg/m³.

23.5.4.43. Modelled background concentrations of $PM_{2.5}$ are shown in Plate 23.14.

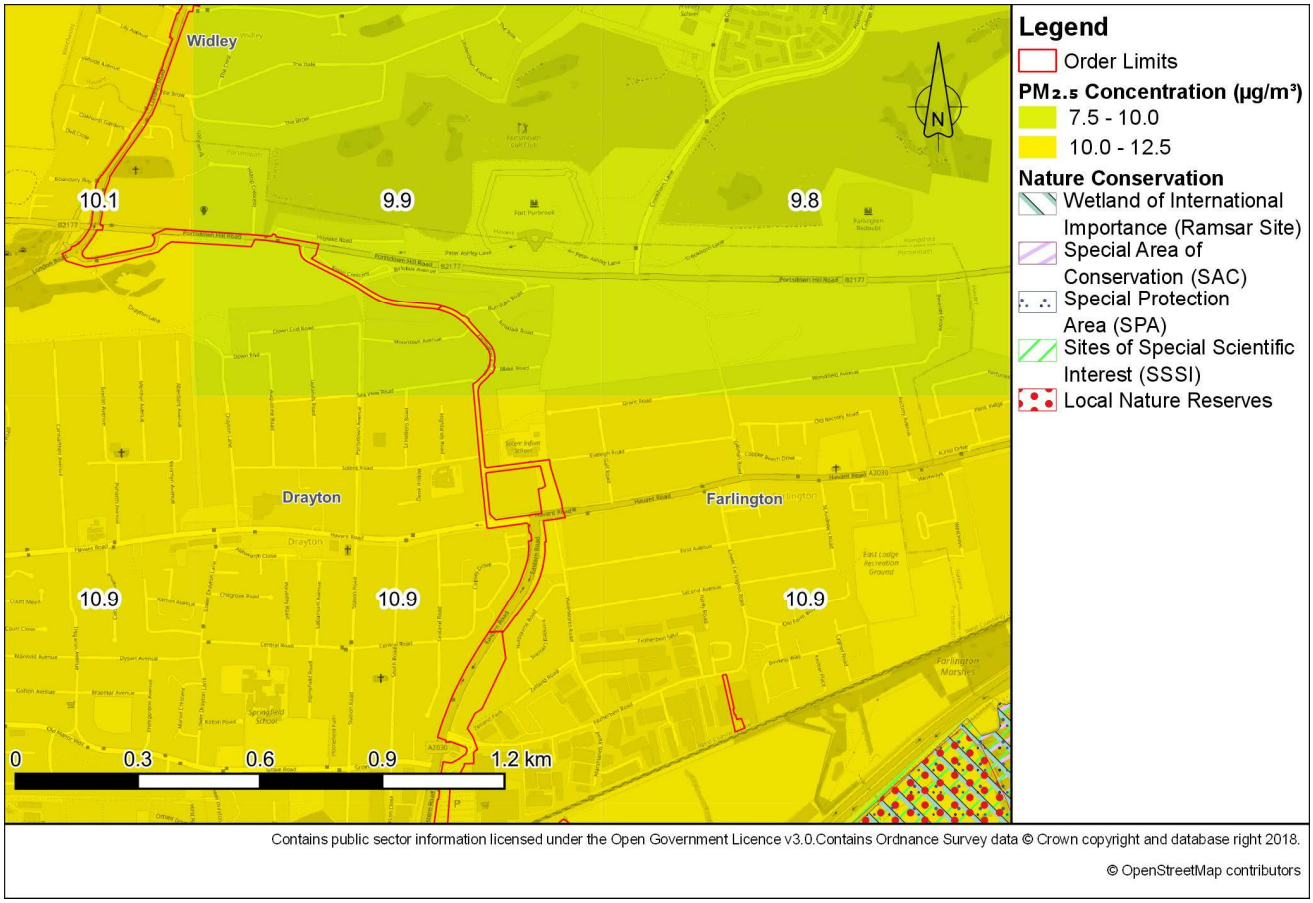


Plate 23.14 – Section 5 $PM_{2.5}$ Concentrations

23.5.4.44. Plate 23.14 shows that concentrations of $PM_{2.5}$ in this section are approaching 50 % of the limit value, leaving little headroom for polluting activities. The average concentration of $PM_{2.5}$ for this section is 10.4 µg/m³.

23.5.4.45. The areas of Drayton and Farlington that this section passes through are densely populated suburban areas close to the A27.

23.5.4.46. Cumulative banded receptor counts for this section are shown in Table 23.13.

Table 23.13 - Cumulative Receptor Counts for Section 5

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	171	285	499	872	1,374	195
Community	3	3	4	4	6	0
Commercial	3	3	3	8	60	10
Total	177	291	506	884	1,440	205

23.5.4.47. Education facilities within 350 m of this section are:

- Solent Infant School; and
- Solent Junior School.

23.5.4.48. The ANA Treatment Centres Ltd medical institution is within 350 m of this section.

23.5.4.49. There is one ecologically designated site adjacent to the order limits for this section:

- Farlington Avenue SINC.

Section 6 – Zetland Field and Sainsbury's Car Park

23.5.4.50. Modelled background concentrations of PM_{10} are shown in Plate 23.15.

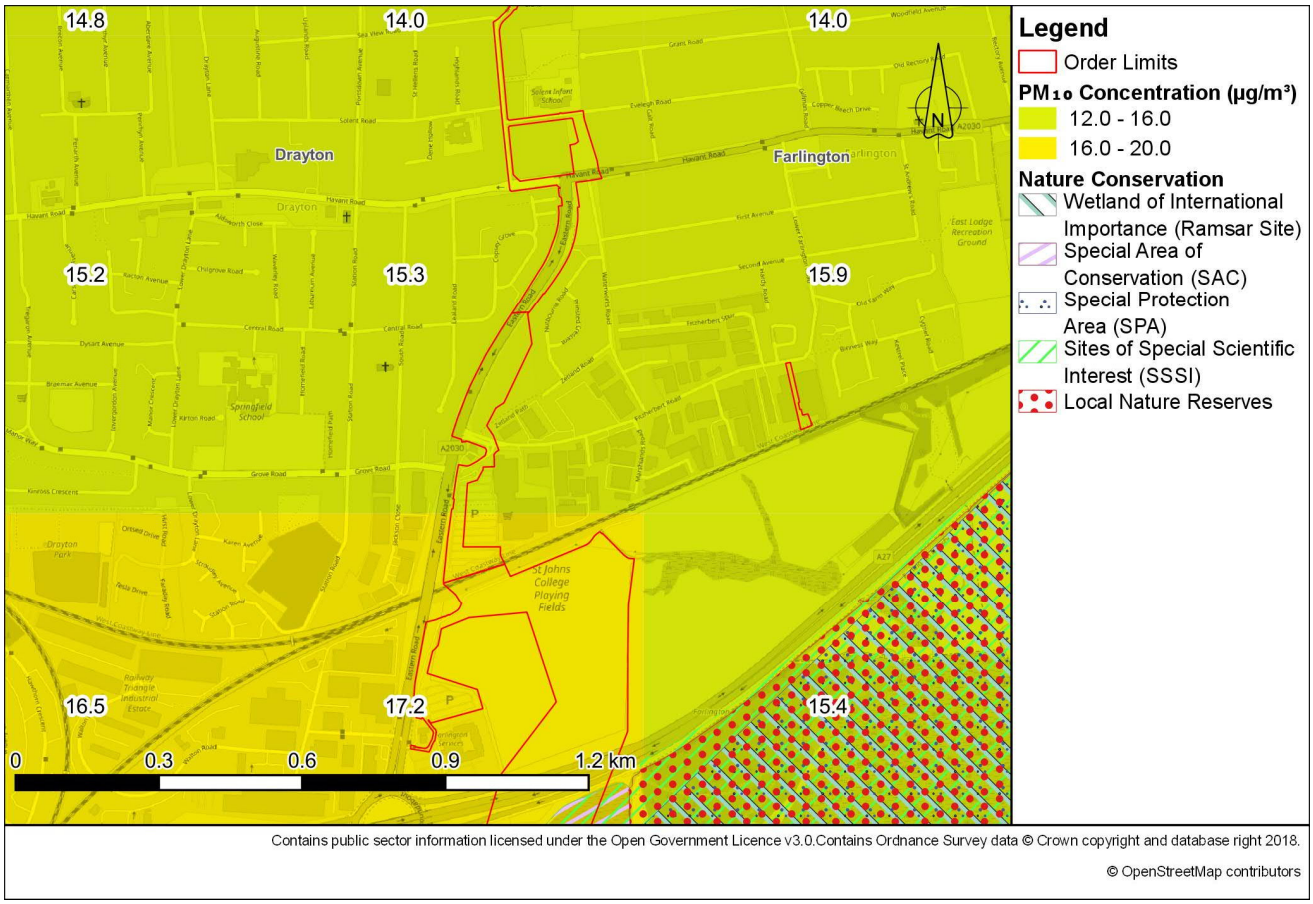


Plate 23.15 – Section 6 PM_{10} Concentration

23.5.4.51. Plate 23.15 shows that concentrations of PM_{10} are low, with an average concentration for the area of 15.9 µg/m³.

23.5.4.52. Modelled concentrations of $PM_{2.5}$ are shown in Plate 23.16.

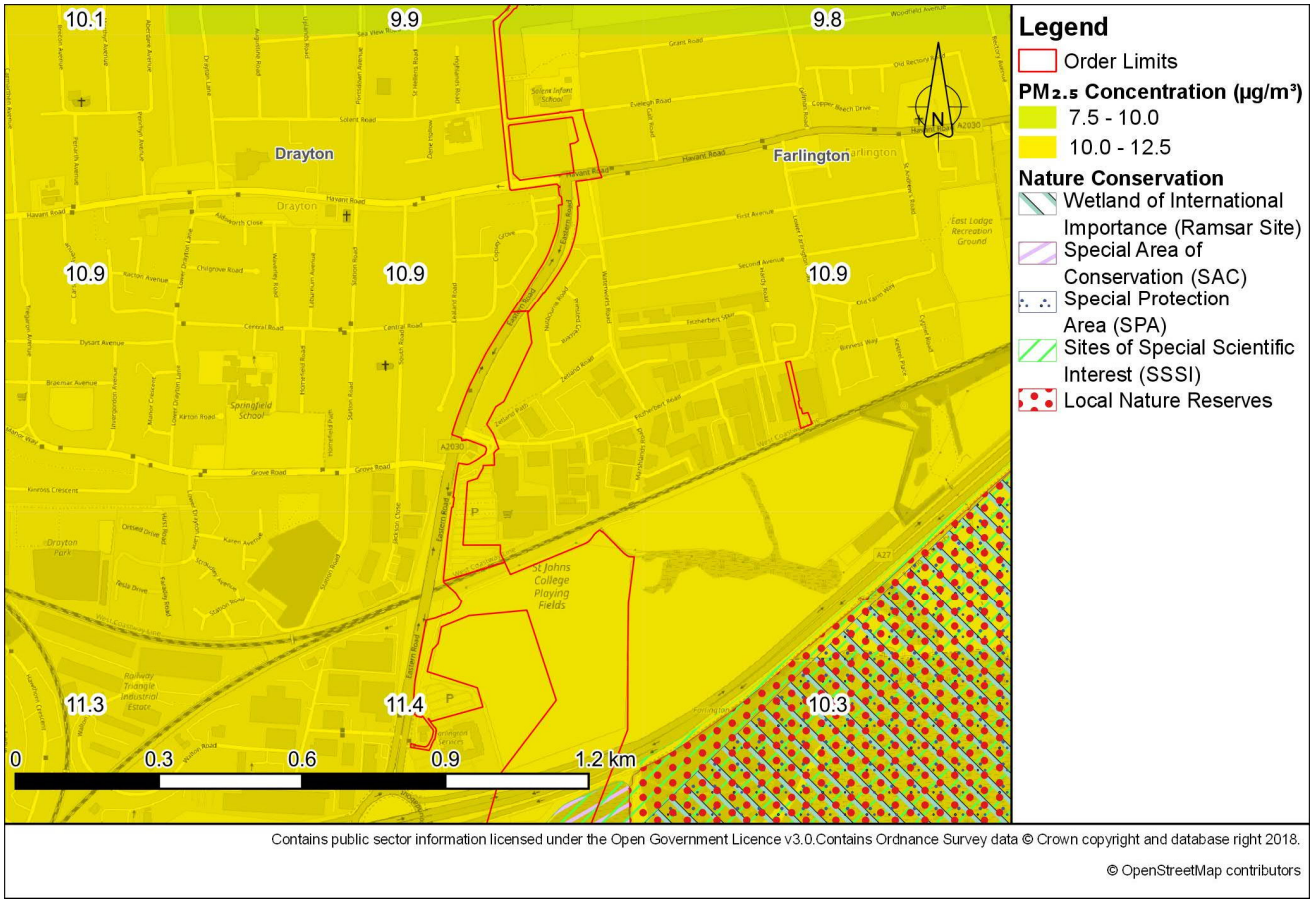


Plate 23.16 – Section 6 $PM_{2.5}$ Concentrations

23.5.4.53. Plate 23.16 shows that concentrations of $PM_{2.5}$ are generally low, though close to 50% of the limit value, leaving little headroom for particulate producing activities. Average concentrations of $PM_{2.5}$ for this section are 10.9 µg/m³.

23.5.4.54. The surrounding area is made up of densely populated suburbia and commercial areas, including a large supermarket.

23.5.4.55. Cumulative banded receptor for this Section are shown in Table 23.14.

Table 23.14 - Cumulative Receptor Counts for Section 6

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	39	121	313	642	1,217	0
Community	0	0	0	2	2	0
Commercial	12	22	59	129	178	0
Total	51	143	372	773	1,397	0

23.5.4.56. The ANA Treatment Centres Ltd medical institution for vulnerable adults is within 350 m of this Section.

Section 7 – Farlington Junction to Airport Service Road

23.5.4.57. Modelled PM_{10} concentrations for this Section are shown in Plate 23.17.

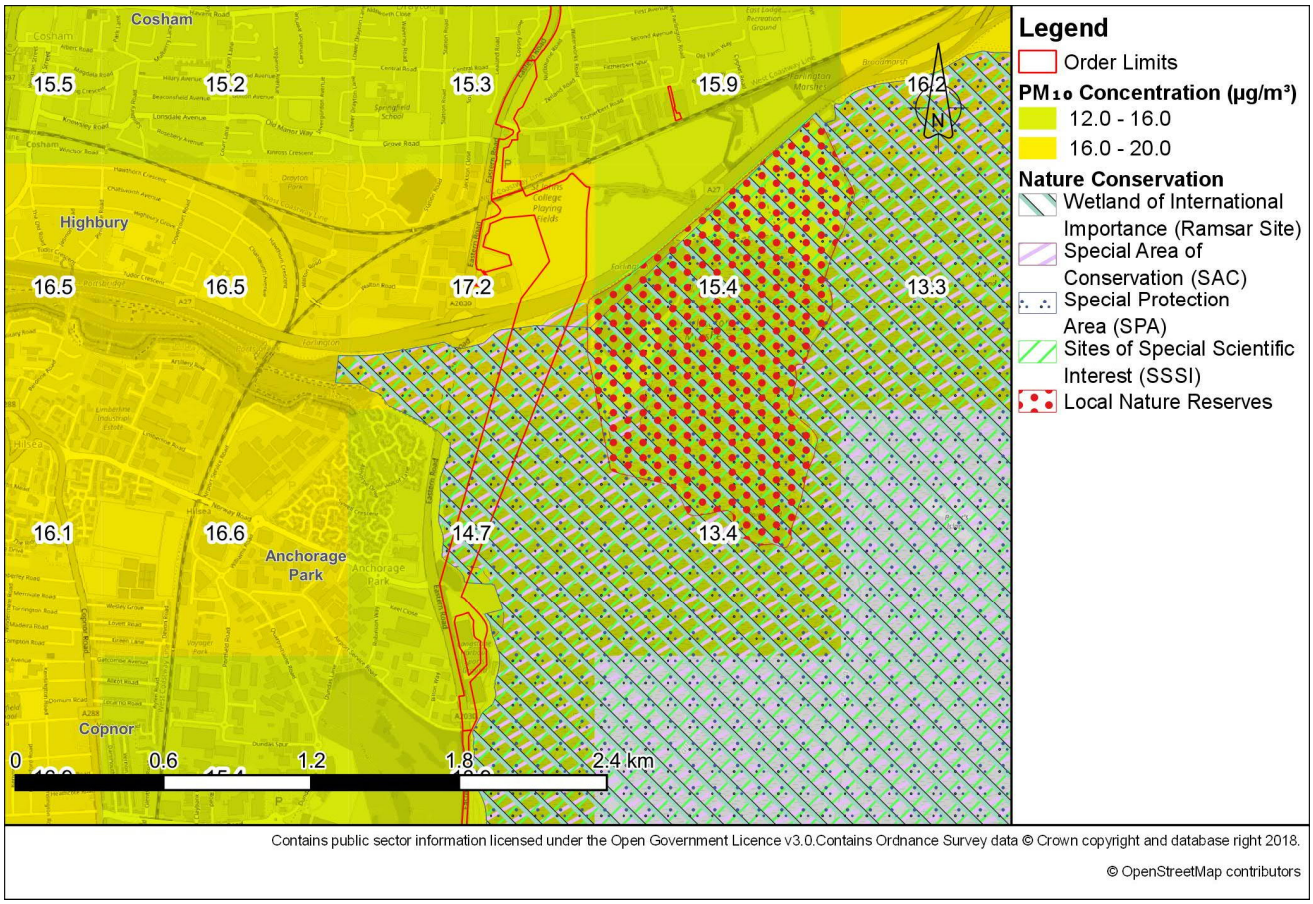


Plate 23.17 – Section 7 PM_{10} Concentrations

23.5.4.58. Plate 23.17 shows low background concentrations of PM_{10}, with the average concentration for the section being 15.1 µg/m³.

23.5.4.59. Modelled $PM_{2.5}$ concentrations for this section are shown in Plate 23.18.

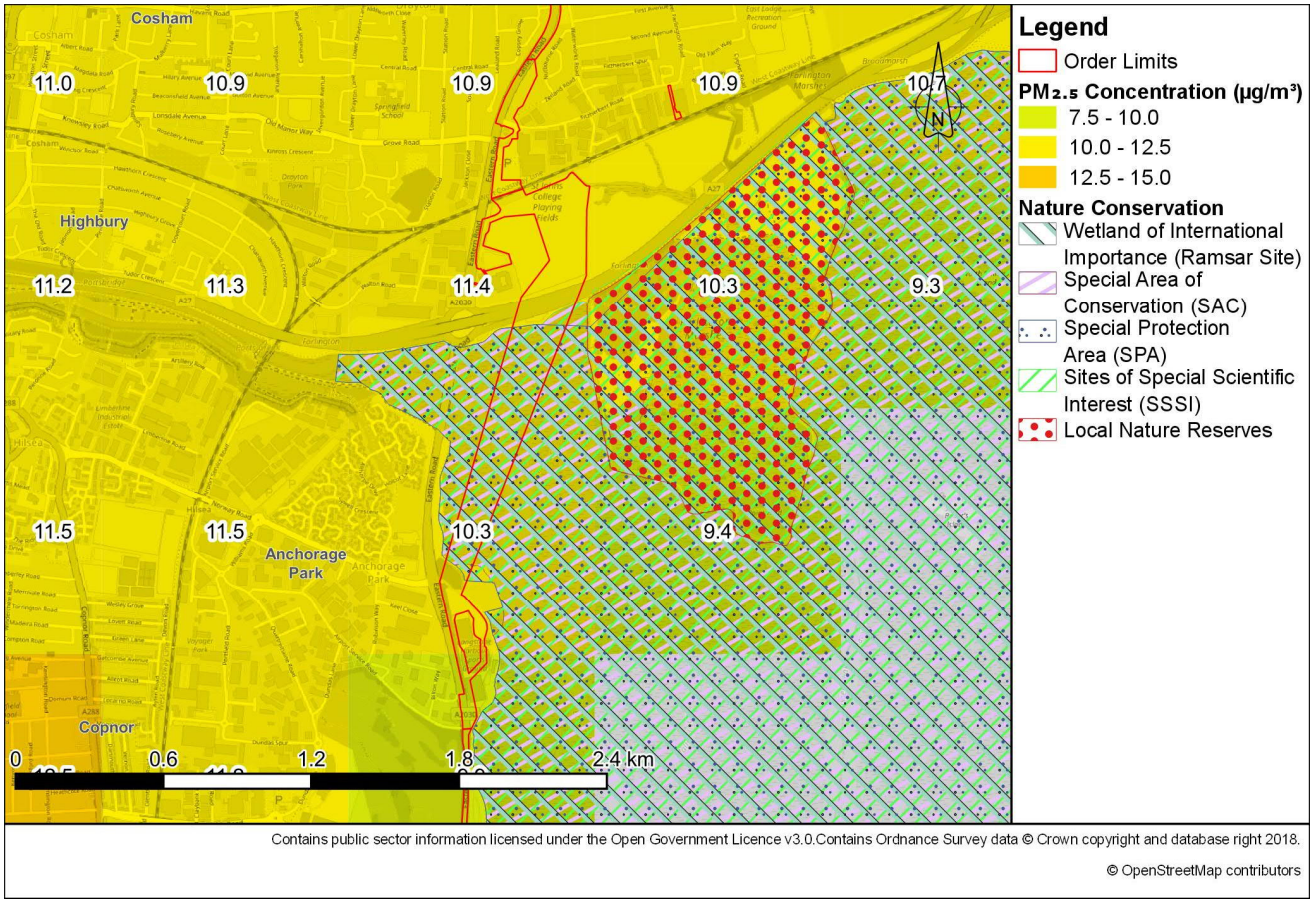


Plate 23.18 – Section 7 $PM_{2.5}$ Concentrations

23.5.4.60. Plate 23.18 shows generally low concentrations of $PM_{2.5}$ for this section, with an average concentration 10.5 µg/m³.

23.5.4.61. The area around this section includes the A27 and its junction with the A2030 Eastern Road that leads to Drayton and Farlington north of the junction and down the eastern side of the City of Portsmouth south of the junction.

23.5.4.62. This section passes through Chichester and Langstone Harbours Wetland of International Importance (Ramsar) (ID UK11013) and Special Protection Area ('SPA') (ID UK9011011), Langstone Harbour Site of Special Scientific Interest ('SSSI') (ID 7752), and Solent Maritime Special Area of Conservation ('SAC') (ID UK0030059). It is adjacent to the Farlington Marshes Local Nature Reserve ('LNR'), the Farlington Marshes SINC and Land adjacent to Farlington Playing Fields SINC. All of these areas may be sensitive to the effects of particulate matter from construction activities.

23.5.4.63. Cumulative banded receptor counts for this Section are shown in Table 23.15.

Table 23.15 - Cumulative Receptor Counts for Section 7

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	0	0	0	28	401	14
Community	0	0	0	0	3	0
Commercial	10	16	45	100	154	9
Total	10	16	45	128	558	23

Section 8 – Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way

23.5.4.64. Modelled PM_{10} concentrations for this section are shown in Plate 23.19 and $PM_{2.5}$ concentrations in Plate 23.20.

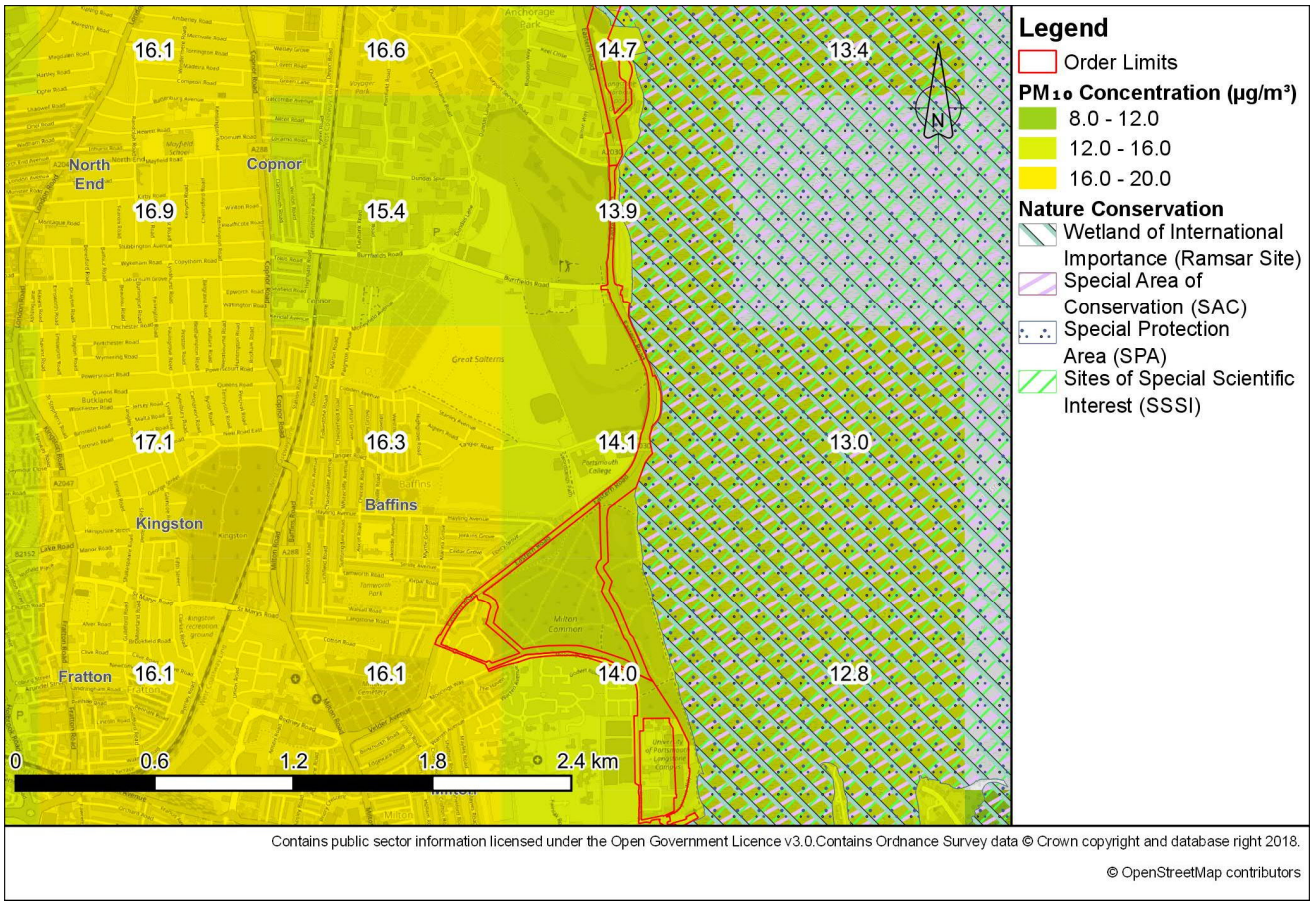


Plate 23.19 – Section 8 PM_{10} Concentrations

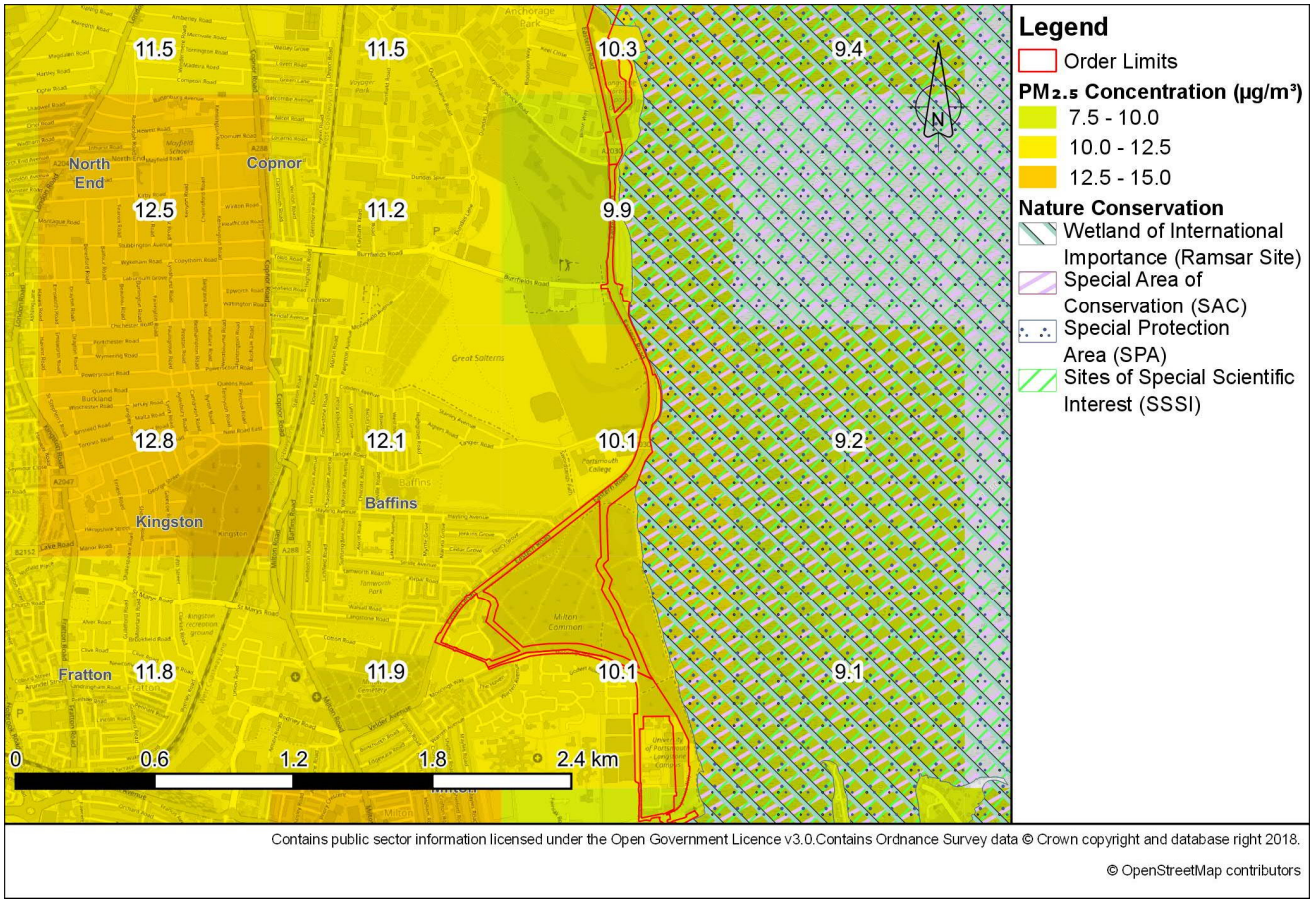


Plate 23.20 – Section 8 $PM_{2.5}$ Concentrations

23.5.4.65. Plate 23.19 and Plate 23.20 show that background particulate concentrations are low in the area covered by this section, with average concentrations being 14.4 µg/m³ for PM_{10} and 10.3 µg/m³ for $PM_{2.5}$. The following designated ecological sites are directly adjacent to or within the Order Limits for this section:

- Chichester and Langstone Harbours RAMSAR;
- Chichester and Langstone Harbours SPA;
- Solent Maritime SAC;
- Langstone Harbour SSSI;
- Golf Course north of Burrfields Road SINC;
- Great Salterns Lake SINC; and
- Milton Common SINC.

23.5.4.66. All of these sites may be sensitive to particulate deposition.

23.5.4.67. Cumulative banded receptor counts for this section are shown in Table 23.16.

Table 23.16 - Cumulative Receptor Counts for Section 8

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	284	532	965	1,703	2,806	448
Community	1	2	3	3	11	0
Commercial	7	16	25	47	64	15
Total	292	550	993	1,753	2,881	463

23.5.4.68. Education facilities within 350 m of this Section are:

- Moorings Way Infant School; and
- Portsmouth College.

23.5.4.69. Medical facilities within 350 m of this Section are:

- St. James Hospital; and
- The Limes Mental Health Rehabilitation Unit.

Section 9 –Moorings Way to Bransbury Road

23.5.4.70. Modelled PM_{10} concentrations for this section are shown in Plate 23.21 and $PM_{2.5}$ concentrations Plate 23.22.

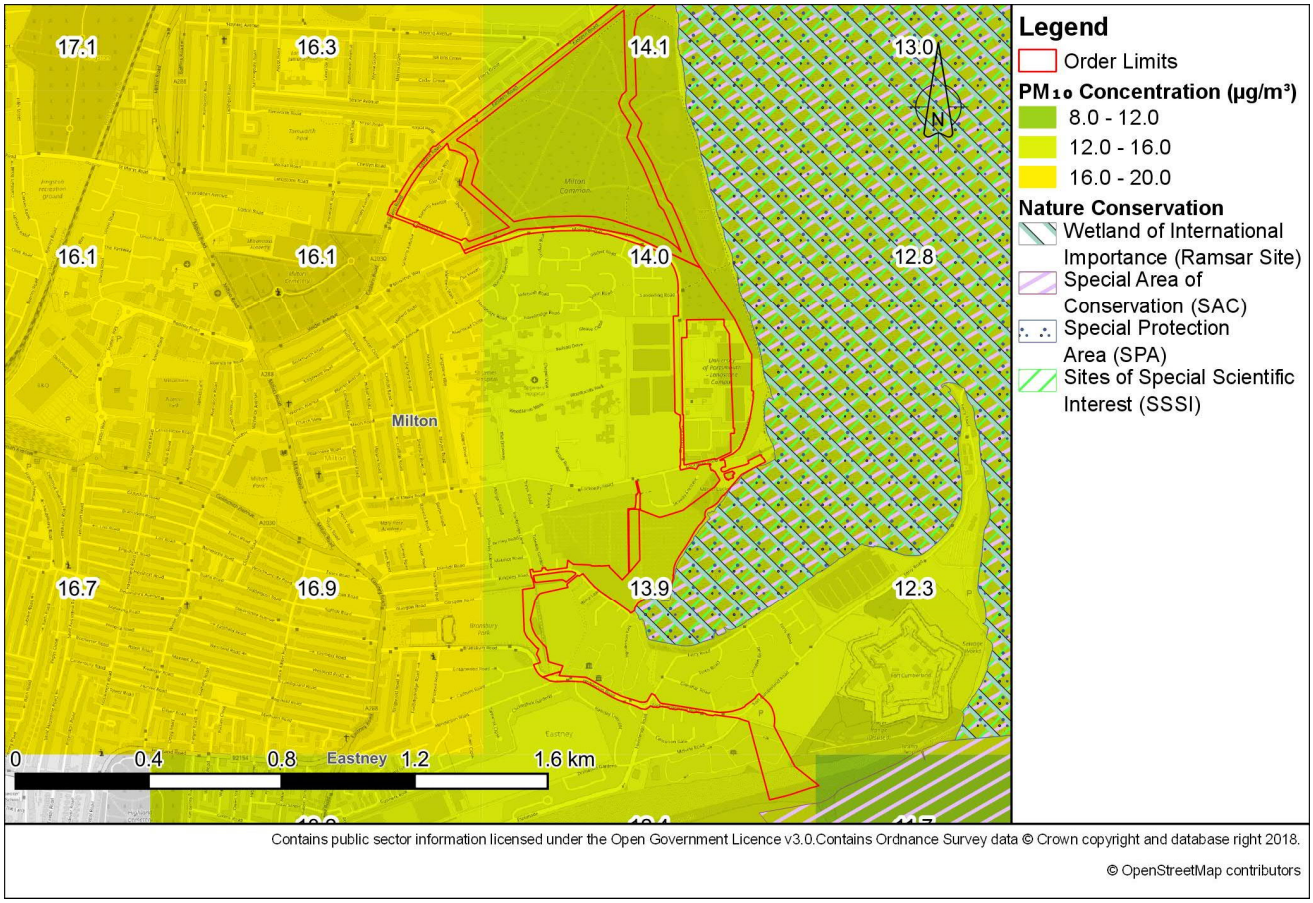


Plate 23.21 – Section 9 PM_{10} Concentrations

23.5.4.71. Plate 23.21 shows that concentrations of PM_{10} are slightly elevated compared to earlier sections but are still considered low being below 50 % of the limit and objective value. The average PM_{10} concentration for this section is 14.0 µg/m³.

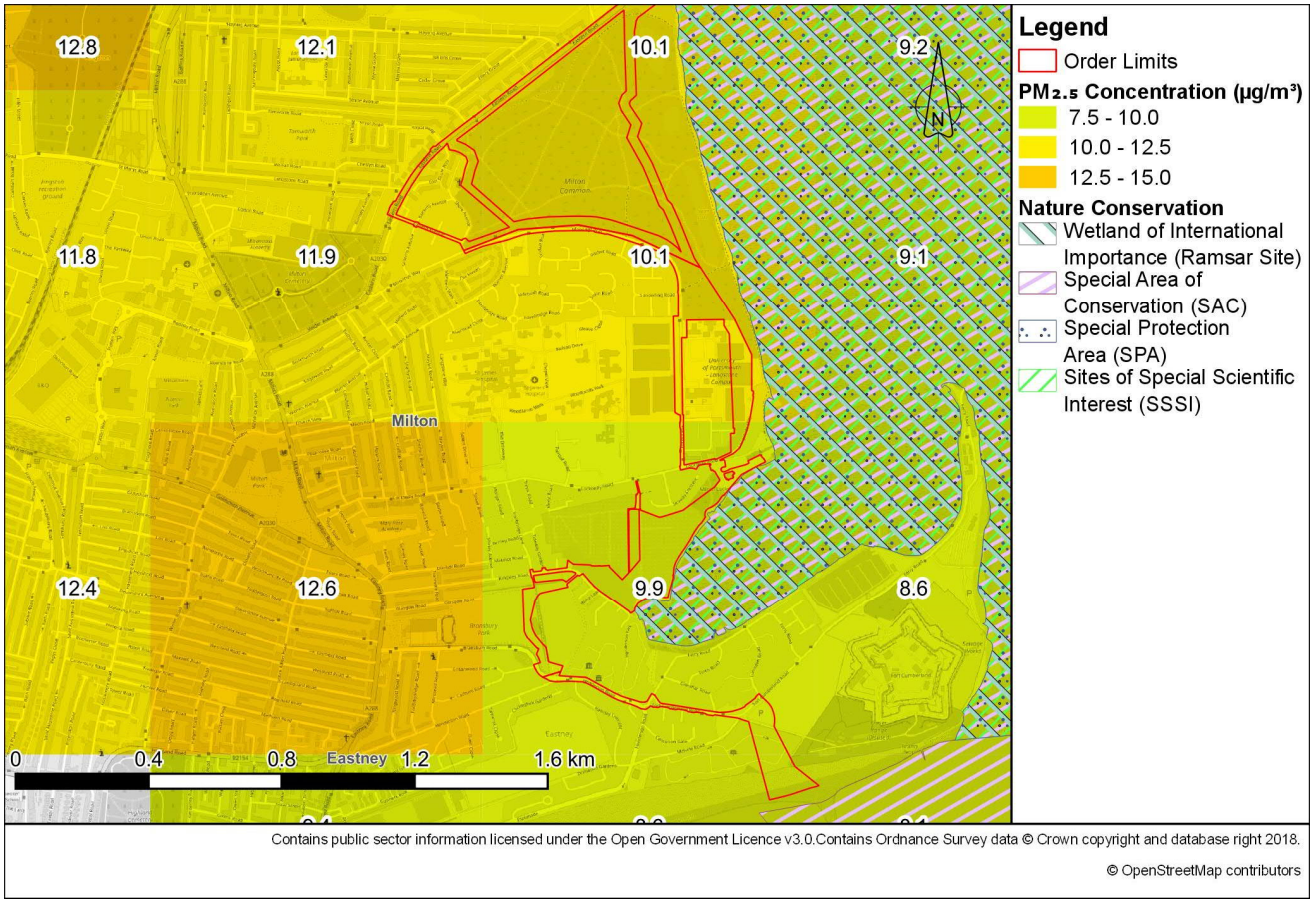


Plate 23.22 – Section 9 $PM_{2.5}$ Concentrations

23.5.4.72. Plate 23.22 shows that some areas covered by this section are above 50 % of the limit value for $PM_{2.5}$ leaving less capacity for particulate generating activities. The average concentration for this section is 10.0 µg/m³.

23.5.4.73. Cumulative banded receptor counts for this section are shown in Table 23.17.

Table 23.17 - Cumulative Receptor Counts for Section 9

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	364	706	1,253	2,100	3,813	0
Community	2	3	3	6	19	0
Commercial	10	12	17	37	65	0
Total	376	721	1,273	2,143	3,897	0

23.5.4.74. Education facilities within 350 m of this section are:

- Private Nurseries;
- The University of Portsmouth Langstone Campus;
- Portsmouth Day Services;
- Moorings Way Infant School; and
- The Harbour School.

23.5.4.75. Medical facilities within 350 m of this Section are:

- St. James House Medical Centre;
- St. James Hospital; and
- The Limes Mental Health Rehabilitation Unit.

23.5.4.76. The following designated ecological sites are directly adjacent to or within the Order Limits for this section:

- Chichester and Langstone Harbours RAMSAR;
- Chichester and Langstone Harbours SPA;
- Solent Maritime SAC;
- Langstone Harbour SSSI; and
- Milton Common SINC.

Section 10 – Eastney (Landfall)

23.5.4.77. Modelled background concentrations of PM_{10} for this section are shown in Plate 23.23 and background concentration of $PM_{2.5}$ in Plate 23.24.

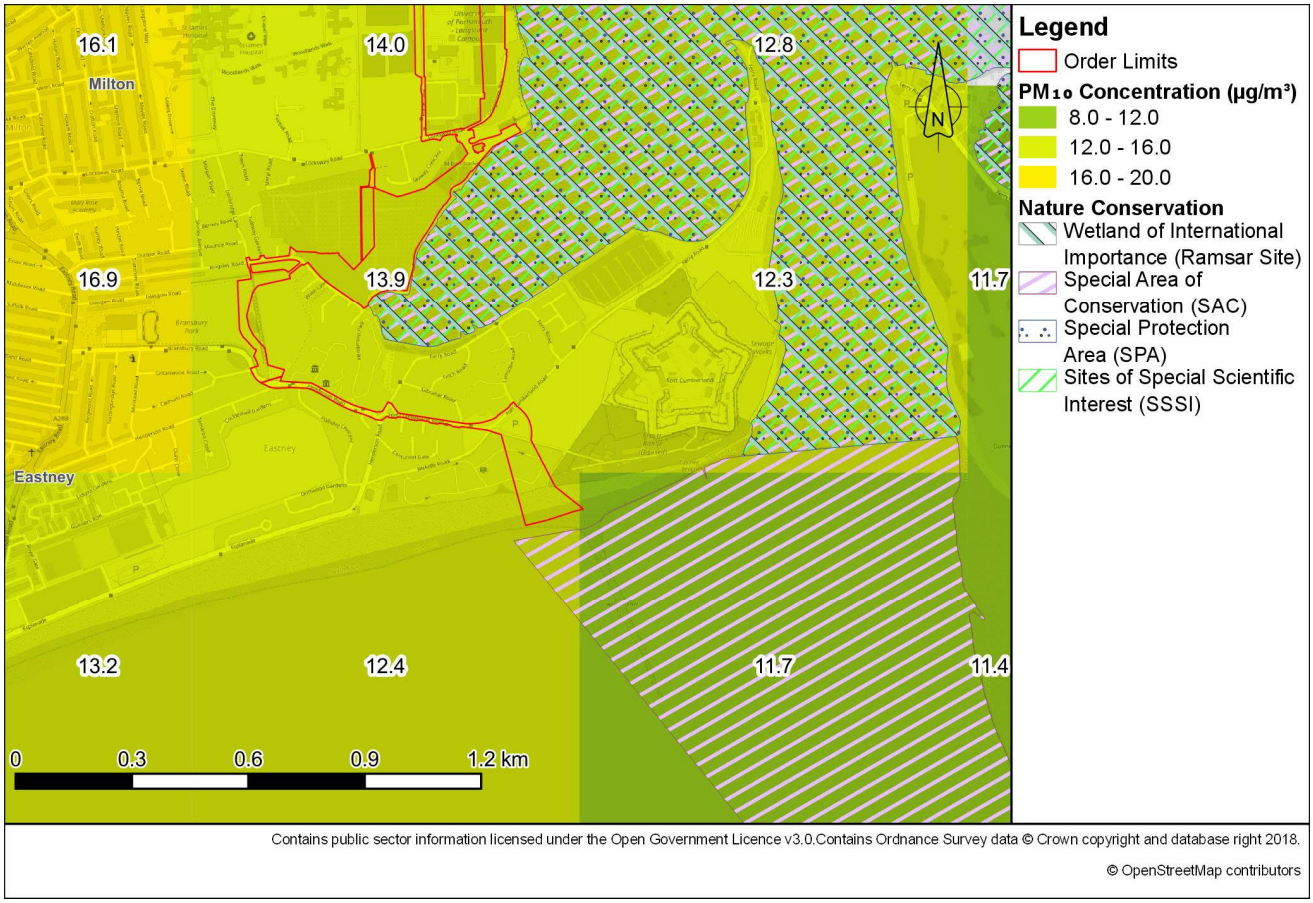


Plate 23.23 – Section 10 PM_{10} Concentrations

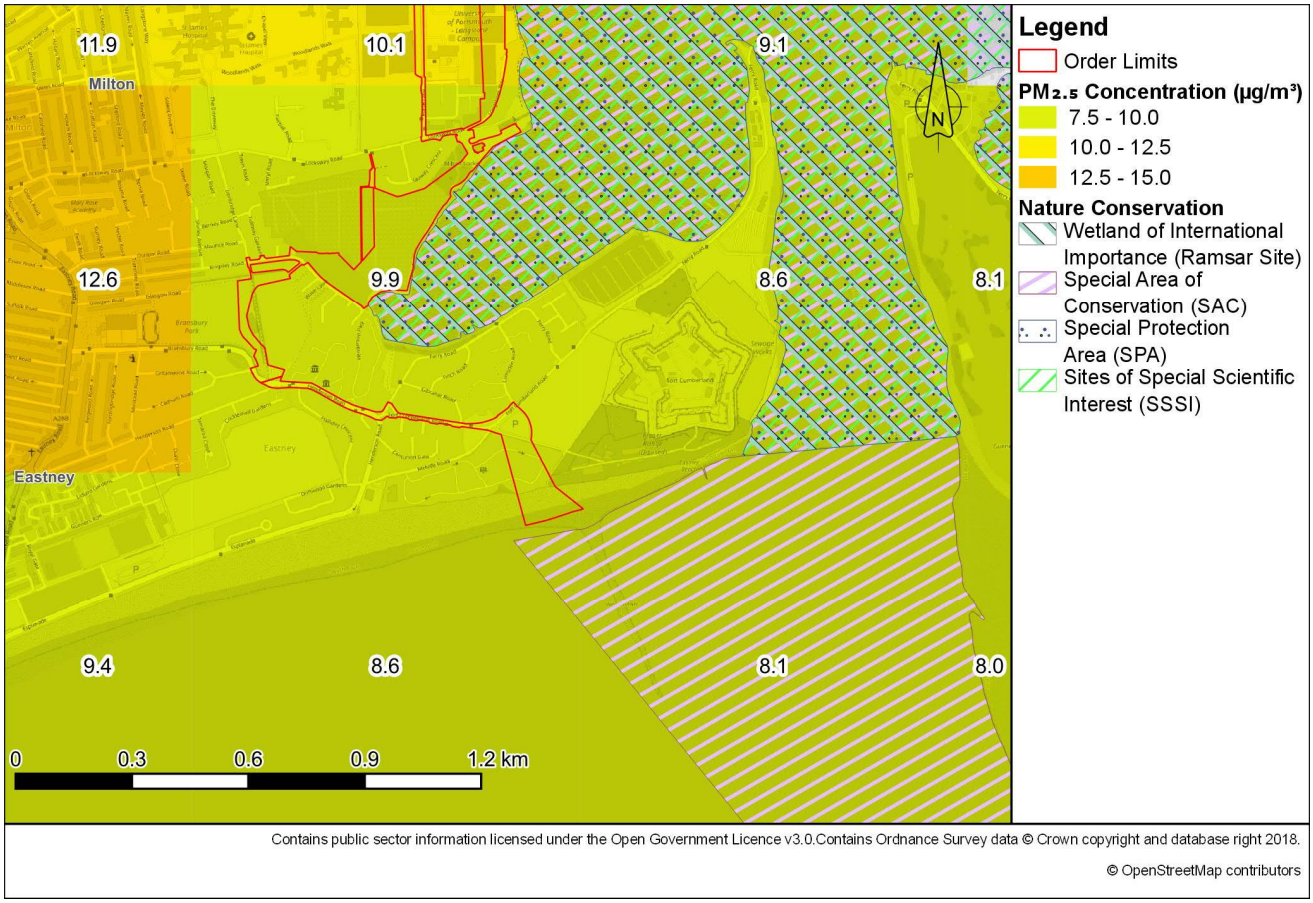


Plate 23.24 – Section 10 $PM_{2.5}$ Concentrations

23.5.4.78. Plate 23.23 and Plate 23.24 show that concentrations of particulates are generally low in this section, with notable reductions in concentrations due to the presence of the coastline. The average concentration for PM_{10} in this section is 13.4 µg/m³ and for $PM_{2.5}$ it is 9.5 µg/m³. This area includes residential and leisure areas, along with the sand beach coastline.

23.5.4.79. Cumulative banded receptor counts for this section are shown in Table 23.18.

Table 23.18 - Cumulative Receptor Counts for Section 10

Receptor Type	0-20 m	0-50 m	0-100 m	0-200 m	0-350 m	Trackout
Residential	155	270	484	864	1,383	384
Community	1	2	2	4	6	8
Commercial	40	57	68	124	127	47
Total	196	329	554	992	1,516	439

23.5.4.80. Education facilities within 350 m of Section 10 are:

- Private Nurseries; and
- Portsmouth Day Services.

23.5.4.81. This section includes the following ecologically designated sites:

- Solent Maritime SAC;
- Land West of Fort Cumberland SINC; and
- Eastney Beach SINC.

23.5.5. DESIGNATED ECOLOGICAL SITES

Designations

23.5.5.1. Section 1 Lovedean (Converter Station Area) is directly adjacent to the SDNP. There are no specific requirements in air quality legislation or air quality assessment guidance specific to national park designations. By default of the screening criteria in Section 23.4, receptors within the SDNP are captured in the air quality assessment.

23.5.5.2. Statutory Designated Ecological sites and Designated Ancient Woodland sites relevant to the assessment are shown in Table 23.19. All sites are immediately adjacent to the Order Limits.

Table 23.19 - Qualifying Features at the Designated Ecological Sites and Habitats of Principal Importance

Designation	Name	ID	Qualifying Features
Wetland of International Importance (Ramsar)	Chichester and Langstone Harbours	UK11013	The area consists of a near-natural wetland that supports over 76,000 waterfowl. A number of species are supported in excess of the Ramsar 1% population criteria.
Special Protection Area (SPA)	Chichester and Langstone Harbours	UK9011011	The SPA is designed for its waterfowl assemblage, considered internationally important, consisting of a number of Annex II species. The area regularly supports approximately 93,000 individuals over winter.
Special Area of Conservation (SAC)	Solent Maritime	UK0030059	The SAC is designated for the presence of Annex I protected habitats and the presence of Annex II protected species that include otter *Lutra lutra*,

Designation	Name	ID	Qualifying Features
			common seal *Phoca vitulina* and whorl snail *Vertigo moulinsiana*.
Site of Special Scientific Importance (SSSI)	Langstone Harbour	1001182	Tidal basin with extensive mudflats and saltmarsh areas. Internationally important area for assemblages of invertebrates and migrating bird species.
Ancient Woodland	Crabdens Row	27510	Ancient and semi-natural woodland.
Ancient Woodland	Crabdens Row	27511	Ancient and semi-natural woodland.
Ancient Woodland	Crabdens Copse	27509	Ancient and semi-natural woodland.
Ancient Woodland	Stoneacre Copse	47398	Ancient and semi-natural woodland.
Site of Importance for Nature Conservation (SINC)	Eastney Beach	PO0011	Vegetated shingle beach featuring *Calystegia soldanella* (Sea Bindweed) [RDB]; *Honckenya peploides* (Sea Sandwort) [CS]; *Raphanus raphanistrum* subsp. maritimus (Sea Radish) [CS]; *Rosa spinosissima* (Burnet Rose) [CS]; *Sedum anglicum* (English Stonecrop) [nHR]; *Silene nutans* (Nottingham Catch)
SINC	Land West of Fort Cumberland	PO0013	Managed grassland, featuring *Lepidium latifolium* (Dittander) [CI]; *Raphanus raphanistrum maritimus* (Sea Radish) [CS]; *Spiranthes spiralis* (Autumn Lady's-Tresses) [NI]
SINC	Fort Cumberland	PO0018	Managed grassland, featuring *Lepidium latifolium* (Dittander) [CI]; *Raphanus raphanistrum maritimus* (Sea Radish) [CS]; *Spiranthes spiralis* (Autumn Lady's-Tresses) [NI]

Critical Levels and Critical Loads

23.5.5.3. Table 23.20 shows the critical loads for the relevant habitats in the designated ecological sites nearest to the source of emissions as a result of operation of the backup generators associated with the ORS and the Converter Station Area. The Critical Load for eutrophication is presented in units of kilograms of nitrogen per hectare per year (kgN/ha/yr) and the Critical Load function for acid deposition is presented in units of kilo-equivalents per hectare per year (keq/ha/yr).

Table 23.20 – Critical Loads for Relevant Habitats

Designated Site	Habitat	Critical Load for Eutrophication (kgN/ha/yr)	Critical Load Function for Acid Deposition (keq/ha/yr)
Langstone Harbour SSSI Unit 11 – Eastney Lake (1019415) (SPA, SAC and Ramsar)	Littoral Sediment	20 - 30	Habitats not sensitive to acidification
	Fen, marsh and swamp	15 - 30	
Langstone Harbour SSSI Unit 3 – Langstone Harbour West (1007445) (SPA, SAC and Ramsar)	Littoral Sediment	20 - 30	Habitats not sensitive to acidification
	Fen, marsh and swamp	15 - 30	
Crabdens Row (27510)	Broadleaved, mixed and yew woodland	10 - 20	MaxCLminN: 0.285 MaxCLMaxN: 1.293 MaxCLMaxS: 1.008 MinCLminN: 0.142 MinCLMaxN: 1.1 MinCLMaxS: 0.958*
Crabdens Row (27511)			
Crabdens Copse (27509)			
Stoneacre Copse (47398)			

**** General critical load function for Acid deposition for Unmanaged broadleaved/coniferous woodland***

23.5.5.4. No critical loads are available for the SINC sites, therefore a critical load for eutrophication of 10-20 kgN/ha/yr has been used as a conservative measure.

Background Concentrations and Deposition

23.5.5.5. Modelled background rates of deposition have been obtained from the UK Concentration Based Estimated Deposition ('CBED') model (Levy, et al., 2020) administered by the Centre of Ecology and Hydrology. Deposition estimates are provided for reduced and oxidised N species and for sulphur species and are provided on a three-year average rolling basis at a resolution of 5 km x 5 km.

23.5.5.6. Plate 23.25 shows the background levels of N deposition based on the latest available 2015-2017 three-year rolling average figures.

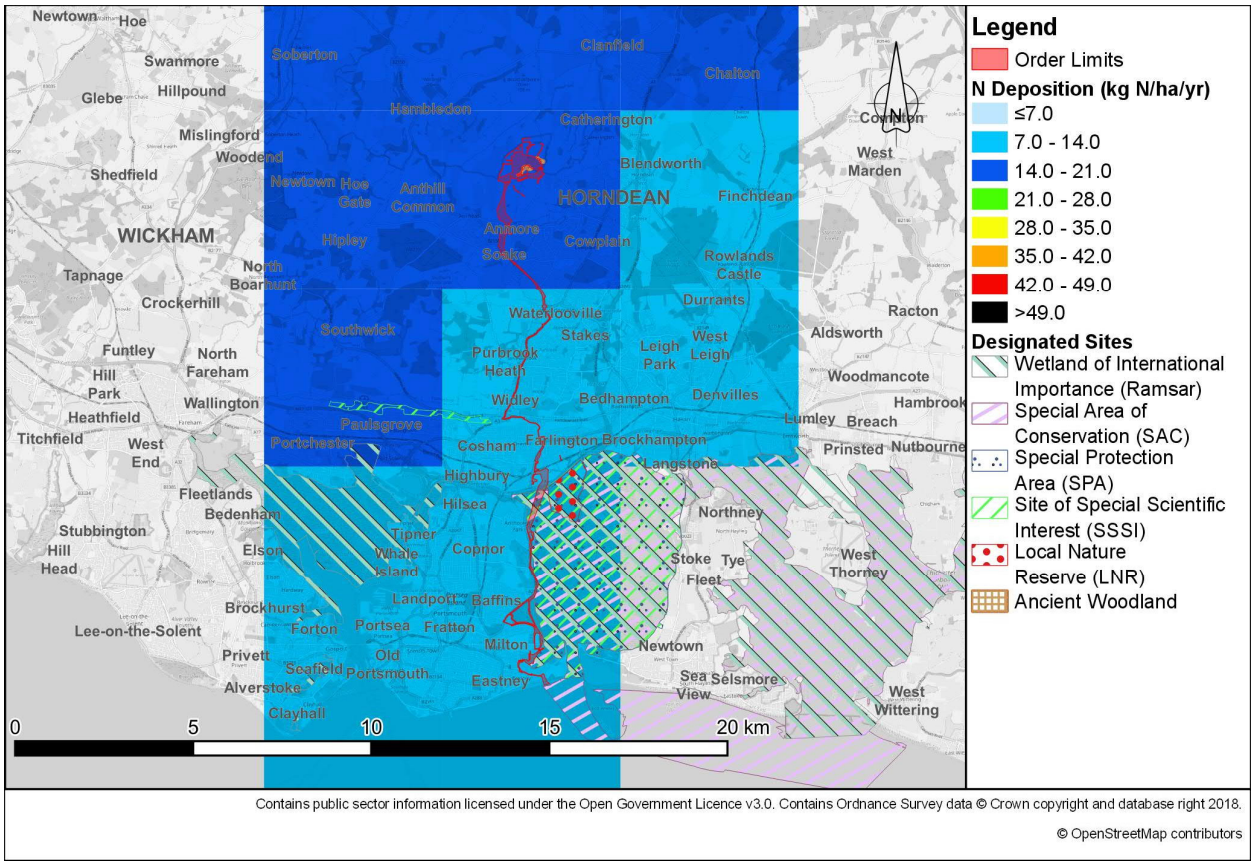


Plate 23.25 - Background N Deposition

23.5.5.7. Plate 23.25 shows generally low levels of N deposition within the area covered by the air quality assessment. Slightly elevated concentrations are in evidence in areas dominated by arable agricultural land.

23.5.5.8. Plate 23.26 shows the background levels of N acid deposition from the UK Concentration Based Estimated Deposition dataset (Levy, et al., 2020) based on the latest available 2015-2017 three-year rolling average figures.

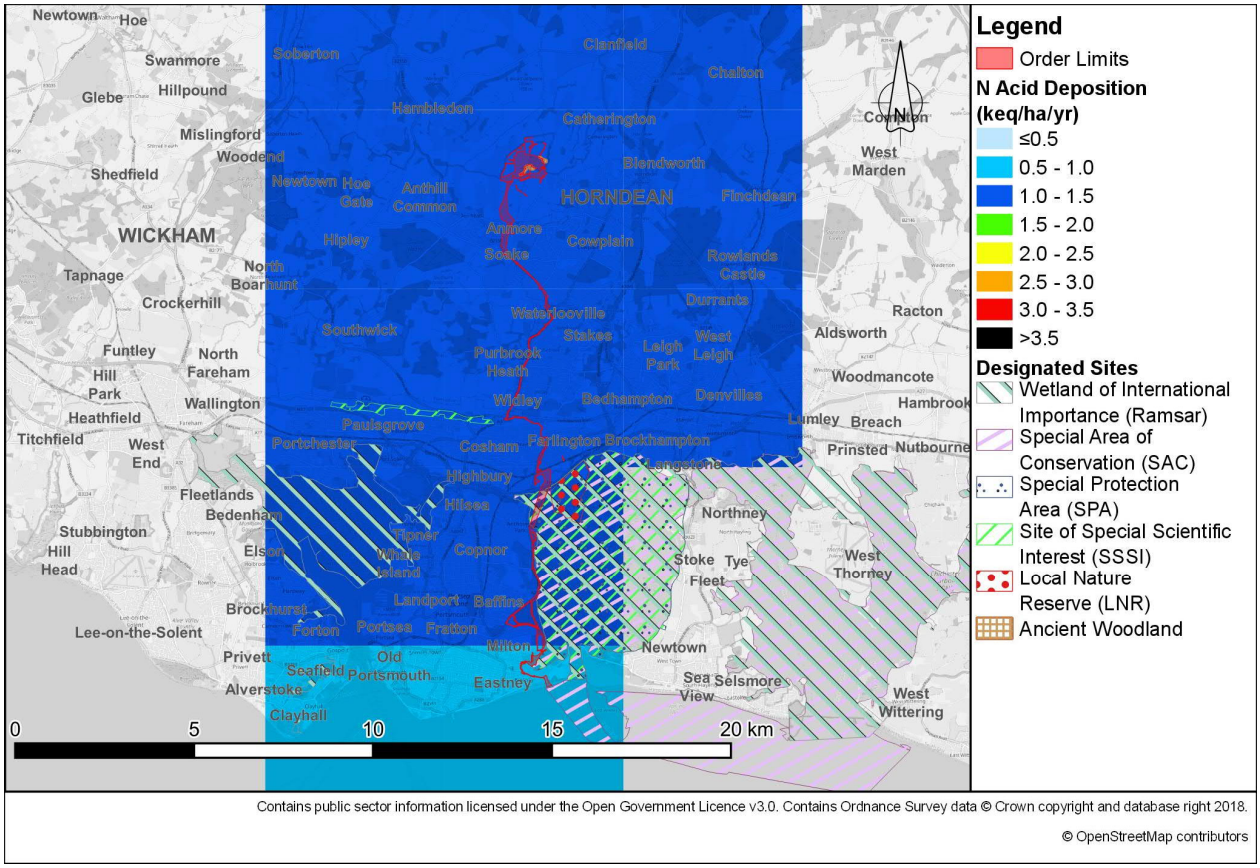


Plate 23.26 - N Acid Deposition

23.5.5.9. Plate 23.26 shows generally low levels of N acid deposition within the area covered by the air quality assessment. Lower concentrations are present on the coast, with slightly elevated levels inland due to the presence of urban and agricultural areas.

23.5.5.10. Plate 23.27 shows the backgrounds used for the assessment of short-term NO_X impacts. When assessing against short-term limits, it is standard practice to use a value of twice the magnitude of the annual background.

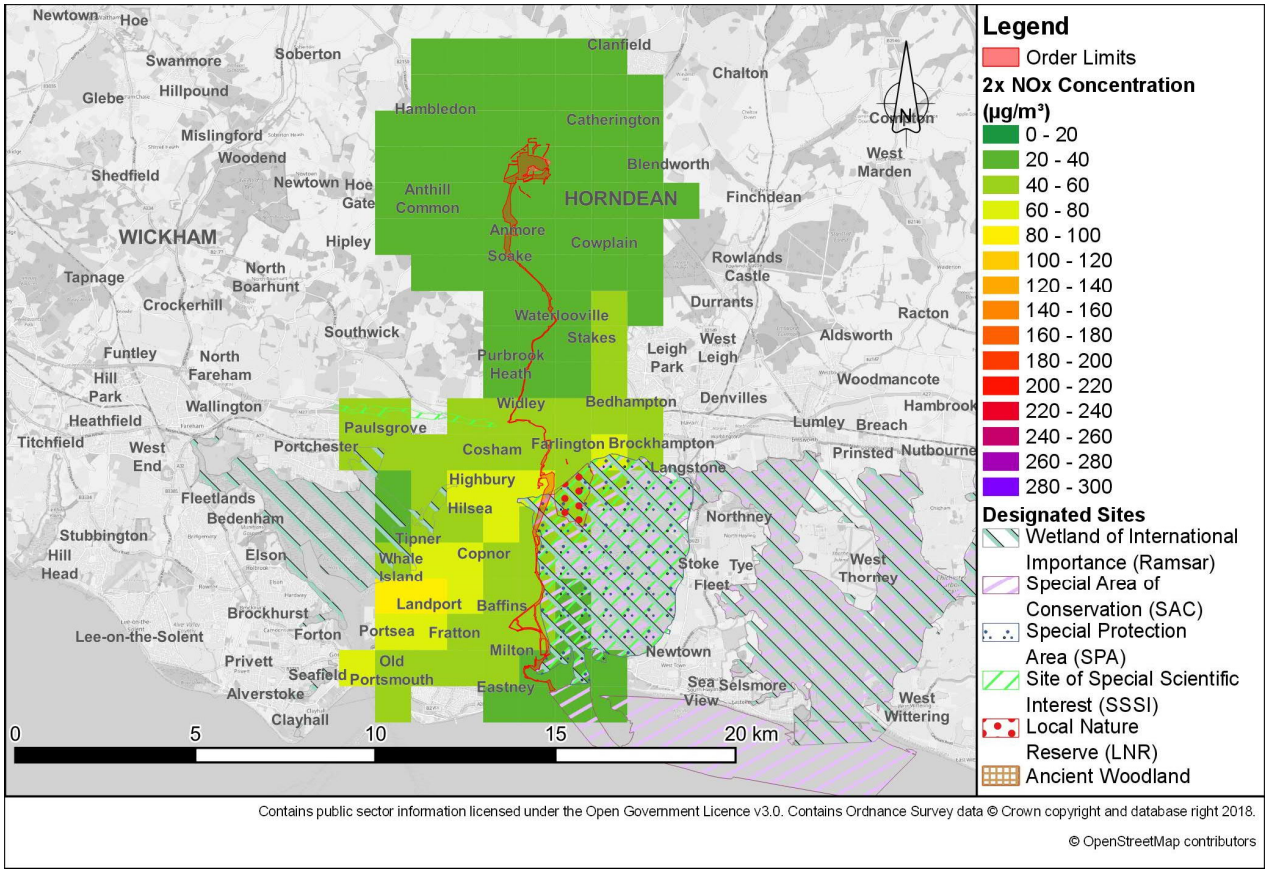


Plate 23.27 - 2x 2022 Background NO_X Concentrations for Assessment against the Short-term limit

23.5.5.11. Plate 23.27 shows that background concentrations of NO_X are low with respect to the short-term limit of 200µg/m³.

23.6. PREDICTED IMPACTS

23.6.1.1. This section describes the impacts associated with the Construction and Operational Stages from site activities, the temporary use of on-road construction vehicles, temporary diversions, road closures and other traffic management, Onshore Cable laying and pulling (including HDD operations) and welfare back up power generation.

23.6.1.2. The construction site activity impact assessment results are presented according to the ten identified sections. For construction traffic, results are presented according to the six model Verification Zones as identified in Appendix 23.3 (Air Quality Traffic Modelling).

23.6.2. CONSTRUCTION STAGE

Construction Site Activities

23.6.2.1. Appendix 23.2 (IAQM Construction Assessment) provides a description of the proposed construction site activities for each Section of the Onshore Cable Corridor.

23.6.2.2. This section reports the derived risk of short-term temporary impacts from dust soiling, and on human health and ecological receptors from site earthworks, construction activities and from trackout of material to the road network. These risks are derived using the assessed dust emission magnitude and the assessed sensitivity for each Section of the Onshore Cable Corridor in accordance with the matrices in Appendix 23.2 (IAQM Construction Assessment).

23.6.2.3. The derived risk is used to determine appropriate mitigation measures specific to the works being undertaken in accordance with the recommended mitigation measures in the IAQM Guidance. For each construction site, the assessment of emission magnitude, sensitivity and recommended mitigation measures to inform the Onshore Outline CEMP are described in Appendix 23.2 (IAQM Construction Assessment).

Embedded Mitigation

23.6.2.4. Mitigation measures identified by the dust risk assessment are to be embedded within the construction methodology. Following the IAQM guidance impact significance is determined after the implementation of specific mitigation measures identified in the assessment. These measures, determined as a result of this dust risk assessment, are applied through the Onshore Outline CEMP. Section 1.2 of Appendix 23.2 (IAQM Construction Assessment) describes the mitigation measures to be incorporated into the ten Sections of the Onshore Cable Corridor of the Proposed Development design to avoid or reduce any likely significant effects during construction. These are incorporated into the Onshore Outline CEMP.

23.6.2.5. All measures that are referred to as “highly desirable” must be implemented where appropriate and proportionate with the agreement of the local EHO. All measures that are referred to as “desirable” may be implemented if it is deemed by AQUIND and the local EHO that they are appropriate for the site and local conditions.

Section 1 – Lovedean (Converter Station Area)

Description of Works

23.6.2.6. Section 1 involves the construction of the Converter Station with activities being undertaken over a period of approximately 2.5 years. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 1 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.7. The overall dust risk for Section 1 is shown in Table 23.21.

Table 23.21 – Section 1 Overall Dust Risk

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk

23.6.2.8. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 1 this is a **high risk**.

Significance

23.6.2.9. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of section 1 are considered to be **negligible**.

Section 2 – Anmore

Description of Works

23.6.2.10. Section 2 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 13 weeks. The works will be undertaken in 100 m sections. Further detail on the specific magnitude of and conditions for earthworks, construction and trackout activities for Section 2 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.11. The overall dust risk for Section 2 is shown in Table 23.22.

Table 23.22 – Section 2 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	-
Human Health	Low Risk	Low Risk	Low Risk	-
Ecological	Low Risk	Low Risk	Low Risk	-

23.6.2.12. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 2 this is a **high risk**.

Significance

23.6.2.13. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 2 are considered to be **negligible**.

Section 3 – Denmead/Kings Pond Meadow

Description of Works

23.6.2.14. Section 3 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 6 weeks per circuit including trenching, ducting and joint bay installation, and 13 weeks of Horizontal Directional Drilling (HDD) under Kings Pond. The trenching works will be undertaken in 100 m sections. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 3 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.15. The overall dust risk for Section 3 is shown in Table 23.23.

Table 23.23 – Section 3 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	-
Human Health	Low Risk	Low Risk	Low Risk	-
Ecological	Low Risk	Low Risk	Low Risk	-

23.6.2.16. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 3 this is a **high risk**.

Significance

23.6.2.17. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 3 are considered to be **negligible**.

Section 4 – Hambledon Road to Farlington Avenue

Description of Works

23.6.2.18. Section 4 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 89 weeks for both circuits for trenching, ducting and joint bay installation, assuming the trenching works will be undertaken in 100 m sections. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 4 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.19. The overall dust risk for Section 4 is shown in Table 23.24.

Table 23.24 – Section 4 Overall Dust Risk

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

23.6.2.20. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 4 this is a **high risk**.

Significance

23.6.2.21. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 4 are considered to be **negligible**.

Section 5 – Farlington

Description of Works

23.6.2.22. Section 5 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 15 weeks for trenching, ducting and joint bay installation. The trenching works will be undertaken in 100 m sections, including on the public highway and footway. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 5 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.23. The overall dust risk for Section 5 is shown in Table 23.25.

Table 23.25 – Section 5 Overall Dust Risk

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

23.6.2.24. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 5 this is a **high risk**.

Significance

23.6.2.25. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 5 are considered to be **negligible**.

Section 6 – Zetland Field to Sainsbury's Car Park

Description of Works

23.6.2.26. Section 6 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 11 weeks per circuit for trenching, ducting and joint bay installation. The trenching works will be undertaken in 100 m sections. Further HDD works will be undertaken under the West Coastway Railway Line between Section 6 and Section 7 over a period of approximately 23 weeks. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 6 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.27. The overall dust risk for Section 6 is shown in Table 23.26.

Table 23.26 – Section 6 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	-
Human Health	Low Risk	Low Risk	Low Risk	-
Ecological	-	-	-	-

23.6.2.28. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 6 this is a **high risk**.

Significance

23.6.2.29. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 6 are considered to be **negligible**.

Section 7 – Farlington Junction to Airport Service Road

Description of Works

23.6.2.30. This Section involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 9 weeks per circuit for trench ducting and joint bay installation. Approximately 31 weeks of HDD under Langstone Harbour will be undertaken with 24-hour working in place. Approximately 23 weeks HDD work under the West Coastway Railway Line will be shared between this Section 7 and Section 6. The trenching works will be undertaken in 100 m sections. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 6 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.31. The overall dust risk for Section 7 is shown in Table 23.27.

Table 23.27 – Section 7 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	Negligible
Human Health	Low Risk	Low Risk	Low Risk	Negligible
Ecological	Medium Risk	High Risk	Medium Risk	Low Risk

23.6.2.32. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 7 this is a **high risk**.

Significance

23.6.2.33. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 7 are considered to be **negligible**.

Section 8 – Eastern Road (adjacent to great Salterns Golf Course) to Moorings Way

Description of Works

23.6.2.34. Section 8 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 27 weeks per circuit for trench ducting and joint bay installation.

23.6.2.35. HDD drilling under Milton Common will occur for a period of 2 weeks.

23.6.2.36. The trenching works will be undertaken in 100 m sections. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 8 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.37. The overall dust risk for Section 8 is shown in Table 23.28.

Table 23.28 – Section 8 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk	Negligible
Ecological	Medium Risk	High Risk	Medium Risk	Low Risk

23.6.2.38. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 8 this is a **high risk**.

Significance

23.6.2.39. The overall assessment is for a high risk in an area with high sensitivity receptors, which constitutes a major effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate embedded mitigation measures the effects in respect of Section 8 are considered to be **negligible**.

Section 9 –Moorings Way to Bransbury Road

Description of Works

23.6.2.40. Section 9 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 14 weeks per circuit for trenching, ducting and joint bay installation. The trenching works will be undertaken in 100 m sections. HDD drilling will be undertaken under Eastney and Milton allotments for a period of 12 weeks. Further detail on the specific, magnitude of and conditions for demolition, earthworks and construction activities for Section 9 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.41. The overall dust risk for Section 9 is shown in Table 23.29.

Table 23.29 – Section 9 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk	Medium Risk

23.6.2.42. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 9 this is a **medium risk**.

Significance

23.6.2.43. The overall assessment is for a medium risk in an area with high sensitivity receptors, which constitutes a major to moderate effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate mitigation measures the effects in respect of Section 9 are considered to be **negligible**.

Section 10 – Eastney (Landfall)

Description of Works

23.6.2.44. Section 10 involves the installation of ducting for the Onshore Cables and will be undertaken over a period of approximately 22 weeks per circuit for trenching, ducting, joint bay installation and ORS construction with approximately a further 44 weeks of 24-hour working for HDD involved in creating the landfall for the cable. The trenching works will be undertaken in 100 m sections. Further detail on the specific, magnitude of and conditions for earthworks, construction and trackout activities for Section 10 is provided in Appendix 23.2 (IAQM Construction Assessment).

Impacts

23.6.2.45. The overall dust risk for Section 10 is shown in Table 23.30.

Table 23.30 – Section 10 Overall Dust Risk

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk	Medium Risk

23.6.2.46. The overall dust risk is conservatively assigned based on the highest dust risk from all categories. For Section 10 this is a **medium risk**.

Significance

23.6.2.47. The overall assessment is for a medium risk in an area with high sensitivity receptors, which constitutes a major to moderate effect according to the matrix in Table 23.7. However, with the incorporation of the appropriate mitigation measures the effects in respect of Section 10 are considered to be **negligible**.

Diverted Traffic Impacts

Description of Works

23.6.2.48. Temporary, diverted traffic emissions are those resulting from the use of alternative routes as a result of temporary diversions, road closures and other traffic management for the duration of the construction programme only. These are presented based on the model Verification Zones shown in Figure 23.12, and the presence of AQMAs.

Embedded Mitigation

23.6.2.49. Embedded mitigation is described in the Appendix 22.1A (Framework Traffic Management Strategy) of the ES Volume (APP-449) and includes the following:

- Temporary traffic signals to be used where lane closures or partial carriageway closure is required. During peak times the signals will be manually adjusted to ensure delays are kept to a minimum;
- Temporary road closures may be required where the highway is of insufficient width to accommodate works and have traffic continue to flow at a safe distance. Where this is required, diversion routes will be agreed with the local highways authority; and
- Construction hours will be scheduled to avoid peak times, especially where schools are in the immediate vicinity of works, and to avoid particular major scheduled events.

Impacts

23.6.2.50. A summary of the impacts for each of the traffic Verification Zones is presented in Table 23.31, with detailed results presented in Appendix 23.3 (Air Quality Traffic Modelling).

23.6.2.51. The overall impacts for the DS1 scenario are presented in Figure 23.6 of the ES Volume 2 (APP-328 Rev02), Figure 23.7 of the ES Volume 2 (APP-329 Rev02) and Figure 23.10 of the ES Volume 2 (APP-332 Rev02) and for the DS2 scenario are presented in Figure 23.9 of the ES Volume 2 (APP-331 Rev02), Figure 23.8 of the ES Volume 2 (APP-330 Rev02) and Figure 23.11 of the ES Volume 2 (APP-333 Rev02). The information presented shows that improvements in concentrations correspond to areas where road closures or lane restrictions are expected to occur, and deteriorations in concentrations occur on those roads likely to carry more traffic as a result.

23.6.2.52. The summary results in Table 23.31 show that there are exceedances of the limit value for NO_2 within Verification Zones 1, 2 and 5, and within the AQMA areas. These exceedances of the limit value for NO_2 are present in the Do-Minimum scenario representative of conditions without the construction activity taking place. The maximum predicted concentrations of NO_2 are unaffected in verification Zones 2 and 5, and are worsened in Verification Zone 1 and the AQMA areas by 0.1 µg/m³ under the DS1 scenario and 0.2 µg/m³ under the DS2 scenario, which can be considered **negligible** changes.

Table 23.31 - Summary of results for Diverted Traffic

Verification Section	DM Max NO_2 Annual Mean Concentration (µg/m³)	DS1						DS2					
		Max NO_2 Annual Mean Concentration (µg/m³)	Receptors with Improvements	Receptors with No Change	Receptors with Deterioration	Max Deterioration (µg/m³)	Max Improvement (µg/m³)	Max NO_2 Annual Mean Concentration (µg/m³)	Receptors with Improvements	Receptors with No Change	Receptors with Deterioration	Max Deterioration (µg/m³)	Max Improvement (µg/m³)
1	**48.2**	**48.3**	15,291	15,237	798	0.6	-0.2	**48.4**	4,492	26,663	171	0.7	-0.1
2	26.7	26.8	3,856	2,503	3,312	0.7	-1.2	26.9	2,612	5,772	1,287	0.2	-0.2
3	32.3	32.7	1,881	1,250	152	0.5	-0.7	32.6	1,366	1,806	111	0.6	-0.5
4	**41.7**	**41.7**	1,988	2,824	490	1.0	-0.9	**41.7**	1,986	2,834	482	0.5	-0.9
5	38.8	39.5	5,794	762	1,061	2.5	-2.5	39.2	5,793	763	1,061	2.6	-2.5
6	**53.6**	**53.6**	488	3,757	228	0.3	-0.6	**53.6**	393	3,952	128	0.3	-0.4
AQMA	**48.2**	**48.3**	8,091	5,261	2,403	0.4	-1.2	**48.4**	2,893	11,857	1,005	0.2	-0.2

Exceedances of the limit value are shown in bold.

23.6.2.53. The results in Table 23.31 show that there are exceedances of the annual mean limit value for NO_2 of 40 µgm/³ within three of the Verification Zones, and within the Portsmouth AQMA areas which overlap Verification Zone 1. Exceedances are pre-existing within the Do-Minimum scenario and are either unchanged under both of the modelled Do-Something scenarios, or negligibly worsened in the case of Verification Zone 1 and the Portsmouth AQMAs. In general the highest predicted concentrations in the remaining Verification Zones are predicted to be negligibly changed.

23.6.2.54. The output from this modelling is further discussed in Appendix 23.3 (Air Quality Traffic Modelling), with the results taken forward and combined with the outputs from the assessment of the impacts of Construction Traffic effects and assessment of the impacts from Local Power Generation to provide an overall assessment of impact.

Table 23.32 – Diverted Traffic Impact Summary

Verification Zone	Maximum DM NO_2 Annual Mean conc. ($\mu g/m^3$)	Maximum DS NO_2 Annual Mean conc. ($\mu g/m^3$)	Scenario with more NO_2 improvements than deteriorations	Scenario with more NO_2 deteriorations than improvements	Exceedances	Model RMSE ($\mu g/m^3$)
1	**48.2**	**48.4**	DS1, DS2	None	DM, DS1, DS2	6.88
2	26.7	26.9	DS1, DS2	None	None	5.02
3	32.3	32.7	DS1, DS2	None	None	1.59
4	**41.7**	**41.7**	DS1, DS2	None	DM, DS1, DS2	7.36
5	38.8	39.5	DS1, DS2	None	None	8.55
6	**53.6**	**53.6**	DS1, DS2	None	DM, DS1, DS2	5.36
Zone 1 (AQMA receptors)	**48.2**	**48.4**	DS1, DS2	None	DM, DS1, DS2	6.88
Zone 2 (AQMA receptors)	22.8	19.5	DS1, DS2	None	None	5.02

23.6.2.55. Table 23.31 and Table 23.32 show that beneficial and adverse impacts are predicted in all of the Verification Zones. The RMSE for NO_2 in all zones, except for Verification Zone 3, is higher than the recommended 10% of the annual mean objective and therefore exceedances at some modelled receptors in Verification Zone 5 cannot be ruled out under the DM scenario and both the DS1 and DS2 scenarios. Exceedances in Verification Zones 2 and 3 are unlikely as the RMSE for these Verification Zones is less than the headroom for the maximum prediction under the objective in this zone. Improvements in air quality at all the AQMA receptors in Zone 2 are predicted due to lane closures along Eastern Road.

Considering the uncertainty on the modelling process discussed in Appendix 23.3 (Air Quality Traffic Modelling), the NO_2 objective is highly likely to be exceeded in the Do-Minimum scenario, and these predictions are either unchanged or negligibly increased in the DS1 and DS2 scenarios.

23.6.2.56. It should be noted in the context of the results that the impacts will be temporary and although the exact period of each impact cannot be determined, they are expected to last for less than one year due to the mobile nature of the trenching works and restrictions on traffic management periods, and will not necessarily occur simultaneously in each zone. The traffic flows used to complete the predictive modelling have been applied on the assumption that these measures will be in place all year in each zone simultaneously. which represents a highly conservative and robust approach.

Compliance with Directive 2008/50/EC

23.6.2.57. The impacts associated with diversions, road closures and other traffic management measures and construction traffic operation are transitory and temporal in nature, and so are not predicted to impact on the ability of the Compliance Risk Road Network applicable to the Proposed Development to meet obligations under EU Directive 2008/50/EC.

23.6.2.58. There are however, areas within the City of Portsmouth where the roadside concentration is predicted in the DM scenario to be above the annual limit value for NO_2 of 40 µg/m³. These areas have been compared to the Defra PCM compliance links highlighted in the City of Portsmouth Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019).

23.6.2.59. Plate 23.28 shows the Defra compliance link annual mean concentrations under the DM scenario, with those above the limit value for NO_2 highlighted.

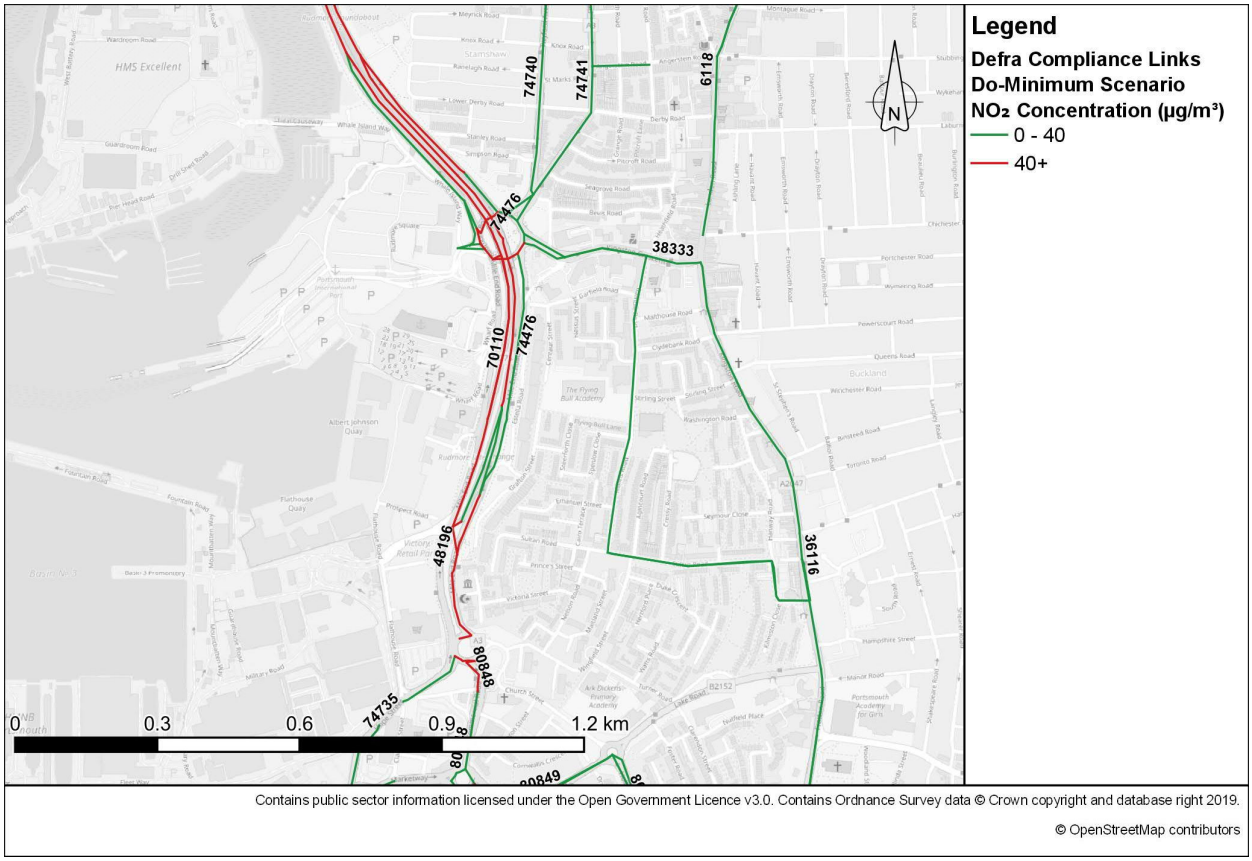


Plate 23.28 - DM Scenario Defra Compliance Links

23.6.2.60. Plate 23.28 shows exceedance of the annual mean limit value for NO_2 at a number of locations along the M275 corridor under the DM scenario.

23.6.2.61. Table 23.33 shows the PCM Compliance results for the DS1 scenario. The maximum modelled concentrations for each compliance link are shown alongside the Defra PCM projections for each compliance link.

Table 23.33 - DS1 PCM Compliance Results

Defra PCM Data			Defra PCM Model Total NO_2 (µg/m^3)			Annual Mean NO_2 Concentration (µg/m^3) (4m Compliance Receptor)			
Defra ID	Zone / Agglomeration Ref No	Compliant Zone?	2020 Projected	2025 Projected	Equivalent 2022 Year	DM	DS1	Change (DS1-DM)	Equivalent PCM DS1
18114	UK0012	N	39.4	30.4	35.8	**42.9**	**42.9**	0.0	35.8
48196	UK0012	N	42.9	33.1	39.0	**49.9**	**50.6**	0.7	39.7
36116	UK0012	N	26.3	20.3	23.9	38.2	38.4	0.2	24.1
38333	UK0012	N	30.6	23.6	27.8	35.0	35.4	0.4	28.2
6118	UK0012	N	26.5	20.5	24.1	33.4	33.6	0.2	24.3

23.6.2.62. Table 23.33 shows the compliance links within the City of Portsmouth highlighted within the Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019) will not meet the Defra PCM links standards under the DM scenario. Two of the links, 18114 covering the A3 Albert Road and 48196 covering the A3 Mile End Road, also remain above the annual mean limit for NO_2 of 40 µg/m³.

23.6.2.63. Under the DS1 scenario, concentrations are increased at four out of the five links, however these changes are negligible in magnitude.

23.6.2.64. Plate 23.29 shows the Defra compliance link annual mean concentrations under the DS1 scenario, with those above the limit value for NO_2 highlighted.

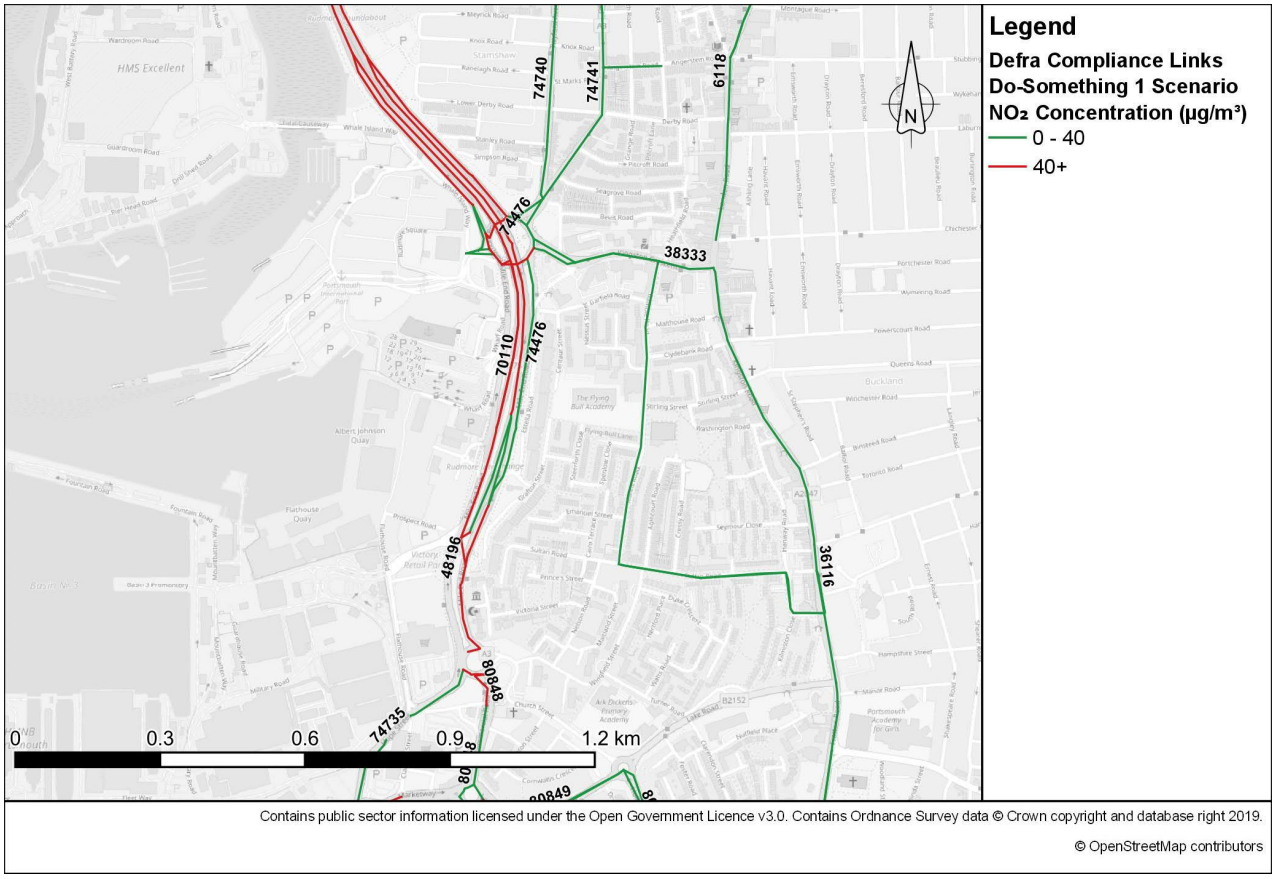
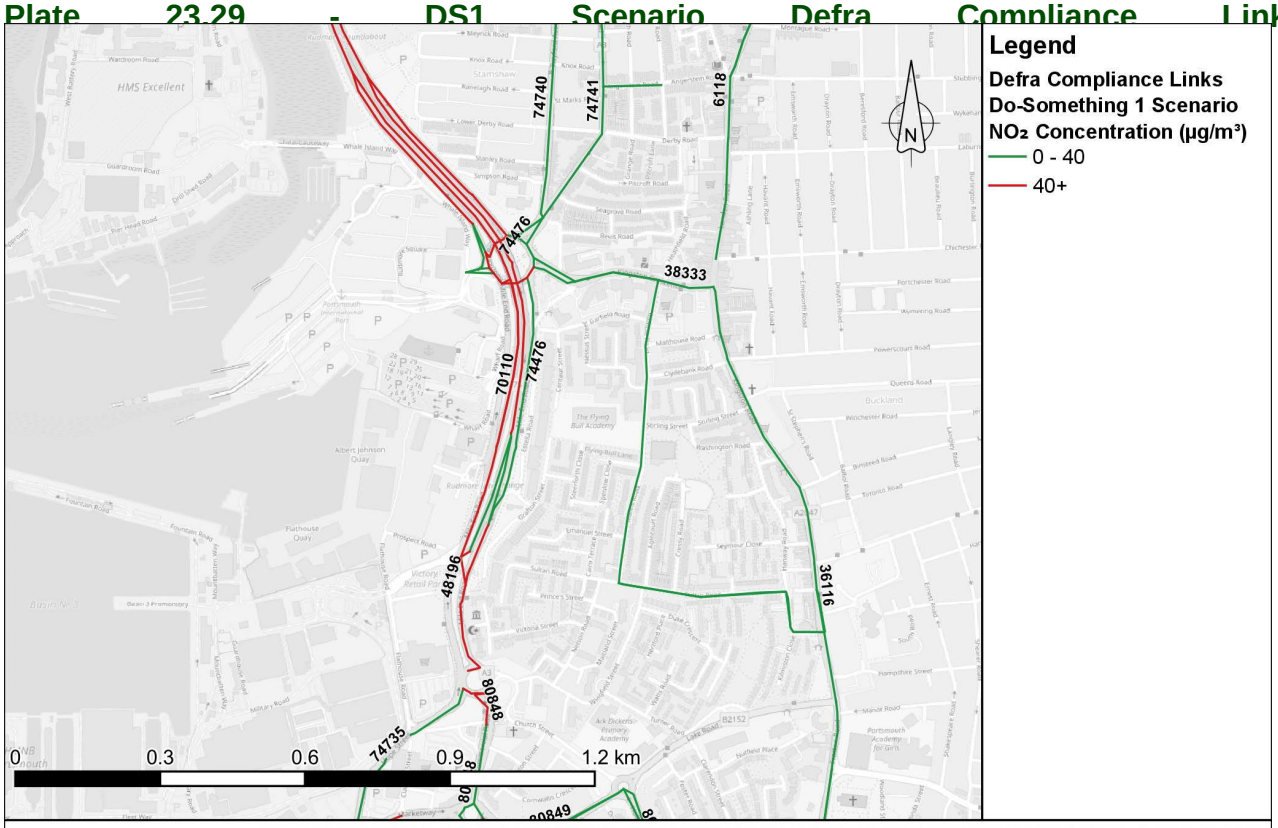


Plate 23.29 - DS1 Scenario Defra Compliance Links



23.6.2.65. Plate 23.29 shows that under the DS1 scenario concentrations on the Defra compliance links are predicted to remain above the annual mean limit value for NO_2 in all of the same areas as under the Do-Minimum scenario, including around the Hope Street Roundabout.

Table 23.34 shows the PCM Compliance results for the DS2 scenario. The maximum modelled concentrations for each compliance link are shown alongside the Defra PCM projections for each compliance link.

Table 23.34 - DS2 PCM Compliance Results

Defra's PCM Data			Defra PCM Model Total NO_2 (µg/m^3)			Annual Mean NO_2 Concentration (µg/m^3) (4m Compliance Receptor)			
Defra Link Census ID	Zone / Agglomeration Ref No	Compliant Zone?	2020 Projected	2025 Projected	Equivalent 2022 Year	DM	DS2	Change (DS2-DM)	Equivalent PCM DS2
18114	UK0012	N	39.4	30.4	35.8	**42.9**	**42.9**	0.0	35.8
48196	UK0012	N	42.9	33.1	39.0	**49.9**	**50.1**	0.2	39.2
36116	UK0012	N	26.3	20.3	23.9	38.2	38.3	0.1	24.0
38333	UK0012	N	30.6	23.6	27.8	35.0	35.0	0.0	27.8
6118	UK0012	N	26.5	20.5	24.1	33.4	33.6	0.2	24.3

23.6.2.66. Table 23.34 shows that two of the compliance links highlighted in the Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019) will remain above the annual mean limit for NO_2 of 40 µg/m³ under the DS2 scenario. The changes from the DS2 scenario relevant to the DM scenario are less than those under from the DS1 scenario, and are considered to be of negligible magnitude.

23.6.2.67. Plate 23.30 shows the Defra compliance link concentrations under the DS2 scenario, with those above the limit value for NO_2 highlighted.

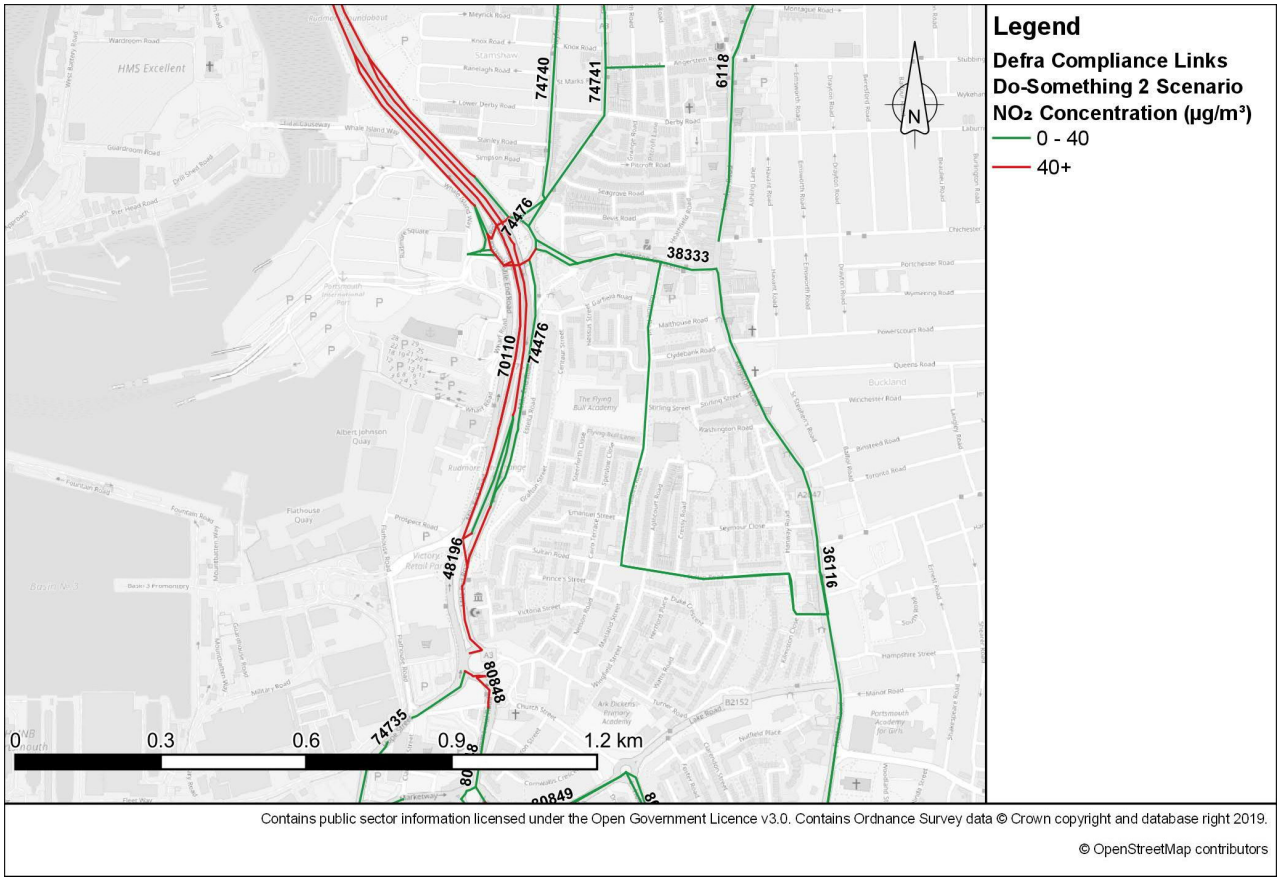
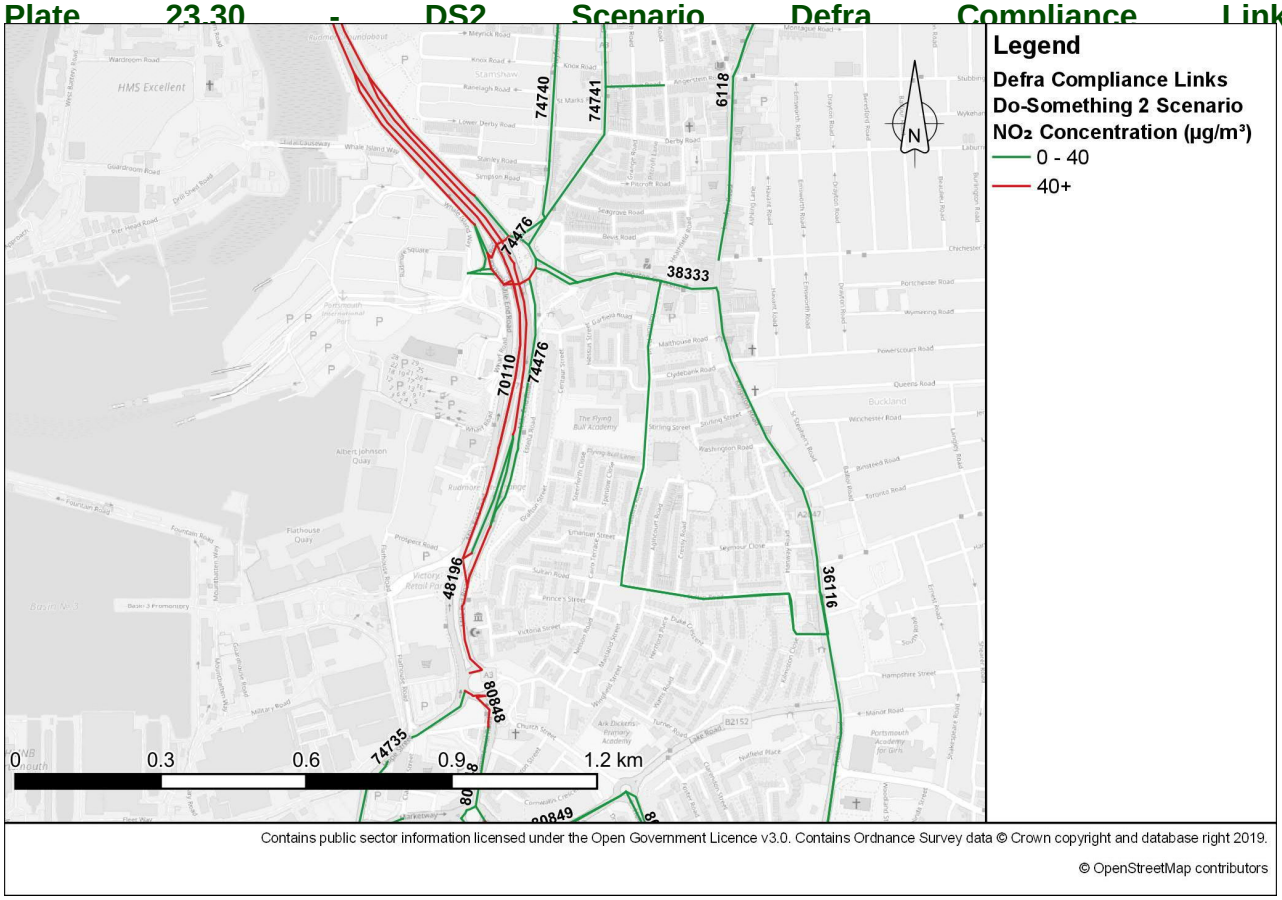


Plate 23.30 - DS2 Scenario Defra Compliance Links



23.6.2.68. Plate 23.30 shows that under the DS2 scenario, concentrations on the Defra compliance links are predicted to remain above the annual mean limit value for NO_2 in all of the same areas as under the Do-Minimum scenario, including around the Hope Street Roundabout.

23.6.2.69. Whilst there are areas that are not predicted to meet compliance in any scenario including the Do-Minimum, it is predicted that neither of the DS scenarios will impact upon other activities being undertaken in the city with respect to Defra compliance given the negligible changes in concentrations. The implementation of the Class B CAZ may have a positive effect on pollutant concentrations in this area, however the effect of this is not included in the EFTv9 or the SRTM, leading to the high likelihood that the predictions presented here for 2022 are over-estimated.

Construction Traffic Impacts

Description of Works

23.6.2.70. At the Converter Station, an anticipated HDV AADT of 86 was included in the model, in addition to 300 AADT for employee private cars.

23.6.2.71. Along the Onshore Cable Route, construction traffic movements through the study area were assumed in the traffic model as described in Chapter 22 (Traffic and Transport), and as follows:

- **Section 1:** Broadway Lane – Day Lane – Lovedean Lane – Milton Road – B2150 Hambledon Road;
- **Section 2**: Broadway Lane – Day Lane – Lovedean Lane – Milton Road – B2150 Hambledon Road;
- **Section 3**: Broadway Lane – Day Lane – Lovedean Lane – Milton Road – B2150 Hambledon Road – A3 Maurepas Way – A3 London Road;
- **Section 4:** Broadway Lane – Day Lane – Lovedean Lane – A3 Portsmouth Road – B2149 Dell Piece West – A3(M) Junction 2 – A3(M) – A3(M) Junction 5 – A2030 Eastern Road;
- **Section 5:** Broadway Lane – Day Lane – Lovedean Lane – A3 Portsmouth Road – B2149 Dell Piece West – A3(M) Junction 2 – A3(M) – A27 Havant Bypass – A2030 Eastern Road; and
- **Section 6 to 10:** Broadway Lane – Day Lane – Lovedean Lane – A3 Portsmouth Road – B2149 Dell Piece West – A3(M) Junction 2 – A3(M) – A27 Havant Bypass – A2030 Eastern Road – A2030 Velder Avenue – A288 Milton Road – A288 Eastney Road – Bransbury Road – Henderson Road – Fort Cumberland Road.

23.6.2.72. Work to construct the Onshore Cable Route will typically be undertaken in 100 m sections, served by 8 AADT HDV movements and 4 AADT LDV movements as described in detail in Chapter 22 (Traffic and Transport).

Embedded Mitigation

23.6.2.73. Mitigation identified by risk assessment is embedded in the design in that impact significance is determined after the implementation of measures which will be applied through the Onshore Outline CEMP and Appendix 22.2 (Framework CTMP). This includes the operation of plant such as diesel generators and construction vehicles to a minimum of EU Stage III emissions standards for non-road diesel engines. Though no Euro standard is required for construction vehicles operating on the public highway the use of construction vehicles should be consistent with the requirements of the LAQM measures such as Portsmouth CAZ.

Impacts

23.6.2.74. Within 200 m of the routes affected by construction traffic, the number of impacted receptors is shown in Table 23.35.

Table 23.35 - Impacted Receptors for Construction Traffic

Type	Receptor Count
Residential	13,071
Commercial	578
Community	55

Type	Receptor Count
Military	0
Total Number of Receptors	**13,704**

23.6.2.75. Within the numbers of receptors shown in Table 23.35, there are receptors with particular sensitivity, as shown in Table 23.36.

Table 23.36 - Particularly Sensitive Receptors for Construction Traffic

Sensitive Receptor	Receptor Count
Schools	16
Medical	11
Hospice	0
Sheltered Accommodation	1
Care Home	54

Do-Something Scenario 1

23.6.2.76. A summary of the results for generated construction traffic for the DS1 scenario is shown in Table 23.37.

Table 23.37 – Generated Construction Traffic Assessment Results for the Do-Something Scenario 1 (2022)

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration	33.6	23.1	13.0
	DS1 (2022) Maximum Modelled Concentration	33.5	19.6	12.7
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
	Improvement in Concentration	8,586	7,717	6,020

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Total Number of Properties	No Change in Concentration	3,107	4,484	6,609
	Deterioration in Concentration	2,011	1,503	1,075
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement	9.2	5.1	1.5
	Maximum Deterioration	10.0	1.8	0.5

23.6.2.77. The modelling results indicate an improvement of 0.1 µg/m^3 in the maximum modelled concentration at receptors within the study area for NO_2. There are improvements in the highest predicted concentrations for PM_{10}, with a reduction of 3.4 µg/m^3 and a smaller improvement (0.3 µg/m$^{3)}$ in the maximum $PM_{2.5}$ concentration.

23.6.2.78. The highest NO_2 concentration of 33.5 µg/m³ under the DS1 scenario is located at a single residential receptor at 72 Lower Road, east of the Bedhampton Roundabout.

23.6.2.79. Table 23.37 shows a maximum predicted improvement of 9.2 µg/m³ in NO_2 concentrations, which is predicted at residential receptors in the area around Corbett Road and Mountbatten Drive.

23.6.2.80. The maximum predicted deterioration of 10.0 µg/m³ in NO_2 concentrations is located at residential receptors on the B2150 Hambledon Road where the maximum predicted DM concentration is 14.9 µg/m³.

Do-Something Scenario 2

23.6.2.81. A summary of the results for generated construction traffic for the DS2 scenario are shown in Table 23.38.

Table 23.38 – Generated Construction Traffic Assessment Results for the Do-Something Scenario 2 (2022)

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration	33.6	23.1	13.0
	DS2 (2022) Maximum Modelled Concentration	29.6	18.5	12.7
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	13,264	12,177	8,030
	No Change in Concentration	244	1,281	5,573
	Deterioration in Concentration	196	246	101

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement	9.4	4.9	1.5
	Maximum Deterioration	7.0	0.8	0.2

23.6.2.82. The modelling results indicate that there is an improvement of 3.7 µg/m^3 in the maximum modelled concentration at receptors within the study area for NO_2 in the DS2 scenario. This is a larger improvement than the DS1 scenario. There are improvements in the highest predicted concentrations for PM_{10} of a similar magnitude (4.6 µg/m$^{3)}$ and a smaller improvement in the maximum $PM_{2.5}$ concentration (0.3 µg/m^3).

23.6.2.83. The highest predicted NO_2 concentration of 29.6 µg/m³ under the DS2 scenario is located at a single residential receptor at 72 Lower Road, east of the Bedhampton Roundabout.

23.6.2.84. Table 23.38 shows the maximum predicted improvement of 9.4 µg/m³ in NO_2 concentrations, which is predicted at residential receptors along Mountbatten Drive, Alexander Close and Corbett Road where the maximum predicted DM concentration is 32.6 µg/m³ .

23.6.2.85. The maximum predicted deterioration of 7.0 µg/m³ in NO_2 concentrations is located at two residential receptors, St Michaels and The Cedars on Hambledon Road where the maximum predicted DM concentration is 14.9 µg/m³.

Supplementary Transport Assessment Work

23.6.2.86. Additional work has been undertaken with regards to routes for construction traffic in Waterlooville. This has resulted in a minor change, routing construction vehicles along the A3 London Road instead of Milton Road in Waterlooville. The volumes of construction vehicles in this area are predicted to be:

- 12 AADT LDV; and
- 24 AADT HDV.

23.6.2.87. As there is no AQMA in this area, and this volume of traffic does not meet the scoping requirements in the IAQM construction dust assessment guidance, it is concluded that this minor change will not result in significant effects, and additional quantitative assessment is not required.

Local Power Generation for HDD Operations

23.6.2.88. A summary of the detailed data sheets for Construction Stage local power generation associated with HDD operations, resulting emissions calculations and assumptions made to inform the quantitative assessment of these emissions is shown in Appendix 23.4 (Air Quality Generator Emissions Modelling).

Embedded Mitigation

23.6.2.89. Mitigation is embedded into the design of the Proposed Development through the use of generators which conform to a minimum of EU Stage III emissions standards for non-road diesel engines.

Impacts

Meteorological Sensitivity

23.6.2.90. To test the sensitivity of the predicted concentrations to variable dispersion conditions, five years of meteorological data were tested to identify which year provides the most conservative dispersion conditions. The results of the meteorological sensitivity testing are presented for five years of hourly sequential data (2014 – 2018) for the main pollutant of concern which is NO_X / NO_2. The statistical testing presented in Appendix 23.4 (Air Quality Generator Emissions Modelling) was undertaken, and results from the year 2014 were determined to represent the worst-case emissions scenario.

Impact Assessment

23.6.2.91. The results of the dispersion modelling are presented in tabular format for the likely Construction Stage scenario. Impacts are considered on human receptors as identified by the discrete receptor locations included in the model which are shown in Appendix 23.4 (Air Quality Generator Emissions Modelling).

23.6.2.92. A summary of the predicted annual NO_2, CO, THC, PM_{10} and $PM_{2.5}$ results at the modelled discrete receptors are presented in Table 23.39. Table 23.40 shows the short-term CO and PM_{10} results, and Table 23.41 the short-term NO_2 results. These tables show the maximum predicted concentration for each pollutant and averaging period and an interpretation of the magnitude of impact following the IAQM Planning guidance.

Table 23.39 – Do-Something Scenario results for modelled receptors (annual average)

Statistic	NO_2	THC	PM_{10}	$PM_{2.5}$**
Maximum Annual Mean PC (µg/m³)	5.0	0.7	13.2	11.8
Maximum Annual Mean PEC (PC + Background) (µg/m³)	21.2	1.1	27.4	22
AQAL (µg/m³)	40	5*	40	25***
Change relative to AQAL (%)	13%	14%	33.0%	47%
IAQM Impact	**Moderate**	**Moderate**	**Moderate**	**Moderate**

**** Annual average AQAL for benzene***

***** The exhaust gas concentrations provided by generator manufacturers did not differentiate between PM_{10} and $PM_{2.5}$. PM results are therefore assumed to be PM_{10} and converted to $PM_{2.5}$ using factors in the Defra Damage Cost Guidance for assessment against the objective values.***

****** Target value***

23.6.2.93. Table 23.39 shows that the annual average objectives for NO_2, THC, PM_{10} and $PM_{2.5}$ will not be exceeded during construction at any of the sensitive receptors. The largest predicted increase relative to the AQAL is 47 % for $PM_{2.5}$ and the largest receptor concentration inclusive of background will be 22 µg/m³ for $PM_{2.5}$. This is a **moderate** impact in accordance with the IAQM criterion as the predicted concentration is 88 % of the annual mean objective.

23.6.2.94. The predicted maximum annual mean PC is above 10% of the AQAL for all modelled pollutants.

Table 23.40 – Do-Something Scenario results for modelled receptors (24-hour PM_{10} and max 8-hour CO)

Statistic	CO (mg/m³)	PM_{10} (µg/m³)
Max. Percentile PEC (*90.4th daily mean* PM_{10} *and max daily 8-hour running mean CO*)	0.67	18.8
Exceedance days	-	2.6
AQAL	10	50
IAQM magnitude	Small	Negligible

23.6.2.95. Table 23.40 shows that the highest 8-hour running mean CO concentration is 0.67 mg/m^3 which is less than 7% of the AQAL and is assigned a magnitude of **Small**. The 90.4th percentile daily mean PM_{10} concentration is predicted to be 18.8 µg/m^3 which is **negligible** in comparison to the AQAL. There may be up to 3 occasions predicted where the 24-hour limit may be exceeded for PM_{10}.

Table 23.41 – Do-Something Scenario results for top 10 modelled receptors (1-hour NO_2)

Statistic ($\mu g/m^3$)	1	2	3	4	5	6	7	8	9	10
x	467810	467853	467804	467844	467834	467815	467825	467799	467836	467836
y	99175	99072	99173	99075	99077	99083	99080	99172	99194	99194
2 x Background	24	24	24	24	24	24	24	24	24	24
Max. Percentile PC (*99.79th hourly* NO_2)	103.7	96.4	93.6	91.9	90.9	87.7	87.5	86.4	84.4	84.4
PEC	127.7	120.4	117.6	115.9	114.9	111.7	111.5	110.4	108.4	108.4
Short-term AQAL ($\mu g/m^3$)	200	200	200	200	200	200	200	200	200	200
Change relative to AQAL (%)	63.9	60.2	58.8	58	57.5	55.9	55.8	55.2	54.2	54.2
IAQM magnitude	**Large**									

23.6.2.96. Table 23.41 shows that the highest 1-hour NO_2 concentration is 127.7 µg/m^3 which is 64 % of the AQAL. The top ten 1-hour NO_2 concentrations range from 55-64 % of the AQAL. These are assessed as **large** impacts following the IAQM impact criterion in Section 0 as they are all in excess of 51 % of the AQAL.

Amalgamated Effects

23.6.2.97. This section details the amalgamated effect results from the following assessments:

- Temporary diverted traffic emissions effects Appendix 23.3 (Air Quality Traffic Modelling);
- Generated construction traffic emissions effects Appendix 23.3 (Air Quality Traffic Modelling) (*ibid*); and
- Construction Stage local power generation emissions effect Appendix 23.3 (Air Quality Traffic Modelling) (*ibid*).

23.6.2.98. Due to the semi-quantitative nature of Construction Dust Assessment (Section 23.6.2) it is not possible to combine those results with the quantitative predictions from the other assessments.

Impacts

23.6.2.99. The overall impacts for the DS1 scenario are presented in Figure 23.6, Figure 23.7 and Figure 23.10 and for the DS2 scenario are presented in Figure 23.8, Figure 23.9 and Figure 23.11.

Verification Zone 1

Verification Zone 1 Receptors

23.6.2.100. The number of impacted receptors within Verification Zone 1 is shown in Table 23.42.

Table 23.42 - Impacted Receptors in Verification Zone 1

Type	Receptor Count
Residential	29,424
Commercial	1,719
Community	176
Military	7
Total Number of Receptors	**31,326**

23.6.2.101. Within the numbers of receptors shown in Table 23.42, there are receptors with particular sensitivity, as shown in Table 23.43.

Table 23.43 - Particularly Sensitive Receptors in Verification Zone 1

Sensitive Receptor	Receptor Count
Schools	80
Medical	33
Hospice	0
Sheltered Accommodation	0
Care Home	13

Verification Zone 1 Results

23.6.2.102. A summary of the amalgamated results for the DS1 scenario are shown in Table 23.44.

Table 23.44 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Verification Zone 1

Pollutant		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	**48.2**	23.6	14.6
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	**48.3**	23.6	14.6
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	798	221	277
	No Change in Concentration	15,237	26,497	30,106
	Deterioration in Concentration	15,291	4,608	943
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.2	0.1	0.1
	Maximum Deterioration (µg/m³)	0.6	0.2	0.1

23.6.2.103. The summary results in Table 23.44 for the DS1 scenario are unchanged from the assessment of diverted traffic impacts. Verification Zone 1 covers the city centre area of the City of Portsmouth and is not affected by construction traffic or HDD operations.

23.6.2.104. Table 23.44 shows there is a deterioration of 0.1 µg/m^3 in the maximum modelled concentration at receptors within Verification Zone 1 for NO_2. The maximum DS1 concentration of 48.3 µg/m^3 is above the objective. Figure 23.14 Sheet 1 of the ES Volume 2 (document reference 6.2.23.14) should be compared with Figure 23.15 Sheet 1 of the ES Volume 2 (document reference 6.2.23.15) for a comparison of the DM against the DS1 scenario. There are imperceptible changes in the maximum modelled concentrations for PM_{10} and $PM_{2.5}$.

23.6.2.105. The highest predicted concentration of 48.3 µg/m^3 for NO_2 under the DS1 scenario occurs at high occupancy residential receptors on Old Commercial Road and Grafton Street, closest to the M275.

23.6.2.106. The highest predicted deterioration of 0.6 µg/m^3 in concentrations of NO_2 occurs at high occupancy residential receptors on Percy Chandler Street, where the maximum modelled DM concentration is 15.5 µg/m^3.

23.6.2.107. The highest predicted improvement of 0.2 µg/m^3 in concentrations of NO_2 occur along Osier Way and Harbour Way, closest to the M275, where the maximum modelled DM concentration is 20.5 µg/m^3.

23.6.2.108. A summary of the amalgamated results for the DS2 scenario are shown in Table 23.45.

Table 23.45 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Verification Zone 1

Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m^3)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m^3)	**48.2**	23.6	14.6
	DS2 (2022) Maximum Modelled Concentration (µg/m^3)	**48.4**	23.6	14.6
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	171	149	0
	No Change in Concentration	26,663	29,384	31,043
	Deterioration in Concentration	4,492	1,793	283

Pollutant (Annual Mean)		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.1	0.1	0.0
	Maximum Deterioration (µg/m³)	0.7	0.1	0.1

23.6.2.109. The summary results in Table 23.45 for the DS2 scenario are unchanged from the diverted traffic DS2 scenario results due to the remoteness of the construction traffic routes and HDD operations from this zone.

23.6.2.110. Table 23.45 shows that there is an deterioration of 0.2 µg/m^3 in the highest predicted concentration at receptors within the study area for NO_2 in the DS2 scenario. The maximum DS2 concentration of 48.4 µg/m^3 is above the objective. Figure 23.14 Sheet 1 should be compared with Figure 23.16 Sheet 1 of the ES Volume 2 (document reference 6.2.23.16) for a comparison of the DM against the DS2 scenario.

23.6.2.111. The highest predicted concentration of 48.4 µg/m³ for NO_2 in DS2 occurs at high occupancy residential receptors on Old Commercial Road and Grafton Street, closest to the M275.

23.6.2.112. The highest predicted deterioration of 0.7 µg/m³ in concentrations of NO_2 occurs at high occupancy residential receptors on Percy Chandler Street, where the maximum modelled DM concentration is 15.5 µg/m³.

23.6.2.113. The highest predicted improvement of 0.1 µg/m³ in concentrations of NO_2 occur along Osier Way and Harbour Way, closest to the M275, where the maximum modelled DM concentration is 20.5 µg/m³.

23.6.2.114. For NO_2, PM_{10} and $PM_{2.5}$, concentrations are not predicted to change at most of the receptors assessed for the DS2 scenario.

23.6.2.115. The concentrations at representative receptors are as presented in Table 23.46.

Table 23.46 - Verification Zone 1 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
I Glancey, 108 New Road	20.8	21.0	0.2	Negligible Adverse	20.8	0.0	Negligible No-change	No
Meadow House Rest Home, 47-51 Stubbington Avenue	19.8	19.6	-0.2	Negligible Beneficial	19.8	0.0	Negligible No-change	Yes
Stubbington Avenue Dental Practice, Ring Baxte & Reid, 12 Stubbington Avenue	19.8	19.6	-0.2	Negligible Beneficial	19.8	0.0	Negligible No-change	Yes
Good Manors Day Nursery, Stubbington Lodge, 45 Stubbington Avenue	19.8	19.6	-0.2	Negligible Beneficial	19.8	0.0	Negligible No-change	Yes
The Harbour School Stamshaw, Ranelagh Road	**46.5**	**46.8**	0.3	Moderate Adverse	**47.2**	0.7	Substantial Adverse	No
24 Grafton Street	**48.2**	**48.3**	0.1	Negligible Adverse	**48.4**	0.2	Negligible Adverse	Yes
110 Grafton Street	**48.2**	**48.3**	0.1	Negligible Adverse	**48.4**	0.2	Negligible Adverse	Yes

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
401j Old Commercial Road	**48.2**	**48.3**	0.1	Negligible Adverse	**48.4**	0.2	Negligible Adverse	Yes
St. John Ambulance, 406-414 Old Commercial Road	**48.2**	**48.3**	0.1	Negligible Adverse	**48.4**	0.2	Negligible Adverse	Yes
14 Harbour Way	**45.0**	**45.1**	0.1	Negligible Adverse	**45.1**	0.1	Negligible Adverse	No
4 Osier Close	**45.0**	**45.1**	0.1	Negligible Adverse	**45.1**	0.1	Negligible Adverse	No
Horndean House, Percy Chandler Street	29.5	30.1	0.6	Slight Adverse	29.6	0.1	Negligible Adverse	No
Horndean House, Percy Chandler Street	29.5	30.1	0.6	Slight Adverse	29.6	0.1	Negligible Adverse	No

Verification Zone 1 Significance

23.6.2.116. In the Do-Minimum scenario for Verification Zone 1, 447 exceedances of the annual average NO_2 objective are predicted. No exceedances of the particulate matter objectives are predicted.

23.6.2.117. The information in Table 23.47 provides a summary of the amalgamated impacts for the DS1 scenario.

Table 23.47 - DS1 Impact Summary for Verification Zone 1

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	798	221	277
	No change	15,237	26,497	30,106
	Adverse	15,176	4,608	943
Slight	Beneficial	0	0	0
	Adverse	20	0	0
Moderate	Beneficial	0	0	0
	Adverse	95	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.118. Table 23.47 shows that at the vast majority of impacts at receptors within Verification Zone 1 are predicted to be negligible, with no change in concentration or a negligible adverse magnitude of impact. 3% of receptors are likely to see a beneficial impact. There are 115 receptors with slight or moderate adverse impacts in relation to concentrations of NO_2. All of these receptors are predicted to be in exceedance the objective in the Do-Minimum scenario and the maximum modelled deterioration is 0.7µg/m^3. For this reason the significance of impacts for the DS1 scenario in Verification Zone 1 is determined using professional judgement to be **slight adverse**.

23.6.2.119. The information in Table 23.48 provides a summary of the amalgamated impacts in Verification Zone 1 under the DS2 scenario.

Table 23.48 – DS2 Impact Summary for Verification Zone 1

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	171	149	0
	No change	26,663	29,384	31,043
	Adverse	4,491	1,793	283

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	1	0	0

23.6.2.120. Table 23.48 shows that for 85% of all receptors in Zone 1 under the DS2 scenario, there is no change in predicted concentration. However, negligible adverse impacts are predicted at 14% of all receptors and negligible beneficial at just 1%.

23.6.2.121. At the Harbour School on Ranelagh Road where an exceedance is predicted in the Do-Minimum scenario, a substantial adverse impact is predicted as a result of a 1.8% increase in NO_2 concentration to a maximum concentration of 47.2 µg/m³. Whilst this receptor is located remote from the works, it is within 30 m of the M275 motorway where traffic flow is predicted to increase as a result of traffic management on the A3. Taking all of the above into account and using professional judgement the impact of the DS2 scenario in Verification Zone 1 is determined to be **negligible adverse**.

23.6.2.122. Consideration of the model performance, as measured by the RMSE (±6.9µg/m³), determines that the maximum predicted concentrations will be over the objective even assuming the model is over-predicting.

23.6.2.123. Given the information in Table 23.47 and Table 23.48, the presence of AQMAs, the high sensitivity of the area, objective exceedances, model performance and the balance of adverse to beneficial impacts, the significance of effects in Verification Zone 1 is judged as follows:

- Verification Zone 1 (DS1) - **slight adverse** impact and **significant effect;** and
- Verification Zone 1 (DS2) - negligible adverse impact and no significant effect.

23.6.2.124. It is notable in Verification Zone 1 more than the other verification zones that there appears to be a substantial difference between the number of receptors predicted to experience different NO_2 impacts between the DS1 and DS2 scenario. A review of the number of receptors predicted to experience no change in NO_2 concentrations under the DS2 scenario was undertaken. This showed that 11,005 receptors were predicted to experience no change in NO_2 concentrations under the DS2 scenario that were predicted to experience changes of 0.4 µg/m³ or less under the DS1 scenario. Of those receptors, 3,857 were predicted to experience changes of 0.1 µg/m³ or less under the DS1 scenario. This shows that the actual predicted

differences between a negligible beneficial or adverse impact, or no change in concentrations, are actually so small as to be imperceptible to humans.

Verification Zone 2

Verification Zone 2 Receptors

23.6.2.125. Within Verification Zone 2, the number of impacted receptors is shown in Table 23.49.

Table 23.49 - Impacted Receptors in Verification Zone 2

Type	Receptor Count
Residential	12,343
Commercial	492
Community	73
Military	0
Total Number of Receptors	**12,908**

23.6.2.126. Within the numbers of receptors shown in Table 23.49, there are receptors with particular sensitivity, as shown in Table 23.50.

Table 23.50 - Particularly Sensitive Receptors in Verification Zone 2

Sensitive Receptor	Receptor Count
Schools	20
Medical	27
Hospice	5
Sheltered Accommodation	1
Care Home	**43**

Verification Zone 2 Results

23.6.2.127. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario are shown in Table 23.51.

Table 23.51 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2026) for Verification Zone 2

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	26.7	20.8	13.5
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	26.8	20.8	13.5
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	5,445	5,168	2,990
	No Change in Concentration	1,853	3,605	6,797
	Deterioration in Concentration	5,713	4,238	3,224
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	4.2	1.7	0.5
	Maximum Deterioration (µg/m³)	9.2	3.5	2.3

23.6.2.128. The results in Table 23.51 show that the maximum modelled concentrations for all pollutants are unaffected by combining the diverted traffic, construction traffic and HDD emissions results with respect to the maximum concentrations for diverted traffic reported in Table 26 of Appendix 23.3 (Air Quality Traffic Modelling).

23.6.2.129. The highest predicted deterioration of 9.2 µg/m³ in concentrations of NO_2 occurs at a one receptor within Verification Zone 2 within the Southsea Leisure Park where the maximum modelled DM concentration is 13.3 µg/m³.

23.6.2.130. The highest predicted improvement of 4.2 µg/m³ in concentrations of NO_2 occurs at high density residential receptors at 397-413 Eastern Road.

23.6.2.131. A summary of the amalgamated results for the for the DS2 scenario are shown in Table 23.52.

Table 23.52 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2026) for Verification Zone 2

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	26.7	20.8	13.5
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	26.9	20.9	13.5
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	4,617	4,452	3,073
	No Change in Concentration	3,889	5,558	7,069
	Deterioration in Concentration	4,505	3,001	2,869
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	4.3	1.9	0.6
	Maximum Deterioration (µg/m³)	9.2	3.5	2.3

23.6.2.132. The summary results in Table 23.52 show that there is no change in the highest predicted concentration with respect to the results of diverted traffic presented in Appendix 23.3 (Air Quality Traffic Modelling) Table 27

23.6.2.133. The highest predicted improvement of 4.3 µg/m³ in concentrations of NO_2 occurs at a total of 185 receptors within Verification Zone 2 around the Eastern Road and Moorings Way area of the city, including at Portsmouth College.

23.6.2.134. The highest predicted deterioration of 9.2 µg/m³ in concentrations of NO_2 occurs at a one receptor within Verification Zone 2 within the Southsea Leisure Park where the maximum modelled concentration is 13.3 µg/m³. This is due to the operation of the HDD equipment at Eastney (Landfall).

23.6.2.135. For particulates, concentrations are not predicted to change at the majority of receptors assessed for the DS2 scenario.

23.6.2.136. NO_2 concentrations at a selection of representative receptors are shown in Table 23.53 consisting of high sensitivity receptors highlighted in Appendix 23.4 (Air Quality Generator Emissions Modelling) Table 2, Figure 23.14 Sheet 2 and Figure 23.16 Sheet 2, within 50 m of the road centreline, and those receptors predicted to experience the highest concentrations or largest changes (> ±0.2 µg/m³).

Table 23.53 - Verification Zone 2 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
My Dentist, B P Henning Dental Surgeon, 310 Chichester Road	23.0	23.2	0.2	Negligible Adverse	23.1	0.1	Negligible Adverse	No
Doctors Surgery, 111 Copnor Road	23.0	23.2	0.2	Negligible Adverse	23.1	0.1	Negligible Adverse	No
Mary Rose Manor, Copnor Road	20.9	21.3	0.4	Negligible Adverse	21.0	0.1	Negligible Adverse	No
Shearwater, 18 Moorings Way	18.4	17.2	-1.2	Slight	17.2	-1.2	Slight Beneficial	Yes
Portsmouth College, Tangier Road	15.4	14.7	-0.7	Negligible Beneficial	14.6	-0.8	Negligible Beneficial	No
Tangier Road Children's Home, 265-267 Tangier Road	16.0	15.9	-0.1	Negligible Beneficial	16.0	0.0	Negligible No-change	No
94 Eastern Road	22.8	19.5	-3.3	Moderate Beneficial	19.5	-3.3	Moderate Beneficial	Yes
5 Hayling Avenue	26.7	26.8	0.1	Negligible Adverse	26.9	0.2	Negligible Adverse	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
3 Plover Reach	17.5	16.7	-0.8	Negligible	16.8	-0.7	Negligible Beneficial	Yes
18 The Haven	25.7	25.2	-0.5	Negligible Beneficial	25.6	-0.1	Negligible Beneficial	Yes
The Harbour School, Waterside Unit, Locksway Road	13.3	13.4	0.1	Negligible Adverse	13.4	0.1	Negligible Adverse	No
University Of Portsmouth, Bungalow 2, Flat 10 Langstone Student Village, Furze Lane	14.3	14.4	0.1	Negligible Adverse	14.4	0.1	Negligible Adverse	No
Miltoncross Academy, Milton Road	18.9	18.9	0.0	Negligible No-change	18.9	0.0	Negligible No-change	No
The Limes, Woodlands Walk	14.3	14.4	0.1	Negligible Adverse	14.4	0.1	Negligible Adverse	No
Solent NHS Trust, St Marys Hospital, Milton Road	21.1	21.3	0.2	Negligible Adverse	21.2	0.1	Negligible Adverse	No
27 Finch Road	12.9	13.4	0.5	Negligible Adverse	13.4	0.5	Negligible Adverse	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
51 Fort Cumberland Road	12.9	18.6	5.7	Moderate Adverse	18.6	5.7	Moderate Adverse	No
36 Finch Road	12.9	13.8	0.9	Slight Adverse	13.8	0.9	Slight Adverse	No
Al 4 Southsea Leisure Park, Melville Road	13.3	17.3	4.0	Moderate Adverse	17.3	4.0	Moderate Adverse	No
88 Seaway Crescent	13.3	13.4	0.1	Negligible Adverse	13.4	0.1	Negligible Adverse	No
The Thatched House, Milton Locks	13.3	14.0	0.7	Negligible Adverse	14.0	0.7	Negligible Adverse	No
20 Broom Close	13.3	13.4	0.1	Negligible Adverse	13.4	0.1	Negligible Adverse	No
383 Eastern Road	21.4	17.2	-4.2	Moderate Beneficial	17.1	-4.3	Moderate Beneficial	No
229 Hayling Avenue	17.6	16.9	-0.7	Negligible Beneficial	16.8	-0.8	Negligible Beneficial	No

Verification Zone 2 Significance

23.6.2.137. In the Do-Minimum scenario, no exceedances of the annual average NO_2 or particulate matter objectives at any receptors are predicted in Verification Zone 2.

23.6.2.138. Table 23.54 shows a summary of the impacts for the DS1 scenario in verification Zone 2.

Table 23.54 - DS1 Impact Summary for Verification Zone 2

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	3,964	4,495	2,990
	No change	1,853	3,605	6,797
	Adverse	5,210	4,118	3,141
Slight	Beneficial	640	673	0
	Adverse	270	92	61
Moderate	Beneficial	841	0	0
	Adverse	233	28	22
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.139. Table 23.54 shows that the majority of impacts within Verification Zone 2 are predicted to be negligible. As the highest predicted concentration for NO_2 is over 13µg/m^3 below the objective, less precaution is afforded to the judgement of significance on account of the predicted adverse impacts. Therefore, the impact for the DS1 scenario is predicted using professional judgement to be **negligible no change**.

23.6.2.140. Table 23.55 shows a summary of the impacts for the DS2 scenario in Verification Zone 2.

Table 23.55 - DS2 Impact Summary for Verification Zone 2

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	3,376	3,779	3,073
	No change	3,889	5,558	7,069
	Adverse	4,013	2,911	2,786
Slight	Beneficial	568	641	0

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
	Adverse	259	64	61
Moderate	Beneficial	673	32	0
	Adverse	233	26	22
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.141. Table 23.55 shows similar results to those for the DS1 scenario, with the majority of impacts in Verification Zone 2 predicted to be negligible. There are over 3 times as many slight beneficial impacts predicted as slight adverse. Less precaution is required to the judgement of significance on account of the predicted adverse impacts. Therefore, using professional judgment the impact for the DS2 scenario is predicted to be **negligible no change**.

23.6.2.142. Accounting for predicted results for the DS1 and DS2 scenarios, the presence of AQMAs, the high sensitivity of the area, objective compliance and the dominance of beneficial over adverse impacts, the impact of the high model error (RMSE 5.0 $\mu g/m^3$) is negated. The significance of effects in Verification Zone 2 is judged as follows:

- Verification Zone 2 (DS1) – negligible no change and no significant effect; and
- Verification Zone 2 (DS2) - negligible no change and no significant effect.

Verification Zone 3

Verification Zone 3 Receptors

23.6.2.143. Within Verification Zone 3, the number of impacted receptors is shown in Table 23.56, which represents a small increase over the number of receptors shown in Appendix 23.3 (Air Quality Traffic Modelling) Table 29.

Table 23.56 - Impacted Receptors in Verification Zone 3

Type	Receptor Count
Residential	2,922
Commercial	399
Community	17
Military	0
Total Number of Receptors	**3,338**

23.6.2.144. Within the numbers of receptors shown in Table 23.56, there are receptors with particular sensitivity, as shown in Table 23.57.

Table 23.57 - Particularly Sensitive Receptors in Verification Zone 3

Sensitive Receptor	Receptor Count
Schools	10
Medical	0
Hospice	0
Sheltered Accommodation	0
Care Home	82

Verification Zone 3 Results

23.6.2.145. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario are shown in Table 23.58.

Table 23.58 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Verification Zone 3

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	32.3	22.1	12.8
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	32.7	22.2	13.2
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	215	203	191
	No Change in Concentration	1,123	2,300	2,547
	Deterioration in Concentration	2,000	835	600
	Maximum Improvement (µg/m³)	3.1	1.6	0.5

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Deterioration (µg/m³)	8.7	4.2	2.8

23.6.2.146. The summary results in Table 23.58 show no change in the maximum predicted concentrations for all modelled pollutants with respect to those presented in Appendix 23.3 (Air Quality Traffic Modelling) Table 31.

23.6.2.147. The highest predicted improvement of 3.1 µg/m³ in concentrations of NO_2 occurs at residential receptors on Blakesley Lane and Wilby Lane that back onto Eastern Road.

23.6.2.148. The highest predicted deterioration of 8.7 µg/m³ in concentrations of NO_2 occurs at commercial receptors at Kendall's Wharf off Eastern Road where the maximum modelled DM concentration is 17.9 µg/m³.

23.6.2.149. For NO_2, PM_{10} and $PM_{2.5}$, 98% of all predictions are negligible.

23.6.2.150. A summary of the amalgamated assessment results for the DS2 scenario are shown in Table 23.59.

Table 23.59 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Verification Zone 3

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	32.3	22.1	12.8
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	32.6	22.1	13.2
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
	Improvement in Concentration	216	213	180

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Total Number of Properties	No Change in Concentration	1,646	2,321	2,604
	Deterioration in Concentration	1,476	804	554
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	3.6	1.8	0.5
	Maximum Deterioration (µg/m³)	8.6	4.2	2.8

23.6.2.151. The summary results in Table 23.59 show that the maximum predicted concentrations are unchanged with respect to those presented in Appendix 23.3 (Air Quality Traffic Modelling) Table 32.

23.6.2.152. The highest predicted deterioration of 8.6 µg/m³ in concentrations of NO_2 occurs at commercial receptors in the Ocean Park Retail Park on Dundas Lane, immediately opposite the Lord Nelson School where the maximum modelled concentration is 17.9 µg/m³.

23.6.2.153. The highest predicted improvement of 3.6 µg/m³ in concentrations of NO_2 occurs at the Morrisons supermarket on Eastern Road.

23.6.2.154. For particulates, concentrations are predicted to be unchanged at the majority of receptors assessed for the DS2 scenario whilst for NO_2 there is a broadly similar number of deteriorations and no change predictions. A larger number of receptors are predicted to experience a deterioration in ambient pollutant concentrations than those predicted to improve.

23.6.2.155. NO_2 concentrations at a selection of representative receptors are shown in Table 23.60, consisting of high sensitivity receptors highlighted in Appendix 23.4 (Air Quality Generator Emissions Modelling) Table 2, Figure 23.14 Sheet 3 and Figure 23.16 Sheet 3, and within 50 m of the road centreline, and those receptors predicted to experience the highest concentrations or largest changes (> ±0.2 µg/m³).

Table 23.60 - Verification Zone 3 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
Admiral Lord Nelson School, Dundas Lane	16.5	16.8	0.3	Negligible Adverse	16.8	0.3	Negligible Adverse	No
Stage 2 Business Centre, Dundas Lane	16.4	16.8	0.4	Negligible Adverse	16.8	0.4	Negligible Adverse	No
Eastern Road Car Sales	15.6	14.1	-1.5	Slight Beneficial	13.9	-1.7	Moderate Beneficial	No
Texaco Ltd, Eastern Road Service Station, Eastern Road	15.6	14.1	-1.5	Slight Beneficial	13.9	-1.7	Moderate Beneficial	No
Building F, Bilton Way	18.7	17.6	-1.1	Slight Beneficial	16.8	-1.9	Moderate Beneficial	No
60 Ecton Lane	19.9	20.1	0.2	Negligible Adverse	19.9	0	Negligible No-change	No
Morrisons, Anchorage Road	19.8	18.1	-1.7	Slight Beneficial	17.2	-2.6	Moderate Beneficial	No
Tudor Sailing Club, Eastern Road	16.3	17.2	0.9	Slight Adverse	15.8	-0.5	Negligible Beneficial	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
Seward Portsmouth, Building B, Bilton Way	18.7	17.8	-0.9	Negligible	16.8	-1.9	Moderate Beneficial	No
Smeg Uk Ltd, 1-2 And 4, Interchange Park, Robinson Way	18.7	18.9	0.2	Negligible Adverse	16.8	-1.9	Moderate Beneficial	No

Verification Zone 3 Significance

23.6.2.156. In the Do-Minimum scenario, no exceedances of the annual average NO_2 or particulate matter objectives at any receptors are predicted in Verification Zone 3.

23.6.2.157. Table 23.61 shows a summary of the impacts for the DS1 scenario in Verification Zone 3.

Table 23.61 - DS1 Impact Summary for Verification Zone 3

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	190	182	191
	No change	1,123	2,300	2,547
	Adverse	1,991	833	597
Slight	Beneficial	6	21	0
	Adverse	7	0	1
Moderate	Beneficial	19	0	0
	Adverse	2	2	2
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.158. Table 23.61 shows that the predicted impacts at the vast majority of receptors are negligible. There are noticeably more predicted negligible adverse impacts than negligible beneficial impacts. For NO_2, 19 moderate beneficial impacts and 2 moderate adverse impacts are predicted and there is a similar number of slight adverse and beneficial impact predictions. There are 2 moderate adverse predictions for particulates.

23.6.2.159. The overall significance for the DS1 scenario in Verification Zone 3 is assessed using professional judgment as **negligible adverse**.

23.6.2.160. Table 23.62 shows a summary for the predicted DS2 scenario impacts in Verification Zone 3.

Table 23.62 - DS2 Impact Summary for Verification Zone 3

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	149	188	180
	No change	1,646	2,321	2,604
	Adverse	1,470	802	552

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Slight	Beneficial	48	25	0
	Adverse	4	0	0
Moderate	Beneficial	19	0	0
	Adverse	2	2	2
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.161. Table 23.62 shows that for the DS2 scenario in Verification Zone 3 the vast majority of impacts are predicted to be negligible and with no change in predicted concentrations of all pollutants. There are more receptors predicted to experience adverse impacts than beneficial impacts in the negligible category for NO_2. For NO_2, 48 slight beneficial and 19 moderate beneficial impacts are predicted and there are also 4 slight and 2 moderate adverse impacts, which may impact on areas of the city that include AQMA. There are 2 moderate adverse predictions for particulates.

23.6.2.162. The overall impact for the DS2 scenario in Verification Zone 3 is assessed using professional judgement as **negligible adverse**.

23.6.2.163. Accounting for predicted results for the DS1 and DS2 scenarios, the presence of AQMAs, the high sensitivity of the area, objective compliance, the dominance of negligible impacts and the low model error (RMSE 1.6 µg/m^3), the significance of effects in Verification Zone 3 is judged as follows:

- Verification Zone 3 (DS1) – **negligible adverse** impact and **no significant effect;** and
- Verification Zone 3 (DS2) - **negligible adverse** impact and **no significant effect.**

Verification Zone 4

Verification Zone 4 Receptors

Within Verification Zone 4, the number of impacted receptors is shown in

23.6.2.164. Table 23.63 which is an increase over the numbers reported in Appendix 23.3 (Air Quality Traffic Modelling), Table 34.

Table 23.63 - Impacted Receptors in Verification Zone 4

Type	Receptor Count
Residential	5,303
Commercial	425
Community	50
Military	0
Total Number of Receptors	**5,778**

Within the numbers of receptors shown in

23.6.2.165. Table 23.63, there are receptors with particular sensitivity, as shown in Table 23.64.

Table 23.64 - Particularly Sensitive Receptors in Verification Zone 4

Sensitive Receptor	Receptor Count
Schools	11
Medical	26
Hospice	0
Sheltered Accommodation	0
Care Home	12

Verification Zone 4 Results

23.6.2.166. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario is shown in Table 23.65.

Table 23.65 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2026) for Verification Zone 4

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration	**41.7**	22.7	13.5
	DS1 (2022) Maximum Modelled Concentration	**41.7**	22.7	13.5
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	665	387	353
	No Change in Concentration	3,253	4,567	4,679
	Deterioration in Concentration	1,860	824	746
	Maximum Improvement	0.8	0.3	0.1

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Deterioration	1.0	0.2	0.1

23.6.2.167. Table 23.65 shows that the maximum modelled concentrations for all pollutants under the DS1 scenario in Verification Zone 4 are unchanged from those reported in Appendix 23.3 (Air Quality Traffic Modelling) Table 36 for diverted traffic.

23.6.2.168. The highest predicted deterioration of 1.0 µg/m³ in concentrations of NO_2 occurs at the Inland Revenue offices located north of Portsbridge Roundabout adjacent to the A397 Northern Road, unchanged from the result reported in Appendix 23.3 (Air Quality Traffic Modelling), where the maximum modelled DM concentration is 15.2 µg/m³. This is change is due to increased traffic flows around the nearby Portsbridge Roundabout.

23.6.2.169. The highest predicted improvement of 0.8 µg/m³ in concentrations of NO_2 occurs at residential receptors at the junction of the A2030 Havant Road with Eastern Road.

23.6.2.170. For all modelled pollutants, concentrations are not predicted to change at the majority of the receptors assessed for the DS1 scenario. For all modelled pollutants, more receptors are predicted to experience a deterioration than an improvement. The level of maximum improvement is greater than deterioration for PM_{10} and the opposite applies for NO_2. For $PM_{2.5}$, the maximum improvement and deterioration are equal.

23.6.2.171. A summary of the amalgamated assessment results for the DS2 scenario are shown in Table 23.66.

Table 23.66 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2026) for Verification Zone 4

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	**41.7**	22.7	13.5

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	**41.7**	22.7	13.5
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	1,287	1,004	597
	No Change in Concentration	2,626	3,934	4,432
	Deterioration in Concentration	1,865	840	749
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	1.4	0.5	0.2
	Maximum Deterioration (µg/m³)	0.5	0.2	0.1

23.6.2.172. The summary results in Table 23.66 show that the predictions for the amalgamated maximum modelled concentrations for all pollutants under the DS2 scenario in Verification Zone 4 are unchanged from those reported in Appendix 23.3 (Air Quality Traffic Modelling), Table 37 for diverted traffic.

23.6.2.173. The highest predicted deterioration of 0.5 µg/m³ in concentrations of NO_2 occurs at the Inland Revenue offices located north of Portsbridge Roundabout adjacent to the A397 Northern Road where the maximum modelled concentration is 14.9 µg/m³.

23.6.2.174. The highest predicted improvement of 1.4 µg/m³ in concentrations of NO_2 occurs at 30 residential receptors at the junction of the A2030 Havant Road with Eastern Road.

23.6.2.175. For all modelled pollutants, concentrations are not predicted to change at the majority of receptors assessed for the DS2 scenario. The level of maximum improvement is greater than deterioration for NO_2, PM_{10} and $PM_{2.5}$.

23.6.2.176. NO_2 concentrations at a selection of representative receptors is shown in Table 23.67, consisting of high sensitivity receptors highlighted in Appendix 23.4, Table 2, Figure 23.16 Sheet 4 and Figure 23.14 Sheet 4, and within 50 m of the road centreline, and those receptors predicted to experience the highest concentrations or largest changes (> ±0.2 µg/m³).

Table 23.67 - Verification Zone 4 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
Solent Infant School, Eveleigh Road	14.7	14.7	0	Negligible No-change	14.6	-0.1	Negligible Beneficial	No
65 Eveleigh Road	14.7	14.7	0	Negligible No-change	14.6	-0.1	Negligible Beneficial	No
A N A Treatment Centres Ltd, Fleming House, Waterworks Road	14.9	14.9	0	Negligible No-change	14.7	-0.2	Negligible Beneficial	No
331 Havant Road	16.1	16.1	0	Negligible No-change	15.5	-0.6	Negligible Beneficial	No
3 Highbury Grove	31.6	31.3	-0.3	Negligible Beneficial	31.4	-0.2	Negligible Beneficial	No
6 Highbury Grove	31.6	31.3	-0.3	Negligible Beneficial	31.4	-0.2	Negligible Beneficial	No
11 Highbury Grove	31.6	31.3	-0.3	Negligible Beneficial	31.4	-0.2	Negligible Beneficial	No
77 Lealand Road	15.8	15.4	-0.4	Negligible Beneficial	15.4	-0.4	Negligible Beneficial	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
4 Copsey Close	16.1	15.5	-0.6	Negligible Beneficial	15.2	-0.9	Slight Beneficial	No
96 Station Road	15.5	15.5	0	Negligible No-change	15.5	0	Negligible No-change	No
National Plastics, Unit B2, Mountbatten Business Park, Jackson Close	17.8	17.8	0	Negligible No-change	17.8	0	Negligible No-change	No
Hampshire Sports Equipment Ltd, Unit A3 Mountbatten Business Park Jackson Close	19.1	18.9	-0.2	Negligible Beneficial	18.9	-0.2	Negligible Beneficial	No
Sainsburys, Fitzherbert Road	15.4	15.4	0	Negligible No-change	15.4	0	Negligible No-change	No
Farlington Sports Centre, Eastern Road	19.1	19	-0.1	Negligible Beneficial	18.9	-0.2	Negligible Beneficial	No
Solent Fish Ltd, Unit 5, Marshlands Road	15.7	15.7	0	Negligible No-change	15.7	0	Negligible No-change	No

Verification Zone 4 Significance

23.6.2.177. In the Do-Minimum scenario, 16 exceedances of the annual average NO_2 objective are predicted. There are no particulate matter objective exceedances predicted at any receptors in Verification Zone 4.

23.6.2.178. Table 23.68 shows a summary of the impacts from the DS1 scenario for Verification Zone 4.

Table 23.68 - DS1 Impact Summary for Verification Zone 4

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	665	387	353
	No change	3,253	4,567	4,679
	Adverse	1,859	824	746
Slight	Beneficial	0	0	0
	Adverse	1	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.179. Table 23.68 shows that majority of predicted impacts for the DS1 scenario in Verification Zone 4 are negligible, with the majority of receptors predicted to experience no change in concentrations of all modelled pollutants. Of the minority that are predicted to experience changes, the larger number are predicted to experience adverse changes. One receptor is predicted to experience a slight adverse change in respect of NO_2. The predicted impact under the DS1 scenario in Verification Zone 4 is assessed using professional judgment as **negligible adverse**.

23.6.2.180. Table 23.69 presents a summary of the impacts for the DS2 scenario in Verification Zone 4.

Table 23.69 - DS2 Impact Summary for Verification Zone 4

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	1,257	1,004	597
	No change	2,626	3,934	4,432
	Adverse	1,864	840	749
Slight	Beneficial	30	0	0

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
	Adverse	1	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.181. Table 23.69 shows that the majority of impacts under the DS2 scenario in Verification Zone 4 are predicted to be negligible with no change in concentrations of all modelled pollutants. Of those predicted to experience negligible changes, slightly more are predicted to experience adverse effects for NO_2, whilst for PM_{10} and $PM_{2.5}$ more receptors are predicted to experience improvements.

23.6.2.182. A small number of receptors are predicted to experience slight effects for changes in NO_2 concentrations.

23.6.2.183. The predicted impact under the DS2 scenario in Verification Zone 4 is assessed using professional judgement as **negligible adverse**.

23.6.2.184. Consideration of the model performance, as measured by the RMSE (±7.4µg/m^3), determines that the maximum predicted concentrations will be under the objective assuming the model is over-predicting and will remain over if the model is under-predicting.

23.6.2.185. Accounting for predicted results for the DS1 and DS2 scenarios, the presence of AQMAs, the high sensitivity of the area, objective exceedances, model performance and the dominance of negligible impacts, the significance of effects in Verification Zone 4 is judged as follows:

- Verification Zone 4 (DS1) – **negligible adverse** impact and **no significant effect;** and
- Verification Zone 4 (DS2) - negligible adverse impact and no significant effect.

Verification Zone 5

Verification Zone 5 Receptors

23.6.2.186. Within Verification Zone 5, the number of impacted receptors is shown in Table 23.70. This represents a near doubling of the numbers of receptors reported in Appendix 23.3 (Air Quality Traffic Modelling), Table 39 due to the addition of HDD point source receptors compared to those for the diverted traffic assessment only.

Table 23.70 - Impacted Receptors in Verification Zone 5

Type	Receptor Count
Residential	12,451
Commercial	520
Community	53
Military	1
Total Number of Receptors	**13,025**

23.6.2.187. Within the numbers of receptors shown in Table 23.70, there are receptors with particular sensitivity, as shown in Table 23.71.

Table 23.71 - Particularly Sensitive Receptors in Verification Zone 5

Sensitive Receptor	Receptor Count
Schools	14
Medical	11
Hospice	0
Sheltered Accommodation	0
Care Home	31

Verification Zone 5 Results

23.6.2.188. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario is shown in Table 23.72.

Table 23.72 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2026) for Verification Zone 5

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	38.8	25.7	13.9
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	39.5	26.0	14.0

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	4,051	3,862	3,399
	No Change in Concentration	1,846	3,437	6,217
	Deterioration in Concentration	7,128	5,726	3,409
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	9.2	5.1	1.5
	Maximum Deterioration (µg/m³)	10.3	1.8	0.8

23.6.2.189. The summary results in Table 23.72 show that the maximum predicted concentrations for all pollutants are unchanged from those reported in Appendix 23.3 (Air Quality Traffic Modelling), Table 41 for diverted traffic.

23.6.2.190. The highest predicted deterioration of 10.3 µg/m³ in concentrations of NO_2 occurs at 2 residential receptors on Hambledon Road close to the junction with Soake Road where the maximum modelled concentration is 14.9 µg/m³. This location is exposed to the effects of construction traffic and the operation of HDD drilling equipment, with the operation of HDD drilling equipment making the largest contribution to the change.

23.6.2.191. The highest predicted improvements of 10% or more of the limit value for NO_2 occur at receptors on London Road, Maurepas Road and Hambledon Road. This includes the highest predicted improvement of 9.2 µg/m³ in concentrations of NO_2 at receptors Hambledon Road. This location is in an area that will experience significant lane closures as a result of trenching installation as described in Chapter 22 (Traffic and Transport).

23.6.2.192. For NO_2 the majority of receptors in Verification Zone 5 are predicted to experience a deterioration in concentrations. For PM_{10} and $PM_{2.5}$, the numbers predicted to experience either improvements or no change in concentrations are greater than those predicted to experience deteriorations.

23.6.2.193. The following receptors are presented in response to a request from the EHO for HBC:

- At No. 2 Bedhampton Hill, Havant, representative of concentrations in the Portsdown Hill area of Havant, an NO_2 concentration of 31.7 µg/m³ is predicted, which represents an increase of 0.6 µg/m³;
- At No. 262 Stakes Hill Road, Havant, representative of the Stakes Hill area, an NO_2 concentration of 21.6 µg/m³ is predicted, which represents an increase of 1.2 µg/m³;
- At No. 32 Hurstville Drive, Havant, representative of the Hurstville area, an NO_2 concentration of 19.5 µg/m³ is predicted, which represents an increase of 2.2 µg/m³; and
- At No. 54. Westbrook Grove, Havant, representative of the Aldermoor area, an NO_2 concentration of 16.2 µg/m³ is predicted, which represents an increase of 1.1 µg/m³.

23.6.2.194. The Construction Stage amalgamated assessment results for the DS2 scenario are shown in Table 23.73.

Table 23.73 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2026) for Verification Zone 5

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	38.8	25.7	13.9
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	39.2	25.9	14
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	6,794	6,175	4,753
	No Change in Concentration	903	2,343	5,772
	Deterioration in Concentration	5,328	4,507	2,500
Do Something-Do Minimum Annual Mean	Maximum Improvement (µg/m³)	9.4	4.9	1.5
	Maximum Deterioration (µg/m³)	7.3	1.3	0.8

	Construction Scenario DS2 2022		
Pollutant (Annual Mean)	**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)	**40**	**40**	**25**
Change (µg/m³)			

23.6.2.195. The summary results in Table 23.73 show that the maximum predicted concentrations for all modelled pollutants are unchanged from those shown in Appendix 23.3 (Air Quality Traffic Modelling) Table 42 for diverted traffic.

23.6.2.196. The highest predicted deterioration of 7.3 µg/m³ in concentrations of NO_2 occurs at 2 residential receptors on Hambledon Road close to the junction with Soake Road where the maximum modelled concentration is 14.9 µg/m³.

23.6.2.197. The highest predicted improvement of 9.4 µg/m³ in concentrations of NO_2 occurs at residential receptors on Corbett Close, Mountbatten Drive and Alexander Close.

23.6.2.198. For all pollutants, a larger number of receptors are predicted to experience improvements than deteriorations.

23.6.2.199. The following receptor results are presented in response to a request from the EHO for HBC:

- At No. 2 Bedhampton Hill, Havant, representative of concentrations in the Portsdown Hill area of Havant, an NO_2 concentration of 31.7 µg/m³ is predicted, which represents an increase of 0.6 µg/m³;
- At No. 262 Stakes Hill Road, Havant, representative of the Stakes Hill area, an NO_2 concentration of 21.7 µg/m³ is predicted, which represents an increase of 1.3 µg/m³;
- At No. 32 Hurstville Drive, Havant, representative of the Hurstville area, an NO_2 concentration of 19.5 µg/m³ is predicted, which represents an increase of 2.2 µg/m³; and
- At No. 54. Westbrook Grove, Havant, representative of the Aldermoor area, an NO_2 concentration of 16.2 µg/m³ is predicted, which represents an increase of 1.1 µg/m³.

23.6.2.200. NO_2 concentrations at a selection of representative receptors are shown in Table 23.74 consisting of high sensitivity receptors highlighted in Appendix 23.4 (Air Quality Generator Emissions Modelling)Table 2, Figure 23.14 Sheet 5 and Figure 23.16 Sheet 5, and within 50 m of the road centreline, and within 50 m of the road centreline, and those receptors predicted to experience the highest concentrations or largest changes (> ±0.2 µg/m³).

Table 23.74 - Verification Zone 5 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
K B Griffin Builders, Towers Farm, 16 Portsdown Hill Road	19.8	19.8	0.0	Negligible No-change	19.0	-0.8	Negligible Beneficial	No
36 Hurstville Drive	17.3	19.5	2.2	Moderate Adverse	19.5	2.2	Moderate Adverse	No
Edenvale Nursing Home, 63-65 Silvester Road	15.5	16.5	1	Slight Adverse	16.5	1.0	Slight Adverse	No
2 Padnell Road	18.1	17.9	-0.2	Negligible Beneficial	17.9	-0.2	Negligible Beneficial	No
Queenswood Surgery, 223 London Road	18.0	18.4	0.4	Negligible Adverse	18.4	0.4	Negligible Adverse	No
197 London Road	18.0	18.4	0.4	Negligible Adverse	18.4	0.4	Negligible Adverse	No
Trimak Ltd, Cowpalin Family Practice, 26-30 London Road	18.1	17.9	-0.2	Negligible Beneficial	17.9	-0.2	Negligible Beneficial	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
Purbrook Junior & Infant School, Aldermoor Road East	15.1	16.2	1.1	Slight Adverse	16.1	1.0	Slight Adverse	No
Oaklands Care Home, 216 Stakes Hill Road	19.2	20.4	1.2	Slight Adverse	20.4	1.2	Slight Adverse	No
Latham Lodge Rest Home, 137-139 Stakes Road	19	19.4	0.4	Negligible Adverse	19.5	0.5	Negligible Adverse	No
Belmont Castle Rest Home, 18-20 Portsdown Hill Road	18.5	18.5	0.0	Negligible No-change	18.1	-0.4	Negligible Beneficial	No
79 Silvester Road	15.5	16.5	1.0	Slight Adverse	16.5	1.0	Slight Adverse	No
31 Trefoil Close	23.6	25.9	2.3	Slight Adverse	25.9	2.3	Slight Adverse	No
2 Lower Bere Wood	17.3	19.5	2.2	Moderate Adverse	19.5	2.2	Moderate Adverse	No
9 Trefoil Close	24.5	26	1.5	Slight Adverse	26	1.5	Slight Adverse	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
28 Hurstville Drive	17.4	18.8	1.4	Slight Adverse	18.8	1.4	Slight Adverse	No
1 Dogwood Dell	17.9	19.2	1.3	Slight Adverse	19.2	1.3	Slight Adverse	No
3 Lily Avenue	18	17.7	-0.3	Negligible Beneficial	17.7	-0.3	Negligible Beneficial	No
45 Hurstville Drive	20	19.7	-0.3	Negligible Beneficial	19.7	-0.3	Negligible Beneficial	No
14 Siskin Grove	15.2	15.2	0.0	Negligible No-change	15	-0.2	Negligible Beneficial	No
Broadways Coffee Shop, 14 London Road	21.1	18.1	-3	Moderate Beneficial	17.2	-3.9	Moderate Beneficial	No
33c London Road	24.5	23.7	-0.8	Negligible Beneficial	23.7	-0.8	Negligible Beneficial	No
15 London Road	24.7	23.7	-1	Negligible Beneficial	23.7	-1.0	Negligible Beneficial	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
44 Stakes Road	18.9	17.9	-1.0	Negligible Beneficial	17.9	-1.0	Negligible Beneficial	No
Debney Lodge, Mey Close	29.3	27.1	-2.2	Slight Beneficial	27.1	-2.2	Slight Beneficial	No
179 Park Avenue	17.9	15.5	-2.4	Moderate Beneficial	15.6	-2.3	Moderate Beneficial	No
2 Boundary Way	35.1	32.7	-2.4	Moderate Beneficial	32.6	-2.5	Moderate Beneficial	No
Lavender House, Anmore Road	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
Lily Cottage, Anmore Road	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
Wellesley Court, Manager's Office, Darnel Road	16.3	20.1	3.8	Moderate Adverse	18	1.7	Moderate Adverse	No
Conifers, Soake Road	11.6	14.1	2.5	Moderate Adverse	13.5	1.9	Moderate Adverse	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
Soake Farm House, Soake Road	11.2	14.2	3.0	Moderate Adverse	13.8	2.6	Moderate Adverse	No
The Coach House, Soake Road	10.6	11.7	1.1	Slight Adverse	11.7	1.1	Slight Adverse	No
35 Great Mead	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
St. Michaels, Hambledon Road	14.9	25.2	10.3	Moderate Adverse	22.2	7.3	Moderate Adverse	No
115 Anmore Road	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
117 Anmore Road	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
20 Mill Close	10.6	10.7	0.1	Negligible Adverse	10.7	0.1	Negligible Adverse	No
2 Bedhampton Hill, Denmead	31.1	31.7	0.6	Slight Adverse	31.7	0.6	Slight Adverse	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
262 Stakes Hill Road, Waterlooville	20.4	21.6	1.2	Slight Adverse	21.7	1.3	Slight Adverse	No
32 Hurstville Drive, Waterlooville	17.3	19.5	2.2	Moderate Adverse	19.5	2.2	Moderate Adverse	No
54 Westbrook Grove, Waterlooville	15.1	16.2	1.1	Slight Adverse	16.2	1.1	Slight Adverse	No
Wansbeck, 8 Boundary Way	38.8	39.5	0.7	Moderate Adverse	39.2	0.4	Slight Adverse	No

Verification Zone 5 Significance

23.6.2.201. In the Do-Minimum scenario, no exceedances of the annual average NO_2 or particulate matter objectives at any receptors are predicted in Verification Zone 5.

23.6.2.202. Table 23.75 shows a summary of the predicted impacts under the DS1 scenario in Verification Zone 5.

Table 23.75 - DS1 Impact Summary for Verification Zone 5

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	2,498	3,283	2,986
	No change	1,846	3,437	6,217
	Adverse	5,852	5,569	3,406
Slight	Beneficial	974	229	383
	Adverse	1,050	16	3
Moderate	Beneficial	579	350	30
	Adverse	226	141	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.203. Table 23.75 shows that the majority of impacts under the DS1 scenario in Verification Zone 5 are negligible.

23.6.2.204. There are a number of receptors predicted to experience slight and moderate impacts in NO_2 concentrations, for which 12% of all predictions are beneficial and 10% adverse. Although no exceedances of the objectives are predicted, there are several predictions which are close to the NO_2 annual mean objective in the DM and DS1 scenarios, and 2% of all predictions are moderate adverse. This should be taken together with consideration of the RMSE of ±8.6 µg/m³.

23.6.2.205. Adverse slight and moderate changes in PM_{10} and $PM_{2.5}$ are predicted to occur in those areas where adverse effects of a similar magnitude are predicted for NO_2 in the area around Hurstville Drive and Lancaster Way.

23.6.2.206. Therefore, the overall impact for the DS1 scenario in Verification Zone 5 is determined using professional judgement to be **slight adverse**.

23.6.2.207. Table 23.76 presents a summary of the impacts for the DS2 scenario in Verification Zone 5.

Table 23.76 - DS2 Impact Summary for Verification Zone 5

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	3,910	5,049	4,322
	No change	903	2,343	5,772
	Adverse	4,270	4,495	2,499
Slight	Beneficial	1,725	695	391
	Adverse	842	12	1
Moderate	Beneficial	1,159	431	40
	Adverse	216	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.208. Table 23.76 shows that the majority of predicted impacts at receptors under the DS2 scenario in Verification Zone 5 are expected to be negligible. More receptors are predicted to experience slight and moderate beneficial impacts in NO_2 concentration (22%) than adverse (8%). No exceedances of the objectives are predicted but there several predictions which are close to the NO_2 annual mean objective with 2% of all predictions being moderate adverse.

23.6.2.209. As with the DS1 scenario, for DS2 adverse slight and moderate changes in PM_{10} and $PM_{2.5}$ are predicted to occur in those areas where adverse effects of a similar magnitude are predicted for NO_2 in the area around Hurstville Drive and Lancaster Way.

23.6.2.210. The overall assessment of significance for the DS2 scenario in Verification Zone 5 is determined using professional judgement to be **slight beneficial**.

23.6.2.211. Consideration of the model performance, as measured by the RMSE (±8.6µg/m^3), determines that the maximum predicted concentrations could exceed the objective, potentially creating new exceedances.

23.6.2.212. Accounting for predicted results for the DS1 and DS2 scenarios, the presence of AQMAs, the high sensitivity of the area, predicted concentrations close to the objective, model performance and the dominance of negligible impacts, the significance of effects in Verification Zone 5 is judged as follows:

- Verification Zone 5 (DS1) – **slight adverse** impact with **significant effects;** and
- Verification Zone 5 (DS2) – **slight beneficial** impact with **significant effects.**

Verification Zone 6

Verification Zone 6 Receptors

23.6.2.213. Within Verification Zone 6, the number of impacted receptors is shown in Table 23.77, which are unchanged from those shown in Appendix 23.3 (Air Quality Traffic Modelling) Table 44.

Table 23.77 - Impacted Receptors in Verification Zone 6

Type	Receptor Count
Residential	4,081
Commercial	448
Community	22
Military	2
Total Number of Receptors	**4,553**

23.6.2.214. Within the numbers of receptors shown in Table 23.77, there are receptors with particular sensitivity, as shown in Table 23.78.

Table 23.78 - Particularly Sensitive Receptors in Verification Zone 6

Sensitive Receptor	Receptor Count
Schools	9
Medical	1
Hospice	0
Sheltered Accommodation	0
Care Home	8

Verification Zone 6 Results

23.6.2.215. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario is shown in Table 23.79.

Table 23.79 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Verification Zone 6

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	**53.6**	31.6	16.3
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	**53.6**	31.7	16.3
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	275	4	3
	No Change in Concentration	4,037	4,434	4,544
	Deterioration in Concentration	241	115	6
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.5	0.2	0.1
	Maximum Deterioration (µg/m³)	0.3	0.1	0.1

23.6.2.216. The summary results in Table 23.79 show that the maximum predicted concentrations for all pollutants are unchanged from those reported in Appendix 23.3 (Air Quality Traffic Modelling) Table 46.

23.6.2.217. The highest predicted concentration of 53.6 µg/m³ for NO_2 under both the DM and the DS1 scenarios and is an exceedance of the NO_2 limit value of 40 µg/m³ and occurs at 83 residential receptors and one commercial receptor adjacent to the eastbound carriageway of the M27 in the Portsdown Hill and Paulsgrove areas. The concentrations occur as a result of the proximity of the receptors to the M27 motorway, which carries in approximately 160,000 vehicles per day under the Do-Minimum scenario, in relation to the prevailing westerly and south-westerly winds.

23.6.2.218. The highest predicted deterioration of 0.3 µg/m³ in concentrations of NO_2 occurs at residential receptors on Maple Wood adjacent to Bedhampton Road where the maximum modelled DM concentration is 24.1 µg/m³.

23.6.2.219. The highest predicted improvement in concentrations of NO_2 is 0.5 µg/m³ at high density residential receptors on Port Way at the Port Solent Marina.

23.6.2.220. For NO_2, PM_{10} and $PM_{2.5}$, concentrations are not predicted to change at the majority of the receptors assessed for the DS1 scenario. For NO_2 a greater number of receptors are predicted to experience an improvement compared to those predicted to experience a deterioration, whilst for PM_{10} and $PM_{2.5}$ a greater number are predicted to experience a deterioration.

23.6.2.221. A summary of the amalgamated assessment results for the DS2 scenario are shown in Table 23.80.

Table 23.80 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Verification Zone 6

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	**53.6**	31.6	16.3
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	**53.6**	31.6	16.3
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	1,262	1,039	210
	No Change in Concentration	3,151	3,445	4,338
	Deterioration in Concentration	140	69	5
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	4.0	1.1	0.4
	Maximum Deterioration (µg/m³)	0.2	0.1	0.0

23.6.2.222. The summary results in Table 23.80 show that the maximum predicted concentrations under the DS2 scenario for Verification Zone 6 are unchanged from those presented in Appendix 23.3 (Air Quality Traffic Modelling) Table 47.

23.6.2.223. The highest predicted concentration of 53.6 µg/m³ for NO_2 that occurs under both the DM scenario and the DS2 scenario is an exceedance of the NO_2 limit value of 40 µg/m³ and occurs at 83 residential receptors and one commercial receptor adjacent to the eastbound carriageway of the M27 in the Portsdown Hill and Paulsgrove areas. This is due to the proximity of these receptors to the M27 motorway.

23.6.2.224. The highest predicted deterioration of 0.2 µg/m³ in concentrations of NO_2 occurs at commercial receptors at the junction of the A27 Western Road and the A3 Southampton Road, and at Highbury College, where the maximum modelled concentrations is 13.5 µg/m³.

23.6.2.225. For PM_{10} and $PM_{2.5}$, concentrations are not predicted to change at the majority of the receptors assessed for the DS2 scenario. For all pollutants, a greater number of receptors are predicted to experience an improvement than a deterioration or no change.

23.6.2.226. NO_2 concentrations at a selection of representative receptors are shown in Table 23.81, consisting of high sensitivity receptors highlighted in Appendix 23.4 (Air Quality Generator Emissions Modelling) Table 2, Figure 23.16 Sheet 6 and Figure 23.14 Sheet 6, and within 50 m of the road centreline, and those receptors predicted to experience the highest concentrations or largest changes (> ±0.2 µg/m³).

Table 23.81 - Verification Zone 6 Representative Receptor Selection

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
109 Browning Avenue	**53.6**	**53.6**	0.0	Negligible No-change	**53.6**	0.0	Negligible No-change	No
Highbury College, Tudor Crescent	**49.1**	**49.0**	-0.1	Negligible Beneficial	**49.2**	0.1	Negligible Adverse	No
Graduate Court, Tudor Crescent	**47.7**	**47.8**	0.1	Negligible Adverse	**47.7**	0.0	Negligible No-change	No
37 Portsdown View	24.4	24.4	0.0	Negligible No-change	22.5	-1.9	Slight Beneficial	No
43 Coleridge Road	**53.6**	**53.6**	0.0	Negligible No-change	**53.6**	0.0	Negligible No-change	No
39 Falmouth Road	**53.6**	**53.6**	0.0	Negligible No-change	**53.6**	0.0	Negligible No-change	No
1 Falmouth Road	**52.6**	**52.6**	0.0	Negligible No-change	**52.6**	0.0	Negligible No-change	No
41 Tudor Crescent	**49.0**	**49.1**	0.1	Negligible Adverse	**49.0**	0.0	Negligible No-change	No

Receptor	NO_2 Concentration (µg/m³)							In AQMA
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM	
97 Hillsley Road	**52.8**	**52.8**	0.0	Negligible No-change	**52.8**	0.0	Negligible No-change	No
19 Hillsley Road	**52.8**	**52.8**	0.0	Negligible No-change	**52.8**	0.0	Negligible No-change	No
Flat 10, Oyster Quay, Port Way	**45.6**	**45.5**	-0.1	Negligible Beneficial	**45.6**	0.0	Negligible No-change	No
Flat 2, Oyster Quay, Port Way	**45.6**	**45.5**	-0.1	Negligible Beneficial	**45.6**	0.0	Negligible No-change	No
Flat 39, Oyster Quay, Port Way	**45.6**	**45.5**	-0.1	Negligible Beneficial	**45.6**	0.0	Negligible No-change	No

Verification Zone 6 Significance

23.6.2.227. In the Do-Minimum scenario for Verification Zone 1, 359 exceedances of the annual average NO_2 objective are predicted. No exceedances of the particulate matter objectives are predicted.

23.6.2.228. Table 23.82 shows a summary of the impacts for the DS1 scenario in Verification Zone 6.

Table 23.82 - DS1 Impact Summary for Verification Zone 6

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	274	4	3
	No change	4,037	4,434	4,544
	Adverse	215	115	6
Slight	Beneficial	1	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	26	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.229. Table 23.82 shows that the majority of impacts in Verification Zone 6 for the DS1 scenario are negligible with no change in concentration. There are receptors predicted to experience slight and moderate impacts for NO_2, with one slight beneficial and 26 moderate adverse impacts. Such is the extent and number of exceedances and the presence of moderate adverse impacts, the overall impact for the DS1 scenario in Verification Zone 6 is assessed using professional judgement as **slight adverse**.

23.6.2.230. Table 23.83 presents a summary of the impacts in Verification Zone 6 under the DS2 scenario.

Table 23.83 - DS2 Impact Summary for Verification Zone 6

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	1,191	1,037	210
	No change	3,151	3,445	4,338
	Adverse	140	69	5

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Slight	Beneficial	24	2	0
	Adverse	0	0	0
Moderate	Beneficial	47	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.231. Table 23.83 shows that the majority of impacts in Verification Zone 6 for the DS2 scenario are negligible with no change in concentration. There are receptors predicted to experience slight and moderate impacts, with a number of slight and moderate beneficial effects, located near to the A3(M) in areas around the Bedhampton Junction.

23.6.2.232. Whilst there are large numbers of receptors predicted to experience no change in their predicted impacts, there are also a larger number of receptors predicted to experience beneficial impacts compared to those predicted to experience adverse impacts.

23.6.2.233. Consideration of the model performance, as measured by the RMSE (±5.4µg/m^3), determines that the maximum predicted concentrations will remain over the objective even assuming the model is over-predicting.

23.6.2.234. Therefore, the overall assessment of significance for Verification Zone 6 is determined using professional judgement to be **negligible beneficial**.

23.6.2.235. Accounting for predicted results for the DS1 and DS2 scenarios, the presence of AQMAs, the high sensitivity of the area, predicted concentrations close to the objective, model performance and the dominance of negligible impacts, the significance of effects in Verification Zone 6 is judged as follows:

- Verification Zone 6 (DS1) – slight adverse impact with significant effects; and
- Verification Zone 6 (DS2) – negligible beneficial impact with significant effects.

Portsmouth AQMA Nº 6

23.6.2.236. Portsmouth AQMA Nº 6 covers an area in Portsmouth city centre along the A2047 from the junction of London Road and Kirby Road (northern extent) to the junction of Fratton Road with Selbourne Terrace (southern extent). All of the receptors within this AQMA are modelled wholly within Verification Zone 1, and the numbers of receptors are shown in Table 23.84.

Table 23.84 - Impacted Receptors in Portsmouth AQMA No. 6

Type	Receptor Count
Residential	10,714
Commercial	716
Community	63
Military	0
Total Number of Receptors	**11,493**

23.6.2.237. Within the numbers of receptors shown in Table 23.84, there are receptors with particular sensitivity, as shown in Table 23.85.

Table 23.85 - Particularly Sensitive Receptors in Portsmouth AQMA Nº 6

Sensitive Receptor	Receptor Count
Schools	21
Medical	17
Hospice	0
Sheltered Accommodation	0
Care Home	4

Portsmouth AQMA Nº 6 Results

23.6.2.238. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario is shown in Table 23.86.

Table 23.86 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Portsmouth AQMA N° 6

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	30.9	19.8	13.4

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	31.2	19.7	13.4
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	538	157	164
	No Change in Concentration	3,645	9,393	11,057
	Deterioration in Concentration	7,310	1,943	272
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.2	0.1	0.1
	Maximum Deterioration (µg/m³)	0.3	0.1	0.1

23.6.2.239. The results in Table 23.86 show that there is a deterioration of 0.3 µg/m³ in the maximum predicted concentration for NO_2, which occurs at The Furniture Factory commercial receptor located on the A2047 London Road. There is a predicted improvement of 0.1 µg/m³ in concentrations of PM_{10}, and no predicted change in concentrations of $PM_{2.5}$.

23.6.2.240. The maximum predicted deterioration in concentrations of NO_2 of 0.3 µg/m³ occurs at The Furniture Factory commercial receptor located on the A2047 London Road.

23.6.2.241. During the Construction Stage a summary of the amalgamated assessment results for the DS2 scenario is shown in Table 23.87.

Table 23.87 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Portsmouth AQMA N° 6

		Construction Scenario DS2 2022		
Pollutant (Annual Means)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	30.9	19.8	13.4
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	30.9	19.8	13.4
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	113	113	0
	No Change in Concentration	9,674	10,774	11,368
	Deterioration in Concentration	1,706	606	125
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.1	0.1	0
	Maximum Deterioration (µg/m³)	0.1	0.1	0.1

23.6.2.242. Table 23.87 show no predicted changes in the maximum concentrations of any of the air pollutants of concern in Portsmouth AQMA Nº 6 under the DS2 scenario.

23.6.2.243. The highest predicted deterioration in concentrations of NO_2 of 0.1 µg/m³ occurs at The Furniture Factory commercial receptor located on the A2047 London Road.

Portsmouth AQMA N° 6 Significance

23.6.2.244. Table 23.88 shows a summary of the impacts for the DS1 scenario in Portsmouth AQMA N° 6.

Table 23.88 - DS1 Impact Summary for Portsmouth AQMA N° 6

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	538	157	164
	No change	3,645	9,393	11,057
	Adverse	7,310	1,943	272

Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.245. Table 23.88 shows a negligible adverse effect predicted at the majority of receptors on concentrations of NO_2, whilst for PM_{10} and $PM_{2.5}$ the majority of receptors are predicted to experience no change.

23.6.2.246. Table 23.89 shows a summary of the impacts for the DS2 scenario in Portsmouth AQMA N° 6.

Table 23.89 – DS2 Impact Summary for Portsmouth AQMA N° 6

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	113	113	0
	No change	9,674	10,774	11,368
	Adverse	1,706	606	125
Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.247. Table 23.89 shows that the majority of receptors are predicted to experience no change in concentrations of all relevant pollutants under the DS2 scenario.

23.6.2.248. The model performance relevant for this AQMA, as measured by the RMSE (±6.9 µg/m^3) for Verification Zone 1, shows that the maximum possible predicted concentrations of NO_2 in AQMA N° 6 would not exceed the annual limit value of 40 µg/m^3 assuming over-prediction.

23.6.2.249. Accounting for the predicted concentrations, the small maximum predicted changes in concentrations of all pollutants, and the sensitive receptors present in this AQMA, the significance is defined as follows:

- Portsmouth AQMA N° 6 (DS1) – negligible adverse impact and no significant effect; and
- Portsmouth AQMA N° 6 (DS2) – negligible adverse impact and no significant effect.

Portsmouth AQMA N° 7

23.6.2.250. Portsmouth AQMA N° 7 covers areas of the Old Portsmouth and Somers Town areas of the city, including High Street, St. Georges Road, Cambridge Road, St. Michael's Road and the junction of the A3 with the A2030.

23.6.2.251. The entire area of AQMA N° 7 falls wholly within Verification Zone 1, and the numbers of receptors are shown in Table 23.90.

Table 23.90 - Impacted Receptors in Portsmouth AQMA No. 7

Type	Receptor Count
Residential	3,699
Commercial	207
Community	38
Military	1
Total Number of Receptors	**3,945**

23.6.2.252. Within the numbers of receptors shown in Table 23.90, there are receptors with particular sensitivity, as shown in Table 23.91.

Table 23.91 - Particularly Sensitive Receptors in Portsmouth AQMA Nº 7

Sensitive Receptor	Receptor Count
Schools	22
Medical	6
Hospice	0
Sheltered Accommodation	0
Care Home	0

Portsmouth AQMA Nº 7 Results

23.6.2.253. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario are shown in Table 23.92.

Table 23.92 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Portsmouth AQMA N° 7

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	27.4	17.1	10.7
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	27.6	17.1	10.7
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	126	16	113
	No Change in Concentration	2,799	3,516	3,738
	Deterioration in Concentration	1,020	413	94
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.2	0.1	0.1
	Maximum Deterioration (µg/m³)	0.2	0.1	0.1

23.6.2.254. Table 23.92 shows that the maximum predicted concentration of NO_2 in AQMA N° 7 deteriorates by 0.2 µg/m³ under the DS1 scenario, and is significantly below the annual limit value of 40 µg/m³. The maximum predicted NO_2 concentration of 27.6 µg/m³ occurs at the White Swan Building and New Theatre Royal located on White Swan Road and Guildhall Walk respectively. This is also the location of the maximum predicted deterioration in concentrations of NO_2.

23.6.2.255. The maximum predicted PM_{10} and $PM_{2.5}$ concentrations remain unchanged.

23.6.2.256. A summary of the amalgamated results for the DS2 scenario are shown in Table 23.93.

Table 23.93 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Portsmouth AQMA N° 7

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	30.9	19.8	13.4
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	30.9	19.8	13.4
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	113	113	0
	No Change in Concentration	9,674	10,774	11,368
	Deterioration in Concentration	1,706	606	125
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.1	0.1	0
	Maximum Deterioration (µg/m³)	0.1	0.1	0.1

23.6.2.257. Table 23.93 shows that the maximum predicted concentrations for all air pollutants of concern within AQMA N° 7 are unchanged in the DS2 scenario. The maximum predicted deterioration in concentrations of NO_2 is 0.1 µg/m³ at the White Swan Building and New Theatre Royal.

Portsmouth AQMA N° 7 Significance

23.6.2.258. Table 23.94 shows a summary of the impacts for the DS1 scenario in Portsmouth AQMA N° 7.

Table 23.94 - DS1 Impact Summary for Portsmouth AQMA N° 7

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	126	16	113
	No change	2,799	3,516	3,738
	Adverse	1,020	413	94
Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.259. Table 23.94 shows that whilst he majority of receptors are predicted to experience no change in concentrations, there are a number predicted to experience a negligible adverse impact.

23.6.2.260. Table 23.95 shows a summary of the impacts for the DS2 scenario in Portsmouth AQMA N° 7.

Table 23.95 – DS2 Impact Summary for Portsmouth AQMA N° 7

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	3	3	0
	No change	3,524	3,551	3,851
	Adverse	418	391	94
Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.261. Table 23.95 shows that the majority of receptors are predicted to experience no change in concentration of all relevant pollutants, however some are predicted to experience a negligible adverse effect.

23.6.2.262. Given the highest predicted concentrations in AQMA N° 7 from Table 23.92 and Table 23.93, and the model performance for verification Zone 1 that is applicable to this AQMA (RMSE ±6.9 µg/m³), it is unlikely that that annual limit value of 40 µg/m³ for NO_2 will be exceeded.

23.6.2.263. Taking into account the numbers of receptors affected, the maximum predicted concentrations and the maximum predicted changes, the significance of effect on Portsmouth AQMA N° 7 is assessed as:

- Portsmouth AQMA N° 7 (DS1) – negligible adverse impact and no significant effect; and
- Portsmouth AQMA N° 7 (DS2) – negligible adverse impact and no significant effect.

Portsmouth AQMA N° 9

23.6.2.264. Portsmouth AQMA N° 9 covers an area from the A2030 Eastern Road at the junction of Sword Sands Road at its eastern extent to the A288 Milton Road at its junction with Warren Avenue at the western extent.

23.6.2.265. This AQMA includes areas within Verification Zone 2 and Verification Zone 3. The numbers of receptors affected are shown within Table 23.96

Table 23.96 - Impacted Receptors in Portsmouth AQMA No. 9

Type	Receptor Count
Residential	2,510
Commercial	111
Community	12
Military	0
Total Number of Receptors	**2,633**

23.6.2.266. Within the numbers of receptors shown in Table 23.96, there are receptors with particular sensitivity, as shown in Table 23.97.

Table 23.97 - Particularly Sensitive Receptors in Portsmouth AQMA Nº 9

Sensitive Receptor	Receptor Count
Schools	3
Medical	1
Hospice	0
Sheltered Accommodation	1
Care Home	39

Portsmouth AQMA N° 9 Results

23.6.2.267. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario are shown in Table 23.98.

Table 23.98 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Portsmouth AQMA N° 9

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	25.7	20.4	13.1

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	25.2	20.1	13.0
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	2,633	2,629	2,148
	No Change in Concentration	0	2	442
	Deterioration in Concentration	0	2	43
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	4.2	1.7	0.5
	Maximum Deterioration (µg/m³)	0.0	0.0	0.0

23.6.2.268. Table 23.98 shows that the maximum predicted concentration of NO_2 in AQMA N° 9 improves by 0.5 µg/m³ under the DS1 scenario, and is significantly below the annual limit value of 40 µg/m³. There are also improvements in the maximum predicted concentrations of PM_{10} and $PM_{2.5}$. The maximum predicted NO_2 concentration of 25.2 µg/m³ occurs at units in the Warren Avenue Industrial Estate.

23.6.2.269. There are no predicted deteriorations in concentrations of NO_2.

23.6.2.270. A summary of the amalgamated results for the DS2 scenario are shown in Table 23.99.

Table 23.99 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Portsmouth AQMA N° 9

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	25.7	20.4	13.1

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	25.6	20.3	13.1
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	2,419	2,493	2,065
	No Change in Concentration	212	138	525
	Deterioration in Concentration	2	2	43
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	4.3	1.9	0.6
	Maximum Deterioration (µg/m³)	0.0	0.0	0.0

23.6.2.271. Table 23.99 shows that the maximum predicted concentration of NO_2 improves by 0.1 µg/m³. The maximum predicted concentration of PM_{10} also improves by 0.1 µg/m³, and $PM_{2.5}$ is unchanged. There are no deteriorations in predicted concentrations of any of the air pollutants of concern at any modelled receptor.

Portsmouth AQMA N° 9 Significance

23.6.2.272. Table 23.100 shows a summary of the impacts for the DS1 scenario in Portsmouth AQMA N° 9.

Table 23.100 - DS1 Impact Summary for Portsmouth AQMA N° 9

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	1,574	1,956	2,148
	No change	0	2	442
	Adverse	0	2	43
Slight	Beneficial	386	673	0
	Adverse	0	0	0
Moderate	Beneficial	673	0	0

	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.273. Table 23.100 shows that whilst the majority of receptors are predicted to experience a negligible beneficial impact for all modelled pollutants. There also slight and moderate beneficial impacts at some receptors. For $PM_{2.5}$, there are a small number of negligible adverse effects predicted.

23.6.2.274. Table 23.101 shows a summary of the impacts for the DS2 scenario in Portsmouth AQMA N° 9.

Table 23.101 – DS2 Impact Summary for Portsmouth AQMA N° 9

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	1,360	1,820	2,065
	No change	212	138	525
	Adverse	2	2	43
Slight	Beneficial	386	641	0
	Adverse	0	0	0
Moderate	Beneficial	673	32	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.275. Table 23.101 shows that the majority of receptors are predicted to experience beneficial effects for all of the air pollutants of concern, with some slight and moderate beneficial effects. There are some receptors that are predicted to experience negligible adverse impacts for concentrations of $PM_{2.5}$.

23.6.2.276. Taking account of the predicted impacts, some of which are slight or moderate beneficial, it is considered that the significance of the impacts on AQMA N° 9 are as follows:

- Portsmouth AQMA N° 9 (DS1) – slight beneficial impact with significant effects; and
- Portsmouth AQMA N° 9 (DS2) – slight beneficial impact with significant effects.

23.6.2.277. The maximum Do-Minimum receptor prediction within Portsmouth AQMA No.9 made at numbers 8 to 85 Eastern Road, is 22.8 µg/m^3 and in both corresponding Do-Something scenarios is 19.5 µg/m^3 (Figure 23.18, Figure 23.19 and Figure 23.20). This reduction in concentration reflects the reduction in traffic predicted due to the lane closure on Eastern Road during construction. Therefore, under the Do-Something scenario there is 20.5 µg/m^3 of 'headroom' under the 40 µg/m^3 annual mean NO_2 objective. Therefore, it is considered that any difference in the magnitude of the impact resulting from increased queuing is unlikely to change the judgement of impact significance made on Eastern Road.

23.6.2.278. Further examination of the transport modelling and the reassignment of traffic has been undertaken with respect to the impacts on the A2030 Eastern Road within AQMA N° 9. This is included in the Eastern Road Further Traffic Assessments Report (Appendix 4 of the Supplementary Transport Assessment) (document reference 7.8.1.13).

23.6.2.279. As noted in that report, when the TM locations are introduced along Eastern Road within the 2026 DS scenarios, the resultant changes in capacity and journey time along the Onshore Cable Route changes the generalised costs for all trips using that road. This means that the optimum route between origin and destination may change. Where this occurs, vehicles reassign across alternative routes for every relevant origin and destination pair until a new equilibrium is found. This therefore shows how the SRTM has robustly considered the reassignment effects of TM required to facilitate construction of the Onshore Cable Route in the highway across the wider highway network within Portsmouth.

23.6.2.280. The Eastern Road Further Traffic Assessments Report (Appendix 4 of the Supplementary Transport Assessment) (document reference 7.8.1.13) includes additional modelling of the junction of A2030 Eastern Road / Tangier Road. As is set out in paragraph 5.35 of that report, the additional modelling undertaken found that temporary closure of a northbound or southbound lane on Eastern Road at the junction with Tangier Road will result in the junction operating over its theoretical capacity with significant queues forecast as a result. The queues are forecast in the southbound direction in the PM peak where traffic management is located on the southbound lane (DS1), and in the northbound direction in the AM peak where traffic management is located on the northbound lane (DS2).

23.6.2.281. The queueing found in the additional modelling undertaken is greater than that set out in the SRTM modelled scenario due to the nature of the assessments and the inability of this additional modelling to fully account for the reassignment of traffic. However, this increase in queuing is likely to increase the likelihood of traffic redistributing away from this junction rather than idling at the traffic lights. Further to this, due to the prolonged temporary nature of the works, commuters who regularly travel on this route will likely be aware of the works prior to the commencement of their journey and thus will be able to make informed decisions regarding their route choices.

23.6.2.282. Further detailed air quality modelling was undertaken as a result of the Supplementary Transport Assessment, and the results are presented in Appendix 23.8 Air Quality Sensitivity Testing.

23.6.2.283. Overall, the results of the sensitivity testing are worse than the results presented in **Appendix 23.3 Table 51** to **Table 56** without cabling on Tangier Road / Eastern Road. The results are worse because of the reduction in redistribution in traffic across the wider network and increases in queuing associated with the road closure on Tangier Road / Eastern Road. This serves to concentrate slow moving traffic at the junction locations which has an adverse effect on air quality in the AQMA.

23.6.2.284. The results reported in this section without cabling on Tangier Road / Eastern Road, show the impact to be **slight beneficial** and the effect **significant**. The impact of the sensitivity test results representing road closures and diversions to facilitate cabling on Tangier Road / Eastern Road is considered to be **slight adverse** and the effect **significant**. Although the results are predicted to be worse in the sensitivity scenario, it should be noted that the maximum prediction in AQMA No.9 is over 8 µg/m^3 under the objective. The RMSE from verification of this testing scenario was 6.08 µg/m^3, and therefore exceedances of the health-based objective are highly unlikely.

Portsmouth AQMA N° 11

23.6.2.285. Portsmouth AQMA N° 11 is located to the west of the city centre from a point approximately 320 m north of the Rudmore Roundabout on the M275 to the A3 roundabout forming the junction of Commercial Road, Cornhill Street and Marketway, and also includes Wharf Road, Church Street and a 125 m stretch of Lake Road. Portsmouth AQMA N° 11 is located wholly within Verification Zone 1, and locations within it are identified in the Portsmouth Local Air Quality Plan Outline Business Case (Portsmouth City Council, 2019) as being the site of exceedances of the annual NO_2 limit and objective value of 40 µg/m^3.

Portsmouth AQMA N° 11 Results

23.6.2.286. During the Construction Stage a summary of the amalgamated assessment results for the DS1 scenario are shown in Table 23.102.

Table 23.102 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 1 (2022) for Portsmouth AQMA N° 11

		Construction Scenario DS1 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	48.2	23.6	14.6
	DS1 (2022) Maximum Modelled Concentration (µg/m³)	48.3	23.6	14.6
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	0	39	0
	No Change in Concentration	1,159	3,355	3,926
	Deterioration in Concentration	2,889	654	122
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.0	0.1	0.0
	Maximum Deterioration (µg/m³)	0.6	0.2	0.1

23.6.2.287. Table 23.102 shows that the maximum predicted concentration of NO_2 in AQMA N° 11 is in excess of the annual limit value of 40 µg/m³ under the DM scenario, and deteriorates by 0.1 µg/m³ under the DS1 scenario. The maximum predicted NO_2 concentration of 48.3 µg/m³ occurs at high density residential receptors on Old Commercial Road. A total of 423 receptors are predicted to experience concentrations above the annual limit value of 40 µg/m³ for NO_2 under the DM scenario, and this is unchanged under the DS1 scenario.

23.6.2.288. The highest predicted deterioration in concentrations of NO_2 of 0.6 µg/m³ occurs at high density residential receptors in Horndean House on Percy Chandler Street where the DM concentration is predicted to be 29.5 µg/m³.

23.6.2.289. The maximum concentrations of PM_{10} and $PM_{2.5}$ are unchanged.

23.6.2.290. A summary of the amalgamated results for the DS2 scenario are shown in Table 23.103.

Table 23.103 – Amalgamated Assessment Annual Mean Results for the Do-Something Scenario 2 (2022) for Portsmouth AQMA N° 11

		Construction Scenario DS2 2022		
Pollutant (Annual Mean)		**NO_2**	**PM_{10}**	**$PM_{2.5}$**
Annual Mean Limit Value (µg/m³)		**40**	**40**	**25**
Summary Results	DM (2022) Maximum Modelled Concentration (µg/m³)	48.2	23.6	14.6
	DS2 (2022) Maximum Modelled Concentration (µg/m³)	48.4	23.6	14.6
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	22	0	0
	No Change in Concentration	2,942	3,722	3,984
	Deterioration in Concentration	1,084	326	64
Do Something-Do Minimum Annual Mean Change (µg/m³)	Maximum Improvement (µg/m³)	0.1	0	0
	Maximum Deterioration (µg/m³)	0.7	0.1	0.1

23.6.2.291. Table 23.103 shows that the maximum predicted DM concentration for NO_2 is 48.2 µg/m³, in excess of the annual limit value of 40 µg/m³. Under the DS2 scenario the maximum predicted annual average NO_2 concentration deteriorates by 0.2 µg/m³. The highest predicted annual average concentration for NO_2 occurs at high density residential receptors on Old Commercial Road. The highest predicted deterioration in the annual average NO_2 of 0.7 µg/m³ occurs at The Harbour School located off Lower Derby Road, where the DM concentration is predicted to be 46.5 µg/m³. The impact at this receptor is considered to be substantial.

23.6.2.292. The maximum concentrations of PM_{10} and $PM_{2.5}$ are unchanged.

Portsmouth AQMA N° 11 Significance

23.6.2.293. Table 23.104 shows a summary of the impacts for the DS1 scenario in Portsmouth AQMA N° 11.

Table 23.104 - DS1 Impact Summary for Portsmouth AQMA N° 11

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	0	39	0
	No change	1,159	3,355	3,926
	Adverse	2,774	654	122
Slight	Beneficial	0	0	0
	Adverse	20	0	0
Moderate	Beneficial	0	0	0
	Adverse	95	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

23.6.2.294. Table 23.104 shows that a majority of receptors are predicted to experience a negligible beneficial impact for PM_{10} and $PM_{2.5}$ under the DS1 scenario. For NO_2, the largest proportion are expected to experience adverse effects, with some assessed as slight and moderate in magnitude.

23.6.2.295. Table 23.101 shows a summary of the impacts for the DS2 scenario in Portsmouth AQMA N° 11.

Table 23.105 – DS2 Impact Summary for Portsmouth AQMA N° 11

Magnitude of Impact	Change	NO_2	PM_{10}	$PM_{2.5}$
Negligible	Beneficial	22	0	0
	No change	2,942	3,722	3,984
	Adverse	1,083	326	64
Slight	Beneficial	0	0	0
	Adverse	0	0	0
Moderate	Beneficial	0	0	0
	Adverse	0	0	0
Substantial	Beneficial	0	0	0
	Adverse	1	0	0

23.6.2.296. Table 23.105 shows that the majority of receptors are predicted to experience no change in annual average predicted concentrations for all modelled pollutants under the DS2 scenario. A significant number are predicted to experience negligible adverse effects for NO_2, and there is also a substantial adverse effects predicted at one receptor (The Harbour School) under the DS2 scenario.

23.6.2.297. Considering the sensitivity of the area as one of the city's most polluted AQMAs, and the presence of impacts that are slight, moderate and substantial, the significance of the air quality impacts on the predicted annual average concentrations is as follows:

- Portsmouth AQMA N° 11 (DS1) – slight adverse impact with significant effects; and
- Portsmouth AQMA N° 11 (DS2) – negligible adverse impact with significant effects.

23.6.3. OPERATIONAL STAGE

Embedded Mitigation

23.6.3.1. Due to detailed emissions information not being available with the final plant to be installed yet to be determined, EU Stage VI Q emissions standards were used (applicable for diesel generators new on the market from 2014), as shown in Table 23.6. The generators are expected to be new models installed during the construction year of 2024. As such they will be required to meet this standard at a minimum, barring the introduction of further, more stringent emissions standards during the intervening period.

Description of Works

23.6.3.2. Diesel will be the source of fuel burned in generators to provide back-up power for the ORS and Converter Station described in Section 23.3.6. Other assumptions made in the quantitative assessment are shown in Appendix 23.4 (Generator Emissions).

23.6.3.3. The pollutants considered in the quantitative assessment of local air quality are those for which exhaust gas concentrations were available from manufacturer specifications which are shown in Appendix 23. 4 (Generator Emissions). These are the same as those used for the Construction Stage local power generation assessment.

Impacts

Meteorological Sensitivity

23.6.3.4. To test the sensitivity of the predicted concentrations to variable dispersion conditions, five years of meteorological data were tested to identify which year provides the most conservative dispersion conditions. The results of the meteorological sensitivity testing are presented for five years of hourly sequential data (2014 – 2018) for the main pollutant of concern which is NO_X / NO_2. The statistical testing presented in Appendix 23.4 (Air Quality Generator Emissions Modelling) was undertaken, and results from the year 2014 were determined to represent the worst-case emissions scenario.

Human Health

23.6.3.5. The results of the dispersion modelling are presented in tabular format for the likely single operational scenario. Impacts are considered on human receptors as identified by the discrete receptor locations included in the model which are shown in Figure 23.5 of the ES Volume 2 (APP-327 Rev02).

23.6.3.6. A summary of the predicted annual and short-term NO_2, CO, THC, PM_{10} and $PM_{2.5}$ results at the modelled discrete receptors are presented in Table 23.106, Table 23.107 and Table 23.108. Table 23.114 shows the maximum predicted concentration for each pollutant and averaging period and an assessment of the magnitude of impact following the IAQM Planning guidance.

Table 23.106 – Operational Scenario results for modelled receptors (annual mean average)

Statistic	NO_2	THC	PM_{10}	$PM_{2.5}$**
Maximum Annual Mean PC (µg/m^3)	0.3	0.0	0.0	0.0
Maximum Annual Mean PEC (*PC* + *Background*) (µg/m^3)	12.0	0.4	13.5	10
AQAL (µg/m^3)	40	5*	40	25***
Change relative to AQAL (%)	0.7%	0.4%	0.0%	0.0%
IAQM Impact	**Negligible**	**Negligible**	**Negligible**	**Negligible**

**** Annual mean average AQAL for benzene***

***** The exhaust gas concentrations provided by generator manufacturers did not differentiate between PM_{10} and $PM_{2.5}$. PM results are therefore assumed to be PM_{10} and converted to $PM_{2.5}$ using factors in the Defra Damage Cost Guidance for assessment against the objective values.***

****** Target value***

23.6.3.7. Table 23.106 shows that the annual average objectives for NO_2, THC, PM_{10} and $PM_{2.5}$ will not be exceeded should the backup generators be running constantly for 8,760 hours of the year. The largest predicted increase relative to the AQAL is 0.4 % for THC and 0.7 % for NO_2. The largest receptor concentration inclusive of background will be 13. µg/m^3 for PM_{10}. This is a **Negligible** impact for THC in accordance with the IAQM criteria, and no exceedances are likely.

Table 23.107 – Operational Scenario results for modelled receptors (24-hour PM_{10} mean and max 8-hour CO mean)

Statistic (PC and PEC)	CO (mg/m³)	PM_{10} (µg/m³)
Max. Percentile PC (*90.4th daily* PM_{10} *and max daily 8-hour running mean CO*)	0.67	14.1
Exceedance days	-	0.7
AQAL	10	50
IAQM impact magnitude	**Small**	**Negligible**

23.6.3.8. Table 23.107 shows that the highest 8-hour running mean CO concentration is 0.67 mg/m^3 which is 7 % of the AQAL. The 90.4th percentile daily mean PM_{10} concentration is predicted to be 14.1 µg/m^3 which is **negligible** in comparison to the AQAL. Less than one occasion where the 24-hour limit of 50 µg/m³ may be exceeded is predicted to occur, which is substantially less than the 50 occasions where the 24-hour limit is permitted to be exceeded.

Table 23.108 – Do-Something Scenario results for top 10 worst affected modelled receptors (1-hour NO_2 mean)

Statistic (µg/m^3)	1	2	3	4	5	6	7	8	9	10
X	467252	467256	467261	467364	467373	467382	467261	467390	467399	467408
Y	113415	113406	113397	113413	113408	113403	113397	113398	113394	113389
2 x Background	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Max. Percentile PC (*99.79th hourly NO_2*)	**210.5**	197.3	185.4	174.7	168.1	165.5	165.0	162.4	159.2	156.2
PEC	**232.3**	**219.1**	**207.2**	196.5	189.9	187.3	186.8	184.2	181	178
AQAL (µg/m^3)	200	200	200	200	200	200	200	200	200	200
PC relative to AQAL (%)	105%	99%	93%	87%	84%	83%	83%	81%	80%	78%
IAQM impact magnitude	**Large**									

23.6.3.9. Table 23.108 shows that the highest 1-hour NO_2 concentration is 55.4 µg/m^3 which is 27.7 % of the AQAL. The top ten 1-hour NO_2 concentrations range from 26% to 27.7% of the AQAL. The changes reported at between 21-50% of the AQAL, and so are considered **Large** changes in accordance with the IAQM criteria for short term impacts described in Section 0. However, these concentrations do not occur at human receptors.

Designated Ecological Sites

Ground Level NO_x

23.6.3.10. Table 23.109 shows the results of ground level NO_X predictions made at transect receptors in the Langstone Harbour SSSI - Eastney Lake. The transect receptors are identified in Figure 23.5.

Table 23.109 – Transect annual mean average NO_X prediction results for Langstone Harbour SSSI - Eastney Lake

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
1019415_0	0.003	16.56	16.56	0.01%	55.21%
1019415_10	0.002	16.56	16.56	0.01%	55.21%
1019415_20	0.002	16.56	16.56	0.01%	55.21%
1019415_30	0.002	16.56	16.56	0.01%	55.21%
1019415_40	0.002	16.56	16.56	0.01%	55.21%
1019415_50	0.002	16.56	16.56	0.01%	55.20%
1019415_60	0.002	16.56	16.56	0.01%	55.20%
1019415_70	0.002	16.56	16.56	0.01%	55.20%
1019415_80	0.002	16.56	16.56	0.01%	55.20%
1019415_90	0.002	16.56	16.56	0.01%	55.20%
1019415_100	0.002	16.56	16.56	0.01%	55.20%
1019415_110	0.002	16.56	16.56	0.01%	55.20%
1019415_120	0.002	16.56	16.56	0.01%	55.20%
1019415_130	0.002	16.56	16.56	0.01%	55.20%
1019415_140	0.002	16.56	16.56	0.01%	55.20%
1019415_150	0.002	16.56	16.56	0.01%	55.20%
1019415_160	0.002	16.56	16.56	0.01%	55.20%
1019415_170	0.002	16.56	16.56	0.01%	55.20%
1019415_180	0.002	16.56	16.56	0.01%	55.20%
1019415_190	0.002	16.56	16.56	0.01%	55.20%

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
1019415_200	0.002	16.56	16.56	0.01%	55.20%

23.6.3.11. Table 23.109 shows that all transect receptor predictions of ground level NO_X concentrations for the Eastney Lake unit are less than the 30 µg/m^3 objective set for the protection of vegetation and ecosystems. All of the changes in concentrations are significantly below the 1% threshold for potentially significant change.

23.6.3.12. Table 23.110 shows the results of ground level NO_X predictions made at transect receptors in the Langstone Harbour SSSI - Langstone Harbour West. The transect receptors are identified in Figure 23.5.

Table 23.110 - Transect annual mean average NO_X prediction results for Langstone Harbour SSSI - Langstone Harbour West

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOX (PEC) (µg/m³)	% change	PEC as % of AQAL
1007445_0	0.002	14.82	14.82	0.01%	49.39%
1007445_10	0.002	14.82	14.82	0.01%	49.39%
1007445_20	0.002	14.82	14.82	0.01%	49.39%
1007445_30	0.002	14.82	14.82	0.01%	49.39%
1007445_40	0.002	14.82	14.82	0.01%	49.39%
1007445_50	0.002	14.82	14.82	0.01%	49.39%
1007445_60	0.002	14.82	14.82	0.01%	49.39%
1007445_70	0.002	14.82	14.82	0.01%	49.39%
1007445_80	0.002	14.82	14.82	0.01%	49.39%
1007445_90	0.002	14.82	14.82	0.01%	49.39%
1007445_100	0.002	14.82	14.82	0.01%	49.39%
1007445_110	0.002	14.82	14.82	0.01%	49.39%
1007445_120	0.002	14.82	14.82	0.01%	49.39%
1007445_130	0.002	14.82	14.82	0.01%	49.39%
1007445_140	0.002	14.82	14.82	0.01%	49.39%

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOX (PEC) (µg/m³)	% change	PEC as % of AQAL
1007445_150	0.002	14.82	14.82	0.01%	49.39%
1007445_160	0.002	14.82	14.82	0.01%	49.39%
1007445_170	0.002	14.82	14.82	0.01%	49.39%
1007445_180	0.002	14.82	14.82	0.01%	49.39%
1007445_190	0.002	14.82	14.82	0.01%	49.39%
1007445_200	0.002	14.82	14.82	0.01%	49.39%

23.6.3.13. Table 23.110 shows that all transect receptor predictions of ground level NO_X concentrations for the Langstone Harbour West unit are less than the 30 µg/m^3 objective set for the protection of vegetation and ecosystems. All of the changes in concentrations are significantly below the 1% threshold for potentially significant change.

23.6.3.14. Table 23.111 shows the results of ground level NO_X predictions made at transect receptors in the Stoneacre Copse ancient woodland.

Table 23.111 - Transect annual mean average NO_X prediction results for Stoneacre Copse Ancient Woodland

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
47398_0	0.006	10.92	10.92	1.24%	37.63%
47398_10	0.006	10.92	10.92	1.13%	37.53%
47398_20	0.005	10.92	10.92	1.04%	37.44%
47398_30	0.005	10.92	10.92	0.96%	37.36%
47398_40	0.004	10.92	10.92	0.89%	37.29%
47398_50	0.004	10.92	10.92	0.83%	37.23%
47398_60	0.004	10.92	10.92	0.78%	37.17%
47398_70	0.004	10.92	10.92	0.73%	37.12%
47398_80	0.003	10.92	10.92	0.69%	37.08%
47398_90	0.003	10.92	10.92	0.65%	37.04%

23.6.3.15. Table 23.111 shows that all transect receptor predictions of ground level NO_X concentrations for the Stoneacre Copse Ancient Woodland are less than the 30 µg/m^3 objective set for the protection of vegetation and ecosystems. However the predicted changes in NO_X concentrations within 20 m of the site boundary are greater than the 1% threshold for potentially significant change.

23.6.3.16. Table 23.112 shows the results of ground level NO_X predictions made at transect receptors in the Crabdens Copse Ancient Woodland.

Table 23.112 - Transect annual mean average NO_X prediction results for Crabdens Copse Ancient Woodland

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
27509_0	0.399	10.92	11.32	1.33%	37.73%
27509_10	0.380	10.92	11.30	1.27%	37.66%
27509_20	0.362	10.92	11.28	1.21%	37.60%
27509_30	0.346	10.92	11.26	1.15%	37.55%
27509_40	0.330	10.92	11.25	1.10%	37.50%
27509_50	0.316	10.92	11.24	1.05%	37.45%
27509_60	0.303	10.92	11.22	1.01%	37.41%
27509_70	0.291	10.92	11.21	0.97%	37.37%
27509_80	0.279	10.92	11.20	0.93%	37.33%
27509_90	0.269	10.92	11.19	0.90%	37.29%
27509_100	0.258	10.92	11.18	0.86%	37.26%
27509_110	0.249	10.92	11.17	0.83%	37.23%
27509_120	0.240	10.92	11.16	0.80%	37.20%
27509_130	0.232	10.92	11.15	0.77%	37.17%
27509_140	0.224	10.92	11.14	0.75%	37.14%
27509_150	0.216	10.92	11.13	0.72%	37.12%
27509_160	0.209	10.92	11.13	0.70%	37.09%

23.6.3.17. Table 23.112 shows that all transect receptor predictions of ground level NO_X concentrations for the Crabdens Copse Ancient Woodland are less than the 30 µg/m^3 objective set for the protection of vegetation and ecosystems. However the predicted changes in NO_X concentrations within 60 m of the site are greater than the 1% threshold for potentially significant change.

23.6.3.18. Table 23.113 shows the results of ground level NO_X predictions made at transect receptors in the Crabdens Row Ancient Woodland.

Table 23.113 - Transect annual mean average NO_X prediction results for Crabdens Row Ancient Woodland

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
27510_0	0.205	10.92	11.12	0.68%	37.08%
27510_10	0.200	10.92	11.12	0.67%	37.06%
27510_20	0.195	10.92	11.11	0.65%	37.04%
27510_30	0.190	10.92	11.11	0.63%	37.03%
27510_40	0.185	10.92	11.10	0.62%	37.01%
27510_50	0.181	10.92	11.10	0.60%	37.00%
27510_60	0.177	10.92	11.10	0.59%	36.99%
27510_70	0.173	10.92	11.09	0.58%	36.97%
27510_80	0.169	10.92	11.09	0.56%	36.96%
27510_90	0.166	10.92	11.08	0.55%	36.95%
27510_100	0.162	10.92	11.08	0.54%	36.94%
27510_110	0.159	10.92	11.08	0.53%	36.93%
27510_120	0.156	10.92	11.07	0.52%	36.91%
27510_130	0.152	10.92	11.07	0.51%	36.90%
27510_140	0.149	10.92	11.07	0.50%	36.89%
27510_150	0.147	10.92	11.07	0.49%	36.88%
27510_160	0.144	10.92	11.06	0.48%	36.88%
27510_170	0.141	10.92	11.06	0.47%	36.87%
27510_180	0.138	10.92	11.06	0.46%	36.86%

ID	NOx (annual PC) (µg/m³)	NOx (Defra background) (µg/m³)	NOx (PEC) (µg/m³)	% change	PEC as % of AQAL
27510_190	0.136	10.92	11.05	0.45%	36.85%
27510_200	0.133	10.92	11.05	0.44%	36.84%
27510_210	0.131	10.92	11.05	0.44%	36.83%
27510_220	0.129	10.92	11.05	0.43%	36.83%
27510_230	0.127	10.92	11.05	0.42%	36.82%
27510_240	0.124	10.92	11.04	0.41%	36.81%

23.6.3.19. Table 23.113 shows that all transect receptor predictions of ground level NO_X concentrations for the Crabdens Row Ancient Woodland are less than the 30 µg/m^3 objective set for the protection of vegetation and ecosystems. None of the predicted changes in NOx concentrations at the transect points are greater than the 1% threshold for potentially significant change.

23.6.3.20. As the annual mean objective is not exceeded at any of the transect receptors, and the emissions from the ORS back-up generators will not cause an increase in NO_X concentration of more than 1% of the annual mean objective, the Langstone Harbour designated sites could be screened out of further assessment in accordance with the Environment Agency's risk assessment guidance (Environment Agency, 2019). Despite this, further modelling has been undertaken for nutrient N deposition resulting from both the ORS and Converter Station backup generators and N acid deposition from the Converter Station backup generators.

Nutrient Nitrogen Deposition

23.6.3.21. Plate 23.31 and Plate 23.32 show the predictions for nutrient N deposition along the two transects within the Langstone Harbour SSSI, at Eastney Lake and Langstone Harbour West.

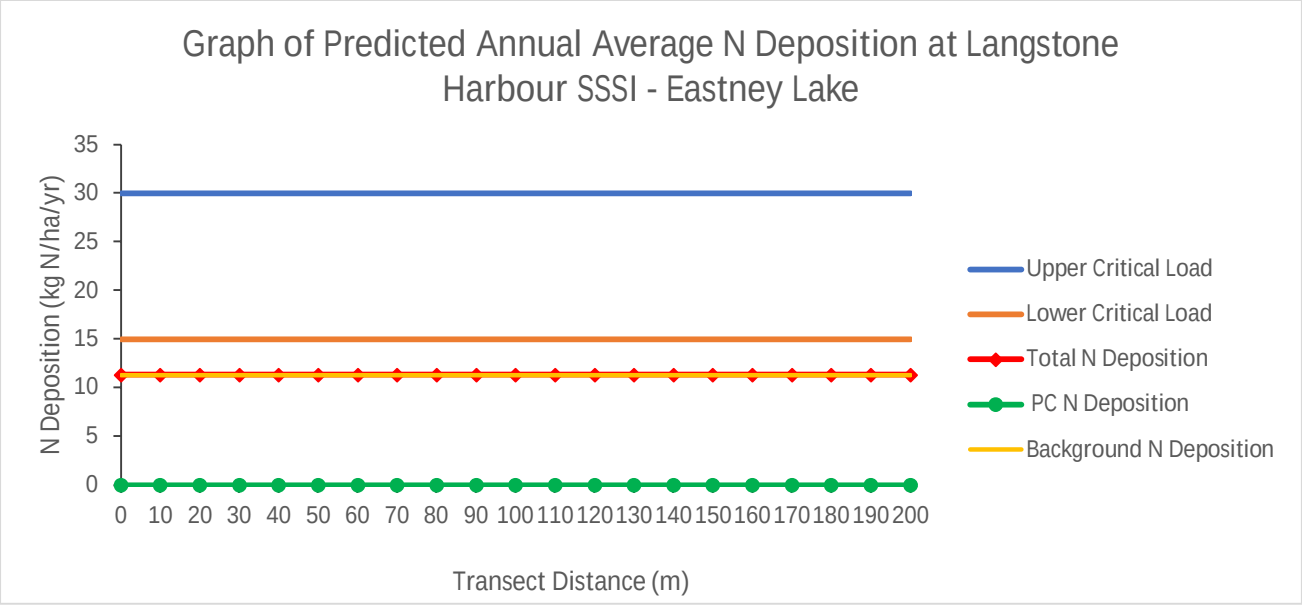


Plate 23.31 - Graph of Predicted Annual Mean Average N Deposition at Langstone Harbour SSSI - Eastney Lake

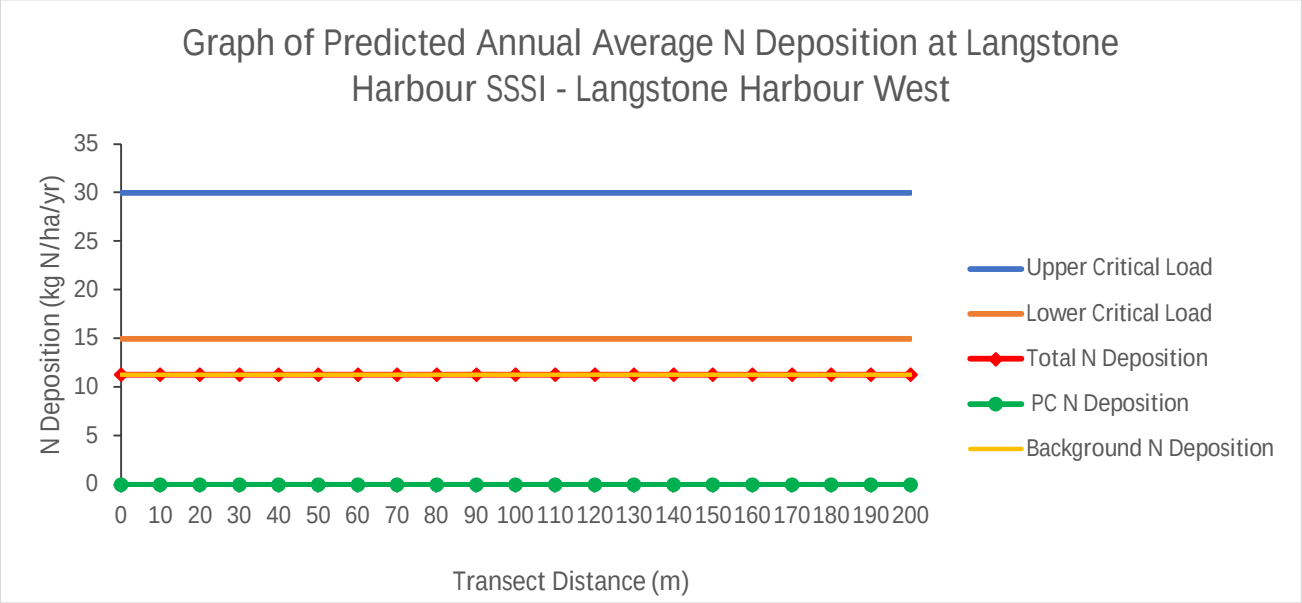


Plate 23.32 - Graph of Predicted Annual Mean Average N Deposition at Langstone Harbour SSSI - Langstone Harbour West

23.6.3.22. Plate 23.31 and Plate 23.32 both show that predicted levels of nutrient N deposition are below the lower critical load value. For both transects the PC contribution to N deposition is small enough to have little discernible effect above background levels of deposition.

23.6.3.23. Plate 23.33, Plate 23.34 and Plate 23.35 show the predictions for nutrient N deposition along the modelled transects within the ancient woodland adjacent to the Converter Station.

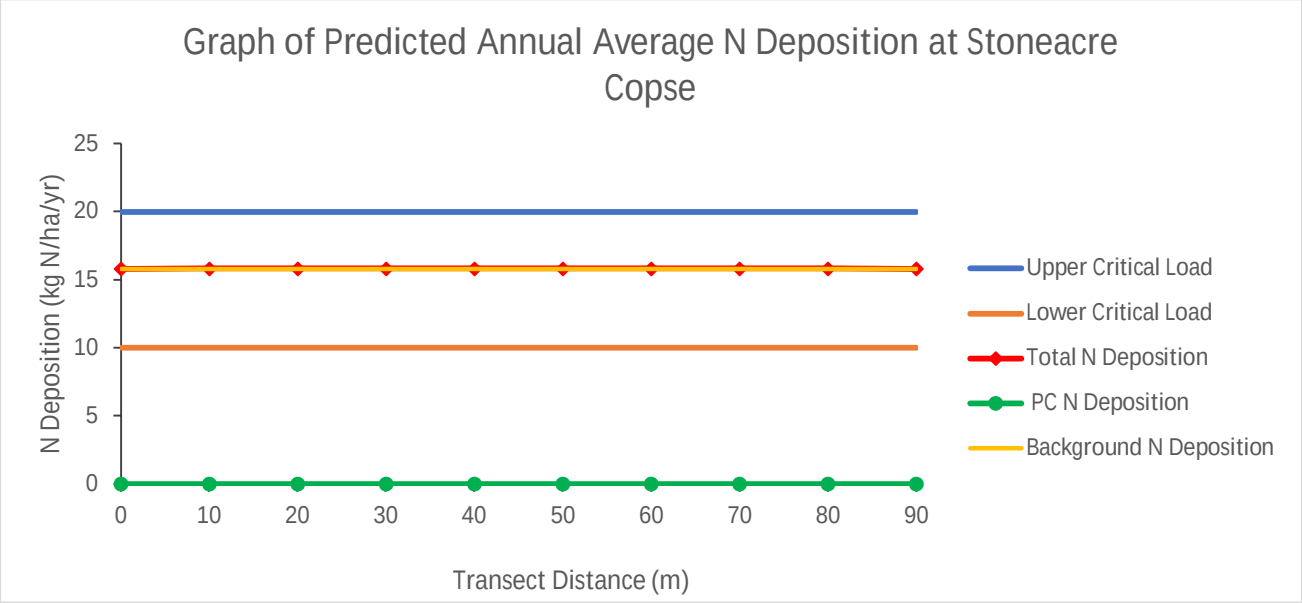


Plate 23.33 - Graph of Predicted Annual Mean Average N Deposition at Stoneacre Copse

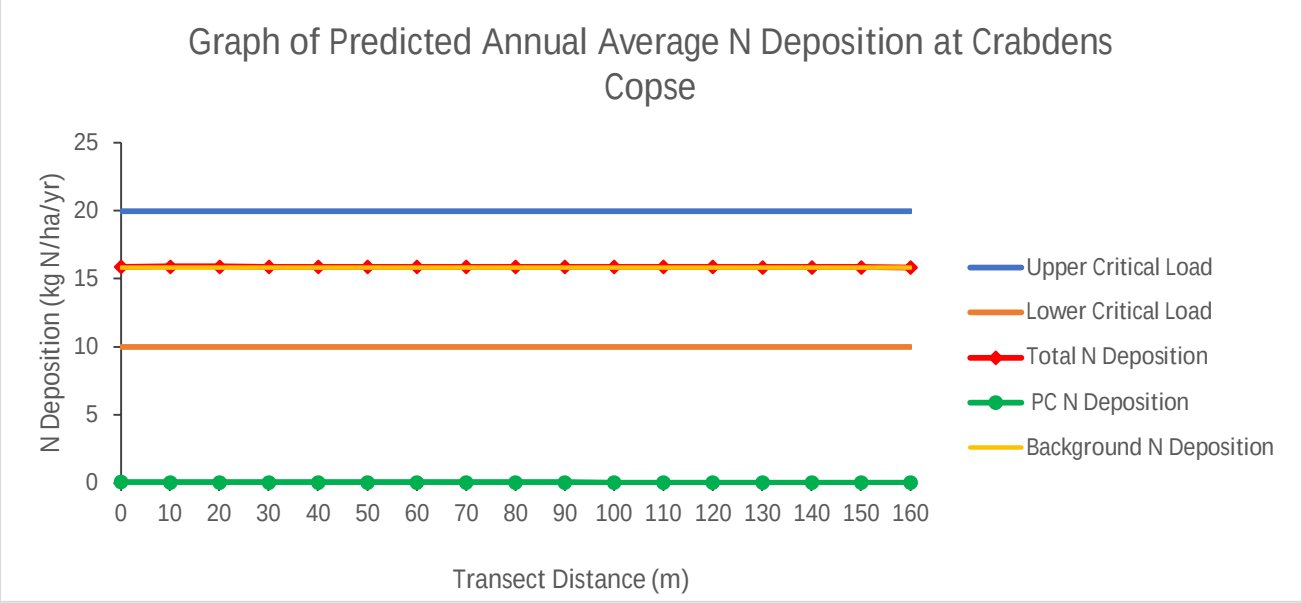


Plate 23.34 - Graph of Predicted Annual Mean Average N Deposition at Crabdens Copse

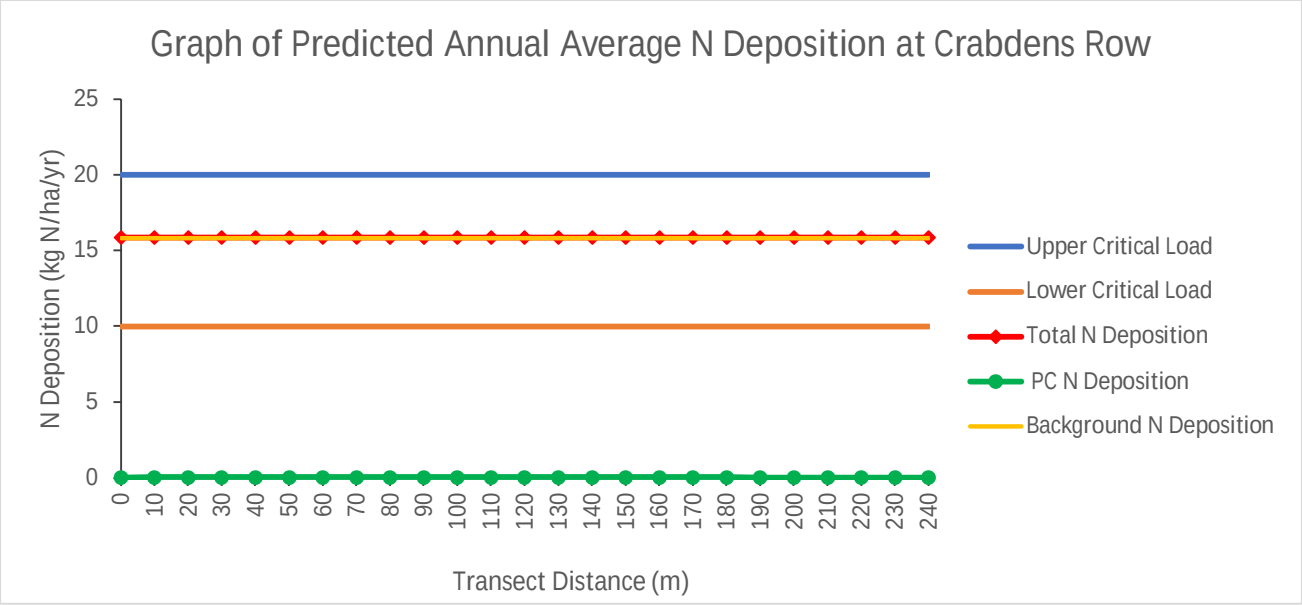


Plate 23.35 - Graph of Predicted Annual Mean Average N Deposition at Crabdens Row

23.6.3.24. Plate 23.33, Plate 23.34 and Plate 23.35 show that background nutrient N deposition within the ancient woodland sites adjacent to the converter station are close to the upper limits of the range for the critical load. The N deposition resulting from the PC has little effect above background levels of N deposition.

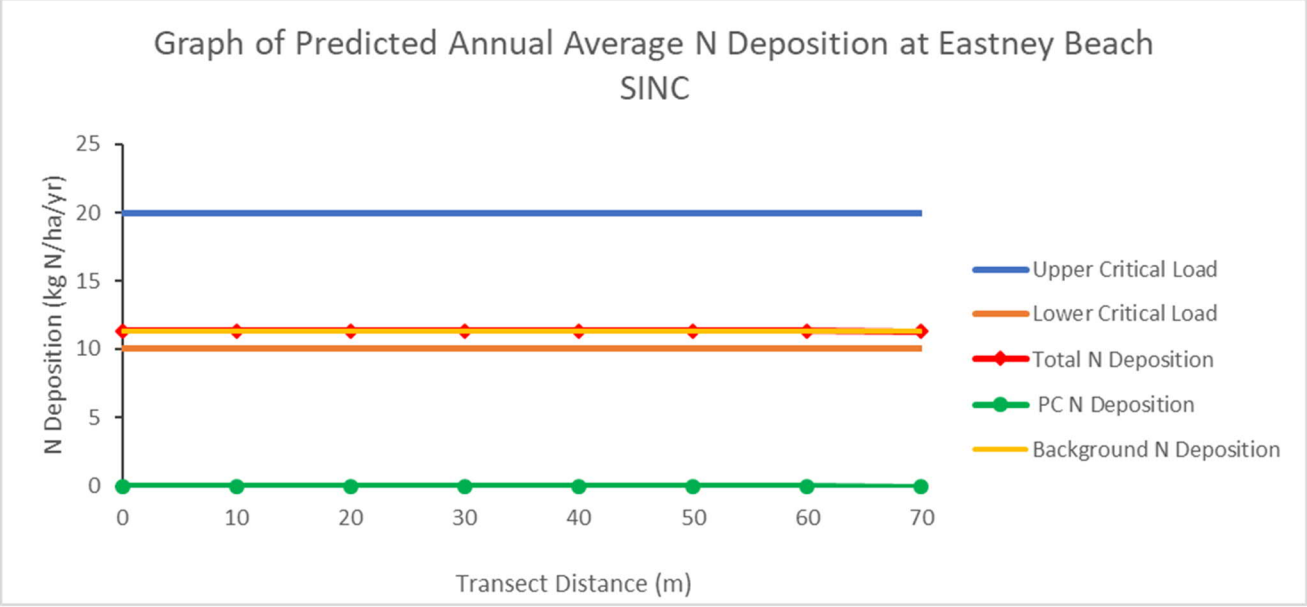


Plate 23.36 Graph of Predicted Annual Mean Average N Deposition at Eastney Beach SINC

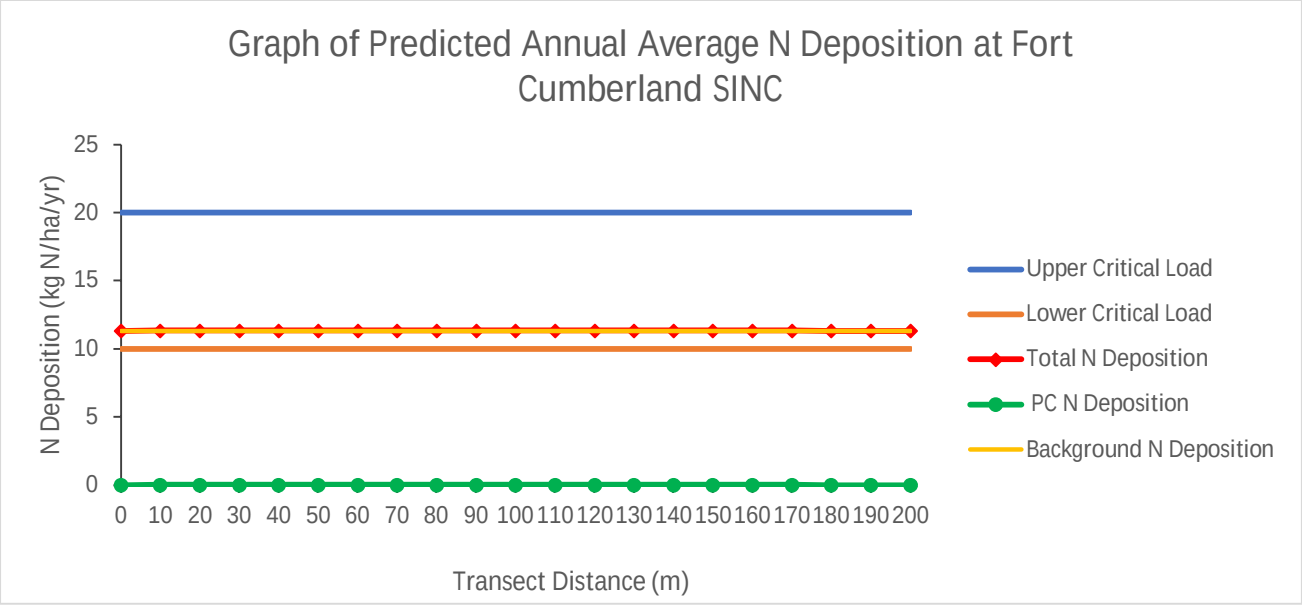


Plate 23.37 Graph of Predicted Annual Mean Average N Deposition at Fort Cumberland SINC

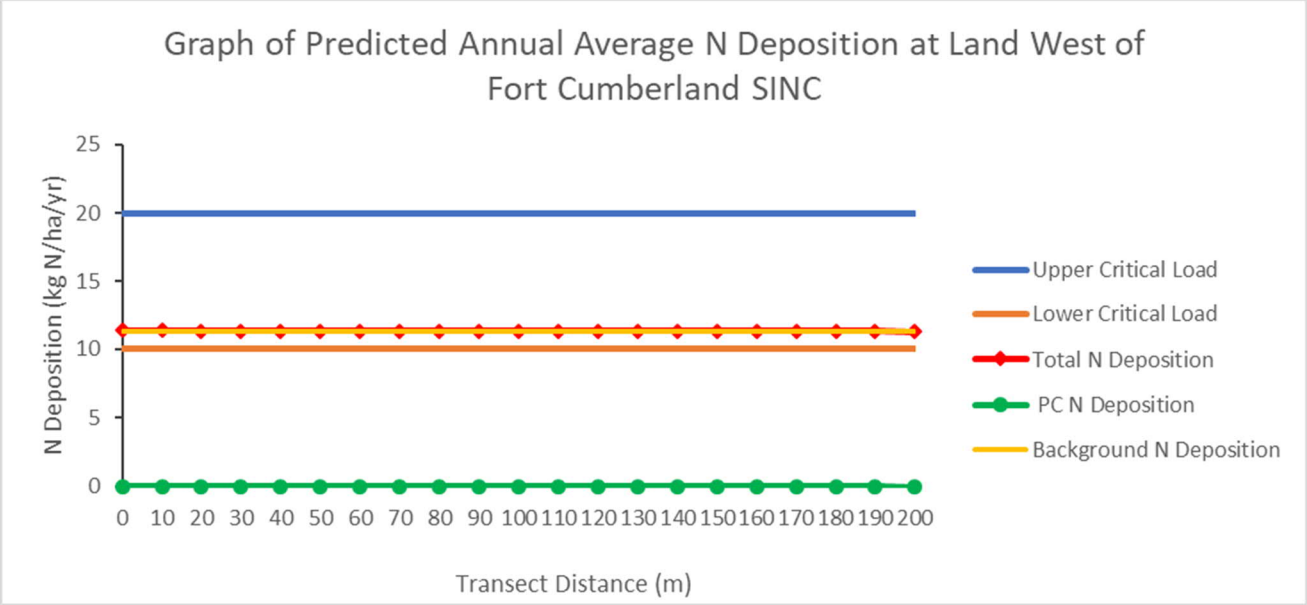


Plate 23.38 Graph of Predicted Annual Mean Average N Deposition at Land West of Fort Cumberland SINC

23.6.3.25. Plate 23.36, Plate 23.37 and Plate 23.38 show that background nutrient N deposition is above the lower critical load level at the three SINC sites modelled, but below the upper critical load level. The contribution of the backup generators to deposition at these locations is minimal.

Acid Deposition

23.6.3.26. Further calculations for N acid deposition have been undertaken for the ancient woodlands due to their sensitivity. The results of these calculations are shown in Plate 23.39, Plate 23.40 and Plate 23.41.

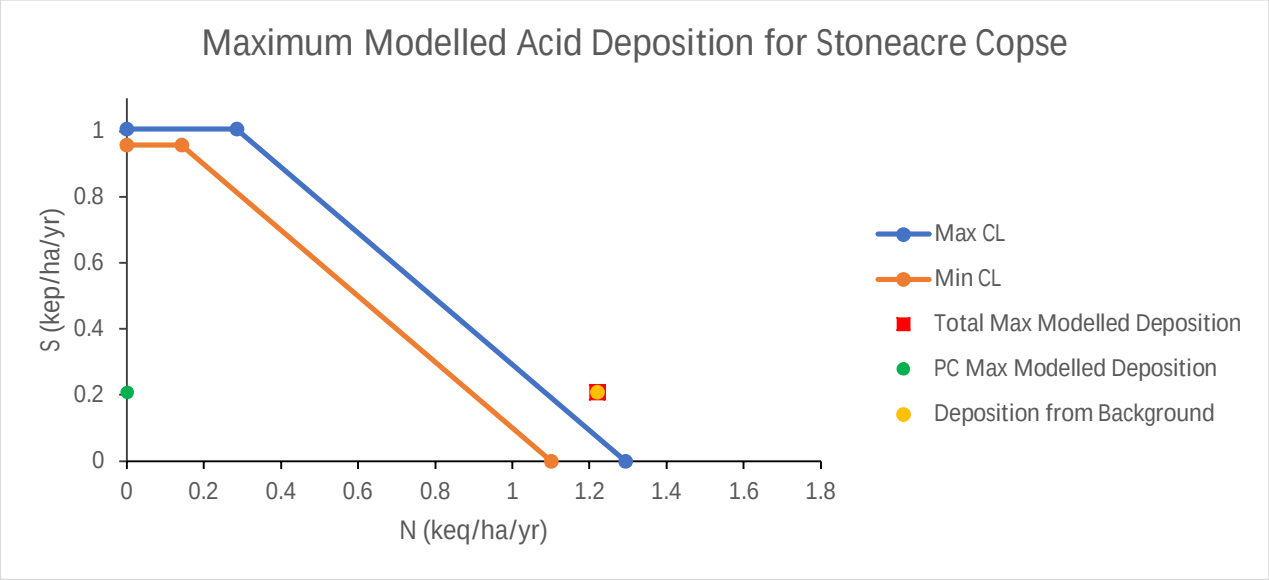


Plate 23.39 - Modelled N Acid Deposition for Stoneacre Copse

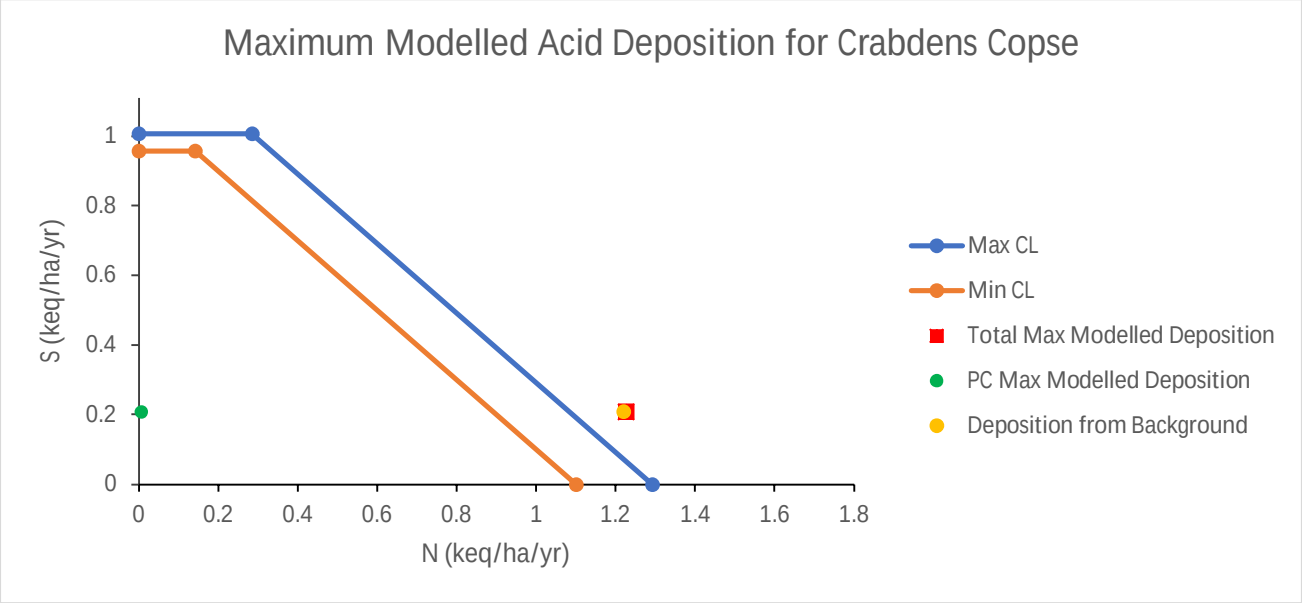


Plate 23.40 - Modelled N Acid Deposition for Crabdens Copse

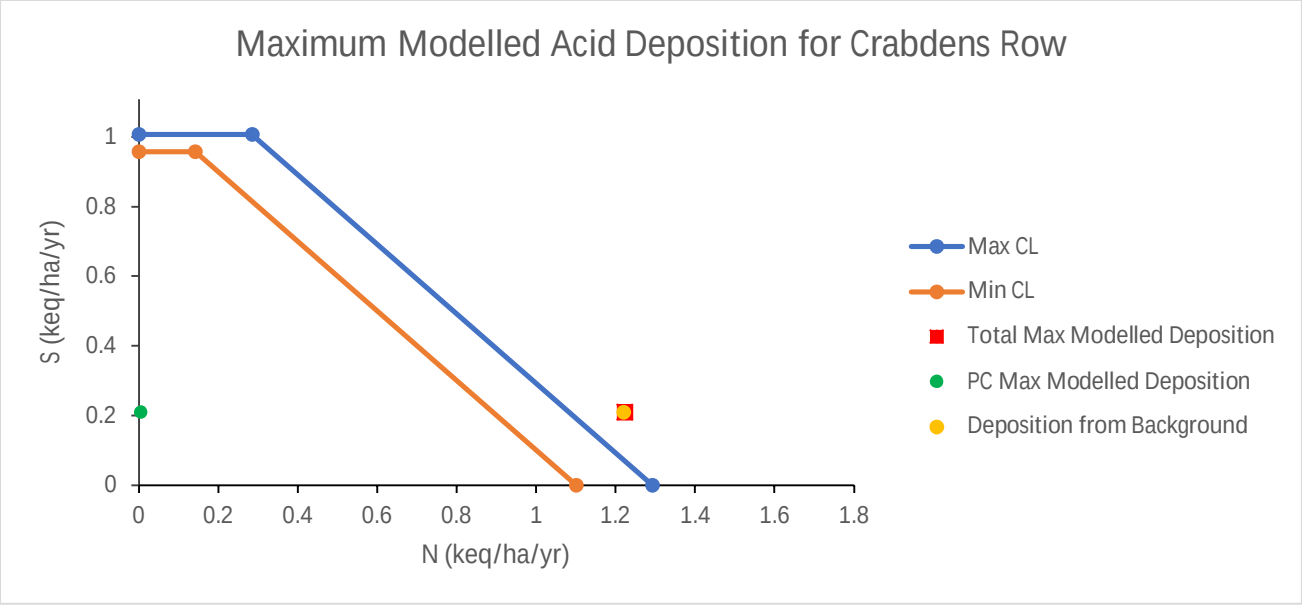


Plate 23.41 - Modelled N Acid Deposition for Crabdens Row

23.6.3.27. Plate 23.39, Plate 23.40 and Plate 23.41 show that background N acid deposition in all of the ancient woodland sites adjacent to the converter station is in excess of the critical loads for this habitat. The modelled deposition resulting from the operation of the backup diesel generator at this location has minimal effect on acid deposition in excess of the critical loads.

Significance of Operational Air Quality Impacts

23.6.3.28. Following the IAQM impact assessment criteria and considering the limitation of sporadic running time associated with the backup generators, negligible impacts are predicted for NO_2, PM_{10} and $PM_{2.5}$ and moderate for THC. Using the conservative assumption for modelling as described in Section 23.4.7, all the predicted maximum annual average air pollutant concentrations are under half of the objective and exceedances of any of the air quality objectives are highly unlikely. The generators have an annual test for 1 hour per year and are not expected to be active for more than six separate 24-hour occasions, therefore actual emissions will be many times lower.

23.6.3.29. Therefore, the effect of changes on local air quality as a result of Operational Stage backup power generation is assessed as **negligible adverse, not significant**. This judgement takes into account that the modelling of THC undertaken has used the highly conservative method of assessing against the limit value for benzene.

23.6.3.30. The results for N deposition show that at Langstone Harbour background levels of N deposition are below the lower Critical Load, and that N deposition resulting from the PC has little discernible impact. Levels also remain below the lower Critical Load at the nearby SINC sites. At the ancient woodlands background N deposition is above the lower Critical Load and just below the upper Critical Load. The PC resulting from the predicted operation of the generators has minimal effect on N deposition above background levels, with the total remaining below the upper Critical Load.

23.6.3.31. Background levels of N acid deposition are above the Max Critical Load at all ancient woodland locations, however all of the increases as a result of the predicted operation of the backup generators at the Converter Station are well below the 1% threshold for potentially significant change.

23.6.3.32. The overall significance of the changes in N deposition and N acid deposition are addressed in Appendix 23.7 (Air Quality Ecological Impacts) of the ES Volume 3 (document reference 6.3.23.7).

23.6.4. PREDICTED IMPACTS SUMMARY

Construction Stage

Construction Site Activities

23.6.4.1. The overall dust risk for each Sections within the Onshore Cable Corridor is summarised in Table 23.114.

Table 23.114 – Summary of the Overall Dust Risk Construction Site Activity

Section	Overall Dust Risk
1 Lovedean (Converter Station Area)	High
2 Anmore	High
3 Denmead/Kings Pond Meadow	High
4 Hambledon Road to Farlington Avenue	High
5 Farlington	High
6 Zetland Field to Sainsbury's Car Park	High
7 Farlington Junction to Airport Service Road	High
8 Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way	High
9 Moorings Way to Bransbury Road	Medium
10 Eastney (Landfall)	Medium

23.6.4.2. The overall dust risk for the Proposed Development during the Construction Stage can be classified as High driven by the magnitude of the works and number of potential exposures in each section. The judgement of significance of emissions from construction site activities has been made with reference to the IAQM construction dust guidance which states *'For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally always possible. Hence the residual effect will normally be 'not significant.''* As the identified effects will be temporary and transient and the project is committed to the implementation of appropriate mitigation in the Onshore Outline CEMP, it is judged that effect of emissions from construction site activities across the Proposed Development will be **not significant**.

Diverted Traffic

23.6.4.3. Data from the SRTM for peak traffic flow year 2026 has been used to represent diverted traffic in the air quality assessment. As the peak construction year is expected to be 2022, this is a conservative approach because local traffic flows are expected to grow between 2022 and 2026. Furthermore, the 2026 traffic data has been produced on the assumption that six construction gangs will be in operation at all times, however it is likely that the spatial extent of the diversions are likely to change during the construction period according to the works being undertaken at any given time. It should also be noted that emission estimates in the assessment,

which are based on EFTv9.0, do not represent the imposition of tighter emission standards associated with the proposed CAZ. The result of this is that predictions for air pollutant concentrations within the area to be covered by the CAZ are likely to be a precautionary estimate.

23.6.4.4. Uncertainties in the model are reflected in the RMSEs reported for each Verification Zone which are generally higher than the Defra recommendation. Therefore, a precautionary approach is taken to the interpretation of the modelled predictions particularly where they are close to the objectives, in the AQMAs and the Defra Compliance Links.

23.6.4.5. The overall impact predicted in Verification Zones 1-5 is **negligible** and **not significant**. In Verification Zone 1 there are number receptors inside AQMAs where the Do-Minimum 2022 predictions exceed the NO_2 objective. Considering the uncertainty on the modelling process, the NO_2 objective is highly likely to be exceeded in the Do-Minimum scenario, and these predictions are either unchanged or negligibly increased in the DS1 and DS2 scenarios. In Verification Zone 6, the AQMA and the Defra compliance links, the vast majority of effects are negligible, although there are exceedances of the NO_2 objective predicted in the 2022 Do-Minimum scenario.

23.6.4.6. Therefore, both diverted traffic scenarios have the potential to cause changes in local air quality which can impact high sensitivity receptors along the entire construction route. Most of the changes predicted are of a low magnitude and impacts range from substantial adverse to moderate beneficial along the route. Isolated cases with higher impacts are present, however these are due to the high concentrations predicted in the Do-Minimum. The modelling has shown that elevated concentrations are mainly unchanged during the construction programme.

23.6.4.7. The Class B CAZ has the potential to affect traffic flows in a manner that has not been predicted in this assessment as the exact boundary of the CAZ is still under consultation. As a result the effect of the CAZ on traffic distribution and compliant vehicle uptake cannot be accurately predicted at this time. Equally the impact of the CAZ on air quality cannot be predicted at this time.

Generated Construction Traffic

23.6.4.8. Both construction traffic scenarios have the potential to cause changes in local air quality which can impact high sensitivity receptors along the entire construction route. As generated construction traffic has been added to diverted traffic, in general concentrations are higher at receptors impacted by activities and a small number of **moderate adverse** and **moderate beneficial** impacts are predicted. There are no objective exceedances predicted where diversions, road closure and other traffic management measures coincide with the routes on the public highway used by constriction traffic, including the Defra compliance links.

23.6.4.9. Though no Euro standard is required for construction vehicles operating on the public highway, the use of construction vehicles should be consistent with the requirements of the local air quality management measures such as Portsmouth CAZ (when implemented) which may impose tighter minimum emission standard for heavy duty vehicles than represented in the model predictions.

23.6.4.10. The Class B CAZ is unlikely to affect construction traffic as none are predicted to pass through the area subject to the Ministerial Direction. It may be the case however, that PCC will require construction traffic and NRMM to meet a minimum standard for operation in the city in order to assist with their air quality objectives in the Air Quality Action Plan.

Construction Stage Local Power Generation

23.6.4.11. It was determined that the evolving construction programme does not include specific information about the power generation and HDD equipment that would be used on-site. Therefore, the HVDC Cabling Team and a drilling specialist were consulted to estimate the likely power generation and HDD equipment and emissions data for the recycling plant and welfare generator. This uncertainty has been mitigated through the application of EU Stage IV R emissions standards and the assumption of constant operation through the working shift. The EU Stage IV emissions standards have now been superseded by more stringent standards (Stage V) prior to the construction period and the local power generation equipment will not always be operational during the working shift. Therefore, the results of the local power generation equipment assessment are considered to be conservative.

23.6.4.12. For Construction Stage local power generation emissions associated with onshore cable laying activities, **negligible** and **moderate adverse** local air quality impacts are predicted. However, the predicted changes in the maximum annual average concentrations are under 50% of the objective, and exceedances of the short-term objective are unlikely even assuming conservative operating hours and the temporary nature of the works. Given the mitigation applied to uncertainty in the method and the magnitude of the maximum annual average concentrations, the effect of changes in local air quality as a result of Construction Stage local power generation is assessed as **minor adverse.**

Amalgamated Construction Effects

23.6.4.13. A summary of the amalgamated effects of diverted traffic, construction traffic and Construction Stage local power generation is shown in Table 23.115.

Table 23.115 - Summary of Amalgamated Construction Impacts and Effects

Verification Zone / AQMA	DS1 Scenario Impact	DS1 Scenario Effect	DS2 Scenario Impact	DS2 Scenario Effect
1	Slight adverse	Significant	Negligible adverse	Not significant
2	No-change	Not significant	No-change	Not significant
3	Negligible adverse	Not significant	Negligible adverse	Not significant
4	Negligible adverse	Not significant	Negligible adverse	Not significant
5	Slight adverse	Significant	Slight beneficial	Significant
6	Slight adverse	Significant	Negligible beneficial	Significant
AQMA N° 6	Negligible adverse	Not significant	Negligible adverse	Not significant
AQMA N° 7	Negligible adverse	Not significant	Negligible adverse	Not significant
AQMA N° 9	Slight beneficial	Significant	Slight beneficial	Significant
AQMA N° 11	Slight adverse	Significant	Negligible adverse	Significant

23.6.4.14. The summary presented in Table 23.115 shows the DS1 predicted zonal impact results are predicted to range from negligible no change to slight adverse. However, results in zones 1 and 6 are judged as significant because of the extent of the objective exceedances for annual average NO_2. It should be noted however, that all exceedances predicted in Verification Zones 1, 4 and 6 already exist and are not new exceedances as a result of emissions from the Proposed Development.

23.6.4.15. Table 23.115 shows that the amalgamated results for DS2 are generally better than DS1 as a result of the difference in proposed diversions, road closures and other traffic management measures. In DS2, the predicted zonal impact is negligible adverse in Verification Zones 1, 3 and 4 and beneficial impacts are predicted in Verification Zones 5 and 6.

23.6.4.16. Using the matrix in Table 23.7 and professional judgement in accordance with the IAQM guidance, the overall impact of the intra-project construction activities is determined to be **slight adverse** and **significant** for DS1, and **negligible** and **not significant** for DS2.

23.6.4.17. The effects of the Proposed Development on the Ministerial Direction for a Class B CAZ are likely to be slight adverse significant under the DS1 scenario and negligible adverse and not significant under the DS2 scenario. This is consistent with the predicted effects for Verification Zone 1 in which it is located. The traffic links within Verification Zone 1 only cover part of the area affected by the proposed CAZ the boundaries of which are yet to be finally defined.

Operational Stage

23.6.4.18. The ORS building back-up generators at the Landfall have been modelled under the conservative assumption of 24-hour operation for 365 days of the year. The generators have an annual test for 1 hour per year and are not expected to be active for more than six separate 24-hour occasions, therefore actual emissions will many times lower. Even under these conservative assumptions, all the predicted maximum annual average concentrations are predicted to be under half of the objective and exceedances of any of the objectives are highly unlikely.

23.6.4.19. With the implementation of embedded mitigation for the ORS building back-up generators at the Landfall, the impact during operation on local air quality is assessed as **negligible adverse**. Similarly, the air quality impact on the designated ecological sites is predicted to be negligible adverse significant because the operation of the ORS building back-up generators will be for a maximum of 24-hours at a time. Emissions would need to be long-term to permanent effects ancient woodlands in the critical load metric. Chapter 16 (Onshore Ecology) of the ES Volume 1 (APP-131) provides a judgement of significance of these effects. The impact of emissions in the Operational Stage is therefore judged as **not significant**.

Decommissioning Stage

23.6.4.20. Decommissioning is anticipated to involve works of a similar nature to the installation as a worst-case scenario, therefore the impacts for each stage of decommissioning work may be expected to be the same as for construction. It is not anticipated that receptor numbers will change in magnitude so as to change the overall impact assessments for each assessment. The impact of emissions in the decommissioning stage is therefore currently judged as **not significant**, however any assessment of the impacts of decommissioning will be dependent on the prevailing guidance and legislation at that time.

23.7. CUMULATIVE EFFECTS

23.7.1.1. Cumulative effects are defined as impacts on local air quality created by the Proposed Development and other approved projects in the study area.

23.7.2. CONSTRUCTION STAGE

23.7.2.1. A review of the planning portals for PCC, Havant Borough, Council, WCC, EHDC and HCC has identified several planning applications for which there is potential for the release of air emissions during construction at the same time as the Proposed Development. These applications are shown in Appendix 23.5 (Air Quality Cumulative Effect Assessment Matrix (Stage 1 & 2)) of the ES Volume 3 (APP-458) and Appendix 23.6 (Air Quality Cumulative Effect Assessment Matrix (Stage 3 & 4) of the ES Volume 3 (APP-459).

23.7.2.2. Particular attention should be paid to the development at the Grainger Development Site under application numbers APP/10/00828 and 10/02862/OUT, and also the development phases of the Berewood development (under multiple separate application numbers) as these may overlap temporally with the Proposed Development and are of a scale where the cumulative effects of construction dust and trackout may warrant consideration. Consultation with the relevant developers should be undertaken according to the construction dust effects mitigation table in the Onshore Outline CEMP.

23.7.2.3. The traffic model described in Chapter 22 (Traffic and Transport) is designed to take into account committed development and future traffic growth within the construction period. As such it is possible to determine that cumulative effects resulting from diverted traffic during the Construction Stage and operational traffic from committed developments are embedded within the model. In this way, the traffic impacts can be determined as cumulative.

23.7.2.4. At this stage of the development design, it is not possible to determine precisely when emissions will occur in each construction corridor section during the Construction Stage. Therefore, the occurrence or otherwise, of cumulative Construction Stage emissions cannot be determined. However, the nature of the proposed and embedded mitigation measures described provides the following opportunities:

- Fugitive emissions of dust and exhaust gases from the Proposed Development have been assessed for the Onshore Cable Corridor, and in all instances the risk of adverse amenity and health impacts is considered to be low in the presence of appropriate mitigation described in Appendix 23.2 (IAQM Construction Assessment). Where the potential for cumulative effects can be identified, scope exists to increase the intensity of mitigation at the Proposed Development construction corridor section site and impose commensurate mitigation on other development sites, as required.
- Actioning the Framework TMS will require the prediction of traffic disruption which will be planned in conjunction with HCC. This provides the opportunity to take a holistic approach to traffic management, to minimise disruption from simultaneous construction projects to minimise the effect cumulative emissions on local air quality.

23.7.3. OPERATIONAL STAGE

23.7.3.1. No cumulative effects have been identified for the Operational Stage.

23.7.4. DECOMMISSIONING STAGE

23.7.4.1. As a worst-case scenario, cumulative effects for the decommissioning stage are expected to be of a similar type, impact and magnitude as those for the Construction Stage, given the similarity of the activities required for these two tasks. The size and nature of concurrent developments at the time of decommissioning cannot be predicted at this stage, therefore any assessment will be dependent on the prevailing conditions, guidance and legislation at that point in the future.

23.8. PROPOSED MITIGATION AND ENHANCEMENT

23.8.1.1. Proposed dust risk specific mitigation for construction activities in each Section is given in Appendix 23.2 (IAQM Construction Assessment) and incorporated into the Onshore Outline CEMP. In accordance with the IAQM guidance, it is anticipated that all “highly desirable” recommendations will be implemented on site where appropriate and proportionate, however the scope exists within the IAQM guidance for coordination with the relevant local authority EHO to apply only to those activities deemed appropriate to each cable section.

23.8.1.2. The mitigation of emissions from Diverted Traffic will be undertaken through measures to be confirmed within the Detailed CTMP documents to be produced by contractors as described in Appendix 22.2 (Framework CTMP).

23.9. RESIDUAL EFFECTS

23.9.1.1. Table 23.116 provides a summary of the findings of the assessment.

Table 23.116 – Summary of Effects Table for Air Quality

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction Stage				
Construction site activities	Local human receptors as described in Figure 23.2	Medium - / T / D / ST	As described in Appendix 23.2 (IAQM Construction Assessment) and in the Onshore Outline CEMP.	Negligible - / T / D / ST
Construction site activities	Ecological receptors as described in Figure 23.2	Medium - / T / D / ST	As described in Appendix 23.2 (IAQM Construction Assessment) and in the Onshore Outline CEMP.	Negligible - / T / D / ST
Amalgamated Air Quality Effects				
Verification Zone 1	Local human receptors as described in Figure 23.2 of the ES Volume 2	Slight adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Slight adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST

	(APP-324) and Table 23.46			
Verification Zone 2	Local human receptors as described in Figure 23.2 and Table 23.53	No change (DS1) ± / T / D / ST No change (DS2) ± / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	No change (DS1) ± / T / D / ST No change (DS2) ± / T / D / ST
Verification Zone 3	Local human receptors as described in Figure 23.2 and Table 23.60	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST
Verification Zone 4	Local human receptors as described in Figure 23.2 Table 23.67	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST
Verification Zone 5	Local human receptors as described in	Slight adverse (DS1) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the	Slight adverse (DS1) - / T / D / ST

	Figure 23.2 Table 23.74	Slight adverse (DS2) + / T / D / ST	requirements for a detailed CTMP.	Slight adverse (DS2) + / T / D / ST
Verification Zone 6	Local human receptors as described in Figure 23.2 Table 23.81	Slight adverse (DS1) - / T / D / ST Negligible beneficial (DS2) + / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Slight adverse (DS1) - / T / D / ST Negligible beneficial + / T / D / ST
AQMA N° 6	Local human receptors as described in Figure 23.2 Table 23.74	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST
AQMA N° 7	Local human receptors as described in Figure 23.2 Table 23.74	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Negligible adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST
AQMA N° 9	Local human receptors as	Slight beneficial (DS1)	As described in Appendix 22.2 (Framework CTMP) and the	Slight beneficial (DS1)

	described in Figure 23.2 Table 23.74	+ / T / D / ST Slight beneficial (DS2) + / T / D / ST	requirements for a detailed CTMP.	+ / T / D / ST Slight beneficial (DS2) + / T / D / ST
AQMA N° 11	Local human receptors as described in Figure 23.2 Table 23.74	Slight adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST	As described in Appendix 22.2 (Framework CTMP) and the requirements for a detailed CTMP.	Slight adverse (DS1) - / T / D / ST Negligible adverse (DS2) - / T / D / ST
Operational Stage				
Back-up power generation for the ORS and Converter Station	Local human receptors as described in Figure 23.5	Negligible - / P / D / LT	None required	Negligible - / P / D / LT
Back-up power generation for the ORS and Converter Station	Ecological receptors described in Figure 23.5	Negligible* - / P / D / LT	None required	Negligible* - / P / D / LT

Key to table:

+ / - : Beneficial / Adverse ; P / T : Permanent or Temporary; D / I : Direct or Indirect; ST / MT / LT : Short Term / Medium Term / Long Term; N/A : Not Applicable.

*The significance and nature of effects of air emissions on designated sites is discussed in Chapter 16 and Appendix 23.7 (Air Quality Ecological Impacts).

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